



GOVERNMENT OF ORISSA
WORKS DEPARTMENT

CIVIL WORKS CONTRACT

[PACKAGE No. OSRP-CW-ICB-Y1-P02]

For

*Widening & Strengthening of existing carriageway to 2-lane for
“Chandabali-Bhadrak-Anandapur” road
(Km. 0/0 to Km. 45/0 of SH-9 & Km. 0/0 to Km 50/0 of SH – 53)*

*under
Orissa State Roads Project*

between

**Chief Engineer, World Bank Projects, Orissa
on behalf of
Orissa Works Department, Government of Orissa**

and

SOM DATT BUILDERS – ARSS JV
Plot No. 38, SECTOR – A, Zone – D
Mancheswar Industrial Estate, Mancheswar, Bhubaneswar – 751010 [INDIA]

[VOLUME – I]

Agreement Value: Rs. 216,23,17,622.00

*Project Management Unit, Orissa State Roads Project
Office of the Engineer-in-Chief (Civil), Orissa,
Nirman Soudha, Keshari Nagar, Unit – V, Bhubaneswar – 751 001*

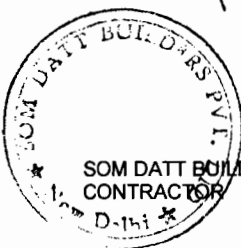
Dated: 3rd November, 2008

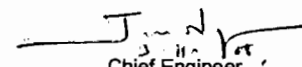
CONTENTS of CONTRACT

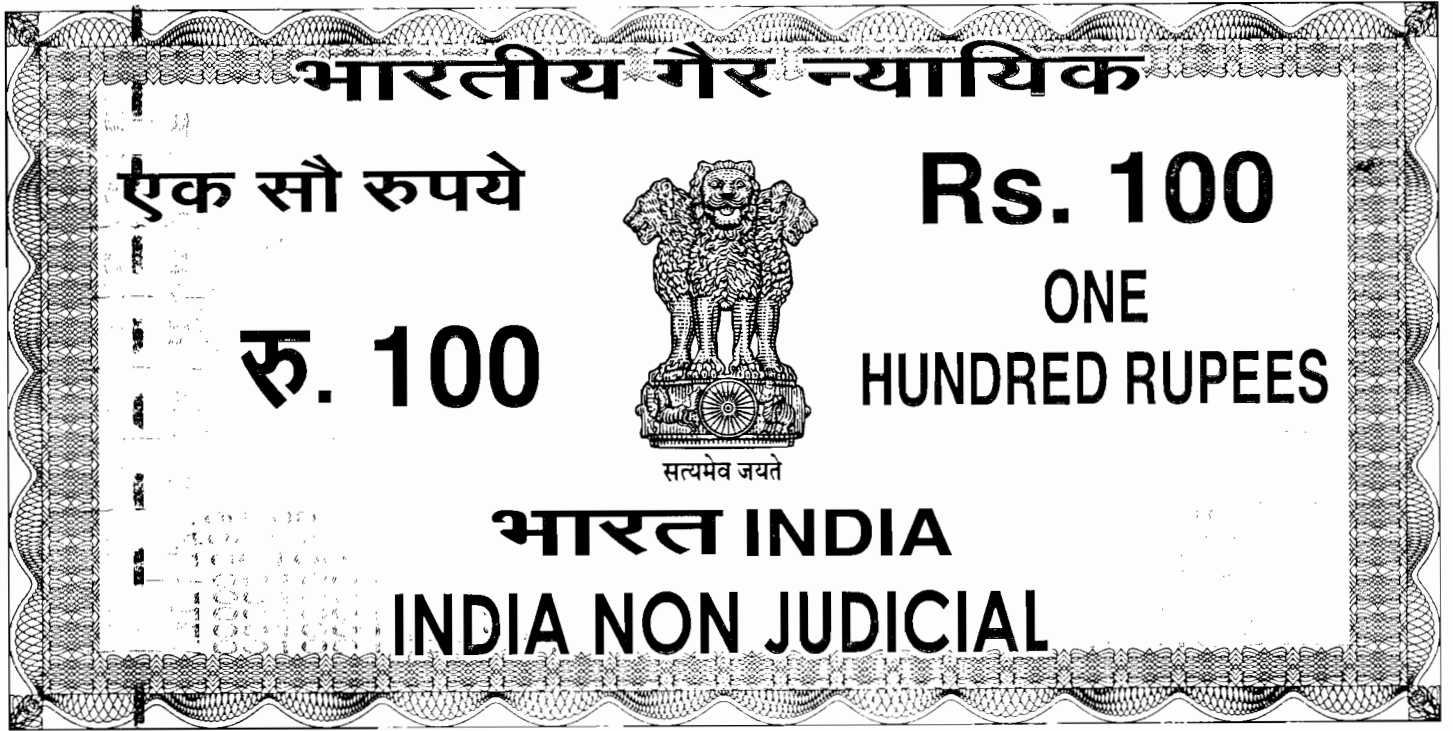
Volume – I	:	Letter of Acceptance, Letter Bid and addenda
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Volume – III	:	Specifications
Volume – IV	:	Drawings
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J. K. Verma
Chief Engineer
World Bank Projects, Orissa
Chief EMPLOYER
World Bank Project
O/o the E.T.C. (Civil)
Bhubaneswar, Bhubaneswar.



उड़ीसा ORISSA

CIVIL WORKS CONTRACT

A 228259

For

Widening & Strengthening of existing carriageway to 2-lane for "Chandabali-Bhadrak-Anandapur" road (Km. 0/0 to Km. 45/0 of SH-9 & Km. 0/0 to Km 50/0 of SH - 53) under Orissa State Roads Project

THIS AGREEMENT made the 3rd day of November, 2008, between the Chief Engineer, World Bank Projects, Orissa, office of the Engineer-in-Chief(Civil), Orissa, Norman Soudh, Unit-V, Kesari Nagar, Bhubaneswar-751001, Orissa (India) on behalf of the Government of Orissa in Works Department, Orissa Secretariat, Bhubaneswar-751001 (hereinafter "the Employer"), of the one part, and SOM DATT BUILDERS-ARSS J.V of Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Mancheswar, Bhubaneswar-750 010, Orissa (India) (hereinafter "the Contractor"), of the other part for an amount of Rs.216,23,17,622.00 (Indian Rupees Two Hundred Sixteen Crore Twenty-Three Lakh Seventeen Thousand Six Hundred Twenty-Two) only:

WHEREAS the Employer desires that the Works known as "Widening & Strengthening of existing carriageway to 2-lane for "Chandabali-Bhadrak-Anandapur" road (Km. 0/0 to Km. 45/0 of SH-9 & Km. 0/0 to Km 50/0 of SH - 53)" should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

SOM DATT BUILDERS - ARSS JV
CONTRACTOR

Volume I : Page 1

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
On the E.I.C. (Civil)
Cuttack Bhubaneswar.

The Employer and the Contractor agree as follows:

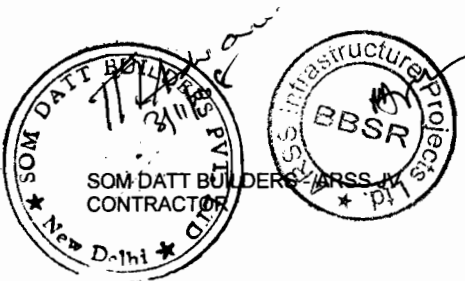
1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.


2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.

- | | |
|--------------------------------|---------------------------------|
| Volume - I | Volume - III |
| (i) the Letter of Acceptance | (vi) the Specification |
| (ii) of the Letter Bid | Volume - IV |
| (iii) the addenda 73 Pages | (vii) the Drawings; and |
| Volume - II | Volume - V |
| (iv) the Particular Conditions | (viii) the completed Schedules, |
| (v) the General Conditions; | |

3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

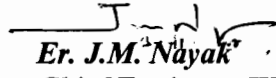
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
O/o the E.I.C. (Civil)
Cuttack, Bhubaneswar.

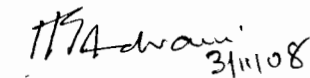
IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of INDIA on the day, month and year indicated above.

For and on behalf of Employer, i.e. Works Department, *Government of Orissa*


Er. J.M. Nayak

Chief Engineer, World Bank Project, Orissa

For and on behalf of each of the Partners of the Joint Venture M/s SOM DATT BUILDERS – ARSS JV


Mr. H.G. ADVANI

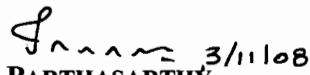
Director
SOM DATT BUILDERS Private Limited

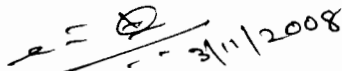




Mr. Rajesh Agarwal

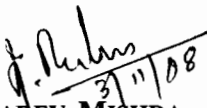
Managing Director
ARSS Infrastructure Projects Limited

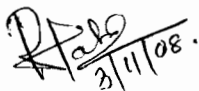
Witness :

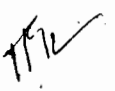

1. MR. V. PARTHASARTHY,
MANAGER (CONTRACTS), SOM DATT BUILDERS PRIVATE LIMITED

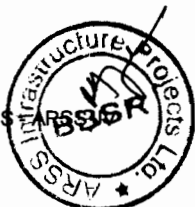

2. MR. S. P. DAS,
GENERAL MANAGER, CONTRACTS, ARSS INFRASTRUCTURE PROJECTS



3. MR. DHIREN KUMAR PRUSTY
EXECUTIVE ENGINEER, PROJECT MANAGEMENT UNIT,
ORISSA STATE ROADS PROJECT


4. MR. JAYDEV MISHRA
SR. DIVISIONAL ACCOUNTS OFFICER, PROJECT MANAGEMENT UNIT,
ORISSA STATE ROADS PROJECT


5. MR. RAMESH KUMAR PATRA
SR. HIGHWAY –CUM- PAVEMENT ENGINEER,
SMEC (INDIA), PVT. LTD.


SOM DATT BUILDERS
CONTRACTOR




Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
World Bank Project
Of the E.T.C. (Civil)
Orissa, Bhubaneswar.

Government of Orissa
Works Department

No 16547 /W Dated the Bhubaneswar, 27 th September-2008
II-T-WBP-2/2008

From:

Sri P.K.Patnaik.
F.A-cum-Addl Secretary to Govt.

To

The Chief Engineer, World Bank Projects.
Orissa, Bhubaneswar.

Sub: Tender for work "Widening & strengthening of existing carriageway to 2 Lane Road from Chandabali-BhadraKh-Anandpur (0/0 km to 45/0 km of SH-9 & 0/0km to 50/0 km of SH-53).

Package No-OSRP-CW-ICB-Y1-PO2

Sir,

I am directed to invite a reference to your Letter No-39462, Dated-29.08.2008 on the subject noted above with World Bank's No Objection in their e-mail Dt.18.8.2008 and convey the approval of the Government for acceptance of the 1st lowest tender of M/S SOMDATT Builders-ARSS (JV) amounting to Rs.216,23,17,622=00 (Rupees two hundred sixteen crore twenty three lakh seventeen thousand six hundred twenty two)only including 4% discount which is 11.28% excess over the corresponding estimated cost of Rs.194,31,12,992=00.

You are also authorized to issue the Notification of Award within the bid validity and sign the contract on behalf of the Government.

A copy of proceedings of the Tender Committee Meeting held on 22.09.2009 at 10.30 A.M for the above work is enclosed herewith for reference.

Tender documents received with your letter under reference are returned herewith, the receipt of which may please be acknowledged.

Yours faithfully,

[Signature]
F.A-cum-Addl Secretary to Government
27.9.08



August 18, 2008

Mr. J. M. Nayak
Chief Engineer (WB Projects)
Government of Orissa
Orissa Nirman Soudha
Keshari Nagar, Unit - V
Bhubaneswar – 751 001

Dear Mr. Nayak:

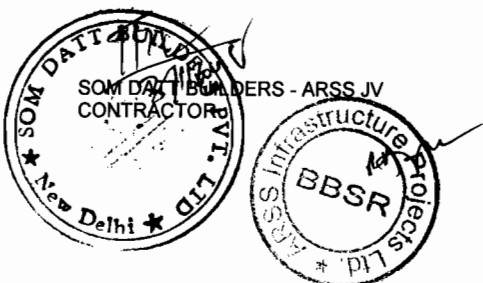
INDIA: Proposed Orissa State Roads Project (P096023) - Bid packages for Widening and Strengthening of Existing Carriageway to 2 lane for from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) (Package OSRP-CW-Y1-P01) and from Chandaballi-Bhadra-Anandapur (0/0 Km to 45/0 Km of SH-9 and 0/0 Km to 50/0 Km of SH-53 (Package OSRP-CW-Y1-P02)- Govt. of Orissa's recommendations for rejection of all bids & inviting fresh bids

Thank you for your letter of July 31, 2008 regarding the above.

We have reviewed your recommendations to reject all the bids received and re-invite bids for both the subject packages, considering that none of the bidders meet the qualifying criteria specified in the bidding documents. However, the Bank is of the view that this may result in higher prices and cause delays in project implementation thereby affecting the overall economics of the project.

In view of the above possibilities and in order to facilitate expeditious implementation of the project, the Bank will have no objection if the Government of Orissa reconsiders its decision and award the contracts to the lowest evaluated bidders, since none of the bidders meet the criteria for reason of application of very strict interpretation of the post qualification criteria and re-bidding may not result in better competition or lower prices, although, in its view, the lowest evaluated bidders are qualified to construct both the roads and bridges of the required type, even though they have not evidenced having constructed both the road and bridge under a single contract. Should, the GoO decide to award these contracts, it should do so before the expiry of the current validity of bids, which is August 31, 2008 and send conformed copies of signed contracts to the Bank.

However, if GoO wishes to maintain the decision to rebid, the Bank would not object, provided new bids shall not be invited on the basis of the same bidding and



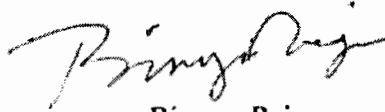
August 18, 2008

contract documents. For that matter you are advised to consider re-packaging of the works, revision of the technical specifications and or revision of the qualification criteria as the responses received under the current bidding documents have shown that no bidder could demonstrate the required experience of having constructed both the road and bridge in a single contract and, as such, in case of rebid, the possibility of repackaging the contracts should be considered, such that contracts for construction of roads are separated from the contracts for bridges and tendered separately. The revised Bidding Documents for the rebidding purpose should be sent to the Bank for review and comments prior to re-inviting bids.

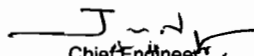
Please inform the Bank how you wish to proceed.

With regards,

Sincerely,



Binyam Reja
Sr. Transport Economist
Task Team Leader, Orissa State Roads
Sustainable Development Unit
South Asia Region



Chief Engineer
World Bank Projects, Orissa
EMPLOYEE
World Bank Project
O/o the E.I.C. (Civil)
Orissa, Bhubaneswar.

OFFICE OF THE ENGINEER-IN-CHIEF (CIVIL), ORISSA
NIRMAN SOUDHA, KESHARI NAGAR, UNIT - V, BHUBANESWAR - 751 001

Letter No. OSRP - CW - Y1 - P02 - E - 44282

Dt. 27.09.2008

From

Er. Jayamangal Nayak
Chief Engineer, World Bank Projects, Orissa
Tel.: + 91 - 674 - 239 6783 / Fax: + 91 674 - 239 1476
Email: piuosrp@gmail.com

To

M/s SOMDATT Builders- ARSS JV
Plot No. 38, Sector - A, Zone - D
Mancheswar Industrial Estate, Mancheswar,
Bhubaneswar - 751 010
Fax: 0674 - 258 5074

Sub: Civil Works ICB Package OSRP-CW-ICB-Y1-P02 under the proposed Orissa State Roads Project with World Bank Assistance

- Widening and Strengthening of Existing Carriageway to 2 lane from Chandbali - Bhadrak - Anandpur (0/0 km to 45/0 km of SH-9 and 0/0 Km to 50/0 Km of SH-53)"

LETTER OF ACCEPTANCE

Ref: i. IFB No: CW-ICB-Y1-P01 - E - 44509 Dt. 23rd Oct, 2007
ii. Your BID Dt. 30.01.2008

Sir,

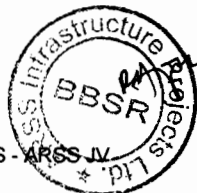
This is to notify you that, your Bid dated **30th January, 2008** for execution of the Civil Works **ICB Package OSRP-CW-ICB-Y1-P02** under the proposed **Orissa State Roads Project** with World Bank Assistance for "Widening & Strengthening of existing carriageway to 2-lane from Chandbali - Bhadrak - Anandpur (Km. 0/0 to Km. 45/0 of SH-9 and Km. 0/0 to Km. 50/0 of SH-53) amounting to **Indian Rs.216,23,17,622/-** (Indian Rupees Two hundred sixteen crore twenty three lakh seventeen thousand six hundred twenty two) only, as corrected and modified in accordance with the Instructions to Bidders, has been accepted by the **Government of Orissa**.


You are requested to furnish the Performance Security in shape of a **Bank Guarantee** in favour of the **Chief Engineer, World Bank Projects, Orissa, Bhubaneswar** on **State Bank of India, Bhubaneswar**, valid till **30th April, 2012**, amounting not less than **Indian Rs.10,81,15,881** (Indian Rupees ten crore eighty one lakh, fifteen thousand eight hundred eighty one) only within 28 days of issuance of this letter, in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Section IX, Annex to the Particular Conditions - Contract Forms, of the Bidding Document.

Upon submission of a satisfactory Performance Security as stated above, the formal Contract agreement shall be signed.

Yours sincerely,


[Authorised Signatory on behalf of Employer]
Chief Engineer
World Bank Projects, Orissa




Chief Engineer,
World Bank Projects, Orissa,
EMPLOYER
C/O the E.I.C. (Civil)
Orissa, Bhubaneswar.

LETTER of BID & ADDENDA

Bid Submission Sheet

(Agreed & Modified as per the evaluated bid)

Date: 30.01.2008

(Original submission date)

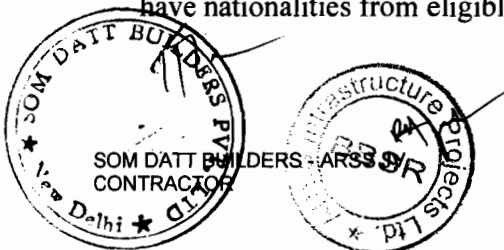
No.: OSRP-CW-Y1-P02

Invitation for Bid No.: CW-ICB-Y1-P01-E-44509

To:
Attention: **Chief Engineer, World Bank Project**
Street Address: Nirman Soudh
Floor/ Room No: Ground Floor
City: Bhubaneswar
Zip Code: 751001
Country: India

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including Addenda issued in accordance with Instructions to Bidders (ITB)8 **No Reservation** ;
- (b) We offer to execute in conformity with the Bidding Document the following Works: **Construction for:- Widening & Strengthening of existing carriageway to 2-lane for "Chandabali-Bhadrak-Anandapur" road (Km. 0/0 to Km. 45/0 of SH-9 & Km. 0/0 to Km 50/0 of SH – 53)**
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is: **Rs. 225,24,14,189.60 (Rupees Two Hundred Twenty-Five Crore Twenty-four Lakh Fourteen Thousand One Hundred Eight-Nine and Paise Sixty)** only including specified provisional sums of Rs. 4,50,000/-;
- (d) The discounts offered and the methodology for their application are: **4% (Four percent)** **[The discount to be effected on total value of work in each bill];**
- (e) Our bid shall be valid for a period of **One Hundred Fifty** days from the date fixed for the bid submission deadline in accordance with the Bidding Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period; However, in pursuant to our letter no- SAJ/ CE/WBP/08-09/785 Dt. 28.08.2008 the validity of bid had been extended till 30.09.2008.
- (f) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document;
- (g) We, including any subcontractors or suppliers for any part of the contract, have or will have nationalities from eligible countries, in accordance with ITB 4.2;



- (h) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3;
- (i) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.3, other than alternative offers submitted in accordance with ITB 13;
- (j) We, including any of our subcontractors or suppliers for any part of the contract, have not been declared ineligible by the Bank, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council;
- (k) We are not a government owned entity/ We are a government owned entity but meet the requirements of ITB-4.5;¹
- (l) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
<u>NONE</u>	<u>NONE</u>	<u>NONE</u>	<u>NONE</u>

(If none has been paid or is to be paid, indicate "none.")

- (m) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (n) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (o) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

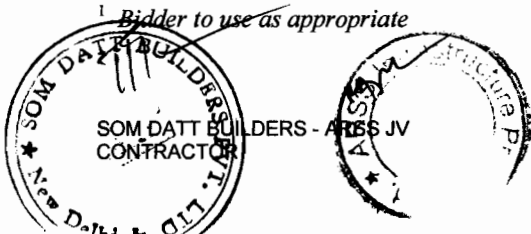
Name **H.G.Advani** in the capacity of **Power of Attorney Holder**

Signed Sd/- (**H.G.Advani**)

Duly authorized to sign the bid for and on behalf of
SOM DATT BUILDERS –ARSS - J.V.

Dated on **30th day of January,2008**

¹ Bidder to use as appropriate



Jr
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/O the E.I.C. (Civil)
Cuttack, Bhubaneswar.

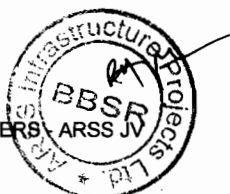
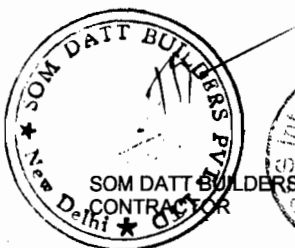
Appendix to Bid

Schedule of Adjustment Data

[In Tables A, B, and C, below, the Bidder shall (a) indicate its amount of local currency payment, (b) indicate its proposed source and base values of indices for the different foreign currency elements of cost, (c) derive its proposed weightings for local and foreign currency payment, and (d) list the exchange rates used in the currency conversion. In the case of very large and/or complex works contracts, it may be necessary to specify several families of price adjustment formulae corresponding to the different works involved.]

Table A. Local Currency

Index code*	Index description*	Source of index*	Base value and date*	Bidder's related currency amount	Bidder's proposed weighting
A	Nonadjustable			100% INR	0.35
B	Steel (Bars and Rods)	Office of Economic advisor	258.30 Jan-08	-do-	0.08
C	Cement	Office of Economic advisor	221.10 Jan-08	-do-	0.07
D ₁	Bitumen 60/70 (Bulk)	IOCL/HALDIA	24700/MT 16.01.2008 (Basic Price)	-do-	0.10
D ₂	CRMB-55 (Bulk)	IOCL/HALDIA	25010/MT 16.01.2008 (Basic Price)	-do-	0.05
E	Labour	Labour and Employment Deptt. Govt. of Orissa.	Rs. 70.00 Per Day Jan-2008	-do-	0.06
F	POL	HPCL Rate at Bhadrak, Orissa	33.38/ Ltr Jan-08	-do-	0.15
G	Other Materials	Office of Economic advisor	218.10 Jan-08	-do-	0.14
Total					1.00



Reference for Base Index for STEEL Monthly Wholesale Price Index

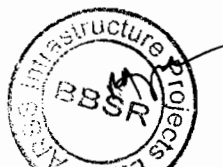
Base Year 1993-94 = 100

Name of Commodity : Bars & rods

Type : Individual Commodity

Month /Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	258.3	258.3	317.7	330.1	330.1	330.1						
2007	252.9	252.9	254.4	255.1	255.1	255.1	255.1	255.1	256.2	258.3	258.3	258.3
2006	255.3	240	240	242.7	241.9	241.9	253.3	253.3	253.3	253.3	253.3	253.1
2005	245.7	245.7	249.8	260.8	262.8	262.8	261.5	262.1	264.9	264.9	264.9	264.9

1. Figure 9999.9 may be treated as index for particular item not-available



Reference for Base Index for CEMENT

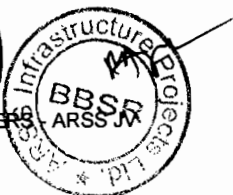
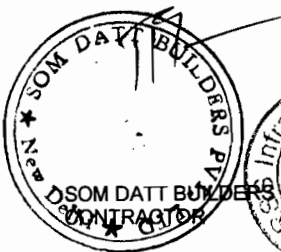
Monthly Wholesale Price Index

Base Year 1993-94 = 100

Name of Commodity : c. Cement
Type : Group Item

Month /Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	221.1	220.9	221	221.4	222.4	221.7						
2007	198.4	200.5	210.7	211.6	211.9	213.3	215.1	215.6	219.8	220	219.6	219.7
2006	168.2	174.1	181.8	191.2	193.5	193.6	194.5	195	194.6	196.8	198.8	198.6
2005	149.2	161.3	163.8	164.3	163.8	163.4	162.2	162.2	164.2	165.9	165.4	164.3

1. Figure 9999.9 may be treated as index for particular item not-available



Reference for Base Index for BITUMEN Indian Oil Corporation Limited

304, BHOI NAGAR, BHUBANESWAR-751022
TEL: 0674-2543381, 2546821, FAX: 2541638, 2543381
E Mail: brmohanty@ioc@gmail.com, bikashmohanty@indianoil.co.in



To,

REF: DMCS/ PRICING
DATE:01.08.2008

SUB: PRICE OF BITUMEN

Dear Sir

We are giving below the Price of Bitumen for the following periods Ex- Haldia:

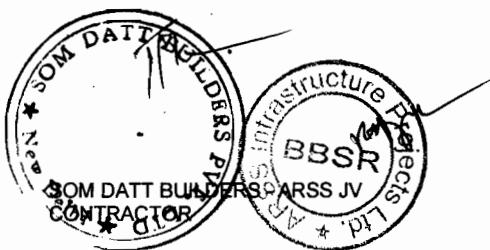
Basic Price In Rs./MT Ex-Haldia w.e.f.	BULK 80/100	BULK 60/70	BULK 30/40	EMULSION MS	CRMB-50	CRMB-55	CRMB-60
16.05.2007	16900.00	18300.00	19410.00	13260.00	19190.00	19750.00	20730.00
16.09.2007	17040.00	18460.00	19580.00	13360.00	19420.00	19980.00	20970.00
01.10.2007	17510.00	19000.00	20160.00	13820.00	19850.00	20390.00	21460.00
16.10.2007	18140.00	19740.00	20940.00	14250.00	20430.00	20940.00	22130.00
01.11.2007	18600.00	20270.00	21510.00	14620.00	20850.00	21350.00	22600.00
16.11.2007	19530.00	21350.00	22670.00	15250.00	21710.00	22170.00	23570.00
01.12.2007	21080.00	22620.00	24030.00	16190.00	23130.00	23530.00	24720.00
16.12.2007	22870.00	24700.00	26250.00	17410.00	24780.00	25110.00	26590.00
16.01.2008	22870.00	24700.00	26250.00	18360.00	24780.00	25110.00	26590.00
16.02.2008	23080.00	24950.00	26510.00	18480.00	24970.00	25290.00	26810.00
01.03.2008	23250.00	25140.00	26720.00	18670.00	25130.00	25440.00	26980.00
01.04.2008	24140.00	25140.00	26720.00	18430.00	25950.00	26220.00	26980.00
01.05.2008	24140.00	25140.00	26720.00	18860.00	25950.00	26220.00	26980.00
16.05.2008	24340.00	25140.00	26970.00	19160.00	26130.00	26400.00	27190.00
01.06.2008	26970.00	27800.00	29530.00	20630.00	28550.00	28710.00	29380.00
05.06.2008	25940.00	26770.00	28420.00	19920.00	27600.00	27810.00	28450.00
01.07.2008	26500.00	27420.00	29110.00	20400.00	28090.00	28260.00	29000.00
16.07.2008	28570.00	29400.00	31220.00	21560.00	29990.00	30080.00	30780.00
01.08.2008	28950.00	29750.00	31590.00	21820.00	30340.00	30410.00	31100.00

- Excise Duty @ 16% will be charged on the Basic Price.
- Education Cess @2% w.e.f.09.07.2004
- Education Cess @3% w.e.f.:01.03.2007
- CST @3% WEF:01.04.2007
- CST@2% WEF:01.06.2008
- Excise Duty @14% w.e.f.01.03.2008
- C.S.T @ 2% (Against C-Form) will be extra and will be charged after E.D. or full rate C.S.T. prevailing on the date of supply will be charged.
- Orissa Entry Tax @ 2% will be directly borne by the customer
- The price is Ex-Haldia and the customer has to arrange his own transport.

Thanking you,

Yours faithfully,
For Indian Oil Corpn Ltd.

(B.R.MOHANTY)
Dy. Mgr.(Consumer Sales), Bhubaneswar



Reference for Base Index for LABOUR

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Government of Orissa
Labour & Employment Department

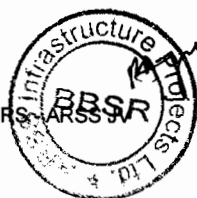
NOTIFICATION

Dated, Bhubaneswar, the 11th April, 2007

No.LL-I (AR)-12/2007 (11/06) A.E. Whereas certain proposals to revise the minimum rates of wages payable to certain categories of employees employed in some of the employments including the **SHOPS AND ESTABLISHMENTS** were published as required under clause (b) of sub-section (1) of section 5 of the Minimum Wages Act, 1948 (11 of 1948) in the extraordinary issue No.82 dated the 10th January, 2007 of the Orissa Gazette issued under the notification of the Government of Orissa in the Labour and Employment Department No.236/LL-I(i)-11/06/2006 dated the 8th January, 2007 bearing S.R.O. No.02/2007 inviting objections and suggestions from all persons likely to be affected thereby within a period of two months from the date of publication of the said notification in the Orissa Gazette;

And whereas, all representations containing objections and suggestions received within the specified period of two months in respect of the said proposals have been duly considered by the State Government and the Advisory Board appointed under section 7 of the said Act, has been consulted;

Now, therefore, in exercise of the powers conferred by clause (b) of sub-section (1) of section 3, read with section 4 and sub-section (2) of section 5 of the said Act and in supersession of all previous notifications issued in this regard revising the minimum rates of wages for Unskilled, Semi-skilled, Skilled and Highly-skilled categories of employees, the State Government do hereby revise the minimum rates of wages payable to the Unskilled, Semi-skilled, Skilled, Highly-skilled categories of employees employed in **SHOPS AND ESTABLISHMENTS** in the whole State of Orissa to Rs.70/-, Rs.80/-, Rs.90/- & Rs.100/- per day respectively. In addition to the said rate of wages a special allowance called as Variable Dearness Allowance shall be payable @Rs.2.50 (Rupees two and paise fifty) only per day for every 50 point rise in the All India Consumer Price Index Number (Base 2001-100) for industrial workers, or on the expiry of every block



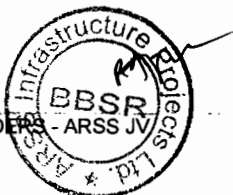
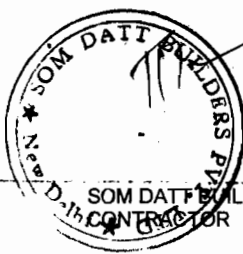
283

vocational activities and the performance of which calls for initiative and judgment.

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- (4) The category "Highly Skilled" includes Stenographer, Accountant, Supervisor, Head Cashier, Manager, Sales Promotion Employees and any other job of highly skilled nature involving high degree of performance and full competence in the performance of certain tasks acquired through intensive technical or professional training or practices, work experience for long years and also required for workers to assume full responsibility of the judgment or decisions involved in execution of those tasks;
- (5) The minimum rates of wages are all inclusive rates including the basic rates, the cost of Living allowance and the cash value of the concessional supply, if any of essential commodities;
- (6) The daily minimum rates of wages shall be inclusive of wages payable for the weekly day of rest;
- (7) An adult employee shall work for 8 (eight) hours per day excluding half-an-hour of rest;
- (8) The minimum rates of wage are applicable to employees employed by Contractors also;
- (9) The minimum rates of wages for disabled persons shall be same as payable to the workers of the appropriate category ;
- (10) There shall not be any discrimination between Male and Female workers in matters of payment of minimum wages in any category of employment.

By order of the Governor,
P. Singh
 Joint Secretary to Government



J
 Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 C/o the P.I.C. (Civil)
 Cuttack, Bhubaneswar.

Reference for Base Index for POL



हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड

(भारत सरकार का उपक्रम) रजिस्टर्ड कार्यालय : 17 जमशेदजी टाटा रोड, मुम्बई - 400 020

HINDUSTAN PETROLEUM CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE) REGISTERED OFFICE 17, JAMSHEDJI TATA ROAD, MUMBAI - 400 020.

भुवनेश्वर क्षेत्रीय कार्यालय (प्रत्यक्ष बिक्री) BHUBANESWAR REGIONAL OFFICE (Direct Sales)
5वीं मंजिल, आलोक भारती भवन, शहीदनगर, भुवनेश्वर- 751 007
5TH FLOOR, ALOK BHARATI BUILDING, SAHID NAGAR, BHUBANESWAR - 751 007

दूरभाष/Telephone 3293292/9
बोर्ड/Board 254192
फैक्स/Fax 2546671
ई-मेल/E-mail bhushanbh@hpcl.co.in / rghoshk

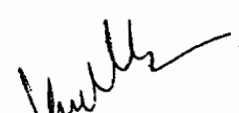
TO WHOM SO EVER IT MAY CONCERN.

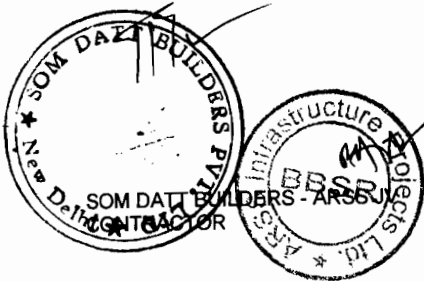
DATE : 24-10-08.

The prevailing HSD retail selling prices at Bhawanipatna & Bhadrak are given below.

Date	Bhawanipatna (Rate/Ltr.)	Bhadrak (Rate / Ltr.)
16.05.07	33.98	33.38
14.02.08	35.11	34.53
01.07.08	37.38	37.19

Thanking you.


T Ashok Kumar.
Manager Marketing.



Monthly Wholesale Price Index

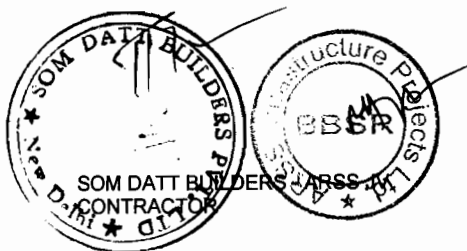
Base Year 1993-94 = 100

Name of Commodity : ALL COMMODITIES

Type : Group Item

Month /Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	218.1	219.9	225.5	228.5	231.1	237.4						
2007	208.8	208.9	209.8	211.5	212.3	212.3	213.6	213.8	215.1	215.2	215.9	216.4
2006	196.3	196.4	196.8	199	201.3	203.1	204	205.3	207.8	208.7	209.1	208.4
2005	188.6	188.8	189.4	191.6	192.1	193.2	194.6	195.3	197.2	197.8	198.2	197.2

1. Figure 9999.9 may be treated as index for particular item not-available



Chief Engineer
World Bank Projects, Orissa
EMPLOYER
O/o the E.O.C. (Civil)
Cuttack, Bhubaneswar.

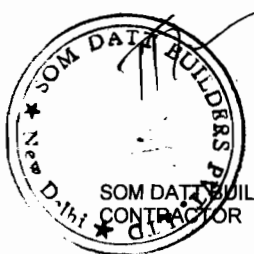
Reference for Base Index for other MATERIALS

Table C. Summary of Payment Currencies

Table: Alternative A

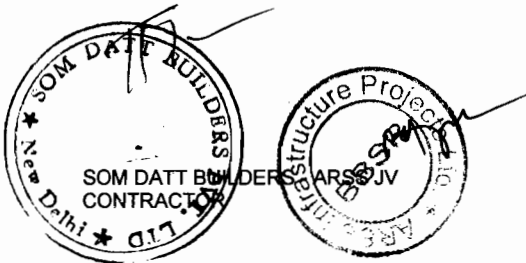
For[insert name of Section of the Works]

Name of payment currency	A Amount of currency	B Rate of exchange (local currency per unit of foreign)	C Local currency equivalent $C = A \times B$	D Percentage of Net Bid Price (NBP) $\frac{100 \times C}{NBP}$
Local currency INR	100.00	1.00	100	$100 \times 100 / 100 = 100$ INR
Foreign currency #1				Not Applicable
Foreign currency #2				NA
Foreign currency #				NA
Net Bid Price				225,24,14,189.60
Discount				(-)9,00,96,567.58
Provisional sums expressed in local currency	Rs.0.45 M			450,000.00
BID PRICE				216,23,17,622.02 SAY:216,23,17,622.00



ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	SOM DATT BUILDERS PVT. LTD.-ARSS (J.V)
In case of JV, legal name of each partner	SOM DATT BUILDERS PVT. LTD (Lead Partner) ARSS Infrastructure Projects Limited (Partner)
Bidder's country of constitution	India
Bidder's year of constitution	2008
Bidder's legal address in country of constitution	M/s SOM DATT BUILDERS-ARSS (JV) Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa. Tel No- 0674-2588552/ 2588554 Fax No- 0674-2585074 Email: somdattbuilders-arssjv@arssgroup.in
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	H.G. Advani, Director of M/s Som Datt Builders Pvt. Ltd. At 56-58, Community Centre, East of Kailash New Delhi -110065, India, Telephone-011-26431607 / 08/09 Mob No. 09810372687 Fax No. 011-26236373 E.mail:- som datt1@nda.vsnl.net.in
Attached: 1) Joint Venture Agreement 2) Power of Attorney	





दिल्ली DELHI

Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR 208406
Govt. of Orissa (India)
Regd. No.-43/2003

JOINT VENTURE AGREEMENT

BETWEEN

SOM DATT BUILDERS PVT. LTD.

AND

M/s ARSS INFRASTRUCTURE PROJECTS LIMITED

FOR

Chief Engineer, World Bank Projects, Works Department, Government Of Orissa, O/o Engineer-

In-Chief (Civil), Orissa, Nirman Soudha, Keshari Nagar, Unit-V, Bhubaneswar 751010

" Construction for Widening & Strengthening of existing carriage way to 2-lane for Chandbali - Bhadrak - Anandpur (Km. 0/0 to 45/0 of SH-9 and Km. 0/0 to Km. 50/0 of SH-53)"

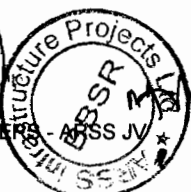
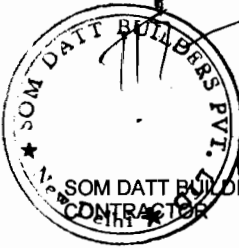
DATED 28th DAY OF JANUARY 2008

THIS JOINT VENTURE AGREEMENT (hereinafter called "JV Agreement") is made at New Delhi, India on the 28th day of January 2008

BETWEEN

M/s ARSS INFRASTRUCTURE PROJECTS LTD.

[Signature]
Managing Director



[Signature]
Chief Engineer
World Bank Projects, Orissa,
EMPLOYER
O/o the E.I.C. (WB)
Orissa, Bhubaneswar.

297

Somy
28.01.08
Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
Principal Office (India)
Bhubaneswar, Orissa, No. 43/2003

SOM DATT BUILDERS PVT. LTD. a company incorporated in India and having its principal office at 56-58 Community Centre, East of Kailash, New Delhi - 110 065, India (hereinafter referred to as "Som Datt Builders").

And

ARSS INFRASTRUCTURE PROJECTS LIMITED, duly organized and existing under and by virtue of the laws of Republic of India with its Registered office at Plot No. 38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar 751010., Orissa. (hereinafter referred to as "ARSS")

(hereinafter in this JV Agreement, Som Datt Builders and ARSS unless specifically referred to are individually referred to as 'the party' or 'Joint Venture' and jointly as 'the parties' or the 'Joint Ventures')

WHEREAS Som Datt Builders is engaged in the business of design, engineering and construction with specialization in Highways and Bridges, Irrigation Projects.

AND WHEREAS ARSS is engaged in construction with specialization in Highway Projects;

Som Datt Builders and ARSS have agreed to collaborate by forming a Joint Venture named "SOM DATT BUILDERS PRIVATE LIMITED and ARSS INFRASTRUCTURE PROJECTS LIMITED" (hereinafter referred to as the JV) for the preparation and submission of Tender to Chief Engineer, World Bank Projects, Works Department, Government Of Orissa, O/o Engineer-In-Chief (Civil), Orissa, Nirman Soudha, Keshari Nagar, Unit-V, Bhubaneswar 751010 (hereinafter referred to as the Employer) for the " Construction for Widening & Strengthening of existing carriage way to 2-lane for Chandbali – Bhadrak – Anandpur (Km. 0/0 to 45/0 of SH-9 and Km. 0/0 to Km. 50/0 of SH-53)" (hereinafter referred to as the Project) and in the event of the Employer accepts the bid submitted by the JV, to execute the Contract (hereinafter referred to as the Contract) for the Project jointly in the name of the JV in accordance with the terms and conditions thereof.

NOW THESE PRESENTS WITNESSETH AND IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

1. DEFINITIONS

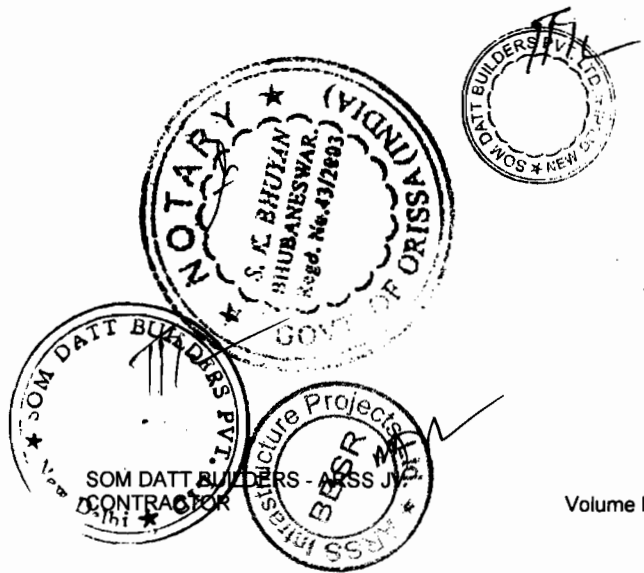
In this Agreement, the following words and expressions shall have the meanings hereby assigned to them unless the context otherwise requires:

"Contract" Means one or several binding contracts entered / to be entered into between the Employer and the Joint Venture, the principal objectives of which are the Construction and completion of:

" Construction for Widening & Strengthening of existing carriage way to 2-lane for Chandbali – Bhadrak – Anandpur (Km. 0/0 to 45/0 of SH-9 and Km. 0/0 to Km. 50/0 of SH-53)"

"Contract Works" Means the works to be executed under the Contract.

For ARSS INFRASTRUCTURE PROJECTS LTD.
[Signature]
Managing Director



J
Chief Engineer
World Bank Projects, Orissa
Employer,
World Bank Project
Civil Engr. (Civil)
Bhubaneswar.

(299)

Sarat Kumar Bhuyan
28-01-08
Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No. 43/2003

- "Contract Price" Means the total price payable by the Employer for the Contract Works in accordance with the Contract.
- "Employer" Means Chief Engineer, World Bank Projects, Works Department, Government Of Orissa, O/o Engineer-In-Chief (Civil), Orissa, Nirman Soudha, Keshari Nagar, Unit-V, Bhubaneswar 751010 or its assigns or successors.
- "Information" Means all drawings, calculations and technical information of a like nature provided by either Joint Venture under the Contract and all drawings, calculations, samples, patterns, models, operations, and maintenance manuals and other technical information of a like nature including but not limited to all the communications received by either parties from the Employer.
- "Joint Venture" Means the joint and several associations of the parties as defined hereinabove for the purpose of fulfilling the Contract.
- "Know-how" Means and includes all inventions, processes, patents, engineering skills and other technical information whether patented or not, which are presently owned by "Som Datt Builders or ARSS" or which may be so owned during the term of this Agreement including without limitation technical and engineering data, design data, calculation and information, specifications, drawings, sketches, photographs and all other forms of recorded information, techniques and designs.
- "Joint Venture" Means either of the parties to this Agreement.
- "Laws" Means the laws of the Government of India.
- "Lead Member" Shall have the meaning ascribed to it in Clause 6 hereof.
- "Plant and Equipment" means all those matters of like nature but not limited to Graders, pavers, rollers, cranes, trucks, tractors, trailers, compressors, welding sets, batching plant, concrete mixers, scaffolding, tackle, tolls, fuel storage, surveying equipment and radio equipment.
- "Tender" Means Joint Venture's priced offer to the Employer for the Execution and completion of the Contract Works and the remedying of any defects therein in accordance with the provisions of the Contract to be entered into.

2. SCOPE OF UNDERTAKINGS

Each of the Joint Venture undertakes to the other –

- a) To perform and observe and also to ensure that the Joint Venture will perform and observe all the provisions of this Agreement.
- b) To take all necessary steps on its part to give full effect to the provisions of this Agreement.

(Signatures and Stamps)

NOTARY
S. K. BHUYAN
BHUBANESWAR
Regd. No. 43/2003

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

SOM DATT BUILDERS - ARSS
CONTRACTOR

ARSS INFRASTRUCTURE PROJECTS LTD.
NEW DELHI

For ARSS INFRASTRUCTURE PROJECTS LTD.
(Signature)
Managing Director

(Signature)
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
O/o the E.I.C. (Civil)
Cuttack, Bhubaneswar.

301

Satyajit
28-01-08
Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Roll No. 43/2003

3. ACCEPTANCE OF TENDER

3.1 If the Tender submitted by the JV is accepted by the Employer, the Joint Ventures shall be jointly and severally bound to the Employer by such acceptance in accordance with the terms of this Agreement and will jointly and faithfully perform and observe all the terms and conditions thereof both as to each other and to the Employer.

4. PARTICIPATION AND JOINT VENTURE SHARES

a) The Joint Ventures shall subject to the provisions hereinafter contained, be entitled to share in the following proportion namely:

Som Datt Builders	-	51% (Fifty One Percent)
ARSS	-	49% (Forty Nine Percent)

(hereinafter referred to as the 'Share Ratio') in execution of all works, profits arising out of the Joint Venture and shall be liable in the same share ratio for all losses, expenses, liabilities, costs, claims or proceedings whatsoever arising out of or resulting therefrom. Income Tax payable by the JV on its profit shall be apportioned between the Joint Ventures in the proportion to their respective share in the profit of the JV as per provisions of the Income Tax Act and Rules thereof.

Provided that nothing contained in this clause shall be construed as limiting the joint and several obligations of the Joint Ventures to the Employer under the Contract.

Neither party of the JV shall be allowed to assign, pledge, sell or otherwise dispose all or part of its respective interest in the JV to any third party. However, should any one of the Joint Ventures decides to transfer a portion of its share to the other Joint Venture, the same can be done with mutual consent of both the Joint Ventures and agreement with regard to financial terms.

Notwithstanding, anything contained in the sub-clause above, the Joint Ventures reaffirm that they shall be jointly and severally bound to the Employer by the terms of the Contract and will faithfully perform all the terms and conditions thereof both as to each other and to the Employer.

5. PARTIES ASSOCIATION

- a) This Agreement shall not be construed by either Joint Venture hereto as constituting each of them the agent of the other nor the Joint Venture as the agent for either of them.
- b) Each of the Joint Ventures shall from time to time assign to the Joint Venture their qualified employees in such numbers and on such terms and conditions as may be agreed upon by both the Joint Ventures mutually.
- c) The Joint Ventures agree that this Agreement shall not constitute an incorporated Company or a partnership or creating a permanent Joint Venture between the parties and nothing contained in this Agreement shall entitle or authorize any party or the JV to pledge the credit of or incur liabilities or obligations binding upon the other party unless expressly agreed by such other party nor shall anything herein be construed as creating any representative, agency or employment relationship between the parties.

6. LEAD MEMBER

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

NOTARY
S. K. BHUYAN
BHUBANESWAR
GOVT. OF ORISSA (INDIA)
ROLL NO. 43/2003

ARSS
INFRASTRUCTURE PROJECTS LTD.
NEW DELHI

SOM DATT BUILDERS PVT. LTD.
CONTRACTOR
NEW DELHI

For ARSS INFRASTRUCTURE PROJECTS LTD.
ASJ
Managing Director

J
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Chief
Of the E.P.C. (JV)
Orissa, Bhubaneswar.

303

Sarat Kumar Bhuyan
22.01.08
Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
Orissa (India)
Regd. No.-43/2003

- a) The Joint Ventures agree that Som Dart Builders shall be designated as Lead Member of the Joint Venture.
- b) The Lead Member shall act in accordance with the directions of the Management Board, which shall have overall control of the Joint Venture.
- c) Subject as aforesaid the Lead Member shall have power to incur liabilities and to receive instructions from the Employer for and on behalf of both the Joint Ventures, receive all cheques / drafts from the Employer drawn in the name of the Joint Venture and shall have authority to Lead all negotiations with the Employer with due participation of the representatives of the other Joint Venture.
- d) Lead Member shall have the power to go for DRB, Arbitration or Court or he may authorize anybody else to carryout above responsibilities.

7. BANK ACCOUNT

Upon entering into the Contract with the Employer as aforesaid a Joint Venture Bank account shall be opened with any scheduled Bank as mutually decided by both the parties in the name of the Joint Venture and all payments received from the Employer under the contract shall be deposited in the said Joint Venture Bank Account. Financial obligations of the Joint Venture shall be discharged through this Joint Venture Bank Account. The operation of the Joint Venture Bank Account shall be in the manner as may be mutually agreed by the Joint Ventures.

8. WORKING CAPITAL AND PLANT & EQUIPMENT

- a) Each Party shall bring plant & equipment, manpower and working capital in the JV in such manner as may be mutually agreed by the Joint Ventures.
- b) Assets including Plant and Machinery, made available to the Joint Venture by any of the Joint Ventures shall not become assets of the Joint Venture and shall not be treated as "Joint Venture Property" unless otherwise agreed between the Joint Venture.

9. ACCOUNTS

Proper Books of Accounts the Records relating to the Joint Venture shall be maintained as per generally accepted accounting practices. The accounts of the JV shall be audited by a firm of Chartered Accountants to be appointed by the Management Board. All expenses of maintenance of books of accounts and carrying out of the audits shall be treated as common expenses and be shared by the Joint Ventures in their share ratio.

10. DEFAULT

Default.

- a) The Joint Ventures have disclosed to each other all relevant information and material facts which could effect the decision of either Joint Venture as to the subject matter of the Joint Venture between the said Joint Ventures. This obligation shall continue throughout the continuance of this joint venture and each Joint Venture assumes the obligation to inform the other Joint Venture of any information or material fact which has not been previously disclosed. Breach of this clause shall entitle the non-defaulting Joint Venture to termination of the Joint Venture Agreement.

The failure of either Joint Venture to insist on the strict and punctual performance of the provisions of this Agreement shall not constitute a waiver of or estoppel against asserting the right to require such performance nor should a waiver or estoppel in one instance constitute a waiver or estoppel with respect to a later breach

Som Datt Builders Pvt. Ltd.

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

SOM DATT BUILDERS PVT. LTD.
NEW DELHI

For ARSS INFRASTRUCTURE PROJECTS LTD.
Raj
Managing Director

J
Chief Engineer
World Bank Projects, Orissa.
World EMPLOYER
C/o the E.I.C. (Orissa)
Ct. Secd., Bhubaneswar.

305

Saraj Kumar Bhuyat
28.01.08
SARAJ KUMAR BHUYAT
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003

whether of similar nature or otherwise.

- b) In the event that any one or more of the provisions contained in this Agreement shall be invalid, illegal or unenforceable in any respect under any applicable law, the validity, legality and enforceability, of the remaining provisions contained herein shall not in any way be affected or impaired thereby, provided, however, that- in the event of either Joint Venture seeking to enforce such invalid, illegal or unenforceable provision, the other Joint Venture may terminate this Agreement.
- c) The failure or delay or either Joint Venture hereto to perform any obligation under this Agreement solely by reason of Acts of God, acts of Governmental policies (otherwise that provided herein) riots, wars strikes, lockouts, accidents in transportation and / or such other causes beyond the Joint Venture's control shall not be deemed to be a breach of this Agreement.

Provided always, if the Joint Venture is so prevented from performing as herein stated it shall continue to take all expedient steps and / or actions within its-ability to rectify the situation.

- d) Except where the nature of the happening is such as to prevent the Joint Venture from doing so, the Joint Venture suffering from the acts by force majeure shall notify the other joint venture in writing within seven (7) days after the occurrence of such happening.

11. DURATION OF THIS JV AGREEMENT

This JV Agreement shall become effective as of the date of the signing thereof by both the Parties. This JV agreement shall be treated as terminated upon the earliest occurrence of any of the following events:

- a. When all the works under the Contract are executed and completed in all respect and the payments under the Contract are received from the Employer and all the liabilities of the JV to third parties are paid in full.
- b. When both the parties mutually decide to terminate this JV Agreement;

12. GOVERNING LAW

This Agreement shall be governed and construed in accordance with the laws of India, and the Joint Ventures hereby select the court of the city of Delhi to settle any disputes arising out of this Agreement. The terms and conditions of this Joint Venture Agreement shall be interpreted according to the common sense meaning intended and the spirit with which it has been drafted and the principles of good faith and equity shall be determinative in deciding and awarding damages.

13. ARBITRATION

- a) Any dispute or difference relating to the Joint Venture or arising under the Contract or the provisions of this Agreement which may arise between the Joint Ventures during the life of this Agreement which cannot be resolved amicably shall in the first instance be referred to the Managing Director of each of the Joint Ventures who shall endeavor to reach an agreement.
- b) Failing such agreement, the matter shall be referred for arbitration to a panel of three arbitrators. Each of the Joint Ventures will appoint one arbitrator. The third arbitrator shall be appointed by the two arbitrators so appointed by the Joint

For ARSS INFRASTRUCTURE PROJECTS LTD.

[Signature]
Managing Director

NOTARY (INDIA)
SARAJ KUMAR BHUYAT
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003

SOM DATT BUILDERS PVT. LTD.
SOM DATT BUILDERS PVT. LTD.
CONTRACT NO. 100/2007
New Delhi

ARSS INFRASTRUCTURE PROJECTS LTD.
ARSS INFRASTRUCTURE PROJECTS LTD.
CONTRACT NO. 100/2007
New Delhi

SOM DATT BUILDERS PVT. LTD.
SOM DATT BUILDERS PVT. LTD.
CONTRACT NO. 100/2007
New Delhi

[Signature]
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
c/o the E.I.C. (India)
C-1000, Bhubaneswar.

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Sarat Kumar Bhuyan
28.01.08
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
1999/2003

Ventures and shall act as presiding arbitrator. The decision of majority shall be final and binding on the Joint Ventures. The venue of arbitration shall be New Delhi and proceeding shall be in accordance with the provisions of Arbitration and Conciliation Act, 1996.

14. ASSIGNMENT

No Joint Venture shall, without the prior written consent of the other Joint Ventures and the Employer, directly or indirectly assign its rights or obligations under this Agreement except to its parent or to wholly owned subsidiary, provided however, that no assignment shall be made to a subsidiary unless the parent continues to remain bound to all obligations involved.

15. CONFIDENTIALLY

a) If one Joint Venture, (herein referred to as "the Receiving Joint Venture"), has access to and receives from the other Joint Venture, (herein referred to as "the Disclosing Joint Venture"), confidential information of either a general business or technical nature, herein referred to as "the Information", which is proprietary to the Disclosing Joint Venture, the Receiving Joint Venture agrees that it will not reveal or disclose this Information or any part thereof to any person, firm or corporate or other entity, nor this Information or any part thereof to any person, firm or corporation or other entity nor use this information or any part thereof without first obtaining the written consent of the Disclosing Joint Venture. The Disclosing Joint Venture will as far as possible mark the information as "Confidential".

The secrecy obligation as stated above shall not apply to Information:

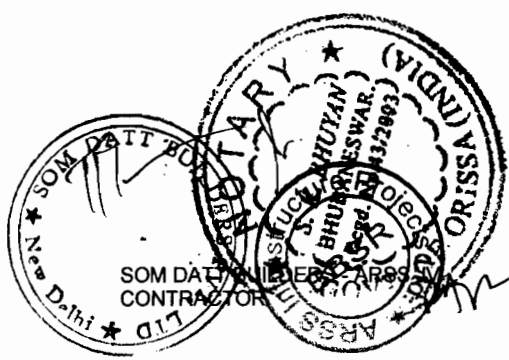
- i) which is already known by the Receiving Joint Venture prior to its receipt from the Disclosing Joint Venture; or
- ii) which is or becomes generally known to the public domain, through no fault of the Receiving Joint Venture; or
- iii) which is disclosed to the Receiving Joint Venture by a third Joint Venture not under any obligation to secrecy to the Disclosing Joint Venture concerning the same and having a bonafide right to disclosure; or
- iv) which is developed by the Receiving Joint Venture independently of any information of the Disclosing Joint Venture.

b) The obligations of the Receiving Joint Venture in this section shall survive the expiration or termination of this Agreement.

c) Each Joint Venture undertakes for itself, its employees, sub-contractors, or any third party to whom information as set forth herein may be disclosed, that its employees, sub-contractors, or such third parties shall treat as confidential any sketches, drawings, writings, manuscripts, designs or information whether or not similar to the foregoing relating to the business of the others and which it shall receive or which may come into its possession arising from or through the operation of this Agreement or the scope of the Contract Works herein envisaged. Each Joint Venture undertakes not to use, publish, pass to a third party, or in any way employ such information to the general or specific detriment or business prospects of the other Joint Ventures, and undertakes to return upon request all or any confidential documents.

For ARSS INFRASTRUCTURE PROJECTS LTD.

Manager/Director



Chief Engineer
World Bank Projects, Orissa
EMPLOYER
at the E.I.C. (Orissa)
Bhubaneswar.

309

Sarat Kumar Bhuyan
28-01-08
Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
GOVT. of Orissa (India)
Regd. No.-43/2003

16. CREDIT

Nothing in this Agreement or the Contract shall authorize any of the Joint Ventures hereto to pledge the credit of or incur liabilities or obligations binding upon any of the other except insofar as this may have been hereinbefore expressly authorized in writing. No Joint Venture shall make any representations or statements to any third party that it has such authority or concerning the business or trading activities or either of the other Joint Venture.

17. TAXES, LEVIES & DUTIES

Tax including surcharges, education cess etc. payable by the Joint Venture under the Indian Income-tax Act and Rules made thereunder on the respective share of Profit / Income of each Joint Venture shall be borne by the concerned Joint Venture and the same shall be deducted by the JV from its share of Profit before distribution of Profits to it. All other Indirect Taxes, Levies, Cess and or Duties resulting from the performance of the Contract work shall be the cost of the Joint Venture. The Joint Venture shall deduct necessary tax at source under the Indian Income-tax Act if applicable from all payments to the respective Joint Ventures.

18. NOTICES

Any notice, request, demand and other communication required or provided to be given hereunder shall be in writing and may be given by the personal service, or prepaid mail or by electronic transmissions to the Joint Ventures hereto at their respective addresses hereinabove mentioned or such other addresses as either of the Joint Ventures may from time to time designate by notice in writing to the other.

19. MAIN OFFICES

The head offices of the Joint Venture shall be at 56-58, Community Centre, East of Kailash, New Delhi - 110 065, India and the J.V office at Plot no-38, sector-A, zone-D, M.I.E, Bhubaneswar-751010, Orissa, or at such other place the Joint Ventures may mutually agree.

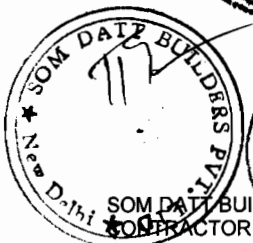
20. HEADINGS

The headings to the respective clauses hereof are inserted for convenient reference only and are not to be construed as limiting or extending the meaning of any of the provisions of this Agreement.



For ARSS INFRASTRUCTURE PROJECTS LTD.

[Signature]
Managing Director



[Signature]
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
On the E.I.C. (O&S)
Orissa, Bhubaneswar.

311

Seraj
28-01-08

Serat Kumar Bhuyan
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003

21. AMENDMENT AND MODIFICATIONS

Any amendment or modification to this Agreement shall be agreed upon in writing by and between the Joint Ventures hereto.

IN WITNESS WHEREOF these presents have been entered into day year first above written.

SIGNED on behalf of **SOM DATT BUILDERS PVT. LTD.**



In presence of :

V. Parthasarthy

V. PARTHASARTHY MANAGER (CONTRACTS)
SOM DATT BUILDERS PVT. LTD.

SIGNED on behalf of **ARSS INFRASTRUCTURE PROJECTS LIMITED**

for **ARSS INFRASTRUCTURE PROJECTS LTD.**

RAJESH AGARWAL
MANAGING DIRECTOR

Rajesh Agarwal
Managing Director

In presence of :

C. S. Datta

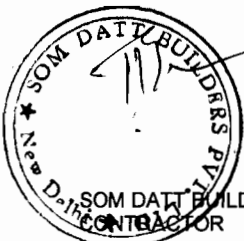
ARSS INFRASTRUCTURE PROJECTS LIMITED

Attested



Seraj
28-01-08

Serat Kumar Bhuyan
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003



Instrument Notarised (29)



दिल्ली DELHI

Sarat Kumar Bhuyan E 208409
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003

POWER OF ATTORNEY

SOM DATT BUILDERS PVT. LTD. a company incorporated in India and having its principal place of business at 56-58 Community Centre, East of Kailash, New Delhi - 110 065, India (hereinafter referred to as "Som Datt Builders").

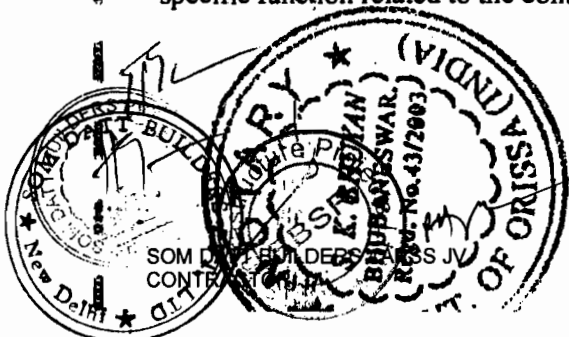
And

ARSS INFRASTRUCTURE PROJECTS LIMITED, having its registered office at Sector - A, Zone - D, Plot No. 38, Mancheswar Industrial Estate, Bhubaneswar 751010 (hereinafter referred to as "ARSS").

hereby jointly appoint M/s. Som Datt Builders Pvt. Ltd. represented by Mr. H.G. Advani, Director, as the company in-charge of the Joint Venture for the works of :

"Construction for Widening & Strengthening of existing carriage way to 2-lane for Chandbali - Bhadrak - Anandpur (Km. 0/0 to 45/0 of SH-9 and Km. 0/0 to Km. 55/0 of SH-53)"

We also hereby appoint Mr. H.G. Advani, Director of M/s. Som Datt Builders Pvt. Ltd. as our representative and entrust him with the following authority as our true and law full attorney to conduct all business for and on behalf of any or all partners of the joint venture during the bidding process and in the event JVA is awarded the contract, during the contract execution. He is also authorized to nominate anybody else to carry out specific function related to the contract.



For ARSS INFRASTRUCTURE PROJECTS LTD.

[Signature]
Managing Director

Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
C/o the E.L.C. (Civil)
Bhubaneswar, Orissa.

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Sarat Kumar Bhuyan
28.01.08

Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003

-2-

Both parties shall be, jointly and severally liable, during the bidding process and for the execution of the contract in accordance with the contract terms.

We hereby agree to confirm and ratify all and every act or thing done by the said Power of Attorney holder within the scope of authority hereby conferred on him to sign and submit the Pre-qualification and bidding documents on behalf of **M/s. Som Datt Builders - "ARSS" (JV)** under this Power of Attorney shall be binding on us as if the same were executed by us.

This Power of Attorney is executed on this 28th day of JANUARY 2008.

Signature of Executive on behalf of
M/s. SOM DATT BUILDERS PVT. LTD.

H.G. Advani
H.G. Advani
Director

Signature of Executive on behalf of
M/s. ARSS INFRASTRUCTURE PROJECTS LIMITED
For ARSS INFRASTRUCTURE PROJECTS LTD.

Rajesh Agarwal
RAJESH AGARWAL
MANAGING DIRECTOR

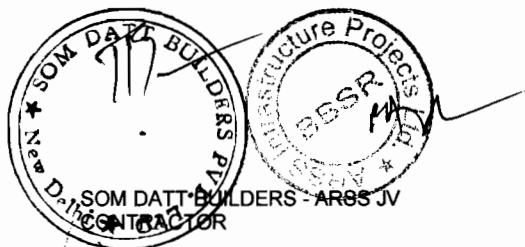
Accepted the above appointment

H.G. Advani
H.G. Advani



A. H. Patel

Sarat Kumar Bhuyan
28.01.08
Sarat Kumar Bhuyan
NOTARY, BHUBANESWAR
Govt. of Orissa (India)
Regd. No.-43/2003



J.
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/O the E.I.C. (Orissa)
Bhubaneswar.

(315)



दिल्ली DELHI

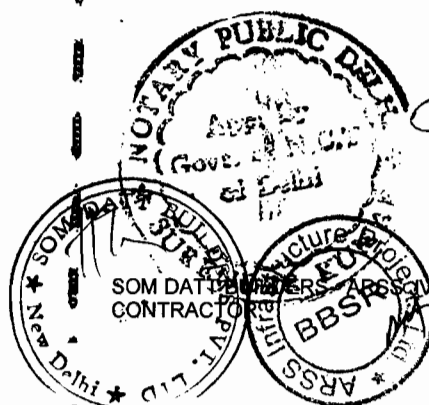
C 698163

SPECIAL POWER OF ATTORNEY

BE IT KNOWN to all that I, Inder Mohan Khaneja s/o Late Shri Nanak Chand by order of the Board of Directors of M/s. Som Datt Builders Private Limited, Engineering Contractors, a Company incorporated under the provision of the Companies Act, 1956 having its Registered Office at 8, Circus Market Place, Kolkata 700 017 and Administrative Office at 56-58, Community Centre, East of Kailash, New Delhi 110 065 (hereinafter called "the Company") do hereby nominate, constitute and appoint Shri H.G. Advani, s/o Late Shri Govind Ram Advani, r/o-M-58, Greater Kailash, Part-II, New Delhi 110 048 to do and execute all or any of the following acts, deeds and things incidental thereto as the Attorney of the Company :-

- a. to sign Tenders & Prequalification documents and other necessary papers relating thereto ;
- b. to submit the application to the Tendering / Project Authority;
- c. to enter into the Joint Venture Agreement;

contd..2/-



[Handwritten Signature]



2 JAN 2000

ATTESTED PHOTO COPY
Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
In the S.I.C. (CIVIL)
(Case Etubanswar)

- d. to execute the Contract Agreement and enter into correspondence relating thereto and to deal with the matter concerning to DRB, Arbitration and Litigation with Engineer / Employer;
- e. to do all other acts, deeds and thing as may be deemed expedient in this connection or to authorize any other official(s) of the Company to act on behalf of the Company in respect of submission of the application for the works.

I hereby agree to confirm, ratify all acts or deeds, matter or assurances done or made by the said Attorney which shall be binding on the Company with full force and effects as per resolution of Board of Directors.

IN WITNESS WHEREOF, I have signed this Power of Attorney on behalf of the Company in the presence of the witnesses hereinafter mention this 24th day of April, 2007.

Witnesses :

1. *U.K. Mathur*
 U.K. MATHUR
 S/o Sh. K.K. MATHUR
 58 Community centre
 East of Kailash, New Delhi

2. *A.C. Sharma*
 A.C. SHARMA
 70/82 R.F. Shoran
 58, Community Centre,
 East of Kailash,
 New Delhi

(Signature)

(INDER MOHAN KHANEJA)
 BY THE ORDER OF THE BOARD OF DIRECTORS
 SOM DATT BUILDERS PRIVATE LIMITED
 56-58, COMMUNITY CENTRE,
 EAST OF KAILASH, NEW DELHI 110 065

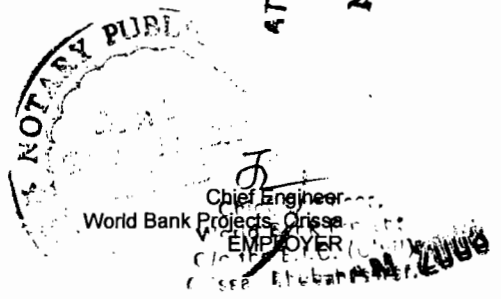
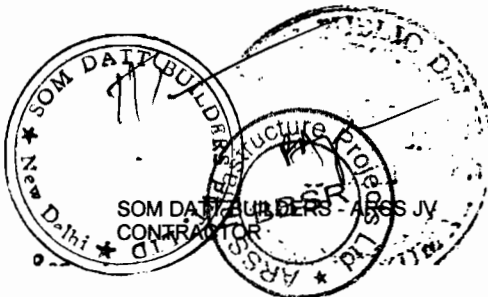
(Signature)

(H.G. ADVANI)
 Specimen Signature of Mr. H.G. Advani,
 Attested

(Signature)

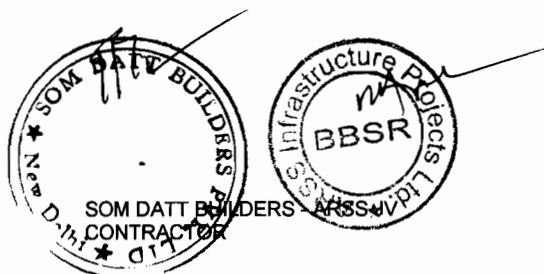
(INDER MOHAN KHANEJA)

ATTESTED PHOTO COPY
 Notary Public, Delhi



ELI - 2: JV Information Sheet

JV / Specialist Subcontractor Information	
Bidder's legal name	SOM DATT BUILDERS-ARSS (J.V)
JV Partner's or Subcontractor's legal name	SOM DATT BUILDERS PVT LTD. (LEAD PARTNER)
JV Partner's or Subcontractor's country of constitution	India
JV Partner's or Subcontractor's year of constitution	1965
JV Partner's or Subcontractor's legal address in country of constitution	At 56-58, Community Centre, East of Kailash, New Delhi-110065, India,
JV Partner's or Subcontractor's authorized representative information <small>(name, address, telephone numbers, fax numbers, e-mail address)</small>	H.G. Advani, Director of M/s Som Datt Builders Pvt. Ltd. 56-58, Community Centre, East of Kailash N.D.-110065, India, Telephone-011-26431607 / 08/09 Mob No. 09810372687 Fax No. 011-26236373 E.mail:- som datt1@nda.vsnl.net.in
Attached the Following Documents	
<ul style="list-style-type: none"> • Certificate of Incorporation • Resolution to sign the documents 	



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**SECOND
CERTIFICATE OF INCORPORATION**

COMPANY NO. 26380

Sd/- 5.1.89
Asstt. Registrar of Companies
West Bengal

I hereby certify that M/s. **SOM DATT BUILDERS PRIVATE LIMITED** was incorporated on the Twenty-fifth day of February, One Thousand Nine Hundred and Sixty-five under the Companies Act, 1956 (No. 1 of 1956) and that the Company is limited.

Issued at Calcutta this the Twenty-first day of September, One Thousand Nine Hundred and Eighty Eight.



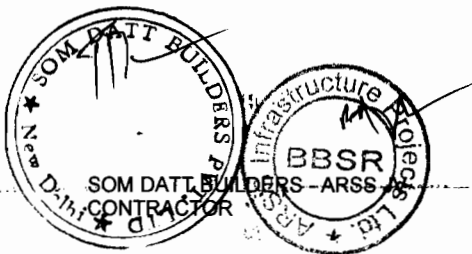
Sd/-
Asstt. Registrar of Companies
West Bengal

* The Company has become Deemed Public U/S 43A (1A) of the Companies Act, 1956.

Sd/- 5.1.89
Asstt. Registrar of Companies
West Bengal

The Company has been re-converted to Private Limited from deemed Public by virtue of Section 43A (2A) of the Companies (Amendment) Act, 2000 in the style **SOM DATT BUILDERS PRIVATE LIMITED**.

Sd/- 21.02.03
Asstt. Registrar of Companies
West Bengal, Kolkata-700020



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E-mail : somdatt1@nda.vsnl.net.in
sdbl@airtelbroadband.in
website : www.somdattbuilders.com

Tel. : +91-11-26431607/8/9
+91-11-26426712/13
+91-11-26483027/28
Fax : +91-11-26236373



SOM DATT BUILDERS PVT. LTD.

ENGINEERING CONTRACTORS

56-58, Community Centre, East of Kailash, New Delhi-110 065



Ref. No. :

Date :

COPY OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS OF SOM DATT BUILDERS PRIVATE LIMITED HELD ON MONDAY, 2ND APRIL, 2007 AT 56-58, COMMUNITY CENTRE, EAST OF KAILASH, NEW DELHI-110 065.

"RESOLVED THAT Shri H.G. Advani, Director of the Company, be and is hereby authorized to do all or any of the acts, deeds and things on behalf of the Company :-

- a. to sign Tenders & Prequalification documents and other necessary papers relating thereto ;
- b. to submit the application to the Tendering / Project Authority;
- c. to enter into the Joint Venture Agreement;
- d. to execute the Contract Agreement and enter into correspondence relating thereto and to deal with the matter concerning to DRB, Arbitration and Litigation with Engineer / Employer;
- e. to do all other acts, deeds and thing as may be deemed expedient in this connection or to authorize any other official(s) of the Company to act on behalf of the Company in respect of submission of the application for the works.

"FURTHER RESOLVED THAT Shri Inder Mohan Khaneja, Director of the Company be and is hereby authorized to execute Special Power of Attorney in favour of Shri H.G. Advani".

/CERTIFIED TRUE COPY/

for SOM DATT BUILDERS PRIVATE LIMITED

AFFIDAVIT PHOTO COPY
Notary Public, Delhi
H.G. Advani



SPECIMEN SIGN. OF Mr.HG ADVANI
DIRECTOR

H.G. Advani

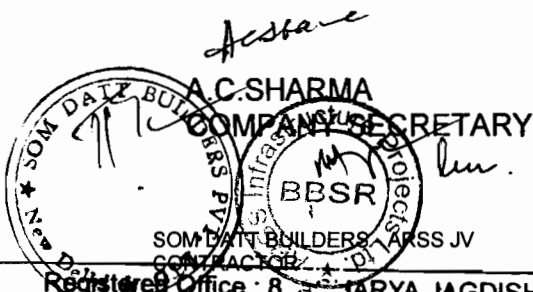
Chief Engineer

World Bank Projects, Orissa

EMPLOYER

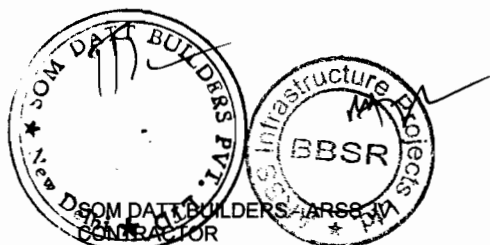
City of P.O. (India)

Phone: 6666666666



ELI - 2: JV Information Sheet

JV / Specialist Subcontractor Information	
Bidder's legal name	SOM DATT BUILDERS-ARSS (J.V)
JV Partner's or Subcontractor's legal name	ARSS INFRASTRUCTURE PROJECTS PVT LTD. (PARTNER)
JV Partner's or Subcontractor's country of constitution	India
JV Partner's or Subcontractor's year of constitution	2005
JV Partner's or Subcontractor's legal address in country of constitution	Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa.
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	H.G. Advani, Director of M/s Som Datt Builders Pvt. Ltd. 56-58, Community Centre, East of Kailash N.D.-110065, India, Telephone-011-26431607 / 08/09 Mob No. 09810372687 Fax No. 011-26236373 E.mail:- som datt1@nda.vsnl.net.in
Attached the Following Documents	
<ul style="list-style-type: none"> • Certificate of Incorporation • Resolution to sign the documents 	



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भारत सरकार-कम्पनी कार्य मंत्रालय
कम्पनी रजिस्ट्रार कार्यालय, उड़ीसा

कम्पनी अधिनियम, 1956 की धारा 18 (1) (क)

उद्देश्य-खंडों में परिवर्तन की पुष्टि हेतु विशेष विनिश्चय के पंजीकरण का प्रमाण-पत्र

कार्पोरेट पहचान संख्या : U14103OR2000PLC006230

मैसर्स ARSS INFRASTRUCTURE PROJECTS LIMITED

के अंशधारकों ने दिनांक 20/04/2007 को आयोजित की गई वार्षिक / असाधारण बैठक में एक विशेष विनिश्चय पारित करके कम्पनी अधिनियम, 1956 (1956 का 1) की धारा 18 (1) का अनुपालन करते हुए अपने संगम-ज्ञापन के प्रावधानों में परिवर्तन कर लिया है।

मैं, एतद्वारा सत्यापित करता हूँ कि उक्त विशेष विनिश्चय की प्रतिलिपि, यथा परिवर्तित संगम-ज्ञापन के साथ, आज पंजीकृत कर ली गई है।

मेरे हस्ताक्षर द्वारा कटौत में यह प्रमाण-पत्र, आज दिनांक तीस अप्रैल दो हजार सात को जारी किया जाता है।

GOVERNMENT OF INDIA - MINISTRY OF COMPANY AFFAIRS
Registrar of Companies, Orissa

SECTION 18(1)(A) OF THE COMPANIES ACT, 1956

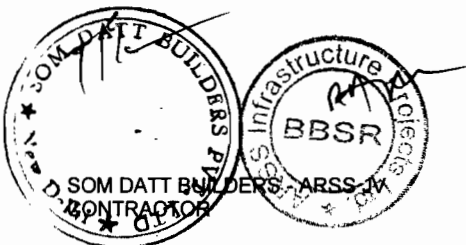
Certificate of Registration of the Special Resolution Confirming Alteration of Object
Clause(s)

Corporate Identity Number : U14103OR2000PLC006230

The share holders of M/s ARSS INFRASTRUCTURE PROJECTS LIMITED having passed Special Resolution in the Annual/Extra Ordinary General Meeting held on 20/04/2007 altered the provisions of its Memorandum of Association with respect to its objects and complied with the Section (18)(1) of the Companies Act, 1956 (No. 1 of 1956).

I hereby certify that the said Special Resolution together with the copy of the Memorandum of Association as altered has this day been registered.

Given under my hand at Cuttack this Thirtieth day of April Two Thousand Seven.



Brohant
(MOHANTY BIBEKANANDA)
कम्पनी रजिस्ट्रार/ Registrar of Companies

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o The E.I.C. (India)
Cuttack, Bhubaneswar.

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COMPANY NO. 15-06230 OF 2000-01

CIN: U14103OR2000PLC006230

**FRESH CERTIFICATE OF INCORPORATION
CONSEQUENT OF CHANGE OF STATUS OF THE
COMPANY IN THE OFFICE OF THE REGISTRAR OF
COMPANIES, ORISSA, CUTTACK**

(UNDER THE COMPANIES ACT, 1956)

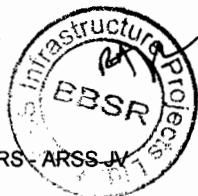
IN THE MATTER OF M/S. ARSS STONES PRIVATE LIMITED

I hereby certify that *M/S. ARSS STONES PRIVATE LIMITED* which was originally incorporated on SEVENTEENTH day of MAY, TWO THOUSAND under the Companies Act, 1956 and under the name ARSS STONES PRIVATE LIMITED subsequently change its name to ARSS INFRASTRUCTURE PROJECTS PRIVATE LIMITED on 20th May, 2005 having passed necessary resolution on 15TH NOVEMBER, 2005 in terms of Section 44(2)(b) read with Section 31 of the Companies Act, 1956 and the approval of the Central Government signified in writing having been accorded hereto in the Registrar of Companies, Orissa the status of the said Company is this day converted to "ARSS INFRASTRUCTURE PROJECTS LIMITED".

Given under my hand at CUTTACK this THIRD day of APRIL, TWO THOUSAND SIX.


(L. MOHANTY)
REGISTRAR OF COMPANIES, ORISSA.

कम्पनी रजिस्ट्रार
Registrar of Companies
उड़ीसा / Orissa



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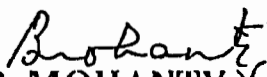
M/S. ARSS INFRASTRUCTURE PROJECTS PRIVATE LIMITED.

COMPANY REGISTRATION NO. 15-006230
CERTIFICATE OF REGISTRATION OF CONFIRMING
ALTERATION OF OBJECTS.

(SECTION 18(1) OF THE COMPANIES ACT, 1956).

M/S. ARSS INFRASTRUCTURE PROJECTS PRIVATE LIMITED having by Special Resolution passed on *TWENTYSIXTH* day of *MAY, TWOTHOUSAND FIVE* altered the provisions of its Memorandum of Association with respect to its main objects and such alteration having been confirmed on the *26TH MAY, 2005*, I hereby certify that the resolution together with the printed copy of the Memorandum of Association as altered has been registered on *27.05.2005*.

Given under my hand at **CUTTACK** this **TWENTYSEVENTH** day of **MAY, TWOTHOUSAND FIVE**.


(**B. MOHANTY**)
REGISTRAR OF COMPANIES,
ORISSA

कम्पनी रजिस्ट्रार
Registrar of Companies
उड़ीसा / Orissa





COMPANY REGISTRATION NO : 15-06230 OF 2000-2001

CIN NO.U14103OR2000PTC006230

**FRESH CERTIFICATE OF INCORPORATION CONSEQUENT ON CHANGE OF NAME
IN THE OFFICE OF THE REGISTRAR OF COMPANIES, ORISSA, CUTTACK**

(UNDER THE COMPANIES ACT, 1956)

IN THE MATTER OF M/S. ARSS STONES PRIVATE LIMITED

I hereby certify that *M/S. ARSS STONES PRIVATE LIMITED* which was originally incorporated on the SEVENTEENTH day of MAY, TWO THOUSAND under the Companies Act, 1956 and under the name "ARSS STONES PRIVATE LIMITED" the said Company passed necessary resolution in terms of Section 21 of the Companies Act, 1956 on 19th April 2005 and the approval of the Central Government, signified in writing having been accorded hereto in the Ministry of Company Affairs, Registrar of Companies, Orissa letter No. TS/S.21/6230/410 dated 20th MAY, 2005 the name of the said Company this day changed to " ARSS INFRASTRUCTURE PROJECTS PRIVATE LIMITED"

Given under my hand at CUTTACK this TWENTIETH day of MAY, TWO THOUSAND FIVE.

B. Mohanty
(B. MOHANTY)

REGISTRAR OF COMPANIES, ORISSA.

कम्पनी रजिस्ट्रार
Registrar of Companies
उड़ीसा / Orissa





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**ARSS INFRASTRUCTURE
PROJECTS LIMITED**

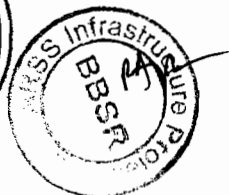
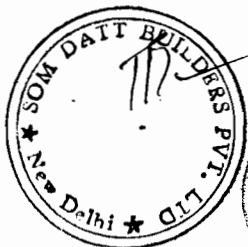
THE EXTRACT OF THE MINUTES OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS OF ARSS INFRASTRUCTURE PROJECTS LIMITED HELD AT ITS REGISTERED OFFICE SITUATED AT PLOT NO. 38, SECTOR-A, ZONE-D, MANCHESWAR INDUSTRIAL ESTATE, BHUBANESWAR – 751010 ON 15TH JANUARY, 2008 AT 11.30 A.M.

"RESOLVED THAT approval of the Board be and is hereby granted to enter into a Joint Venture Agreement with **SOM DATT BUILDERS PVT. LTD.** 56-58 Community Centre, East of Kallash, New Delhi - 110 065, in the name and style of "SOM DATT BUILDERS - ARSS J.V." with effect from 8th January, 2008 for the DAMODAR VALLEY CORPORATION for **"Construction for widening & Strengthening of existing carriageway to 2-lane for Chandbali – Bhadrak – Andapur (Km 0/0 to Km 45/0 of SH-9 and Km. 0/0 to Km. 50/0 of SH-53."**

"RESOLVED FURTHER THAT the draft deed of Joint Venture Agreement duly initialed by the Chairman placed before the meeting be and is hereby approved.

For ARSS INFRASTRUCTURE PROJECTS LTD.

K. Jha
Managing Director

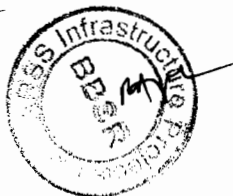


Technical Proposal

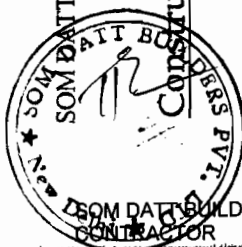
- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **Equipment**
- **Others**



SOM DATT BUILDERS - ARSS JV
CONTRACTOR

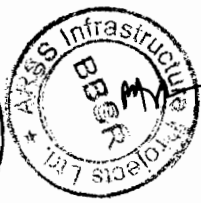



Chief Engineer,
World Bank Project, Orissa
EMPLOYER (C/MP)
College, Bhubaneswar.

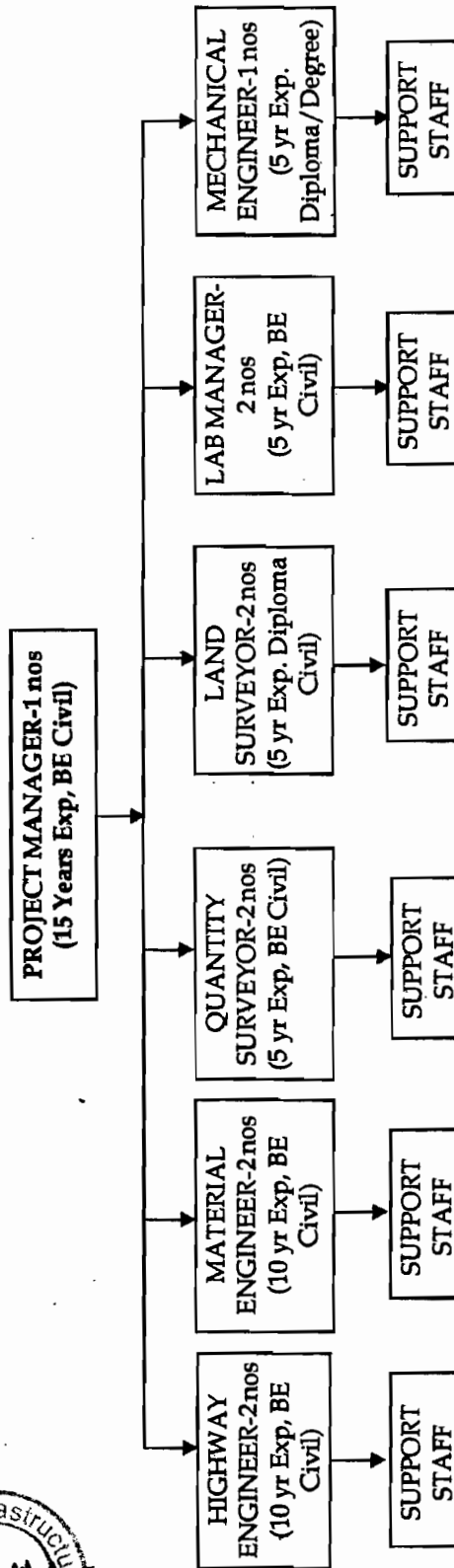


SOM DATT BUILDERS - ARSS (J.V.)

Construction for Widening & Strengthening of existing carriageway to 2-lane for Chandbali - Bhadrak - Anandpur (Km. 0.0 to Km. 45.0 of SH-9 and Km. 0.0 to Km. 50.0 of SH-53)



SITE ORGANISATION



NOTE:- Required manpower with adequate experience will be deployed on award of work as such specific names have not been indicated now



Chief Engineer

World Bank Projects, Orissa

EMPLOYER

Orissa, Bhubaneswar.

Method Statement

1. Introduction:-

The section of Chandabali-Bhadrak-Anandapur 0/0Km to 45/0Km of SH-9 & 0/0Km to 50/0Km of SH-53 is going to be widened from single lane to double lane with improvement of riding quality.

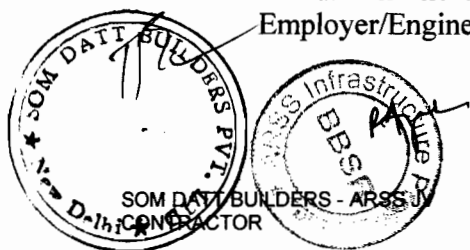
The work comprises of providing double lane carriage way with earthen shoulders on either side. The principal items of work to be executed are Earthwork in subgrade, providing GSB, WMM, DBM, and BC including widening of CD works. The work shall be carried out with the running traffic.

A. General preparatory works And Pre-Construction Activities

- (i) Studying of the design and Alignment, Setting-out and Fixing of toe pillars: Studying of the design & alignment available with the Consultant /Client and checking the correctness of the centre line through professionally well qualified survey team, the centre line marking and fixing of toe pillars shall be taken up. The Survey Engineer of the firm shall have regular interaction with his counterpart of the Consultant for setting out, measuring levels etc.
- (ii) Deployment of Key Personnel in consultation with the Consultant/Client: Qualified & experienced Technical and Supervisory personnel shall be deployed to meet the requirement in line with tender stipulations.

Necessary arrangement shall be made for the payment, housing, fooding and transport of the labourers engaged in conformity with the prevalent labour law.

- (iii) Camp and Accommodation: Arrangement of adequate land for installation of, workshop, go-down, stores, stockyard for materials, camp office, staff quarters, field testing laboratory, hiring of houses for staff shall be taken up. The land shall be minimum 500m away from habitation.
- (iv) Deployment of Machineries & equipment: All required equipments & machineries for completion of the work within stipulated time shall be procured & deployed at site well before start of the event. It is also planned to have enough spare parts and trained personnel to carry out necessary maintenance of plant and machineries. The principal machinery /plant requirements for this work are JCB, Paver, Hot-mix plant, WMM plant, Grader, Roller, dozer, tipper, water tanker etc. The equipment deployment schedule shall be carried out in consultation with the Engineer. The Plant Engineer of the firm shall be exclusively in charge of the Concrete Batch mix Plant, Hot-mix and WMM plants.
- (v) Material planning: The materials to be used for the work shall be located and tested for suitability. Borrow areas to be identified at different locations along the road. Testing for suitability of soil shall be taken up. Stone products are proposed to be used from local quarries along the road. Materials from these quarries shall be tested in approved laboratory. The water from the local source shall also be tested. All these testing work shall be carried out in consultation with the Employer/Engineer and records maintained.

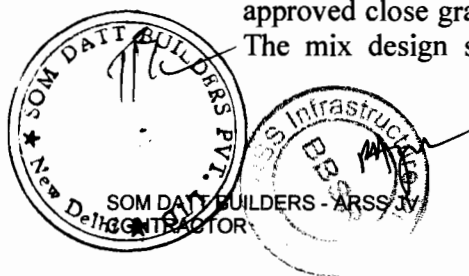


- (vi) **Mix designs, specifying methods, manufacturing of concrete, sampling and testing procedure, Quality Control measures:** The work shall require finalization of mix design for GSB, WMM and concrete over M15 grade as well as bituminous mix designs. For lower grade of concrete, nominal mix shall be followed. It is proposed to use Ultratech/ ACC/ Konark cement of appropriate grade for the entire work and the same shall be got tested in approved laboratory. Similarly steel from SAIL/TATA/ RINL shall be used after conforming to the relevant tests, and satisfying the decided specification.
- (vii) **Establishment of laboratories & Quality Assurance Plan of various components of the works:** Field laboratory with required testing equipments and qualified engineer with support staff shall be in position before commencement of work. To save delay in progress, we may take the service of approved laboratory/Government laboratories to render necessary services. The activity specific Quality Assurance Plan (QAP) conforming to specification appended to the contract shall be finalized in consultation with the Engineer so as to ensure quality construction. The QAP shall cover activities from approval of sources of materials, to finalization of bituminous mix designs and concrete mix designs, laying methods, sampling and testing procedure and Quality Control measures to ensure required standard and consistency in quality, at the commencement of item, etc.
- (viii) **Maintaining the road to keep traffic worthy during construction period.:** Since heavy traffic use this road, necessary maintenance will be taken up with care to ensure safe movement of traffic. Required sign boards/ warnings/ cautionary boards shall be in position before start of events including barricading danger zones.

B. Construction Activities:

Major items of work of the project consists of

- (i) **Construction/extension/repair of cross drainage works:** After finalization of the centre line & fixing of Toe pillars, priority will be given for layout of Construction/ reconstructions/ rehabilitation of HP Culverts, box culverts, bridges. These works shall be completed before starting of road works in these reaches. The widening/ reconstruction/ rehabilitation of culvert works shall be mostly carried out in the first mile stone. Individual design and programme of construction shall be finalized in consultation with the Engineer.
- (ii) **Construction of Embankment, sub grade including rehabilitation of embankment/sub-grade:** The existing road embankment slope and the ground from existing toe line to the final toe line shall be stripped of vegetation and necessary benching shall be done to receive earth work in layers. The widening of the embankment shall be carried out for one side and after reaching the sub-grade level the other sided shall be taken up. The work for embankment and sub-grade shall be carried out as per specification appended to the Contract & relevant codes. The detail methodology for execution of this item shall be prepared separately in consultation with the Engineer.
- (iii) **Construction of Granular Sub base:** Granular sub base shall be done with approved close graded materials of grading-I of cluse 401, MoRTH specification. The mix design shall be carried out and provided to the plant. The detailed



methodology for execution of this item shall be prepared separately in consultation with the Engineer.

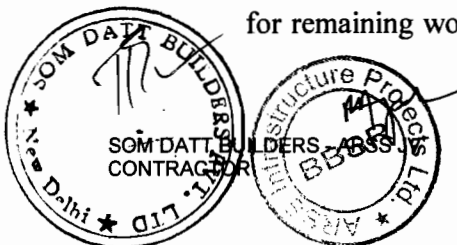
- (iv) **WMM:** The WMM shall be machine mixed as per approved design mix done before start of work and field tests conducted to check the correctness of the mix. WMM to be laid by paver & watered rolled to achieve designed compaction and as per detailed specification of Clause 407, MoRTH.
- (v) **DBM:-** After WMM is laid of required thickness with acceptable compaction and approved by the Engineer preparation works shall be done for laying DBM. DBM as per design mix shall be laid by paver strictly as per technical specifications & MoRTH guidelines Clause 507.
- (vi) **BC:- CRMB-55** The item shall be executed as per direction of Engineer-in-charge & Technical specifications Clause 509 and 21, MoRTH Specifications.
- (vii) **Culverts & Bridges:-** The Culverts and Bridges shall be given top priority and advance planning shall be done to test the materials, prepare design mix, arrange adequate Staging & Shuttering materials etc. All works shall be carried out as per Technical specification & MoRTH guide lines.
- (viii) **Protective Works:** The embankment after construction shall be dressed neatly to desired slopes & shape. Stone pitching wherever planned shall be provided on filter media as per drawing. Turfing as per provision shall be laid & watered will survival of the sods.
- (ix) **Road markings, road signs and kilometer/hectometer stones; Guard posts etc:** The colour, width and layout of road markings shall be as per IRC 35 and as per specification in the drawings. The road surface shall be cleaned by compressed air before layout is given. Materials shall be of approved quality and as per specifications. Road signs and kilometer/hectometer stones; Guard posts etc shall be provided as per drawing and relevant codes. The job has many items and there are specific construction methodology enshrined in the Specification. Some times execution of some items shall have combined methodology for more than one item. From the broader guidelines provided in the specification site specific methodology shall be finalized without deviating from the quality and performance requirement. Construction methodology covering all aspects such as from manufacturing to transportation including Quality control & precautions for each item shall be prepared in consultation with the Engineer.

C. Post-Construction activities

- (i) **Rectification of the defects in the completed works during the Defects Liability Period:** The road stretches after handing over on completion shall be observed carefully. Any defects noticed shall be rectified immediately in consultation with the Engineer.

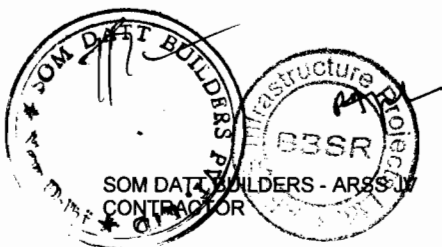
D. Management Meetings

- (i) In order to maintain time and cost control it is necessary that the Employer and Engineer are apprised of the progress and ground difficulties requiring intervention. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early



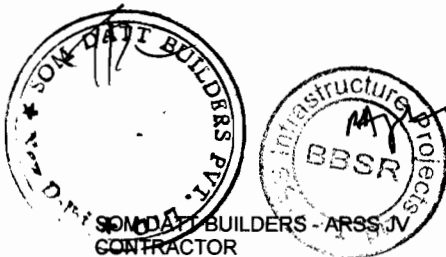
warning procedure. Project Manager of the firm shall attend all management meetings and have regular interaction with the Engineer and Employer.

- (ii) While expediting works with quality assurance, due care shall be taken to control Environmental Pollution to the bare minimum. Also adequate measures will be taken to ensure minimum public in-convenience. All steps/measures shall be taken to carry the general public of the locality to confidence along with our team of Engineers/Workers.



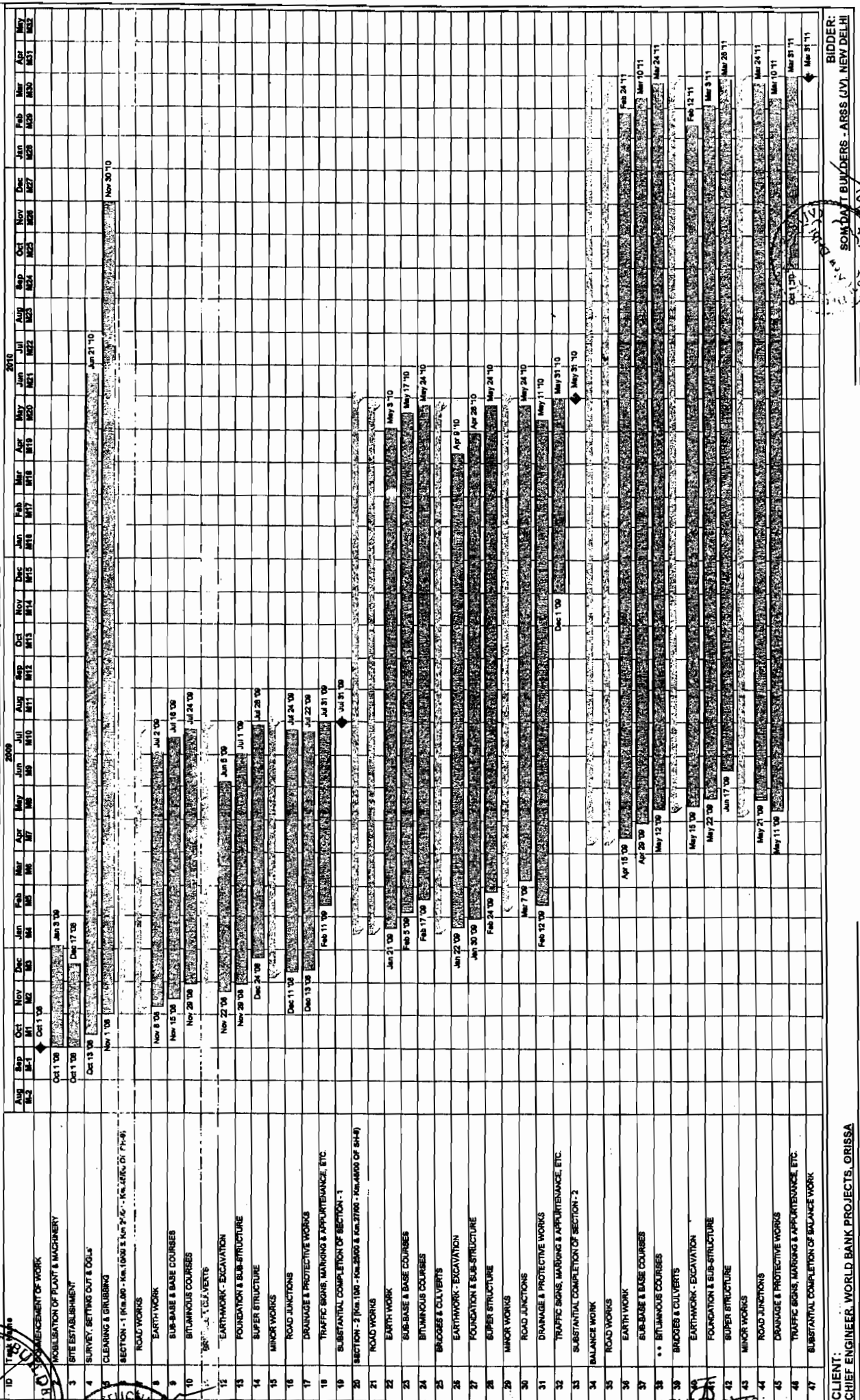
Mobilization Schedule

Man Power	Start Date	7 days from Signing Agreement
	Completion Date	50 days from Signing Agreement
Machinery	Start Date	15 days from Signing Agreement
	Completion Date	90 days from Signing Agreement

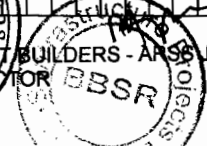


(32)

**TENTATIVE PROGRAMME FOR
CONSTRUCTION FOR WIDENING & STRENGTHENING OF EXISTING CARRIAGEWAY TO 2-LANE FOR CHANDBALI - BHADRAK - ANANDPUR
(Km.0/0 TO Km.45/0 OF SH-9 AND Km.0/0 TO Km.50/0 OF SH-53)
PACKAGE NO.: OSRP-CW-ICB-Y1-P02**



SOM DAITI BUILDERS - ARSS W
CONTRACTOR



World Bank Projects, Orissa
EMPLOYER

CLIENT:
CHIEF ENGINEER, WORLD BANK PROJECTS, ORISSA

BIDDER:
SOM DAITI BUILDERS - ARSS (JV), NEW DELHI



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**TENTATIVE PROGRAMME FOR
"CONSTRUCTION FOR WIDENING & STRENGTHENING OF EXISTING CARRIAGEWAY TO 2-LANE FOR CHANDBALI - BHADRAK - ANANDPUR
(Km.0/0 TO Km.45/0 OF SH-9 AND Km.0/0 TO Km.60/0 OF SH-53)"
PACKAGE NO.: OSRP-CW-ICB-Y1-P02**

Task Name	2010												2011											
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1 COMMENCEMENT OF WORK																								
2 MOBILISATION OF PLANT & MACHINERY																								
3 SITE ESTABLISHMENT																								
4 SURVEY, SETTING OUT & OSL*																								
5 CLEARING & GRUBBING																								
SECTION - 1 (Km.20 - Pk.1.7 & Km.2000 - Km.4500 (C-2+6))																								
ROAD WORKS:																								
8 EARTH WORK																								
9 SUB-BASE & BASE COURSES																								
10 BITUMINOUS COURSES																								
11 PRE-CAST CULVERTS																								
12 EARTHWORK - EXCAVATION																								
13 FOUNDATION & SUB-STRUCTURE																								
14 SUPER STRUCTURE																								
15 MINOR WORKS																								
16 ROAD JUNCTIONS																								
17 DRAINAGE & PROTECTIVE WORKS																								
18 TRAFFIC SIGNS, MARKING & MAINTENANCE, ETC.																								
19 SUBSTANTIAL COMPLETION OF SECTION - 1																								
SECTION - 2 (Km.100 - Km.2400 & Km.2700 - Km.4500 OF SH-9)																								
20 ROAD WORKS																								
21 EARTH WORK																								
22 SUB-BASE & BASE COURSES																								
23 BITUMINOUS COURSES																								
24 BRIDGES & CULVERTS																								
25 EARTHWORK - EXCAVATION																								
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31 TRAFFIC SIGNS, MARKING & MAINTENANCE, ETC.																								
32 SUBSTANTIAL COMPLETION OF SECTION - 2																								
34 BALANCE WORK																								
35 ROAD WORKS																								
36 EARTH WORK																								
37 SUB-BASE & BASE COURSES																								
38 BITUMINOUS COURSES																								
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46 TRAFFIC SIGNS, MARKING & MAINTENANCE, ETC.																								
47 SUBSTANTIAL COMPLETION OF BALANCE WORK																								

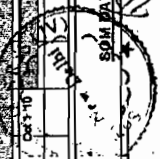


SOM DATT BUILDERS - ARSS JV
CONTRACTOR

World Bank Projects, Orissa
Client: EMPLOYER
Orissa, Bhubaneswar.

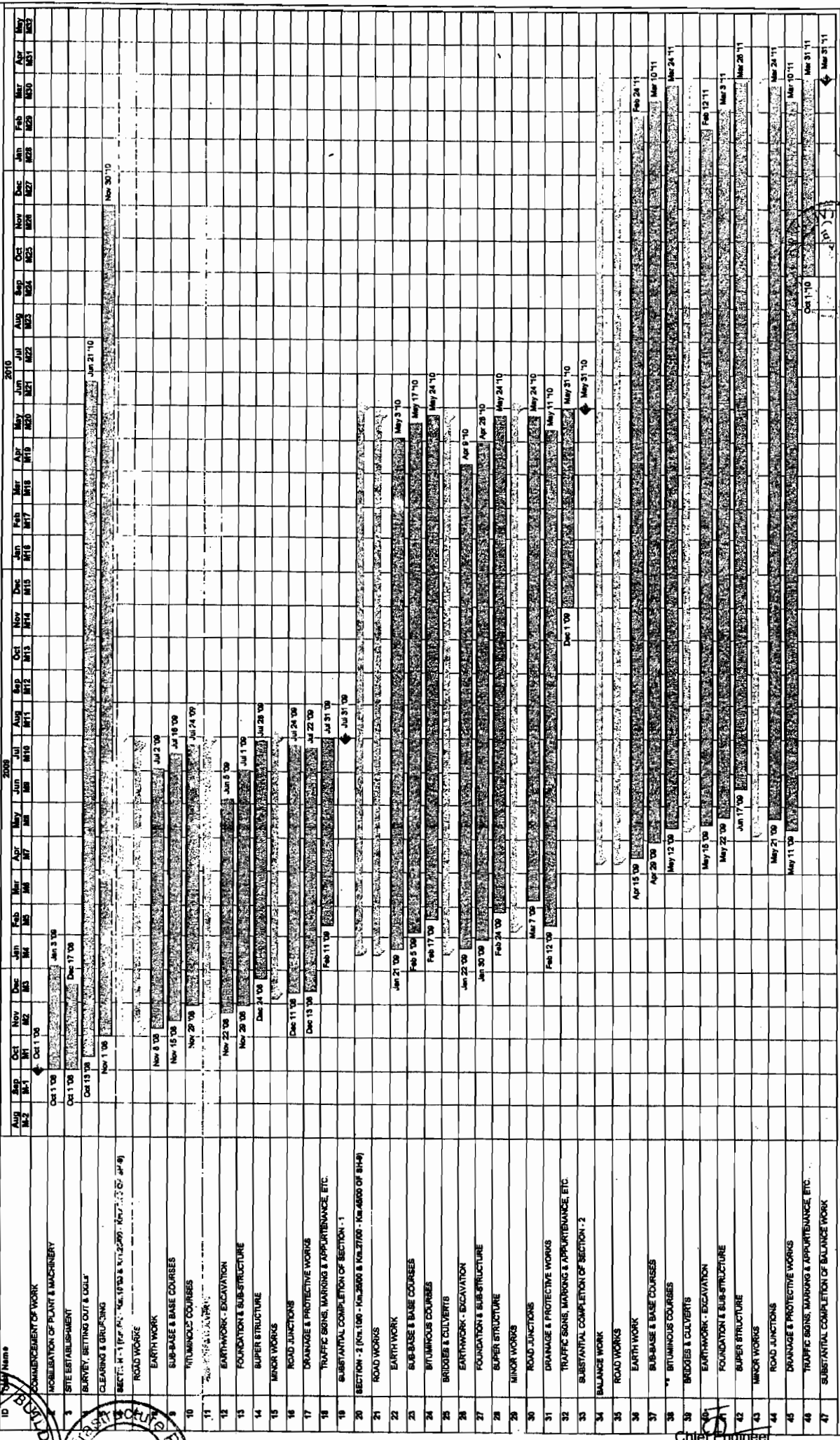
CLIENT: WORLD BANK PROJECTS, ORISSA
CHIEF ENGINEER

BIDDER: SOM DATT BUILDERS - ARSS (JV), NEW DELHI



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**TENTATIVE PROGRAMME FOR
"CONSTRUCTION FOR WIDENING & STRENGTHENING OF EXISTING CARRIAGEWAY TO 2-LANE FOR CHANDBALI - BHADRAK - ANANDPUR
(Km.0/0 TO Km.45/0 OF SH-9 AND Km.0/0 TO Km.60/0 TO Km.60/0 OF SH-63)"
PACKAGE NO.: QSRP-CW-JCB-Y1-P02**

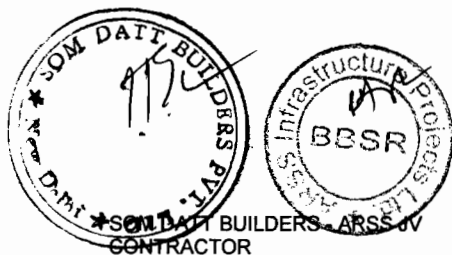


CLIENT: **SOM DATI BUILDERS - ARSS**
 CHIEF ENGINEER: WORLD BANK PROJECTS, ORISSA

World Bank Projects, Orissa
 EMPLOYER
 G/1 the E.L.C. (S.O.)
 Orissa, Bhubaneswar.

Minimum Requirement Equipment

Sl. No	Equipment Type	Characteristics	Minimum Number required
1.	Mechanical Bitumen Sensor Paver	100 TPH	01
2.	Motor Grader	200 cum/Hr	03
3.	Hydraulic Excavator	60 cum/Hr	02
4.	Vibratory Roller	8 T [100 cum/Hr]	03
5.	Pneumatic roller	25 cum/Hr	03
6.	Hot Mix Plant	100 TPH	01
7.	Concrete Batch-mix Plant	75 Cum/Hr	01
8.	Transit Mixer	4.5 cum/Hr	01
9.	Front End Loader	4 Cum / Hr	02
10.	Dozer	150 cum/Hr	02
11.	Tipper	5 cum	20



SOM DATT BUILDERS - ARSS JV
CONTRACTOR

**PLANTS AND EQUIPMENTS PROPOSED FOR THE PROJECT
BY M/s SOM DATT BUILDERS PVT LTD, New Delhi**

1.

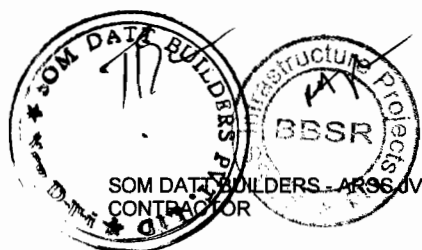
Item of equipment: MECHANICAL BITUMEN SENSOR PAVER – 1 No.		
Equipment information	Name of manufacturer GUJARAT APOLLO	Model and power rating AP 550
	Capacity 100 TPH	Year of manufacture 2006
Current status	Current location TIKAMGARH (M.P.)	
	Details of current commitments Free.	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

2.

Item of equipment:- MOTOR GRADER – 2 Nos.		
Equipment information	Name of manufacturer: VOLVO	Model and power rating G720
	Capacity 200 CUM/HR	Year of manufacture 2002
Current status	Current location KANPUR & TIKAMGARH	
	Details of current commitments Free	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

3.

Item of equipment: HYDRAULIC EXCAVATOR – 1 Nos.		
Equipment information	Name of manufacturer TATA HITACHI	Model and power rating EX-200LC
	Capacity 6CUM	Year of manufacture 2002
Current status	Current location KANPUR & TIKAMGARH	
	Details of current commitments Free	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



4.

Item of equipment: VIBRATORY ROLLER – 2 Nos.		
Equipment information	Name of manufacturer GREAVER BOMAG	Model and power rating BW212-D
	Capacity 8 T (100 CUM/HR)	Year of manufacture 2002
Current status	Current location TIKAMGARH	
	Details of current commitments Free.	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

5.

Item of equipment: PNEUMATIC ROAD ROLLER – 2 Nos.		
Equipment information	Name of manufacturer BOMAG	Model and power rating BW 16 R
	Capacity 25 CUM / HR	Year of manufacture 2002
Current status	Current location KANPUR & TIKAMGARH	
	Details of current commitments Free.	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

6.

Item of equipment: HOT MIX PLANT (BATCH TYPE) WITH ELECTRONIC CONTROLS AND VIBRATORY SCREENS – 1 No.		
Equipment information	Name of manufacturer GUJARAT APOLLO OR EQUAILENT	Model and power rating ANP 1500
	Capacity 100 TPH	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



7.

Item of equipment: CONCRETE BATCHING AND MIXING PLANT-1 No.		
Equipment information	Name of manufacturer MAXOMIX / BHAI OR EQUAILENT	Model and power rating
	Capacity 75 CUM /HR	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

8.

Item of equipment: TRANSIT MIXER- 1 Nos.		
Equipment information	Name of manufacturer GREAVER / CIFA / AJAX FLORI OR EQUAILENT	Model and power rating
	Capacity 4.5 CUM PER HR	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

9.

Item of equipment: FRONT END LOADER – 1 Nos.		
Equipment information	Name of manufacturer LIEBHERR	Model and power rating L544
	Capacity 4 CUM/Hr	Year of manufacture 2002
Current status	Current location KANPUR & TIKAMGARH	
	Details of current commitments Free.	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

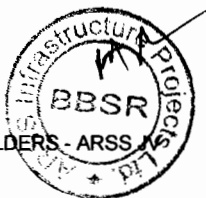


10.

Item of equipment: DOZER – 1 Nos.		
Equipment information	Name of manufacturer:- CATTERPILLER	Model and power rating D6H
	Capacity 150 CUM/HR	Year of manufacture 2001 / 2002
Current status	Current location KANPUR & TIKAMGARH	
	Details of current commitments Free	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

11.

Item of equipment: TIPPERS – 10 Nos.		
Equipment information	Name of manufacturer TATA	Model and power rating
	Capacity 5 CUM	Year of manufacture
Current status	Current location TIKAMGARH	
	Details of current commitments Free.	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



**PLANTS AND EQUIPMENTS PROPOSED FOR THE PROJECT
By M/s ARSS Infrastructure Projects Limited, Bhubaneswar**

1.

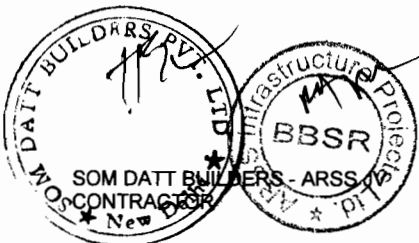
Item of equipment: Motor Garder- 1 No		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 200 Cum/Hour	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

2.

Item of equipment: Hydraulic Excavator- 1 No		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 60 Cum/Hour	Year of manufacture 2006
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

3.

Item of equipment: Vibratory Roller- 1 No		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 8 T (100 Cum/Hr)	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



4.

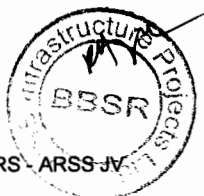
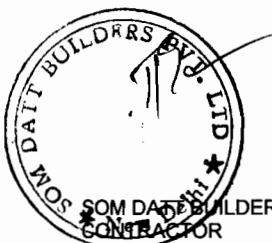
Item of equipment: Pneumatic Roller- 1 No		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 25 Cum/ Hr.	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

5.

Item of equipment: Front End Loader- 1 No		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 4 Cum/ Hr.	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

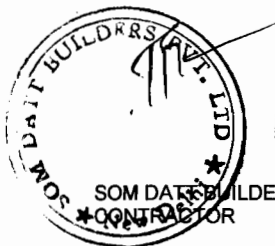
6.

Item of equipment: DOZER- 1 No		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 150 Cum/ Hr	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



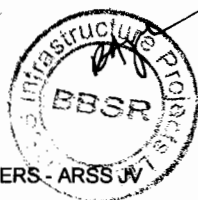
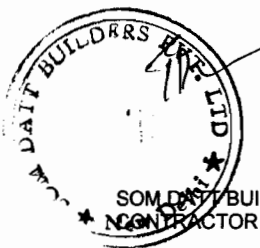
7.


Item of equipment: Tipper-10 Nos		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 14 Cum	Year of manufacture
Current status	Current location TO BE PURCHASED	
	Details of current commitments TO BE PURCHASED	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



Minimum Requirement of Personnel

No.	Position	Total Work Similar Experience (years)	In Similar Works Experience (years)	Qualification and Specific Experiences.
1	Project Manager – 1 No	15	10	Degree in Civil Engg. & must worked as project manager for bigger contracts above 15 million US\$.
2	Highway Engineer – 2 Nos	10	5	Degree in Civil Engg. & must worked as Highway Engr. for bigger contracts above 15 million US\$.
3	Material Engineer – 2 Nos	10	5	Degree in Civil Engg. & must worked as material Engr. for bigger contracts above 15 million US\$.
4	Quantity Surveyor – 2 Nos	5	3	Degree in Civil Engg. & must worked as Quantity for bigger contracts above 5 million US\$.
5	Land Surveyor – 2 Nos.	5	3	Diploma in Civil. Engg.
6	Lab Manager/Technician – 2 Nos	5	3	Degree in Civil Engg.
7	Mech./Equip. maint. Engr – 1 no	5	3	Dip/Degree in Mech. Engg.



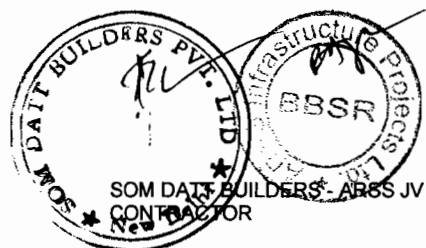

 Chief Engineer
 World Bank Projects, Orissa
 World Bank EMPLOYER
 C/o the E.I.C. (Orissa)
 Orissa, Bhubaneswar.

PERSONNEL

PERSONNEL PROPOSED FOR THE PROJECT BY M/s SOM DATT BUILDERS PVT. LTD.

1.	Title of position* PROJECT MANAGER
	Name – Col. V.B. Arora(Retd.)
2.	Title of position* HIGHWAY ENGINEER
	Name –Mr. Krishna
	Name – Mr. Suman Kumar Singh
3.	Title of position* MATERIAL ENGINEER
	Name-Mr. Davinder Kumar
	Name- Mr. Raghavendra
4.	Title of position* QUANTITY SURVEYOR
	Name-Mr. Gopal Krishnan
	Name- Mr. Satyavan Chaudhary
5.	Title of position* LAB MANAGER
	Name-Mr.Subhash Chandra Tiwari
	Name- Mr. Ravi Singh
6.	Title of position* LAND SURVEYER
	Name-Mr.Vijay Kumr Yadav
	Name- Mr. Rajesh Kumar Pundir
7.	Title of position* MACH./ EQUIP.MAINT.ENGINEER
	Name-Mr.Tirlochan Singh

*As listed in Section III.



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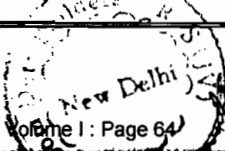
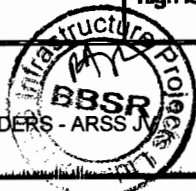
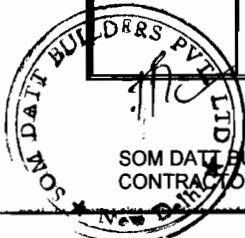
FORM (PER-2)
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Project Manager	
Personal Information	1. Name Col. V.B. Arora (Retd).
	2. Date of birth : 03.02.1946
3. Professional qualifications : M.E. (Civil)	
Present employment	4. Name of employer : Som Datt Builders Private Limited
	Address of employer : 56-58, Community Centre, East of Kailash, New Delhi - 110 065
	Telephone : 26431607/8/9, 26483027/8, 26426712/3
	Contact (Manager/Personnel Officer) : Mr. H.G. Advani
	Fax : 011-26236373
Job title of candidate : Project Director	Years with present employer : 10 Years

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant technical and management experience
June 1997	till date	Working with M/s. Som Datt Builders Pvt. Limited as Project Director and successfully completed the following highway projects :- (a) Four Lining and Strengthening of NH-1 between Ambala - Rajpura Section of 15.80 km long., Punjab funded by WORLD BANK. Value of the project is about Rs. 100 Crores (Flexible Pavement). (b) Halol - Godhra (Km 335.00 km 373.00) of Gujarat State Highway project (GSHP/5) funded by World Bank (Flexible Pavement). (c) Four lining and strengthening of the existing two lane sections between km 393.000 to km 470.000 on NH-2 via Sikandra - Bara Route (Construction Package-IIA) in Uttarpradesh, (Contract No. TNHP/1) (World Bank Funded Project). The value of the project is Rs. 290 Crores. (Rigid and Flexible Pavements).
1995	May, 1997	Worked with NOIDA Authority & U.P. P.W.D. as Consulting Engineer Roads, Bridges and Geo Engineering. As engineer consultant was responsible for supervising the construction of flexible pavement of 180 km length of various stretches in Uttar Pradesh and NOIDA. These works were tested as per the Technical specifications of MOST in the field laboratory to maintain proper quality controls. Was also responsible for proof checking of designs of two bridges of NOIDA authority and provided supervision during their construction.
1993	1995	Worked with VTL as Project Director. As Project Director was responsible for the construction of a turnkey project of a textile mill costing Rs. 120 million and completing the same well ahead of schedule and to the entire satisfaction of the consultants. The consultants for this project were from Italy for looms and civil engineering work, and from U.K. for electronic jacquards. Apart from construction of large span RCC frame structures with typical foundations subjected to high looms 600 RPM to have vibration free floors, fully provided centralised air-conditioning.

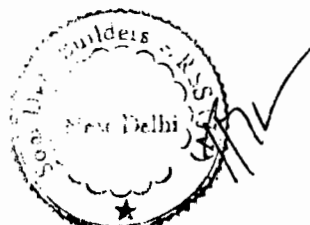
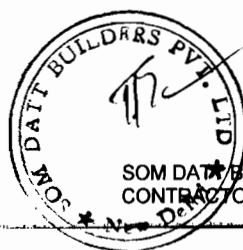


Chief Engineer,
World Bank Projects, Grissa
EMPLOYER
G/10th FLOOR

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(Col. V.B. Arora # 2)

From	To	Company/Project/Position/Relevant technical and management experience
		The road works involved the approach from the NH-1 to the factory main building and all the connecting and intersecting roads leading to various offices / warehouses. Peripheral roads were constructed all along the area for security reasons. All the roads were constructed with use of paver for good quality work.
1991	1993	<p>Worked with Super Special Contracting Agency as Supervision Consultant and Design Engineer.</p> <p>Designed and Constructed two bridges on river Niara & Tain in North India. Tain Bridge consisted of pre-stressed concrete RCC bridge on road Akhnoor Poonch having three spans of 45 meters. each. Mid piers were also with open foundation after doing the river training works. Abutments had the wingwalls, screen walls, return walls to suit the hill side slopes. Niara bridge was a single span prestressed RCC bridge with 60 meters span. Open foundation (rafr) for abutments were placed on hard rock strata being the hilly region. The hill side rivers, because of large catchment areas used to swell up in little time and speed of water would be extremely high posing problems of worrying during the limited non flood period. the designs were governed by the scour depth considerations and foundation were resting on hard rock. Shear key in some cases was provided to offset the erodability in rock stratum.</p> <p>The approaches to these bridges were executed as flexible pavement in hilly terrain, posing problems of hill cutting to maintain proper geometric applicable for hill roads.</p>
1990	1991	<p>Worked with NTPC as Project Director.</p> <p>The work entailed complete construction of the first Turbo deck of Dadri Plant (NTPC) and resurfacing of all the internal roads.</p> <p>It involved non stop concreting without cold joint, 350 cum of concrete at 14 meter high resting on columns. Very large fixtures and placements for subsequent turbine connection was the critical activity. With the resources available concreting was done in 72 hours non stop. In addition very large number of piles, pile caps and foundations were done for other structures in the Thermal Plant.</p>
1988	1990	<p>Worked with Engineer-in-Chief (Indian Army) as Deputy Director Airfield Pavements.</p> <p>Was responsible for co-ordination, assisting in design and providing expert supervision in execution of all the Air force air fields in India for both flexible and rigid pavements.</p> <p>As a pavement supervision expert, the flexible pavement of SIRSA airfield rigid pavement of Jamnagar airfield and flexible and rigid pavements in the technical area at Palam Airport was assigned specially for early completion and were completed by target dates.</p> <p>Was responsible for emergent repairs to the Vavuniya airfield in Sri Lanka which had been made non-operational. Using the local available materials and deploying Engineer troops on war-footing, the airfield was made air traffic worthy in a record time of 3 weeks.</p>

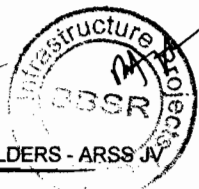


Chief Engineer
 World Bank Projects - Orissa
 EMPLOYER
 Orissa, Bhubaneswar.

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(Col. V.B. Arora # 3)

From	To	Company/Project/Position/Relevant technical and management experience
1986	1988	<p>Worked with Engineer-in-Chief (Indian Army) as Senior Construction Manager.</p> <p>Was responsible for construction of hill roads and bridges for total length of 120 km in very difficult terrain in the North East. To open this axis the design of road was based on local materials available and the river / stream gaps were bridged using Bailey equipment, aluminum bridges for larger spans and mix of improvised and standard equipment available. Subsequently these bridges were converted into beam girder RCC bridges.</p>
1983	1986	<p>Worked with Director General Naval Project as Marine Structures Design Engineer.</p> <p>Designed and executed marine structures. The extension of 8 berth was designed using diaphragm wall, 1 meter dia bored cast in situ pile (30 meters deep approx.) beam and slab and rock anchors to support the diaphragm wall. It was a change from the earlier concept of monolith construction. Another jetty was designed and constructed using vertical cased piles and raker piles. Use of barrages was made for construction in the sea area. The RCC beams and deck slabs were made with provision of fenders on both sides of the jetty. Except for the areas in the close proximity of berthing facilities where rigid pavements were provided, rest in all other areas the flexible roads were provided. Being reclaimed soil a very stringent control of use of materials for filling, subgrade preparation and rolling was called for. A total stretch of such connecting roads was approximately 75 kms.</p>
1980	1983	<p>Worked with Military Engineering Services as Garrison Engineer.</p> <p>As a Garrison Engineer constructed four lane of 30 km road works for an brigade group, new cantonment from abinitio. All the development works, road works, buildings, services in an area of 1390 acres of land was done in record time. The project was subjected to stringent check.</p>
1974	1979	<p>College of Military Engineering (CME) as Instructor in Flexible and Rigid Pavements.</p> <p>Was responsible for imparting technical training to Army officers both in theory and practice for construction of flexible and rigid pavements. The training included emergency rapid repairs to the pavements in war situations as well as normal construction techniques including quality controls i.e. laboratory and field testing.</p> <p>Was specially selected for post graduation in Roorkee University (Soil Mechanics and Foundation Engineering).</p>
1969	1974	<p>Engineer-in-Chief (Indian Army) as Construction Engineer in various projects.</p> <p>Carried out construction of roads and tracks totalling to approximately 300 km. in different terrains ranging from desert to Himalayas to coastal area in various projects in India.</p> <p>Was specially assigned the task of rehabilitation of bridges and road in Bangladesh during 1971.</p>



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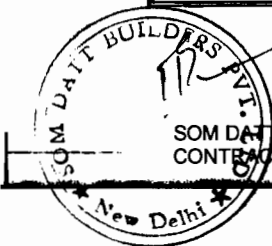
FORM (PER-2)
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : : Highway Engineer		
Personal Information	1. Name Shri Krishna	2. Date of birth : 11.07.1965
	3. Professional qualifications : B.E. (Civil)	
Present employment	4. Name of employer : Som Datt Builders Pvt. Ltd.	
	Address of employer : 56-58, Community Centre, East of Kailash, New Delhi – 110 065	
	Telephone : 26431607/8/9, 26483027/8, 26426712/3	Contact (Manager/Personnel Officer) : Mr. H.G. Advani
	Fax : 011-26236373	E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate : Highway Engineer	Years with present employer : 4 Years

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant technical and management experience
Jan. 2004	till date	Working with M/s. Som Datt Builders Pvt. Ltd. as Project Manger Presently posted Four laning and strengthening of the existing two lane sections between km 470 to km 31 on NH-2 (Construction Package-III) in Uttarpradesh, (Contract No. GTRIP/4) (World Bank Funded Project). The value of the project is Rs. 495 Crores.
Jun.1995	Dec. 2003	Worked with M/s Pearls Buildwell Infrastructure Ltd. as Project manager for the following projects : a) Improvement & Strengthening of Ludhiana-Chandigarh Road (Section Khamao to Kharar) Km. 47.50 to 78.56 including 4 laning portions of Khamano & Gurgaon along with profile correction in Morinda. Project cost Rs.22 Crores. – Period 15 months. b) Widening and strengthening of Dera Baba nanak Gurdaspur Mukerian Road (MDR-68) (Section Gurdaspur to Shalla Km 0 to 15 and Mukerian to Naushera Km 0 to 7) in district Gurdaspur & Hoshiarpur. Project Cost Rs.7 Crores, Period – 9 months. c) Widening of Road from 2 lane to 6 lane with existing ROW Km. 8.89 to 11.60 Chandigarh – Ropar Road (NH-21) and 2 lane to 4 lane in Km 6.80 to 8.28. Project Cost Rs. 6.10 Crores, Period – 9 Month. d) Upgradation of Khanna –Samrala – Machhiwara-Rahaon Road (Section : Left out portion Samrala Town RD 11,640 to 16.780). Project cost Rs.5 Crores. Period 6 months e) Construction of at level crossing No. 32-B at Kurali on Sirhind Nangal Dam Section on Northern Railway crossing Chandigarh – Ropar Road (NH-21) at Km 26.428 under BOT scheme with Toll Rights. Project Cost rs. 20 Crores. Period 24 months.
Jun.1990	May 1995	Worked with M/s Prime Construction Company, New Delhi as Sr Construction Engineer for their projects under M/s Unitech Ltd., New Delhi.



Chief Engineer
 World Bank Projects, Gurgaon
 EMPLOYER
 Mr. H.G. Advani
 Contact: 011-26236373

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FORM (PER-2)

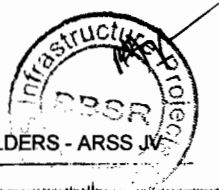
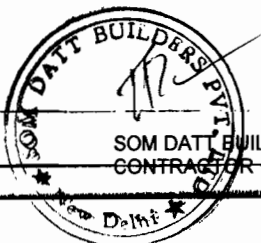
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Highway Engineer		
Candidate Information	1. Name of candidate: Suman Kumar Singh	
	2. Date of birth/age: 16 th Dec. 1967	
	3. Professional qualifications: B.E. Civil	
Present Employment	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G.Advani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate: Highway Engineer	Years with present employer : 9 years

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant/technical and management experience
Nov. 1998	Till Date	Working with Som Datt Builder Pvt. Ltd. as Project Manager for the project Rehabilitation and Strengthening to Orcha SH-37, Tikamgarh to Malhara SH 10 and Tikamgarh to Shahgarh SH-10 in Madhya Pradesh funded by ADB. Successfully Completed the following projects: (a) Four laning and strengthening of the existing two lane sections between km 393.000 to km 470.000 on NH-2 via Sikandra - Bara Route (Construction Package-IIA) in Uttarpradesh, (Contract No. TNHP/1) (World Bank Funded Project). The value of the project is Rs. 290 Crores. (Rigid and Flexible Pavements). (b) Renigunta - Naidupet, Renigunta - Puttur, Chandragiri - Puthalapattu Road project (Contract APSH-5) Andhra Pradesh (World Bank Funded Project). Value of this project is Rs. 103 Crores. The length of the project is 109.50 km.
April 1994	Oct. 1998	Worked with Saporji Palanji Contracting Co. Ltd. as Highway Engineer for the project Mumbai-Poona Expressway, the ghat portion for NHDP, New Delhi Worked with Saporji Palanji Contracting as Sr. Engineer for the project Construction of Five Star Hotel Mourya Sharaton Hotel and Tower and American Embassy School New Delhi
April 1992	March 1994	Avineer Construction Pvt. Ltd. as Site Engineer for the project Construction of Lotus and Kishore Apartment



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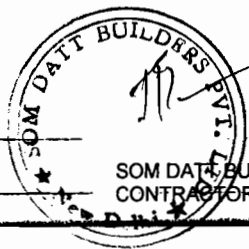
**FORM (PER-2)
Resume of Proposed Personnel**

Name of Bidder : **Som Datt Builders Pvt. Ltd.**

Position : Material Engineer		
Candidate Information	1. Name of candidate: Davinder Kumar	
	2. Date of birth/age: 11 January 1973	
	3. Professional qualifications: B.E. (Civil)	
Present Employment	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G.Advani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate: Material Engineer	Years with present employer : 3 Months

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant/technical and management experience
Oct. 2007	Till Date	Working with M/s Som Datt Builder Pvt. Ltd. as Material Engineer Presently posted at Upgradation of Ludhiana Malerkotla Sangrur Road (Section from 5+938 Km to 77+290 Km) Contract No. PSRSP/WB/UG/2/ICB Value of Project is Rs. 226 Crores.
July 2007	Oct. 2007	Worked with M/s Brahmaputra Consortium Limited as Quality Control Engineer for the project of Rehabilitation of Chandigar-Laandran-Chunni-Sirhind road Project (World Bank Aides)
April 2007	July 2007	Worked with M/s Pearl Buildwell infrastructure Limited as Quality Control Engineer for the project of construction of Nirmal Chhaya Tower at Zirakpur Section
July 2001	March 2007	Worked with M/s P.N.I.L Apex Consortium Ltd. as Quality Control Engineer for the Project of Widening and Strengthening of left out portion of Khanna-Samra-Machhiwara-Rahon Road (RD 11640 to 16780) and Construction of R.O.B. at level crossing no. 32-B Sirhind Nangal Dam Section of Northern Railway on Chandigarh Ropar Road (NH-21) at KM 26.428 at Kurali on B.O.T. Basis
April 1998	July 2001	Worked with M/s Som Datt Builder Pvt. Ltd. as Quality Control Engineer for the project of four laneing and strengthening of NH-1 (from KM 212.2 to KM 228+0) Ambala to Rajpura
July 1995	March 1998	Worked with M/s Amamath Aggarwal Const. (P) Ltd. as Junior Engineer for the project of Construction of 114 boy shosten and 24 No. 1220 Sq. ft. houses at hostel of Government Polytechnic, Ambala City and Construction of Ash duke at GHTP-Stage-III at Lehra Mohbatt, Distt. Bathinda



SOM DATT BUILDERS - ARSS JV
CONTRACTOR

Chief Engineer
World Bank Projects, Orissa

EMPLOYER
Chief Engineer
Orissa, Bhubaneswar

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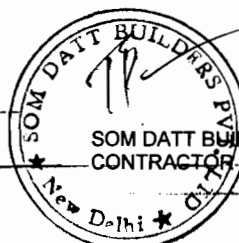
FORM (PER-2)
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Material Engineer	
Personal Information	1. Name Mr. RAGHAVENDRA
	2. Date of birth : 25.05.1964
3. Professional qualifications : B.E. (Civil)	
Present employment	4. Name of employer : Som Datt Builders Pvt. Limited
	Address of employer : 56-58, Community Centre, East of Kailash, New Delhi - 110 065
	Telephone : 26431607/8/9, 26483027/8, 26426712/3
	Contact (Manager/Personnel Officer) : Mr. H.G. Advani
	Fax : 011-26236373
Job title of candidate : Material Engineer	E-mail: somdatt1@nda.vsnl.net.in
	Years with present employer : 3 Years

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant technical and management experience
April 2004	Till date	Working with Som Datt Builders Pvt. Ltd. as Chief Materials Engineer. Presently posted at Four laning and strengthening of the existing two lane sections between km 470 to km 31 on NH-2 (Construction Package-II B) in Uttarpradesh, (Contract No. GTRIP/4) (World Bank Funded Project). The value of the project is Rs. 495 Crores (Rigid and Flexible Pavements).
Feb. 2003	Mar. 2004	Worked with Madhucon Projects Ltd. as Sr. materials Engineer for the construction of Upgrading to 4/6 lanes and Rehabilitation of existing carriageway from Chittorgarh to Mangalwad (NH76) in Rajasthan State (Rigid / Flexible Pavements).
Jan. 2002	Jan. 2003	Worked with Satav Construction Pvt. Ltd., Pune as Materials Engineer for the execution of Widening to Four Lanes and rehabilitation of existing Carriageway of Pune - Satara Road (NH4)PSIII.
Oct. 1997	Dec. 2001	Worked with M/s Jog Engineering Ltd. Pune as Quality Control Engineer for the execution of Mumbai Pune Expressway , Section-D "Ozarde to Dehu road" (Rigid Pavement).
May 1995	Sept. 1997	Worked with V.H. Khatri Engineering & Contractos as Project engineer for the execution of State Highway Project, in the State of Karnataka.
May 1986	Apr.1995	Worked with M/s M.M.C.C, Hubli as Quality Control Engineer for the execution of Konkan Railway Corporation works (Reach VII) and Sharavati Tail Race Hydel Project, Karnataka



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EMPLOYER
Office of the E.T.C. (C.M.)
Orissa, Bhubaneswar.

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FORM (PER-2)

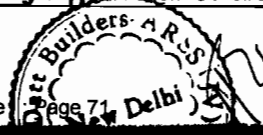
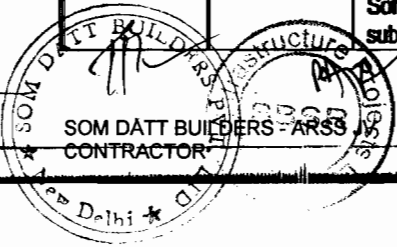
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : QUANTITY SURVEYOR		
Candidate Information	1. Name of candidate: A.K.N. GOPALAKRISHNAN	
	2. Date of birth/age: 10 TH June 1971	
Present Employment	3. Professional qualifications: Civil Engineering	
	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G.Advani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
Job title of candidate: QUANTITY SURVEYOR	Years with present employer : 6 Months	

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

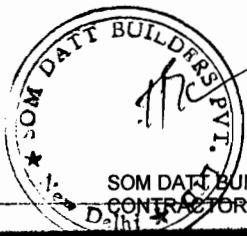
From	To	Company/Project/Position/Relevant/technical and management experience
June, 2007	Till Date	Working with Som Datt Builder Pvt. Ltd. as QUANTITY SURVEYOR. Presently posted at Madhya Pradesh Road Sector Development Program Phase-II for Package (4) : (i) Project Road No. 26, SH37, Tikamgarh-Orcha 78.40 km; (ii) Project Road No. 27 SH10, Tikamgarh-Malhera 57.60 km; (iii) Project Road No. 28 SH37, Tikamgarh-Shahgarh 61.00 km. Value of the Project is Rs. 115 Crore.
Aug. 2006	May 2007	Worked with JMC Project as Deputy Manager for the project Four laning and Strengthening of existing low lanes of Km 0.000 to Km 124.840 (124.840 Km) of Trichy -Madurai Section of NH-45B Responsibility : To assist GM in preparation of monthly progress reports, payment certificates, Variation orders, and verification of contractors invoices claims etc. Establish proper recording procedures and implement document control. To report the day to day matters to GM regarding Construction supervision and progress. To report all measures required to control the project costs and time overrun. To prepare the project reports as per the project requirements. To submit the Claims of the Contractor to the Consultant. To abide by the directions, procedures formats of the reports set by the GM.
Feb 2005	Aug. 2006	Worked with PBA Infrastructure Ltd. as Quantity Surveyor cum Planning Engineer for the project Four Laning and Strengthening of existing two lanes of Km 203.000 to Km 233.600 (30.600km) of Madurai-Kanyakumari Section of NH-7 Responsibility : making Cross Section for Provisional and AS Build in the Road Estimator Software and getting approval from the Contractor and submit to the Consultant and get approved from Consultant and passed by N.H.A.I. Preparing bill for the sub-contractors, piece rate workers, taking measurements and getting the IPC approved and passed as per BOQ by the concerned authorities of the section. Planning, Billing, Preparation of Estimates, Rate Analysis, Preparation of Rate analysis for variation items as per MORT&H DATA BOOK and as per the respective State PWD Schedule of Rates. Preparation of Price Adjustment with respect to Ministry of labour and Ministry of Industries Rates. Is also responsible for proper planning with the resources available and monitoring the activities related to the project. Assisting the Chief Project Manager in all aspects of progress and management of the project. Making Schedule as per the Work Programme and Monitoring the Work accordingly.
April 2002	Jan 2005	Worked with Prathysha Associates as Quantity Surveyor cum Planning Engineer for the project four laning and strengthening of existing two lanes of Km 253.000 to Km 302.200 (49.20km) of Vijayvada-Visakapatnam Section of NH-5 Responsibility : Making Cross Section for Provisional and AS BUILT in the Road Estimator Software and getting approval from the Consultant. Preparing Running Bill for the Contractor and submit to the Consultant and get approved from Consultant and passed by NHAI. Preparing bill for




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		the sub-contractor, piece rate workers, taking measurements and getting the IPC approved and passed as per BOQ by the concerned authorities of the section. Planning, Billing, Preparation of Estimates, Rate Analysis, Preparation of Rate analysis for variation items as per MORT&H DATA BOOK and as per the respective State PWD Schedule of Rates. Preparation of Price Adjustment with respect to Ministry of labour and Ministry of Industries Rates. Is also responsible for proper planning with the resources available and monitoring the activities related to the project. Assisting the Chief Project Manager in all aspects of progress and management of the project. Making Schedule as per the Work Programme and Monitoring the Work accordingly.
July 2000	March 2002	Worked with S. Thiyagarajan Govt. Contractor, K.K. District as Building Supervisor for the project Building works in Departments like PWD & TWAD Board of Tamil Nadu State at Kanakumari Distt. Responsibility : Execution of all building works and taking measurements and preparing Schedule for the work and monitoring the work accordingly.
March 1999	June 2000	Worked with T.M. Kuppuswamy, Engineers & Contractors, Chennai for the project Strengthening of existing two lanes of Km 0.000 to 14.000 at Old Mahalapuram Road from Thiruvanniyur to Chemmanchery of State Highway Responsibility : Execution of all works and check the quality of work, taking measurements and preparing Schedule for the work and monitoring the work accordingly.
Jan 1990	March 1993	Worked with Jaya Engineers Enterprises , Palayamkottai for the project (a) four storied hostel building in st. Ignafius college of education. Palayamkottai (b) Two Nos of Residential Building at Tirunelveli



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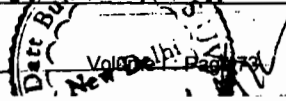
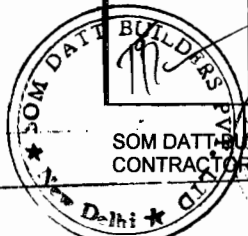
BIDDING ORM (PER-2)
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : QUANTITY SURVEYOR		
Candidate Information	1. Name of candidate: Satyavan Chaudhary	2. Date of birth/age: 5 th Oct. 1969
	3. Professional qualifications: B.E.	
Present Employment	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G.Advani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate: QUANTITY SURVEYOR	Years with present employer : 1 Years

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

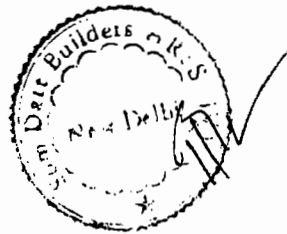
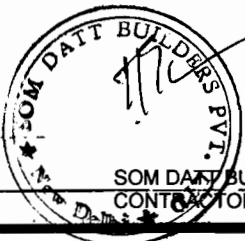
From	To	Company/Project/Position/Relevant/technical and management experience
Jan. 2007	Till Date	Working with Som Datt Builder Pvt. Ltd. as Project Manager. Presently posted at Madhya Pradesh Road Sector Development Program Phase-II for Package (4) : (i) Project Road No. 26, SH37, Tikamgarh-Orcha 78.40 km; (ii) Project Road No. 27 SH10, Tikamgarh-Mahera 57.60 km; (iii) Project Road No. 28 SH37, Tikamgarh-Shahgarh 61.00 km. Value of the Project is Rs. 115 Crore.
July 2006	Dec. 2006	Worked with Era Construction Ltd. as Project Manager for the project MPRDC PROJECT Manasa-Bhanpura-Jhalwar Road Raj. Border Road Project Responsibility : (a) Supervision of Construction work and co-ordination with client (b) preparing bar chart and project review (c) Review of designs, drawings, specification, BOQ and modifications required to suit to prevailing site conditions. Verifications/issue of construction programme, working drawing and monitor the progress of the works
Jan 2006	July 2006	Worked with Purjloyd Ltd. as Dy. Project Manager for the project Integrated Improvement cum Performance Based Maintenance of Baran to Jhalawar road in Rajas than (L2) Responsibility : (a) Supervision of Construction work and co-ordination with client (b) preparing bar chart and project review (c) Review of designs, drawings, specification, BOQ and modifications required to suit to prevailing site conditions. Verifications/issue of construction programme, working drawing and monitor the progress of the works
Dec. 2002	Dec. 2005	Worked with Dadsal Pvt. Ltd. -SKEC (JV) as Sr. Engineer for the project Construction of four lanning NH-8 km 263.00 to km 343.000 Package-1 (Surat-Manor Toll way Project) Responsibility : (a) Supervision of Construction work and co-ordination with client (b) preparing bar chart and project review (c) Review of designs, drawings, specification, BOQ and modifications required to suit to prevailing site conditions. Verifications/issue of construction programme, working drawing and monitor the progress of the works
June 1999	Dec. 2002	Worked with NCC-KNR (JV) as Site Engineer for the project Construction of four lanning NH-24 from Km 27 to km 48 Responsibility : Supervision and Execution of Bituminous Work such as PCC, DBM, BC, with latest machinery and Earthwork, GSB and WMM. Testing of Soil, Sub-Base, WMM handling the Construction of Kerb Site with Survey work. Dealing with Consultant for day-to-day work programme. Checking of measurement at site with Client/Consultant. Preparation of cost control estimate and cash flow statements, planning, programming and monitoring implement the management's decision/rules. Policies objectives, development and goals effectively at project site, submit bill of completed items of work and extra claims as per terms and condition of contract agreement and all other allied works. Responsibilities also included estimation, rate analysis costing using modern computer application, tender documentation, construction planning/scheduling.



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June 1995	Feb 1999	Worked with UNITECH-LG (JV) as Site Engineer (bituminous Work) for the project Four lanning and Stregthening of NH-1 from km 132 to km 212 Responsibility : Supervision and Execution of Bituminous Work such as PCC, DBM, BC, with latest machinery and Earthwork, GSB and WMM. Testing of Soil, Sub-Base, WMM handling the Construction of Kerb Site with Survey work. Dealing with Consultant for day-to-day work programme. Checking of measurement at site with Client/Consultant. Preparation of cost control estimate and cash flow statements, planning, programming and monitoring implement the management's decision/rules. Policies objectives, development and goals effectively at project site, submit bill of completed items of work and extra claims as per terms and condition of contract agreement and all other allied works. Responsibilities also included estimateion, rate analysis costing using modern computer application, tender documentation, construction planning/scheduling.
June 1994	Feb 1995	Worked with Gujarat-Apollo Equipment Ltd. as Engineer (Bituminous Equipmnet)



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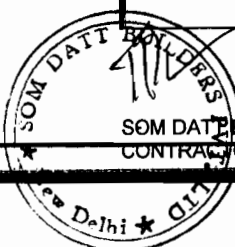
BIDDING FORM (PER-2)
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Lab Engineer		Candidate : <input type="checkbox"/> Prime <input type="checkbox"/> Alternate	
Candidate Information	1. Name of candidate: Subhash Chandra Tiwari		2. Date of birth/age: 20 th May 1972
	3. Professional qualifications: B.Tech Civil		
Present Employment	4. Name of employer: Som Datt Builders Limited		
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065		
	Telephone: 6431607/8/9, 6483027, 6426712/3		Contact (manager/personnel officer): Mr. H.G. Advani
	Facsimile: 011-6236373		E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate: Lab Engineer		Years with present employer : 1 Year 9 Months

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

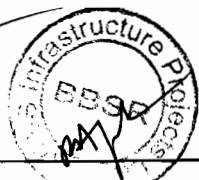
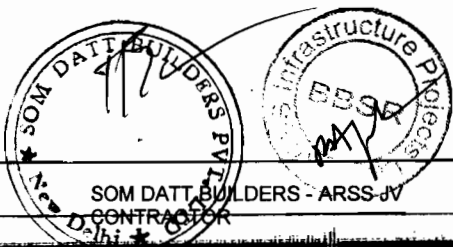
From	To	Company/Project/Position/Relevant/technical and management experience
April 2006	Till Date	Working with Som Datt Builders Pvt. Ltd. as Lab Engineer for the project Package No. 4 Phase-II, (a) Tikangarh-Orcha Road SH-37 (Project Road No. 26) Length of the Road - 78.40km (b) Tikangarh-Malhera SH-10 (Project Road No. 27) Length of Road-57.60 km (c) Tikangarh-Shahgarh SH-37 (Project Road No. 28) Length of Road-61.00 km Responsibility: (a) Preparation of Detailed formats and lab register for compilation of all test records (b) Selection of Borrow Area & Quarry of aggregate in presence of client & consultant for approval. (c) O.G.L. test report at Lab site for erection of soil for embankment & sub grade. (d) For G.S.B. & W.M.M. quarry searching according to grading & properties of aggregates as per contract. (e) Checking size of aggregates & required property at company's own crusher for W.M.M., D.B.M., B.C. and concrete courses at time to time. (f) Estimate quantity of aggregates for every month's work. (g) Estimate quantity of cement and steel for rigid pavement (h) Estimate quantity of Bitumen required for D.B.M. & B.C. for every month. (i) Design of Job mix Formula for G.S.B., W.M.M., D.B.M., B.C., DLC, M-15, M-20, M-25, POC (M-30) etc. (j) Calibration of W.M.M. Plant, Hot Mix Plant & Batching Plant at starting and time to time. (k) Checking of daily test reports, which are required for every day's work. (l) Checking of compaction of every layer L&C, Embankment, Sub grade, G.S.B., W.M.M., P.C.C., D.B.M., B.C. & Concrete layer corresponding to Lab Density (m) Preparation of Quality Assurance and Bar, Chart formation for every month's work. (n) Measurement of completed works and material stockpiles. (o) Reporting of Lab report, which are demanded at time of billing.
Sep 2005	March 2006	Worked with PNC Construction co. Ltd. as Material Engineer for the project upgradation of existing Air Port for Operations of Boeing-737 type of Air Craft at Safai, Etawah (U.P.) Responsibility : Independent in-charge of quality control of Airport Pavements i.e. Run way, Apron Taxi Way, Roads etc. as per MORT&H IS and IRC Specifications and boundary wall as per C.P.W.D. specifications. Selection of Borrow Area for embankment, shoulder and sub-grade, preparation of JMF for GSB, WMM, DBM, BC and concrete work as well as daily lab test reports and maintaining lab register
Aug. 2001	Sep. 2005	Worked with KNR Constructions Ltd. as Material Engineer for the project Maintenance Work of SH-30, Faizabad-Gosaiganj Road (Length of Road-30km), maintenance work of SH-73, Varanasi-Azamgarh Road (Length of Road-30km), Maintenance work of SH-67, Azamgarh-Ghazipur Road (Length of Road-42 km) Responsibility : Responsible for conducting the following types of tests required for day to day construction activities. (i) Soil : Proctor Test, C.B.R., G.S.A. Aterberg Limit, Free swell Index and



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		compaction by sand replacement method. Borrow area approval for Project. (ii) Aggregates : Gradation, Specific Gravity & Water Absorption, Aggregates Impact Value, Flakiness & Elongation test, Aggregate crushing value, Los Angles abrasion test, Soundness test and Ten Percent Fine Value. J.M.F. FOR G.S.B. & W.M.M. Quarry Approval for Projects. (iii) Bituminous Work: J.M.F. for B.M., D.B.M., B.C. & S.D.B.C., Penetration test, Softening Point, Flash & Fire test, Ductility test, viscosity test for Bitumen of different grade, A.I.V., F.I. & E.I., Mix Grading for Aggregates. Marshall Stability, Flow, Va, Vb, V.M.A. V.F.B. Marshall Quotient, Specific Gravity of Mix material & density of cores. Binder content of mix & gradation after extraction. Compaction of Bituminous layers related lab density etc. (iv) Cement : Consistency, initial and final setting time, Cube strength & soundness test. (v) Concrete : Mix design, Compressive strength of cube, flexural strength, Slump test, Core test Compaction test etc.
April 1996	July 2001	Worked with Katal Builder as Material Engineer for the project Construction of granular and Bituminous Pavement Courses of Varanasi-Shakti Nagar road (NH-7), Major District Road Mughalsari-Chakia Road (length of Road 45.0km) , Rehabilitation of MDR Varanasi-bhadohi (length of Road 25.0km) Responsibility : Laboratory Testing work related to road, construction of embankment sub grade, GSB, WBM and Bitumen's layer with proper compaction, level Checking, Material handling & Site Supervision work
March 1995	Feb 1996	Worked with U.P. State Bridge Corporation Ltd. as Apprentice Engineer for the project Varuna Bridge, Varanasi
July 1994	Feb 1995	Worked with Haroo Mall Varanasi as Site Engineer for the project BHU-Maduadiha Road Varanasi



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FORM (PER-2)

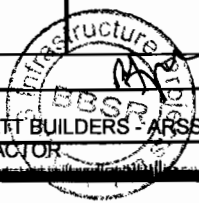
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Lab Manager		
Candidate Information	1. Name of candidate: Ravi Singh	
	2. Date of birth/age: 30 th June 1969	
	3. Professional qualifications: B.E. Civil	
Present Employment	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G. Arvani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate: Lab Manager	Years with present employer : 8 Months

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant/technical and management experience
May 2007	Till Date	Working with Som Datt Builder Pvt. Ltd. as Lab Manager Presently posted at Madhya Pradesh Road Sector Development Program Phase-II for Package (4) : (i) Project Road No. 26, SH37, Tikamgarh-Orcha 78.40 km; (ii) Project Road No. 27 SH10, Tikamgarh-Malhera 57.60 km; (iii) Project Road No. 28 SH37, Tikamgarh-Shahgarh 61.00 km. Value of the Project is Rs. 115 Crore.
Dec. 2005	April 2007	Worked with ITD cementation India Ltd. as Bridge Engineer for the project North South Corridor CSC-11 package no-34 four laning of pathankot-jammu section of NH-1A Responsibility : (a) Full responsibilities of entire structure from km 26.000 to 42.000 km in which 39 Culverts, 6 Cause Ways, 1 Minor Bridge and 2 Major Bridges are as Structure (b) Overall supervision of all Structure (c) To set the plant for the proper execution of task to reach the monthly target.
June 2005	Nov. 2005	Worked with KMC as Bridge Engineer for the project New Construction of Allahabad Bye-Pass Responsibility : (a) Full responsible of 12 box culverts, 8 under passes, 2 over passes & 1 ROB (b) Incharge of 11 km road Section where the embankment made up with fly ash, subgrad, drainage layer & d/c. (c) Fully responsible for the section to handle & deal with the consultant and the client for any type of problems
Sep. 2003	May 2005	Worked with Som Datt builders Ltd. as Bridge Engineer for the project of Four laning and strengthening of the existing two lane sections between km 470 to km 31 on NH-2 (Construction Package-IIB) in Uttarpradesh, (Contract No. GTRIP/4) (World Bank Funded Project). The value of the project is Rs. 495 Crores.
Aug 2002	Aug 2003	Worked with Maheshwari Brothers Ltd. as Senior Engineer for the Project Permanent toll plaza at km 164+000 Dist. Mathura Responsibility ; Incharge of quality control tests, layouts and level records. Fully Responsible for all type of construction works either in roads or in structures or in building of toll plaza
1997	2002	Worked with Dinesh Chandra R Agarwal Engineers as Site in Charge for the project Nh-2 & NH-27 Responsibility : Super vise the maintenance work at NH-2 & Nh-27, in which fully responsible for the stretch to free the pot holes patch work etc.
1996	1997	Worked with Akhil Bhartiya Manav Seva Sansthan as assistant engineer Responsibility : To supervise the construction of Sulabh Complex in Mandi Prasad Campus at lucknow
1995	1996	Worked with Universal Consortium of Engineers Pvt. Ltd. as Assistant Engineer for the project 1/1 Park Street Kolkata Responsibility : To supervise the construction of Six Stories AC Business Complex with all layouts and steel schedule



SOM DATT BUILDERS PVT. LTD. CONTRACTOR

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In the E.L.C. (13/07)
Orissa, Bhubaneswar.

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FORM (PER-2)

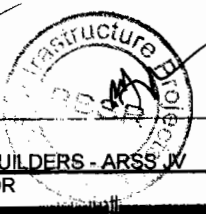
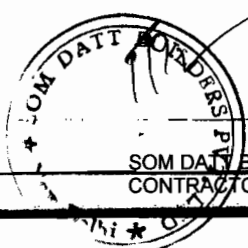
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : LAND SURVEYOR		
Candidate Information	1. Name of candidate: Vijay Kumar Yadav	
	2. Date of birth/age: 1 st July 1971	
	3. Professional qualifications: Diploma in Civil Engineering	
Present Employment	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G.Advani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
	Job title of candidate: LAND SURVEYOR	Years with present employer : 1 year 11 Months

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

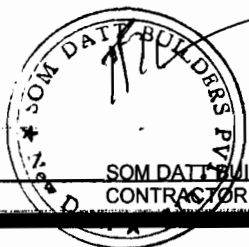
From	To	Company/Project/Position/Relevant/technical and management experience
Jan 2006	Till Date	Working with Som Datt Builder Pvt. Ltd. as Construction Manager for the project Widening & Strengthening of Four Lane on NH-2 (GTRIP-4) Package-IIB in Kanpur (U.P.) Responsibility: R.E. Wall - Fully responsible to monitor and execution of Reinforced earth wall including casting of Facia panel leveling pad, Facia panel erection in alignment laying of Geo-grid, Sand filling & filter media for 21 kms Long which is having one hundred crores. RCC Wall: Responsible to execute various height of RCC Wall from 2.7M to 10M including excavation, Reinforcement Shuttering & Concreting.
Dec. 2005	Dec. 2006	Worked with ITD cementation Indian limited as Manager structure for the project Pathankot to Jammu on NH-1A NS-34 Responsibility : Environment, Manager Structure like ROB, Overpass, Underpass & CD Works
March 2005	Dec. 2005	Worked with KMC Construction ltd. as Construction Manager for the project Allahbad bypass (ABP-3) from km 198+000 to km 242+708 Responsibility : Environment, Manager Structure like ROB, Overpass, Underpass & CD Works
Jan. 2003	Feb 2005	Worked with Som Datt Builders Pvt. Ltd. as Construction Manager for the project Widening & Strengthening of Four Lane on NH-2 (GTRIP-4) Package-IIB in Kanpur Responsibility : R.E. Wall - Fully responsible to monitor and execution of Reinforced earth wall including casting of Facia panel leveling pad, Facia panel erection in alignment laying of Geo-grid, Sand filling & filter media for 21 kms Long which is having one hundred crores. RCC Wall: Responsible to execute various height of RCC Wall from 2.7M to 10M including excavation, Reinforcement Shuttering & Concreting.
Feb. 2000	Dec 2003	Worked with Prakash Building Associates Infrastructure Ltd. Mumbai as Sr. Structure Engineer for the project Widening of NH-8 (A) & NH-76 Four Lane to six Lane Responsibility : Fully responsible for foundation excavation to completion of 3 Nos. major bridges having 30 M Span. All are having open foundation and all girders are casting situ. Also fully responsible for ROB retaining wall, which having counter for of length 1.2 km & maximum height is 15 M. Box Structure : 2 Nos. of Box Structure named ROB-2 near village Badi-Chiwai at NH-8(a), in above 2 structure around 1000m and 200 cum (M-30) Concrete



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EMPLOYER

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Jan 1998	Feb 2000	Worked with G. Kumar & Company as Sr. Engineer for the project Widening & Strengthening of Western & Eastern highway Flyover in Mumbai Responsibility : Fully responsible for foundation excavation to completion of Sub and Super Structure including Pier Cap. Bearing fixing and leveling, Pile foundation., Pile Cap, Minor bridge, underpass and reinforced earth works for 2 nos. bridge approaches, which is costing Rs. 20 crores & same will design and erect by AIMIL and it was 1 st project in India, which is design and supplied by AIMIL Ltd. upto height of 15 M and also responsible for crash barrier for R.E. wall & flyover.
Dec. 1996	Dec. 1997	Worked with Suparda Construction, Dharwad, Karnataka as Sr. Engineer for the project Sugar Factory, cooling Tower, Samil Power Generator Plant Responsibility : Construction of 50 M Height cooling Tower which is design by Aminbhavi & Hegde Associates to operate 200 Mega Watt Power.
Oct. 1995	Dec 1996	Worked with Suparda Construction, Dharwad, Karnataka as Sr. Engineer for the project Sugar factory & Paper Mill in Belgaoun Dist. Karnataka Responsibility : Full responsible for heavy foundation excavation and RCC like Mill foundation, boiler foundation, boiling house foundation, Godown buildings, Main factory building, weighs bridges reservisor, Spray pond & factory roads.
July 1994	Oct. 1995	Worked with Suparda Construction, Dharwad, Karnataka as Site Engineer for the project Sugar Factory in Belgaoun Dist. Karnataka Responsibility : Full responsible for heavy foundation excavation and RCC like Mill foundation, boiler foundation, boiling house foundation, Godown buildings, Main factory building, weighs bridges reservisor, Spray pond & factory roads.
April 1993	July 1994	Worked with Shetty's Construction Pvt. Ltd. (Hubli) as Site Engineer for the project State Highway in Hubli site Responsibility : Responsible for the Struction like Culverts & Drainages works



SOM DATT BUILDERS - ARS & VV
CONTRACTOR

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

C/O the Chief Engineer
Orissa, Bhubaneswar.

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BIDDING FORM (PER-2)
Resume of Proposed Personnel

Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Land Surveyor		Candidate : <input type="checkbox"/> Prime <input type="checkbox"/> Alternate
Candidate Information	1. Name of candidate: Rajesh Kumar Pundir	2. Date of birth/age: 19 th April 1970
	3. Professional qualifications: Diploma in Civil Engineer	
Present Employment	4. Name of employer: Som Datt Builders Limited	
	Address of employer: 56-58, Community Centre, East of Kailash, New Delhi - 110 065	
	Telephone: 6431607/8/9, 6483027, 6426712/3	Contact (manager/personnel officer): Mr. H.G.Advani
	Facsimile: 011-6236373	E-mail: somdatt1@nda.vsnl.net.in
Job title of candidate: Land Surveyor		Years with present employer : 6 Months

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant/technical and management experience
Aug. 2007	Till Date	Working with Som Datt Builder Pvt. Ltd. Land Surveyor at our Ludhiana Site
Sep 2005	Sep 2007	Worked with M/s Oriental Structural Engineers pvt. Ltd. as Project Manager for the project Rehabilitation and up gradation of NH-25, East-West Corridor, Contract Package-EW-2, MPUP-1 (KARERA-JHANSI SECTION) km 49+600 to 90+300. NHA Responsibility : Over all responsible for construction of Highway and Structures from Karera to Jhansi (Flexible Pavement, open foundation bridges, Box Culverts & Drains etc.)
April 1996	Oct. 2005	Worked with M/s Somdatt Builder Pvt. Ltd. as Construction Manager from the project of four lanning and strengthening of 2 lane on NH-2, package-IIA (SIKANDARA-BHAUTI SECTION) Uttar Pradesh Responsibility : Over all responsible for construction of 21 km stretch from Bhognipur to Bhaufi (Flexible Pavement)
Dec. 200	Aug. 2003	Worked with M/s Som Datt Builder Pvt. Ltd. as Construction Manager for the project Strengthening & Paving of Shoulders of GSHP-5 (HALOL-GODHRA HIGHWAY) GUJRAT, km 335+168 to km 373+210 Responsibility : Over all responsible for construction of 38 km stretch from Halol Godhra (Flexible Pavement)
April 1996	Nov. 2001	Worked with M/s Som Datt Builder Pvt. Ltd. as Construction Engineer for the project Construction of additional 2 lanes & Strengthening of Existing Carriageway from km 212+200 to km 228+000 (AMBALA -RAJPURA Section NH-1) Responsibility : Site In-charge for Bituminous works (D.B.M. and Profile corrective course) involving activities : (1) Application of Prime Coat and Tack Coat. (2) Fixing of sensor pegs to achieve the correct line and levels. (3) Laying of mix with sensors (VOGLE-GERMAN) and Mechincal (APPOLO-INDIA) paver (4) Also involved in taking measurement and preparation of R.A. and Final Bill of the Project. Apart from the above carried out the detailed survey work for Ghaggar Bridge which includes the setting out of well foundation, recording the sinking and checking of Tilt & Shifting of wells.
July 1972	April 1996	Worked with M/s A.K.R. SURVEYING CO. (P) LTD.as Civil Engineer Responsibility : As a Civil Engineer, I carried out the various survey Project such as : (a) Hydrography & Topographic survey for all major and minor water courses for HBJ Gas pipeline from Bijaypur (Guna) to Bawana (Delhi) with EIL(Consultant) to GAIL (b) Study of different routes, Fixing of alignment and detail survey for Gas pipeline from Panipat refinery to Kamal bottling plant with EIL (Consultant) to I.O.C. (c) Preparation of feasibility report for Bathing Ghat along Yamuna bank at Wazirabad (Delhi) for WAPCOS INDIA LTD. NEW DELHI (d) Hydrography & Topographic survey for storage capacity of lab under Bhoj wet land Project-Bhopal for Public Health Dept. (M.P.) (e) Feasibility Report of Noida-Okhla Expressway for NATPAC and KAMPAX, New Delhi (f) Details survey work of Varanasi-Shaktinagar Road Project for IRCON, RENUKUT (U.P.) Apart from the above works carried out land survey for Shaktisthal, Raighat, Virbhumi, Kishan Ghat, Obrai-Medians Hotel Noida, Delhi Golf Club, Netaji Nagar Delhi and Sterling Holiday Resort-Agra etc.



SOM DATT BUILDERS - ARSS JV
CONTRACTOR

New Delhi

Chief Engineer
World Bank Projects, Orissa
Chief EMPLOYER

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FORM (PER-2)

Resume of Proposed Personnel

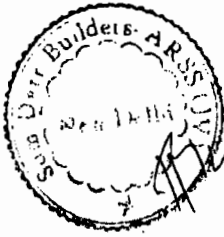
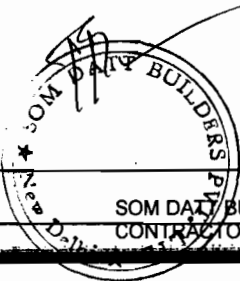
Name of Bidder : Som Datt Builders Pvt. Ltd.

Position : Mechanical & Equipment Maintenance Engineer	
Candidate information	1. Name of candidate: Mr. Tirlochan Singh
	2. Date of birth/age : 15.05.1956
3. Professional qualifications : Diploma (Mech), AMIE	
Present employment	4. Name of employer : Som Datt Builders Private Limited
	Address of employer : 56-58, Community Centre, East of Kailash, New Delhi - 110 065
	Telephone : 26431607/8/9, 6483027/8, 2 6426712/3
	Contact (manager/personnel officer) : Mr. H.G. Advani
	Facsimile : 011-26236373
Job title of candidate : Plant & Equipment Engineer	Years with relevant employer : 1 Years

Summarize professional experience over the last 33 years, in reverse chronological order. Indicate particular technical and management experience relevant to the Project.

From	To	Company/Project/Position/Relevant technical and management experience
Oct. 2006	Till date	Working with M/s. Som Datt Builders Pvt. Limited, Tikamgarh as Plant & Equipment Engineer . Presently posted at Upgradation of Ludhiana Malerkotla Sangrur Road (Section from 5+938 Km to 77+290 Km) Contract No. PSRSP/WB/UG/2/1/CB Value of Project is Rs. 226 Crores.
14.6.2006	14.8.2006	Worked with PWD (B & R), Punjab at Patiala as Superintending Engineer. (Mech.) . Incharge of Mech.Division / Sub Division, Control and running of Central Workshops (Hot mix plants, bituminous sensor pavers, Loaders fleet of Tipper Rollers etc.)
Oct. 1982	Jun 2006	Worked with PWD (B & R), Punjab as Executive Engineer Mechanical at Ludhiana Ferozpur, Jalandhar Divisions. Incharge of Erection and Commissioning of Road Equipments as per requirements of works their operations on maintenance etc., stock inventory for plant and machinery, monitory of progress of works, quality control, budget control as per requirements.
Feb. 1974	Sept. 1982	Worked with PWD (B & R), Punjab as Sub-Divisional Engineer (Mechanical) . Worked at Ferozpur, Amritsar, Jalandhar, Ludhiana and Patiala Divisions from time to time. Incharge of filed workshop including running maintenance repairs of road equipments including erection.

Contd..2..



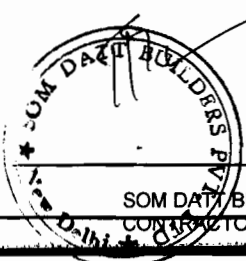
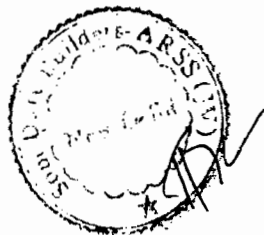
SOM DATT BUILDERS - ARSS JV
CONTRACTOR

Chief Engineer
World Bank Projects, Orissa
World Bank EMPLOYER

Crisna, Bhubaneswer.

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From	To	Company/Project/Position/Relevant technical and management experience
Sep. 1987	Aug. 1991	Worked in M/s. Som Datt Builders Limited in their overseas project, as Sr. Mechanical Engineer. Was incharge of upkeep of plant and machinery consisting of batching plants, crushers, concrete and Asphalt pavers including servicing and maintenance of heavy earth moving equipments consisting of bulldozers, scrapers, backhoe, shovels, road rollers etc. Day to day maintenance of transport vehicles like semi trailers, dumpers, water tankers, trailers, light transport vehicles, etc. connected with execution of JAFR-AZRAQ highway project for Govt. of Jordan costing around US \$ 105 million.
Nov. 1979	Aug. 1987	Worked in M/s. Gammon India Limited, Bombay as. Mechanical Engineer. Was in-charge of planning and co-ordination and day to day maintenance of construction equipments covering Elba Batching Plants, Swing Concrete Pumps, high pressure dewatering pump, tata crane, Terex Loaders, tunnel boring machine, Leyland Dumpers, etc.
Jan. 1977	Jan. 1979	Worked in M/s. Chalerjee Engg. Workshop, Katwa, Burdwan, West Bengal, as Workshop Supervisor. Was inc-harge of planning and supervising of miscellaneous fabrication works for various residential and workshop buildings.



SOM DATT BUILDERS - ARSS JV
CONTRACTOR


Chief Engineer
World Bank Projects, Orissa
EMPLOYER

6/11/11 P.L.C. (11/11/11)
E: 11/11, Bhubaneswar.

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SOM DATT BUILDERS-ARSS (JV)

56-58, Community Centre
East of Kailalsh
New Delhi - 110 065
Tel. 91-11-26431607/8/9
Fax.91-11-26236373
E-mail : somdatt1@nda.vsnl.net.in

No: SDB-ARSS (JV)/CE/WBP/08-09/974

Date: 21/10/08

To
The Chief Engineer
World Bank Projects, Orissa
Office of The Engineer-In-Chief (Civil), Orissa
Nirman Soudha, Kesharinagar, Unit-V,
Bhubaneswar.

Sub: Civil Works ICB, Package OSRP-CW-ICB-Y1-P02 under the proposed Orissa State Roads Project with World Bank Assistance - "Widening and Strengthening of Existing Carriageway to 2 lane from Chandballi - Bhadrak-Anandpur (0/0 km to 45/0 km of SH-9 and 0/0 Km to 50/02 Km of SH-53)".

Ref : i) IFB No. CW-ICB-Y1-P01-E-44509 dt.23.10.2007.
ii) Our Bid dt. 30.01.2008.
iii) Your Letter No. OSRP-CW-Y1-P02-E-44282 dt. 27.09.2008.

Dear Sir,

Inviting kind reference to the above letters on noted subject and in accordance with your instructions vide your letter at serial iii) of reference, we furnish herewith Bank Guarantee Bearing No. **0665708BG0000328 dtd. 20.10.03** from State Bank of India, Commercial Branch, Bhubaneswar for **Rs. 10,81,16,000/-** (Rupees Ten Crore Eighty One Lakh Sixteen Thousand Only) towards Performance Security in accordance with conditions of contract and as per prescribed BG format in section-IX for further necessary action at your end.

We hope you will find the Bank Guarantee in order and we look forward to signing the Contract Agreement.

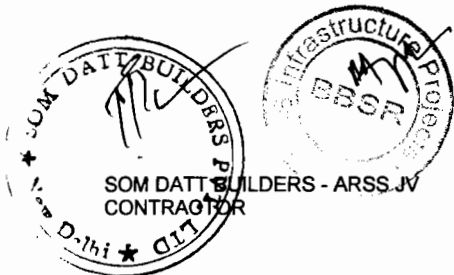
Thanking you and assuring best of our services always.

Thanking you
Yours faithfully,
For **SOM DATT BUILDERS-ARSS (JV)**

H.G. Advani
(H.G. Advani) 21/10
Authorised Signatory

EE IV, PMU
J. N. J.
21.10.08

Encl: As above Original BG.



J.
Chief Engineer
World Bank Projects, Orissa
Employer
C/o the E.I.C. (Civil)
Orissa, Bhubaneswar.

STATE BANK OF INDIA
COMMERCIAL BRANCH
NET-II, ASHOK NAGAR
BHUBANESHWAR, ORISSA

TEL NO:
FAX NO:0674-2530803
SWIFT NO:SBININBB119
PIN CODE:751009

THE CHIEF ENGINEER
WORLD BANK PROJECTS
ORISSA

20/10/2008

AGM (C)
SBI, Com
Bhubaneswar

DEAR SIRs,

GUARANTEE NO : 0665708BG0000328
AMOUNT OF GUARANTEE : INR 10,81,16,000.00
GUARANTEE COVER FROM : 20/10/2008 TO 30/04/2012
LAST DATE FOR LODGEMENT OF CLAIM : 30/04/2012

THIS DEED OF GUARANTEE IS EXECUTED BY THE STATE BANK OF INDIA, CONSTITUTED UNDER THE STATE BANK OF INDIA ACT, 1955 HAVING THE CENTRAL OFFICE AT NARIMAN POINT, MUMBAI AND AMONGST OTHER PLACES. A BRANCH AT COMMERCIAL BRANCH HEREIN AFTER REFERRED TO AS 'THE BANK'). IN FAVOUR OF THE CHIEF ENGINEER, World Bank Projects, Orissa (HEREIN AFTER REFERRED TO AS 'BENEFICIARY') FOR AN AMOUNT NOT EXCEEDING 10,81,16,000.00 ten crore eighty one lakh sixteen thousand only

AT THE REQUEST OF ARSS INFRASTRUCTURE PROJECTS LTD AND THE GUARANTEE SHALL REMAIN IN FULL FORCE UPTO 30/04/2012 AND CANNOT BE INVOKED OTHERWISE THAN BY WRITTEN DEMAND OR CLAIM UNDER THIS GUARANTEE SERVED ON THE BANK ON OR BEFORE THE 30/04/2012

SUBJECT TO AS AFORESAID

NOTWITHSTANDING ANYTHING CONTAINED HEREIN ABOVE, OUR LIABILITY UNDER THIS GUARANTEE IS RESTRICTED TO 10,81,16,000.00 ten crore eighty one lakh sixteen thousand only

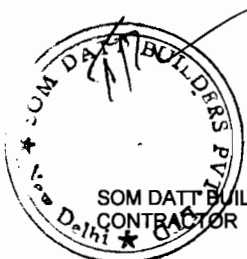
OUR GUARANTEE SHALL REMAIN IN FORCE UNTIL 30/04/2012. UNLESS A DEMAND OR CLAIM UNDER THE GUARANTEE IS MADE ON OUR BANK IN WRITING ON OR BEFORE 30/04/2012 ALL YOURS RIGHTS UNDER THE SAID GUARANTEE BE FORFEITED AND WE SHALL BE RELIEVED AND DISCHARGED FROM ALL LIABILITES THEREUNDER.

AUTHORISED SIGNATORY

S.S.RATH
R-4051

AUTHORISED SIGNATORY

PRADEEP K. DORA
R-4051



SOM DATT BUILDERS - ARSS JV
CONTRACTOR

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the E.I.C. (Orissa)
Orissa, Bhubaneswar.



उड़ीसा, ORISSA

B 142712

Enclosure to BG No. 0665708 BG 0000328

**PERFORMANCE SECURITY
(DEMAND GUARANTEE)**

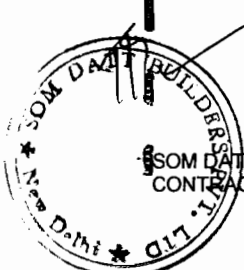
State Bank of India,
Commercial Branch,
IDCOL House,
Unit-II, Ashok Nagar,
Bhubaneswar - 751 009.

Beneficiary: **Chief Engineer,
World Bank Projects,
Orissa,
Bhubaneswar.**

Date: 20.10.08

Performance Guarantee No:- 0665708 BG 0000328

We have been informed that M/s SOMDATT Builders - ARSS J.V,
Plot No - 38, Sector-A, Zone - D, Mancheswar Industrial
Estate, Bhubaneswar - 751010. (Hereinafter called "the
Contractor")



S.S. RATH
CONTRACTOR
BBSR

Volume I: Page 85

P. K. Dora
PRABEER K. DORA
17-4551

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the F.I.C. (S.I.)
Orissa, Bhubaneswar.

has entered into Contract No OSRP-CW-Y1-P01-44282 dated 27.09.2008 with you, for the execution of **Widening & Strengthening of existing carriageway to 2 lane road from Chandbali - Bhadrak - Anandpur (Km. 0/0 to 45/0 of SH-9 and 0/0 Km to 50/0 Km of SH-53)** (hereinafter called "the Contract")


Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

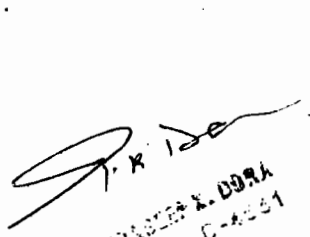
At the request of the Contractor, we State Bank of India, Commercial Branch, Bhubaneswar, Orissa hereby irrevocably undertake to pay you any sum of sums not exceeding in total an amount of Rs 10,81,16,000/- (Rupees Ten Crore Eighty One lakh Sixteen Thousand Only), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

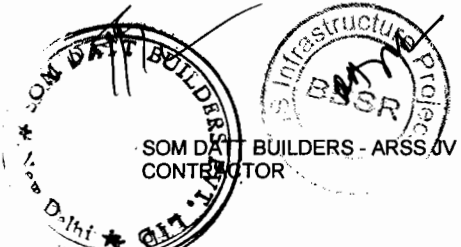
This guarantee shall expire, no later than the 30th Day April, 2012, and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.

Notwithstanding anything Contained herein above, the Bank's liability under this guarantee is restricted to Rs 10,81,16,000/- (Rupees Ten Crore Eighty One lakh Sixteen Thousand Only) and the guarantee shall remain in force until 30.04.2012. Until a demand or claim under the guarantee is made on our bank in writing on or before 30.04.2012, all your rights under the said guarantee be forfeited and we shall be relieved and discharged from all liabilities thereunder.


S.S.RATH [signature(s)]
R-4051


S. K. Das
R-4051



SOM DATT BUILDERS – ARSS (JV)

At 56 – 58, Community Centre, East of Kailash, New Delhi – 110 065.

Tel.: 011-26431607/08/09, Fax: 011-26236373

2562

1/11/08

Ref.: SDB-ARSS/Engg./2008/1002

Date: 30.10.2008

To,
The Chief Engineer,
World Bank Projects,
O/O Chief Engineer World Bank Projects, Orissa
Orissa State Road project
Nirman Soudha, Kesharinagar
Bhubaneswar, Orissa.

Sub.: "Widening and strengthening of existing carriageway to 2 lane for Chandbali Bhadrak-Anandpur (KM-0/0 to KM 45/0 of SH-9 & KM 0/0 to KM 50/0 of SH-53) (IFB No.- CW-ICB-Y1-Po2)".

Ref.: Your letter No. OSRP-CW-Y1-Po2-E-47900 dt 24.10.08.

Dear Sir,

We have received your above letter. We are to state that the Joint Venture is between Som Datt Builders Private Limited and ARSS Infrastructure Projects Limited. In the first page of JV agreement it has been clearly stated that Som Datt Builders Private Limited will be referred to as Som Datt Builders and ARSS Infrastructure Projects Limited. Will be referred to as ARSS.

The name of the JV is "Som Datt Builders – ARSS (JV)" But erroneously on Page-2, the name of JV has been mentioned as 'Som Datt Builders Private Limited and ARSS Infrastructure Projects Limited' instead of "Som Datt Builders – ARSS (JV)".

Further in support of our contention that the name of JV is "Som Datt Builders – ARSS (JV)", we are to state as follows:

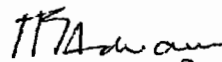
- i) The tender has been submitted in the name of Som Datt Builders – ARSS (JV).
- ii) The Bid Security has been furnished in the name of Som Datt Builders – ARSS (JV).
- iii) The letter of Acceptance by the government has been issued in favour of "Som Datt Builders – ARSS (JV)".

The detailed address along with e-mail address is enclosed for your reference and record. In view of the above the name of the JV is "Som Datt Builders – ARSS (JV)".

Thanking you

Yours sincerely

For Som Datt Builders – ARSS (JV)


H.G. Advani 30/10/08
(Authorised Signatory)

EEV, PMU
EEIV, PMU / Sr. DDO
J. N. V.
1-11-08

J.V. OFFICE: PLOT NO.-38, SECTOR-A, ZONE-D, MANCHESWAR INDUSTRIAL ESTATE, BHUBANESHWAR-751010.


Phone No. 2588552 & 2588554, Fax No.: (0674) 2585074



SOM DATT BUILDERS - ARSS JV
CONTRACTOR



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Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank Projects
C/o the E.I.C. (OR) Ltd.
Orissa, Bhubaneswar.

SOM DATT BUILDERS – ARSS (JV)

At 56 – 58, Community Centre, East of Kailash, New Delhi – 110 065.

Tel.: 011-26431607/08/09, Fax: 011-26236373

Ref.: SDB-ARSS/Engg./2008/1003

Date: 30.10.2008

From: M/s SOM DATT BUILDERS-ARSS (JV)
Plot No.-38, Sector-A, Zone-D,
Mancheswar Industrial Estate,
Bhubaneswar-751010.

To: The Chief Engineer,
World Bank Projects,
O/O Chief Engineer World Bank Projects, Orissa
Orissa State Road project
Nirman Soudha, Kesharinagar
Bhubaneswar, Orissa.

Sub.: "Widening and strengthening of existing carriageway to 2 lane for Chandbali Bhadrak-Anandpur (KM-0/0 to KM 45/0 of SH-9 & KM 0/0 to KM 50/0 of SH-53) (IFB No.- CW-ICB-Y1 Po2)".

Sir,

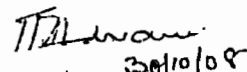
We hereby intimate our E-mail & Correspondence Address for your kind reference and for further communication smoothly.

Email: somdattbuilders-arssiv@arssgroup.in

J.V. Office Address: M/s SOM DATT BUILDERS-ARSS (JV)
Plot No.-38, Sector-A, Zone-D,
Mancheswar Industrial Estate,
Bhubaneswar-751010.
Tel. No. (0674) 2588552, 2588554
Fax No. (0674) 2585074.

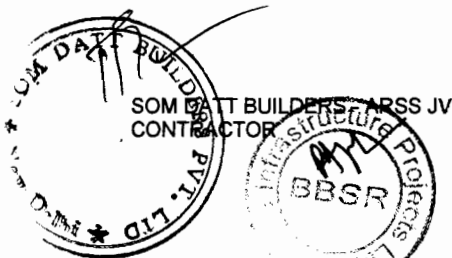
Thanking you


Yours sincerely
For Som Datt Builders – ARSS (JV)


H.G. Advani
(Authorised Signatory)

REV. PMU
REV. PMU / Sr. Dto
for nls
J. M. Advani
30.10.08

J.V. OFFICE: PLOT NO.-38, SECTOR-A, ZONE-D, MANCHESWAR INDUSTRIAL ESTATE, BHUBANESHWAR-751010.
Phone No. 2588552 & 2588554, Fax No.: (0674) 2585074




Chief Engineer
World Bank Projects, Orissa
World EMPLOYER
O/o the E.I.C. (Orissa)
Orissa, Bhubaneswar.

Advance Payment Security

Demand Guarantee

_____ [Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: _____ [Name and Address of Employer]

Date: _____

ADVANCE PAYMENT GUARANTEE No.: _____

We have been informed that _____ [name of Contractor] (hereinafter called "the Contractor") has entered into Contract No. _____ [reference number of the contract] dated _____ with you, for the execution of _____ [name of contract and brief description of Works] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum _____ [amount in figures] (_____ [amount in words]) is to be made against an advance payment guarantee.

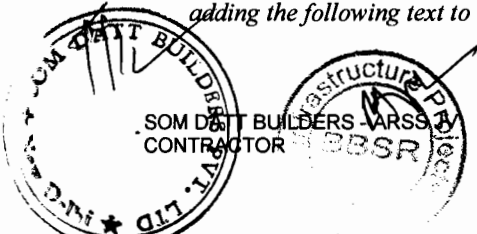
At the request of the Contractor, we _____ [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____ [amount in figures] (_____ [amount in words]) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number _____ at _____ [name and address of Bank].

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty (80) percent of the Contract Price has been certified for payment, or on the ___ day of ___, 2___, 2___, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date..

¹ The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.

² Insert the expected expiration date of the Time for Completion. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a

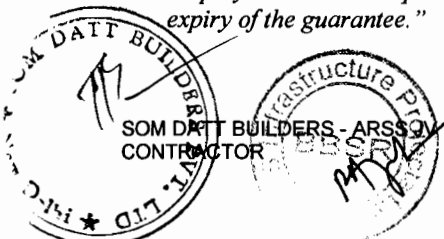



This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."




Chief Engineer,
World Bank Projects, Grissa
EMPLOYER
Grissa, Shubaneswar.

Retention Money Security

Demand Guarantee

_____ [Bank's Name, and Address of Issuing Branch or Office]

Beneficiary: _____ [Name and Address of Employer]

Date: _____

RETENTION MONEY GUARANTEE No.: _____

We have been informed that _____ [name of Contractor] (hereinafter called "the Contractor") has entered into Contract No. _____ [reference number of the contract] dated _____ with you, for the execution of _____ [name of contract and brief description of Works] (hereinafter called "the Contract").

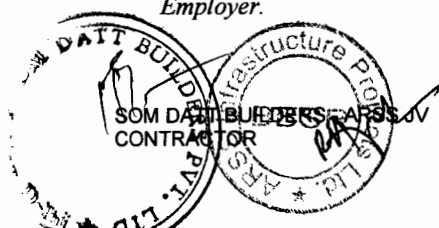
Furthermore, we understand that, according to the conditions of the Contract, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment, payment of [insert the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security] is to be made against a Retention Money guarantee.

At the request of the Contractor, we _____ [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____ [amount in figures] (_____ [amount in words]) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the payment of the second half of the Retention Money referred to above must have been received by the Contractor on its account number _____ at _____ [name and address of Bank].

This guarantee shall expire, at the latest, 21 days after the date when the Employer has received a copy of the Performance Certificate issued by the Engineer. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

¹ The Guarantor shall insert an amount representing the amount of the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and denominated either in the currency(ies) of the second half of the Retention Money as specified in the Contract, or in a freely convertible currency acceptable to the Employer.



This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

not exceeding in total an amount of _____ [amount in figures] (_____) [amount in words]¹ upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the payment of the second half of the Retention Money referred to above must have been received by the Contractor on its account number _____ at _____ [name and address of Bank].

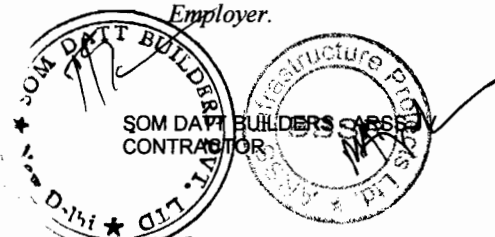
This guarantee shall expire, at the latest, 21 days after the date when the Employer has received a copy of the Performance Certificate issued by the Engineer. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

¹ The Guarantor shall insert an amount representing the amount of the second half of the Retention Money or or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and denominated either in the currency(ies) of the second half of the Retention Money as specified in the Contract, or in a freely convertible currency acceptable to the Employer.



Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Orissa, BHUBANESWAR

AGREEMENT No 4 of 2008 - 09



GOVERNMENT OF ORISSA
WORKS DEPARTMENT

CIVIL WORKS CONTRACT

[PACKAGE No. OSRP-CW-ICB-Y1-P03]

For

*Widening & Strengthening of existing carriageway to 2-lane road for
Chandabali-Bhadrak-Anandapur road
(Km. 0/0 to Km. 45/0 of SH – 9 & Km. 0/0 to Km. 50/0 of SH-53)*

under

Orissa State Roads Project

between

Chief Engineer, World Bank Projects, Orissa
on behalf of
Orissa Works Department, Government of Orissa

and

SOM DATT BUILDERS – ARSS JV
Plot No. 38, SECTOR – A, Zone – D
Mancheswar Industrial Estate, Mancheswar, Bhubaneswar – 751010 [INDIA]

[VOLUME – II: PARTICULAR CONDITIONS & GENERAL CONDITIONS]

Agreement Value: Rs. 216,23,17,622.00

Project Management Unit, Orissa State Roads Project
Office of the Engineer-in-Chief (Civil), Orissa,
Nirman Soudha, Keshari Nagar, Unit – V, Bhubaneswar – 751 001

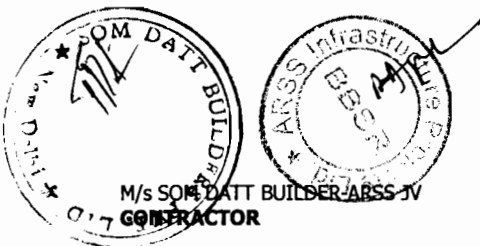
Dated: 3rd November, 2008


CONTENTS of CONTRACT

Volume – I	:	Letter of Acceptance, Letter Bid and addenda
Volume – II	:	Particular Conditions and the General Conditions;
Volume – III	:	Specifications
Volume – IV	:	Drawings
Volume – V	:	Completed Schedules,

CONTENTS of VOLUME II

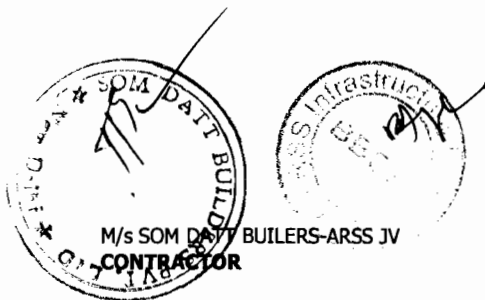
Sl.	Description	Page No.
1	PARTICULAR CONDITIONS	1
	PART – A : Contract Data	2
	PART – B : Specific Provisions	6
	Annexure – AI : Salient features of some major Labour Laws applicable to establishments engaged in Construction of Civil Works	9
	Annexure – AII : Safety & Welfare Provisions for labour to be employed by the Contractor	12
2	GENERAL CONDITIONS	18





Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Chief Engineer,
World Bank Project
Office in the F.I.C. (Civil)
Orissa, Bhubaneswar.

Particular Conditions (PC)

The following Particular Conditions shall supplement the GC. Whenever there is a conflict, the provisions herein shall prevail over those in the GC.

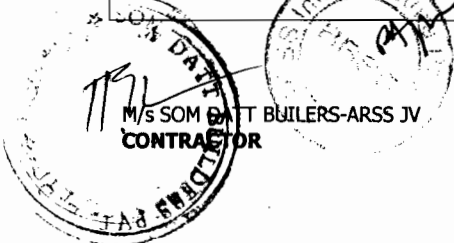


Volume - II - Page No. 1


Chief Engineer
World Bank Projects, Office
of the E.I.C. (Civil)
Chitra, Etubaheswar.

Part A - Contract Data

Conditions	Sub-Clause	Data
Employer's name and address	1.1.2.2 & 1.3	Works Department, Government of Orissa Orissa Secretariat, Bhubaneswar – 751 001
Engineer's name and address	1.1.2.4 & 1.3	The Team Leader M/s SMEC International Pty. Ltd., Australia with Sub-Consultants M/s SMEC India Pvt. Ltd and CMEC Consulting Engineers, India Address: M/s SMEC International Pty. Ltd. [India Regional Office] 5th Floor, DLF Building No. 8, Tower C, DLF Cyber City, Phase – II, GURGAON – 122 002 (Haryana) Fax: 0124 - 4380043 Email: smec@vsnl.com
Bank's name	1.1.2.11	International Bank for Reconstruction and Development, (The World Bank)
Borrower's name	1.1.2.12	Government of Orissa through Government of India
Time for Completion	1.1.3.3	<u>30 Months</u> <i>Refer to Table: Summary of Sections below</i>
Defects Notification Period	1.1.3.7	365 days.
Sections	1.1.5.6	<i>Refer to Table: Summary of Sections below</i>
Electronic transmission systems	1.3	Email
Governing Law	1.4	Law in force in the Union of India.
Ruling language	1.4	English
Language for communications	1.4	English
Time for the Parties entering into a Contract Agreement	1.6	28 days



Conditions	Sub-Clause	Data
Time for access to the Site	2.1	No later than the Commencement Day, except for the following parts (if applicable, with detailed description of parts concerned: 15 days after Commencement Date
Engineer's Duties and Authority	3.1(b)(ii)	Variations resulting in an increase of the Accepted Contract Amount in excess of <u>2</u> % shall require approval of the Employer.
Performance Security	4.2	The performance security will be in the form of a demand guarantee in the amount(s) of 5 percent of the Accepted Contract Amount and in the same currency(ies) of the Accepted Contract Amount.
Normal working hours	6.5	08:00 Hours to 18:00 Hours Except otherwise stipulated by the Government of Orissa in exceptional climatic conditions
Delay damages for the Works	8.7 & 14.15(b)	<u>0.05</u> % of the Contract Price per day. <i>Refer to Table: Summary of Sections below</i>
Maximum amount of delay damages	8.7	10% of the final Contract Price.
Provisional Sums	13.5.(b)(ii)	<i>[If there are Provisional Sums, insert a percentage for adjustment of Provisional Sums]</i> NIL
Adjustments for Changes in Cost	13.8	Period "n" applicable to the adjustment multiplier "Pn": 3 months.
Total advance payment	14.2	<u>5</u> % Percentage of the Accepted Contract Amount payable in the currencies and proportions in which the Accepted Contract Amount is payable in two installments. The 2nd installment of the advance payment shall be paid to the contractor after 30days from the date of release of 1st installment.



M/s SOM DATT BUILDERS PVT. LID.
CONTRACTOR



Volume - II - Page No. 3

J
Chief Engineer,
World Bank Projects, Orissa
Office, Bhubaneswar
EMPLOYER

Conditions	Sub-Clause	Data
Repayment amortization rate of advance payment	14.2(b)	10 %
Percentage of Retention	14.3	10 %
Limit of Retention Money	14.3	5 % of the Accepted Contract Amount
Plant and Materials	14.5(b)(i)	Not Applicable
	14.5(c)(i)	Not Applicable
	14.5(c)(ii)	Applicable only for material with approved quality and limited to 5% of the accepted contract amount.
Minimum Amount of Interim Payment Certificates	14.6	3 % of the Accepted Contract Amount.
Publishing source of commercial interest rates for financial charges in case of delayed payment	14.8	State Bank of India.
Maximum total liability of the Contractor to the Employer	17.6	The accepted contract amount.
Periods for submission of insurance:	18.1	
a. evidence of insurance.		14 days
b. relevant policies	28 days	
Maximum amount of deductibles for insurance of the Employer's risks	18.2(d)	US\$ 5000 or Rs. 200,000 per occurrence
Minimum amount of third party Insurance	18.3	Rs. 10,000,000 per occurrence with unlimited number of occurrences
Date by which the DB shall be appointed	20.2	28 days after the Commencement date
The DB shall be comprised of	20.2	Three Members
List of potential DB sole members	20.2	None
Appointment (if not agreed) to be made by	20.3	President, Indian Roads Congress, New Delhi.

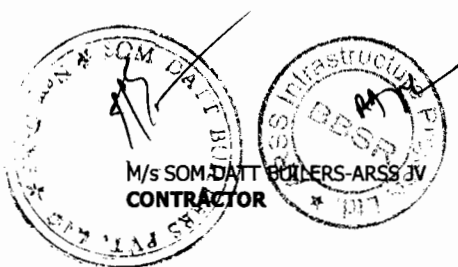


Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Orissa, Bhubaneswar.

Conditions	Sub-Clause	Data
Rules of arbitration	20.6(a)	Rules and Procedures laid out for Arbitration & Reconciliation Act, 1996 of Government of India

Table: Summary of Sections

Section Name/Description (Sub-Clause 1.1.5.6)	Time for Completion (Sub-Clause 1.1.3.3)	Damages for Delay (Sub-Clause 8.7)
Km. 0/0 to Km. 10/0 Km of SH – 9, Km. 25/0 to Km. 45/0 Km of SH – 9	10 Months from Commencement of Works	<u>IRs. 285,000 per day</u>
Km. 10/0 to Km. 25/0 Km of SH – 9, Km. 27/0 to Km. 45/0 Km of SH – 53	20 Months from Commencement of Works	<u>IRs. 315,000 per day</u>
Completion of Whole of the Stretch	30 Months from Commencement of Works	<u>IRs. 315,000 per day</u>



Part B - Specific Provisions

Sub-Clause 14.1

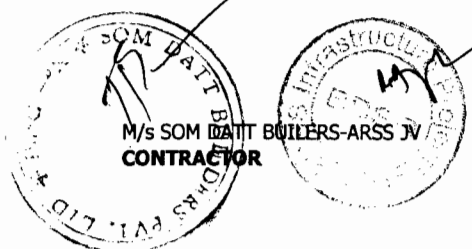
The Contract Price

(Alternative paragraph)

- (e) Notwithstanding the provisions of subparagraph (b), Contractor's Equipment, including essential spare parts therefore, imported by the Contractor for the sole purpose of executing the Contract shall be temporarily exempt from the payment of import duties and taxes upon initial importation, provided the Contractor shall post with the customs authorities at the port of entry an approved export bond or bank guarantee, valid until the Time for Completion plus six months, in an amount equal to the full import duties and taxes which would be payable on the assessed imported value of such Contractor's Equipment and spare parts, and callable in the event the Contractor's Equipment is not exported from the Country on completion of the Contract. A copy of the bond or bank guarantee endorsed by the customs authorities shall be provided by the Contractor to the Employer upon the importation of individual items of Contractor's Equipment and spare parts. Upon export of individual items of Contractor's Equipment or spare parts, or upon the completion of the Contract, the Contractor shall prepare, for approval by the customs authorities, an assessment of the residual value of the Contractor's Equipment and spare part to be exported, based on the depreciation scale(s) and other criteria used by the customs authorities for such purposes under the provisions of the applicable Laws. Import duties and taxes shall be due and payable to the customs authorities by the Contractor on (a) the difference between the initial imported value and the residual value of the Contractor's Equipment and spare parts to be exported; and (b) on the initial imported value that Contractor's Equipment and spare parts remaining in the Country after completion of the Contract. Upon payment of such dues within 28 days of being invoiced, the bond or bank guarantee shall be reduced or released accordingly; otherwise the security shall be called in the full amount remaining.

Sub-Clause 4.1 Contractor's General Obligations

Add the following at the end of 5th Paragraph.
Working Drawings / fabrication drawings for temporary works (such as form work, staging, centering, scaffolding, specialized construction, handling and launching facilities and the like), material list for structural fabrication as well as detailed drawings for anchorage and temporary support details for pre-



stressing cables as well as bar bending and cutting schedules for reinforcement etc. shall be prepared by the Contractor at his own cost and forwarded in triplicate to the Engineer at least four weeks in advance of actual constructional requirements. The Engineer will scrutinize and return one copy of the same for the Contractor's use with amendments, if any, noted in red ink within two weeks of submission. Such approval shall not relieve the Contractor of any of his responsibilities in connection with temporary works. The Contractor will supply six copies of the approved drawings for the Engineer's use. The cost of preparing all such items of work shall be deemed to have been included in the respective rates/prices quoted by the Contractor in the Bill of Quantities.

The Contractor shall ensure that his representative or Senior Site Representative attends all the periodic review meetings notified by the Engineer / Employer / Employer's representative.

**Clause 4.14
Avoidance of
Interference**

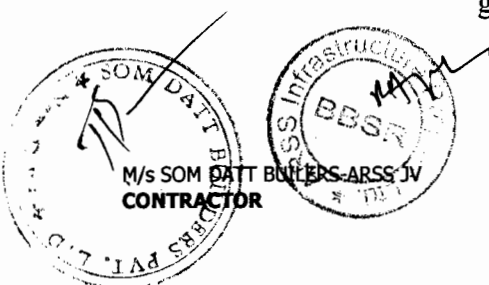
Add the following paras (c), (d) and (e) after para (b) as follows:

- (c) "In case, any operation connected with traffic necessitated diversion, obstruction or closure of any road, railway or any other Right of Way, the approval of the Engineer or the Engineer's Representative and the concerned authorities shall be obtained well in advance by the Contractor."
- (d) The Contractor shall so conduct his operations as to have under construction no greater length or amount of work than he can carry out efficiently with due regard to the convenience of the public.
- (e) The Contractor shall maintain the existing road in its normal condition suitable for the season of the year, from the time he commences the work on Site until the completion of the works.

**Sub-Clause 6.4
Staff and Labour**

Add the following at end of Sub-Clause 6.4:
The employees of the Contractor and the Sub-contractor shall in no case be treated as the employees of the Employer at any point of time.

Salient features of some major Labour Laws applicable to establishments engaged in Construction of Civil Works are given in Annexure A-1 for reference purpose.



The contractor and sub contractor shall comply with the safety and welfare provisions as detailed in Annexure A-II

**Sub-Clause 7.3
Inspection**

Amend the first line of last para as follows:
The Contractor shall give “**not less than 48 (forty eight) hours**” notice to the Engineer whenever any...

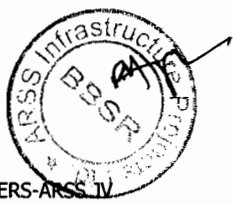
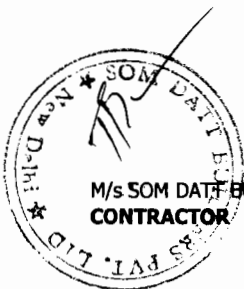
**17.2 Contractor’s
Care of the Works**


Add the following after end of para:

The Contractor has to maintain the stretches handed over to him in a particular mile-stone. A penalty shall be levied at the rate Rs.1000/- per km per day for non-conformity of maintenance of the road as per the decision of the Engineer.

The Contractor has to follow all traffic safety measures as defined in the Technical Specifications. A penalty shall be levied at the rate Rs.2000/- per day per location for non-conformity of Traffic Safety measures as per the decision of the Engineer.

The Contractor has to follow all Environmental Mitigation Measures as defined in the Technical Specifications read alongwith the EMP for the specific corridor. A penalty shall be levied at the rate Rs.1000/- per day per location for non-conformity of EMP measures as per the decision of the Engineer.




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank Projects
O/o the E.I.C. (Civil)
Crisse, Bhubaneswar.

Annexure-AI

Salient features of some major Labour Laws applicable to establishments engaged in Construction of Civil Works

(i) Workmen Compensation Act, 1923

The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

(ii) Payment of Gratuity Act, 1972

Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(iii) Employees' PF and Miscellaneous Provisions Act, 1952

The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %. The benefits payable under the Act are:

- (a) Pension or family pension on retirement or death as the case may be.
- (b) Deposit linked insurance on the death in harness of the worker.
- (c) Payment of PF accumulation on retirement/death etc.

(iv) Maternity Benefit Act, 1951

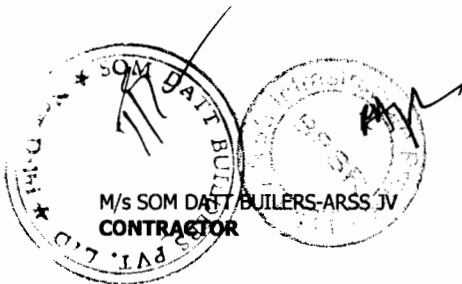
The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

(v) Contract Labour (Regulation and Abolition) Act, 1970

The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labour.

(vi) Minimum Wages Act, 1948

The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, and Runways are scheduled employment.



(vii) Payment of Wages Act, 1936

It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

(viii) Equal Remuneration Act, 1979

The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.

(ix) Payment of Bonus Act, 1965

The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3, 500/- per month shall be worked out by taking wages as Rs.2, 500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

(x) Industrial Disputes Act, 1947

The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(xi) Industrial Employment (Standing Orders) Act, 1946

It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer on matters provided in the Act and get the same certified by the designated Authority.

(xii) Trade Unions Act, 1926

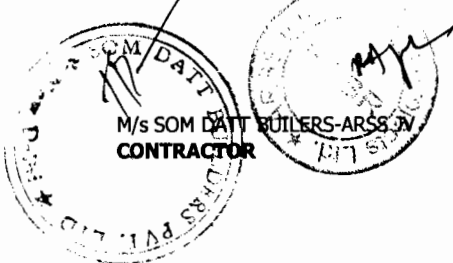
The Act lays down the procedure for registration of trade unions of workmen and employees. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(xiii) Child Labour (Prohibition and Regulation) Act, 1986

The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry.

(xiv) Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979

The Act is applicable to an establishment, which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
O/o the E.I.C. (Civil)
Cuttack, Bhubaneswar.

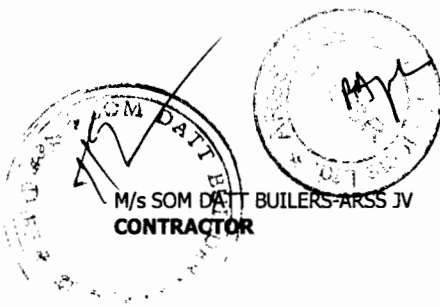
which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back, etc

(xv) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996

All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures at the Building or Construction work and other welfare measures, such as Canteens, First-aid facilities, Ambulance, Housing accommodation for Workers near the workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

(xvi) The Factories Act, 1948

The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.




Chief Engineer
World Bank Projects, Orissa
O/o the E.I.C. (Civil)
Crista, Bhubaneswar.

Safety & Welfare Provisions for labour to be employed by the Contractor

All necessary personal safety equipment as considered adequate by the Engineer shall be available for use of persons employed on the Site and maintained in a condition suitable for immediate use; and the Contractor shall take adequate steps to ensure proper use of such equipment by those concerned.

1. Safety Provisions:

The Contractor shall comply with all the precautions as required for the safety of the workmen.

(i) All workmen at site shall be provided with safety helmets and yellow/orange jackets. Workmen required on site during night hours shall be provided with fluorescent yellow jackets with reflective lopes.

(ii) Workers employed on mixing asphaltic materials, cement, lime mortars, concrete etc. shall be provided with protective footwear, protective goggles.

(iii) Those engaged in handling any material, which is injurious to the eyes, shall be provided with protective goggles.

(iv) Those engaged in welding works shall be provided with welder's protective eye-shield.

(v) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

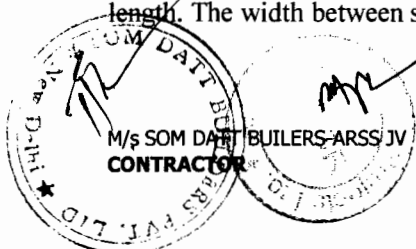
(vi) Suitable scaffolds shall be provided for workmen for all work that cannot safely be done from the ground, or from solid construction except for such short period work as can be done safely from ladders. When a ladder is used, an extra labourer shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable foot-holds and hand-holds shall be provided on the ladder, which shall be given an inclination not steeper than 1/4 to 1.

(vii) Scaffolding or staging more than 3.25 metres above the ground or floor, swung or suspended from an overhead support or erected with stationary support, shall have a guard rail properly attached, bolted, braced and otherwise secured at least 1 metre high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the support or structure.

(viii) Working platforms, gangways, and stairways shall be so constructed that they do not sag unduly or unequally, and if the height of any platform or gangway or stairway is more than 3.25 metres above ground level or floor level, it shall have closely spaced boards, have adequate width and be suitably provided with guard rails as described in (ii) above.

(ix) Every opening in the floor of a structure or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing with a minimum height of one metre.

(x) Safe means of access and egress shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 metres in length. The width between side rails in a rung ladder shall in no case be less than 30 cm for ladders up



to and including 3 metres in length. For longer ladders the width shall be increased at least 6 mm for each additional 30 cm of length. Spacing of steps shall be uniform and shall not exceed 30 cm.

(xi) Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Contractor shall provide all necessary fencing and lights to protect the public from accidents and shall be bound to bear the expenses of defending every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the Contractor be paid to compromise any claim by any such person.

(xii) Excavation and Trenching: All trenches, 1.5 metres or more in depth, shall at all times be supplied with at least one ladder for each 20 metres in length or fraction thereof. Ladders shall be extended from the bottom of the trench to at least 1 metre above the surface of the ground. The sides of a trench, which is 1.5 metres or more in depth shall be stepped back to provide a suitable slope, or be securely held by timber bracing so as to avoid the danger of side collapse. Excavated material shall not be placed within 1.5 metres of the edge of any trench or half the depth of the trench, whichever is more. Excavation shall be made from the top to the bottom. Under no circumstances shall undermining or undercutting be done.

(xiii) When workers are employed in sewers and manholes, which are in use, the Contractor shall ensure that manhole covers are open and manholes are ventilated at least for an hour before workers are allowed to go into them. Manholes so open shall be cordoned off with suitable railing and provide warning signals or boards to prevent accidents to the public.

(xiv) Demolition: Before any demolition work is commenced and also during the process of the work:

a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.

b) No electric cable or apparatus, which is liable to be a source of danger other than a cable or apparatus used by operators, shall remain electrically charged:

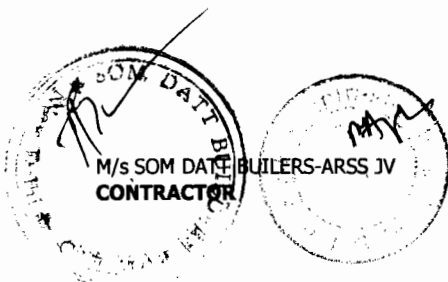
c) All practical steps shall be taken to prevent danger to persons employed by the Employer, from risk of fire or explosion, or flooding. No floor, roof or other part of a building shall be so overloaded with debris or materials as to render it unsafe.

(xv) When work is performed near any place where there is risk of drowning all necessary equipment shall be provided and kept ready for use and all necessary steps taken for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

(xvi) Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following:

(a) These shall be of good mechanical construction, sound material and adequate strength and free from patent defects and shall be kept in good working order be regularly inspected and properly maintained.

(b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from defects.



(c) For every hoisting machine and every chain hook, shackle, swivel and pulley block used in hoisting, lowering or as means of suspension, safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with safe working load. In case of a hoisting machine or a variable safe working load, each safe working load and conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to in the paragraph above shall be loaded beyond safe working load except for the purpose of testing

(xvii) Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards; hoisting appliances shall be provided with such means as will reduce the risk of accident during descent of load to the minimum. Adequate precautions shall be taken to reduce to the minimum risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised, insulating mats, working apparel such as gloves, sleeves and boots, as may be necessary, shall be provided. Workers shall not wear any rings, watches and carry keys or other material which are good conductors of electricity.

(xviii) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in a safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near places of work.

(xix) These safety provisions shall be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work location. Persons responsible for ensuring compliance with the Safety Code shall be named therein by the Contractor.

(xx) To ensure effective enforcement of the rules and regulations relating to safety precautions, arrangements made by the Contractor shall be open to inspection by the Engineer or his Representative.

(xxi) Notwithstanding anything contained in condition (i) to (xv) above, the Contractor shall remain liable to comply with the provisions of all acts, rules, regulations and bylaws for the time being in force in India and applicable in this matter.

The Contractor shall be responsible for observance, by his sub-contractors, of the foregoing provisions.

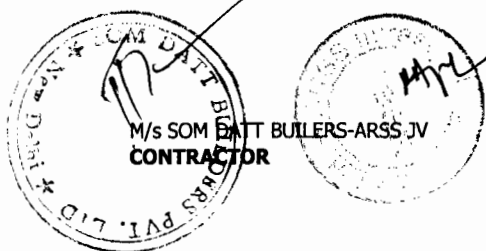
2. Labour Welfare Provisions:

(i) First Aid:

At every workplace, there shall be maintained in a readily accessible place first aid appliances including an adequate supply of sterilised dressings and sterilised cotton wool as prescribed in the Factory Rules of the State in which the work is carried on. The appliances shall be kept in good order and, in large work places, they shall be placed under the charge of a responsible person who shall be readily available during working hours.

(ii) Accommodation for Labour:

The Contractor shall during the progress of the work provide, erect and maintain necessary temporary living accommodation and ancillary facilities for labour at his own expense to standards and scales approved by the Engineer.



(iii) Drinking Water:

In every workplace, there shall be provided and maintained at suitable places easily accessible to labour, a sufficient supply of cold water fit for drinking.

Where drinking water is obtained from an intermittent public water supply each workplace shall be provided with storage tanks where drinking water shall be stored.

Every water supply storage shall be at a distance of not less than 15 metres from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of any latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door, which shall be dust proof and waterproof.

A reliable pump shall be fitted to each covered well. The trap door shall be kept locked and opened only for cleaning or inspection, which shall be done at least once a month.

(iv) Washing and Bathing Places:

Adequate washing and bathing places shall be provided separately for men and women. Such places shall be kept in clean and drained condition.

(v) Scale of Accommodation in Latrines and Urinals:

There shall be provided within the precincts of every workplace, latrines and urinals in an accessible place, and the accommodation, separately for each for these, shall not be less than at the following scale:

No. of Seats

(a) Where number of persons does not exceed 50 2

(b) Where number of persons exceed 50 but does

not exceed 100 3

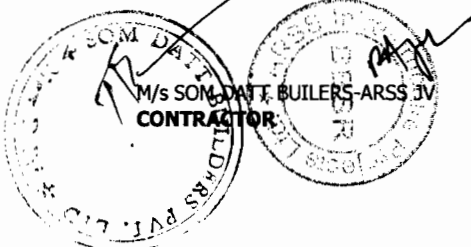
(c) For additional persons per 100 or part thereof 3

In particular cases, the Engineer shall have the power to increase the requirement, wherever necessary.

(vi) Latrines and Urinals:

Except in workplaces provided with water-flushed latrines connected with a water borne sewage system, all latrines shall be provided with dry-earth system (receptacles) which shall be cleaned at least four times daily and at least twice during working hours and kept in a strictly sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

If women are employed, separate latrines and urinals, screened from those for men and marked in the vernacular in conspicuous letters "For women only", shall be provided. Those for men shall be similarly marked "For men only". A poster showing the figure of a man and a woman shall also be exhibited at the entrance to latrines for each sex. There shall be adequate supply of water, close to latrines and urinals.



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(vii) Construction of Latrines:

Inside walls shall be constructed of masonry or other non-absorbent material and shall be cement-washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for the purpose and kept available for inspection. Latrines shall have at least a thatched roof.

(viii) Disposal of Excreta:

Unless otherwise arranged for by the local sanitary authority, arrangement for proper disposal of excreta by incineration at the workplace shall be made by means of a suitable incinerator approved by the local medical health and municipal or cantonment authorities. Alternatively, excreta may be disposed of by putting a layer of night soils at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn into manure).

The Contractor shall, at his own expense, carry out all instructions issued to him by the Engineer to effect proper disposal of soil and other conservancy work in respect of Contractor's work-purpose or employees on the site. The Contractor shall be responsible for payment of any charges, which may be levied by municipal or cantonment authority for execution of such work on his behalf.

(ix) Provisions of shelters during rest:

At every workplace, there shall be provided, free of cost, four suitable sheds, two for meals and two others for rest, separately for use of men and women labour. The height of each shelter shall not be less than 3 metres from floor level to lowest part of roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 0.5 sq.m. per head.

(x) Crèches:

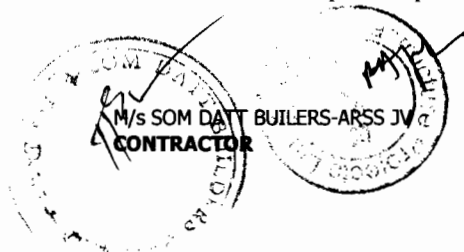
At a place where women are ordinarily employed, there shall be provided at least one hut for use of children under the age of 6 years belonging to such women. Huts shall not be constructed to a standard lower than that of thatched roof, mud floor and wall with wooden planks spread over mud floor and covered with matting.

Huts shall be provided with suitable and sufficient openings, for light and ventilation. There shall be adequate provision of sweepers to keep the places clean. There shall be a maidservant in attendance. Sanitary utensils shall be provided to the satisfaction of local medical, health a municipal or cantonment authorities. Use of huts shall be restricted to children, their attendants and mothers of children.

(xi) Canteen:

A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary.

(xii) Planning, siting and erection of the above mentioned structures shall be approved by the Engineer or his Representative and the whole of such temporary accommodation shall at all times during the progress of the Works be kept tidy and in a clean and sanitary condition to the satisfaction of the Engineer or his Representative and at the Contractor's expense. The Contractor shall conform generally to sanitary requirements of local medical, health and municipal or cantonment authorities and at all times adopt such precautions as may be necessary to prevent soil pollution of the Site.



On completion of the Works, the whole of such temporary structures shall be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the whole of the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer.

(xiii) Anti-malarial precautions:

The Contractor shall, at his own expense, conform to all anti malarial instructions given to him by the Engineer, including filling up any borrow pits which may have been dug by him.

(xiv) Awareness and Education of HIV/AIDS

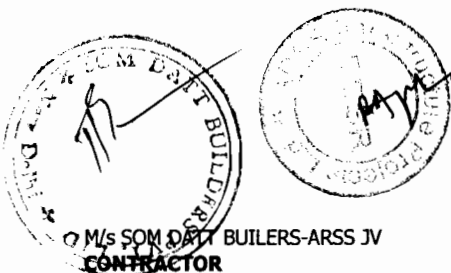
The contractor shall provide/carryout HIV/AIDS awareness and training programme to its labour and management, at least twice per year during the construction period.


(xv) Child Labour Prohibition

The contractor shall not employ Child Labour for any works or in any manner under the Contract at any time. In the event that the Contractor uses child labour, the Employer shall terminate the Contract.

(xvi) Amendments:

The Employer may, from time to time, add to, or amend these Rules and issue such directions as it may be considered necessary for the proper implementation of these Rules or for the purpose of removing any difficulty, which may arise in the administration thereof



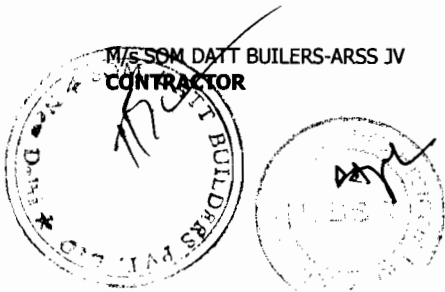

Chief Engineer
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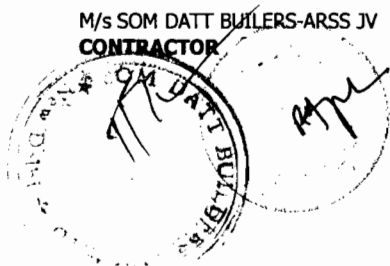



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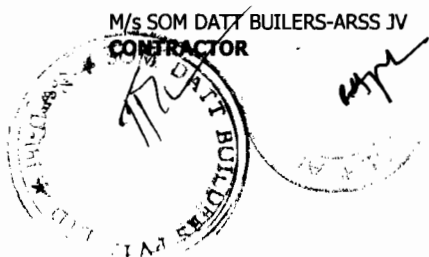


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M/s SOM DATTA BUILDERS-ARSS JV
CONTRACTOR




Chief Engineer
World Bank Projects, Crissa
EMPLOYER
O/o the E.I.C. (Civil)
Crissa, Shubaneswar.

General Conditions (GC)

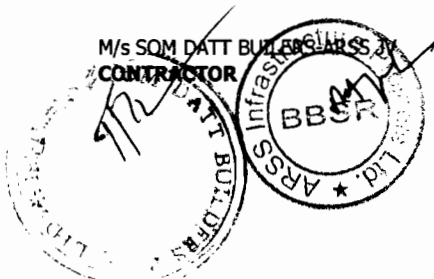
Chief Engineer, World Bank Projects, Orissa State Road Project
on behalf of Works Department, Government of Orissa
[Name of Employer]


CIVIL WORKS CONTRACT [PACKAGE NO. OSRP-CW-ICB-Y1-P02]

For

**Widening & Strengthening of existing carriageway to 2-lane for
Chandabali –Bhadrak –Anandapur
(Km 0/0 to Km 45/0 of SH-9 & Km. 0/0 to Km 50/0 of SH-53)
under Orissa State Roads Project
[Name of Contract]**

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Chief Engineer
World Bank Projects, Orissa
Employer
On the E.T.C. (Civil)
Orissa, Bhubaneswar.

General Conditions

1. General Provisions

1.1 Definitions

In the Conditions of Contract (“these Conditions”), which include Particular Conditions, Parts A and B, and these General Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

1.1.1 The Contract

1.1.1.1 “Contract” means the Contract Agreement, the Letter of Acceptance, the Letter of Tender, these Conditions, the Specification, the Drawings, the Schedules, and the further documents (if any) which are listed in the Contract Agreement or in the Letter of Acceptance.

1.1.1.2 “Contract Agreement” means the contract agreement referred to in Sub-Clause 1.6 [Contract Agreement].

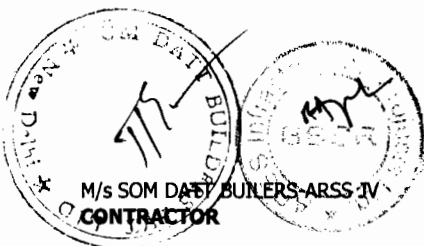
1.1.1.3 “Letter of Acceptance” means the letter of formal acceptance, signed by the Employer, of the Letter of Tender, including any annexed memoranda comprising agreements between and signed by both Parties. If there is no such letter of acceptance, the expression “Letter of Acceptance” means the Contract Agreement and the date of issuing or receiving the Letter of Acceptance means the date of signing the Contract Agreement.

1.1.1.4 “Letter of Tender” means the document entitled letter of tender or letter of bid, which was completed by the Contractor and includes the signed offer to the Employer for the Works.

1.1.1.5 “Specification” means the document entitled specification, as included in the Contract, and any additions and modifications to the specification in accordance with the Contract. Such document specifies the Works.

1.1.1.6 “Drawings” means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract.

1.1.1.7 “Schedules” means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Tender, as included in



the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices.

1.1.1.8 “Tender” means the Letter of Tender and all other documents which the Contractor submitted with the Letter of Tender, as included in the Contract.

1.1.1.9 “Bill of Quantities”, “Daywork Schedule” and “Schedule of Payment Currencies” mean the documents so named (if any) which are comprised in the Schedules.

1.1.1.10 “Contract Data” means the pages completed by the Employer entitled contract data which constitute Part A of the Particular Conditions.

1.1.2 Parties and Persons

1.1.2.1 “Party” means the Employer or the Contractor, as the context requires.

1.1.2.2 “Employer” means the person named as employer in the Contract Data and the legal successors in title to this person.

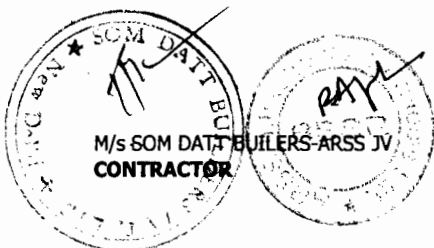
1.1.2.3 “Contractor” means the person(s) named as contractor in the Letter of Tender accepted by the Employer and the legal successors in title to this person(s).

1.1.2.4 “Engineer” means the person appointed by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under Sub-Clause 3.4 [Replacement of the Engineer].

1.1.2.5 “Contractor’s Representative” means the person named by the Contractor in the Contract or appointed from time to time by the Contractor under Sub-Clause 4.3 [Contractor’s Representative], who acts on behalf of the Contractor.

1.1.2.6 “Employer’s Personnel” means the Engineer, the assistants referred to in Sub-Clause 3.2 [Delegation by the Engineer] and all other staff, labour and other employees of the Engineer and of the Employer; and any other personnel notified to the Contractor, by the Employer or the Engineer, as Employer’s Personnel.

1.1.2.7 “Contractor’s Personnel” means the Contractor’s



Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the Works.

1.1.2.8 “Subcontractor” means any person named in the Contract as a subcontractor, or any person appointed as a subcontractor, for a part of the Works; and the legal successors in title to each of these persons.

1.1.2.9 “DB” means the person or three persons appointed under Sub-Clause 20.2 [Appointment of the Dispute Board] or Sub-Clause 20.3 [Failure to Agree on the Composition of the Dispute Board]

1.1.2.10 “FIDIC” means the Fédération Internationale des Ingénieurs-Conseils, the international federation of consulting engineers.

1.1.2.11 “Bank” means the financing institution (if any) named in the Contract Data.

1.1.2.12 “Borrower” means the person (if any) named as the borrower in the Contract Data.

1.1.3 Dates, Tests, Periods and Completion

1.1.3.1 “Base Date” means the date 28 days prior to the latest date for submission of the Tender.

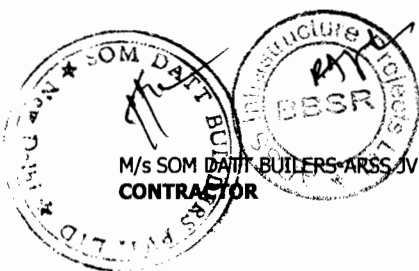
1.1.3.2 “Commencement Date” means the date notified under Sub-Clause 8.1 [Commencement of Works].

1.1.3.3 “Time for Completion” means the time for completing the Works or a Section (as the case may be) under Sub-Clause 8.2 [Time for Completion], as stated in the Contract Data (with any extension under Sub-Clause 8.4 [Extension of Time for Completion]), calculated from the Commencement Date.

1.1.3.4 “Tests on Completion” means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out under Clause 9 [Tests on Completion] before the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.5 “Taking-Over Certificate” means a certificate issued under Clause 10 [Employer’s Taking Over].

1.1.3.6 “Tests after Completion” means the tests (if any)



which are specified in the Contract and which are carried out in accordance with the Specification after the Works or a Section (as the case may be) are taken over by the Employer.

1.1.3.7 “Defects Notification Period” means the period for notifying defects in the Works or a Section (as the case may be) under Sub-Clause 11.1 [Completion of Outstanding Work and Remedying Defects], which extends over twelve months except if otherwise stated in the Contract Data (with any extension under Sub-Clause 11.3 [Extension of Defects Notification Period]), calculated from the date on which the Works or Section is completed as certified under Sub-Clause 10.1 [Taking Over of the Works and Sections].

1.1.3.8 “Performance Certificate” means the certificate issued under Sub-Clause 11.9 [Performance Certificate].

1.1.3.9 “day” means a calendar day and “year” means 365 days.

1.1.4 Money and Payments

1.1.4.1 “Accepted Contract Amount” means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.

1.1.4.2 “Contract Price” means the price defined in Sub-Clause 14.1 [The Contract Price], and includes adjustments in accordance with the Contract.

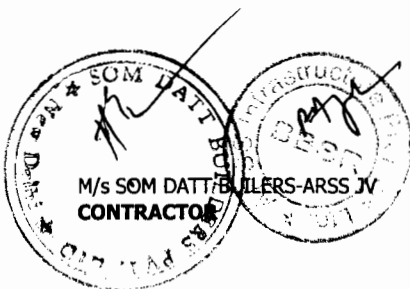
1.1.4.3 “Cost” means all expenditure reasonably incurred (or to be incurred) by the Contractor, whether on or off the Site, including overhead and similar charges, but does not include profit.

1.1.4.4 “Final Payment Certificate” means the payment certificate issued under Sub-Clause 14.13 [Issue of Final Payment Certificate].

1.1.4.5 “Final Statement” means the statement defined in Sub-Clause 14.11 [Application for Final Payment Certificate].

1.1.4.6 “Foreign Currency” means a currency in which part (or all) of the Contract Price is payable, but not the Local Currency.

1.1.4.7 “Interim Payment Certificate” means a payment



certificate issued under Clause 14 [Contract Price and Payment], other than the Final Payment Certificate.

1.1.4.8 “Local Currency” means the currency of the Country.

1.1.4.9 “Payment Certificate” means a payment certificate issued under Clause 14 [Contract Price and Payment].

1.1.4.10 “Provisional Sum” means a sum (if any) which is specified in the Contract as a provisional sum, for the execution of any part of the Works or for the supply of Plant, Materials or services under Sub-Clause 13.5 [Provisional Sums].

1.1.4.11 “Retention Money” means the accumulated retention moneys which the Employer retains under Sub-Clause 14.3 [Application for Interim Payment Certificates] and pays under Sub-Clause 14.9 [Payment of Retention Money].

1.1.4.12 “Statement” means a statement submitted by the Contractor as part of an application, under Clause 14 [Contract Price and Payment], for a payment certificate.

1.1.5 Works and Goods

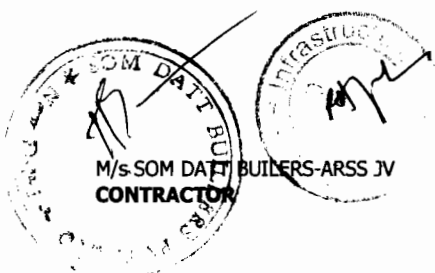
1.1.5.1 “Contractor’s Equipment” means all apparatus, machinery, vehicles and other things required for the execution and completion of the Works and the remedying of any defects. However, Contractor’s Equipment excludes Temporary Works, Employer’s Equipment (if any), Plant, Materials and any other things intended to form or forming part of the Permanent Works.

1.1.5.2 “Goods” means Contractor’s Equipment, Materials, Plant and Temporary Works, or any of them as appropriate.

1.1.5.3 “Materials” means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply-only materials (if any) to be supplied by the Contractor under the Contract.

1.1.5.4 “Permanent Works” means the permanent works to be executed by the Contractor under the Contract.

1.1.5.5 “Plant” means the apparatus, machinery and other equipment intended to form or forming part of the Permanent Works, including vehicles purchased for the Employer and relating to the construction or



operation of the Works.

1.1.5.6 “Section” means a part of the Works specified in the Contract Data as a Section (if any).

1.1.5.7 “Temporary Works” means all temporary works of every kind (other than Contractor’s Equipment) required on Site for the execution and completion of the Permanent Works and the remedying of any defects.

1.1.5.8 “Works” mean the Permanent Works and the Temporary Works, or either of them as appropriate.

1.1.6 Other Definitions

1.1.6.1 “Contractor’s Documents” means the calculations, computer programs and other software, drawings, manuals, models and other documents of a technical nature (if any) supplied by the Contractor under the Contract.

1.1.6.2 “Country” means the country in which the Site (or most of it) is located, where the Permanent Works are to be executed.

1.1.6.3 “Employer’s Equipment” means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Specification; but does not include Plant which has not been taken over by the Employer.

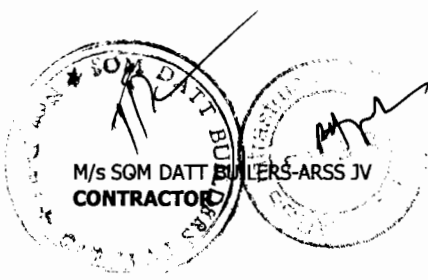
1.1.6.4 “Force Majeure” is defined in Clause 19 [Force Majeure].

1.1.6.5 “Laws” means all national (or state) legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority.

1.1.6.6 “Performance Security” means the security (or securities, if any) under Sub-Clause 4.2 [Performance Security].

1.1.6.7 “Site” means the places where the Permanent Works are to be executed including storage and working areas and to which Plant and Materials are to be delivered, and any other places as may be specified in the Contract as forming part of the Site.

1.1.6.8 “Unforeseeable” means not reasonably foreseeable by an experienced contractor by the Base Date.



1.1.6.9 "Variation" means any change to the Works, which is instructed or approved as a variation under Clause 13 [Variations and Adjustments].

1.2 Interpretation

In the Contract, except where the context requires otherwise:

- (a) words indicating one gender include all genders;
- (b) words indicating the singular also include the plural and words indicating the plural also include the singular;
- (c) provisions including the word "agree," "agreed" or "agreement" require the agreement to be record in writing;
- (d) "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record; and
- (e) the word "tender" is synonymous with "bid", and "tenderer" with "bidder" and the words "tender documents" with "bidding documents"

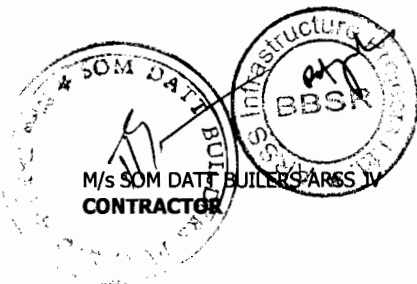
The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

In these Conditions, provisions including the expression "Cost plus profit" require this profit to be one-twentieth (5%) of this Cost unless otherwise indicated in the Contract Data.

1.3 Communications

Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices, requests and discharges, these communications shall be:

- (a) in writing and delivered by hand (against receipt), sent by mail or courier, or transmitted using any of the agreed systems of electronic transmission as stated in the Contract Data; and
- (b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract Data. However:
 - (i) if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and
 - (ii) if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to



the address from which the request was issued.

Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed. When a certificate is issued to a Party, the certifier shall send a copy to the other Party. When a notice is issued to a Party, by the other Party or the Engineer, a copy shall be sent to the Engineer or the other Party, as the case may be.

1.4 Law and Language

The Contract shall be governed by the law of the country or other jurisdiction stated in the Contract Data.

The ruling language of the Contract shall be that stated in the Contract Data.

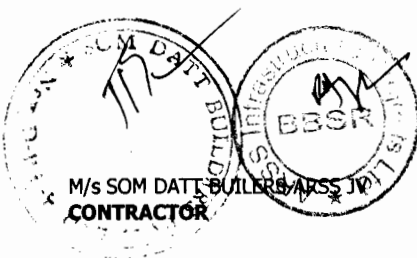
The language for communications shall be that stated in the Contract Data. If no language is stated there, the language for communications shall be the ruling language of the Contract.

1.5 Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

- (a) the Contract Agreement (if any),
- (b) the Letter of Acceptance,
- (c) the Tender,
- (d) the Particular Conditions – Part A,
- (e) the Particular Conditions – Part B
- (f) these General Conditions
- (g) the Specification,
- (h) the Drawings, and
- (i) the Schedules and any other documents forming part of the Contract.

If an ambiguity or discrepancy is found in the documents, the Engineer shall issue any necessary clarification or instruction.



1.6 Contract Agreement

The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance, unless the Particular Conditions establish otherwise. The Contract Agreement shall be based upon the form annexed to the Particular Conditions. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.

1.7 Assignment

Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party:

- (a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party, and
- (b) may, as security in favour of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.

1.8 Care and Supply of Documents

The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, two copies of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.

Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.

The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.

1.9 Delayed Drawings or Instructions

The Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted if any necessary drawing or instruction is not issued to the Contractor within a particular time, which shall be reasonable. The notice shall




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
O/o the E.I.C. (Civil)
Cuttack, Bhubaneswar.

include details of the necessary drawing or instruction, details of why and by when it should be issued, and the nature and amount of the delay or disruption likely to be suffered if it is late.

If the Contractor suffers delay and/or incurs Cost as a result of a failure of the Engineer to issue the notified drawing or instruction within a time which is reasonable and is specified in the notice with supporting details, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

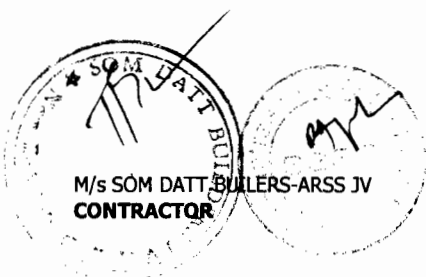
However, if and to the extent that the Engineer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit

1.10 Employer's Use of Contractor's Documents

As between the Parties, the Contractor shall retain the copyright and other intellectual property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.

The Contractor shall be deemed (by signing the Contract) to give to the Employer a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

- (a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,
- (b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and



- (c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as envisaged by the Contract, including replacements of any computers supplied by the Contractor.

The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

1.11 Contractor's Use of Employer's Documents

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Specification, the Drawings and other documents made by (or on behalf of) the Employer. The Contractor may, at his cost, copy, use, and obtain communication of these documents for the purposes of the Contract. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

1.12 Confidential Details

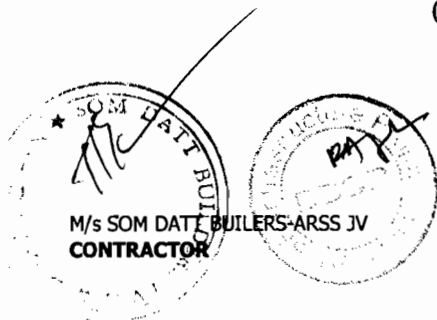
The Contractor's and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify the Contractor's compliance with the Contract and allow its proper implementation.

Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.

1.13 Compliance with Laws

The Contractor shall, in performing the Contract, comply with applicable Laws. Unless otherwise stated in the Particular Conditions:

- (a) the Employer shall have obtained (or shall obtain) the planning, zoning, building permit or similar permission for the Permanent Works, and any other permissions described in the Specification as having been (or to be)



obtained by the Employer; and the Employer shall indemnify and hold the Contractor harmless against and from the consequences of any failure to do so; and

- (b) the Contractor shall give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the Laws in relation to the execution and completion of the Works and the remedying of any defects; and the Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so, unless the Contractor is impeded to accomplish these actions and shows evidence of its diligence.

1.14 Joint and Several Liability

If the Contractor constitutes (under applicable Laws) a joint venture or other unincorporated grouping of two or more persons:

- (a) these persons shall be deemed to be jointly and severally liable to the Employer for the performance of the Contract;
- (b) these persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and
- (c) the Contractor shall not alter its composition or legal status without the prior consent of the Employer.

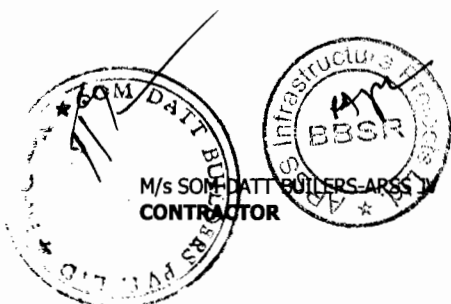
1.15 Inspections and Audit by the Bank

The Contractor shall permit the Bank and/or persons appointed by the Bank to inspect the Site and/or the accounts and records of the Contractor and its subcontractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the Bank if required by the Bank. The Contractor's attention is drawn to Sub-Clause 15.6 [Corrupt or Fraudulent Practices] which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under Sub-Clause 1.15 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility under the Procurement Guidelines).

2. The Employer

2.1 Right of Access to the Site

The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Contract Data. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) possession of any foundation, structure, plant or means of access, the



Employer shall do so in the time and manner stated in the Specification. However, the Employer may withhold any such right or possession until the Performance Security has been received.

If no such time is stated in the Contract Data, the Employer shall give the Contractor right of access to, and possession of, the Site within such times as required to enable the Contractor to proceed without disruption in accordance with the programme submitted under Sub-Clause 8.3 [Programme].

If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

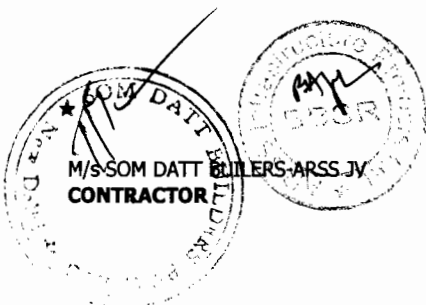
After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.

2.2 Permits, Licences or Approvals

The Employer shall provide, at the request of the Contractor, such reasonable assistance as to allow the Contractor to obtain properly:

- (a) copies of the Laws of the Country which are relevant to the Contract but are not readily available, and
- (b) any permits, licences or approvals required by the Laws of the Country:
 - (i) which the Contractor is required to obtain under Sub-Clause 1.13 [Compliance with Laws],
 - (ii) for the delivery of Goods, including clearance through customs, and
 - (iii) for the export of Contractor's Equipment when it is removed from the Site.



2.3 Employer's Personnel

The Employer shall be responsible for ensuring that the Employer's Personnel and the Employer's other contractors on the Site:

- (a) co-operate with the Contractor's efforts under Sub-Clause 4.6 [Co-operation], and
- (b) take actions similar to those which the Contractor is required to take under sub-paragraphs (a), (b) and (c) of Sub-Clause 4.8 [Safety Procedures] and under Sub-Clause 4.18 [Protection of the Environment].

2.4 Employer's Financial Arrangements

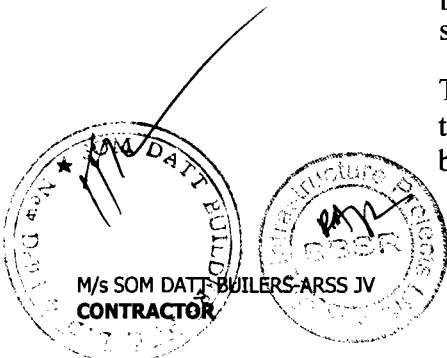
The Employer shall submit, before the Commencement Date and thereafter within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price punctually (as estimated at that time) in accordance with Clause 14 [Contract Price and Payment]. Before the Employer makes any material change to his financial arrangements, the Employer shall give notice to the Contractor with detailed particulars.


In addition, if the Bank has notified to the Borrower that the Bank has suspended disbursements under its loan, which finances in whole or in part the execution of the Works, the Employer shall give notice of such suspension to the Contractor with detailed particulars, including the date of such notification, with a copy to the Engineer, within 7 days of the Borrower having received the suspension notification from the Bank. If alternative funds will be available in appropriate currencies to the Employer to continue making payments to the Contractor beyond a date 60 days after the date of Bank notification of the suspension, the Employer shall provide reasonable evidence in such notice of the extent to which such funds will be available.

2.5 Employer's Claims

If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Notification Period, the Employer or the Engineer shall give notice and particulars to the Contractor. However, notice is not required for payments due under Sub-Clause 4.19 [Electricity, Water and Gas], under Sub-Clause 4.20 [Employer's Equipment and Free-Issue Material], or for other services requested by the Contractor.

The notice shall be given as soon as practicable and no longer than 28 days after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the




Chief Engineer
World Bank Projects, Orissa,
EMPLOYER
D/o Mr. E.I.C. (Civil)
P.O. No. 8, Bhubaneswar.

claim. A notice relating to any extension of the Defects Notification Period shall be given before the expiry of such period.

The particulars shall specify the Clause or other basis of the claim, and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract. The Engineer shall then proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or (ii) the extension (if any) of the Defects Notification Period in accordance with Sub-Clause 11.3 [Extension of Defects Notification Period].

This amount may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, or to otherwise claim against the Contractor, in accordance with this Sub-Clause.

3. The Engineer

3.1 Engineer's Duties and Authority

The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer's staff shall include suitably qualified engineers and other professionals who are competent to carry out these duties.

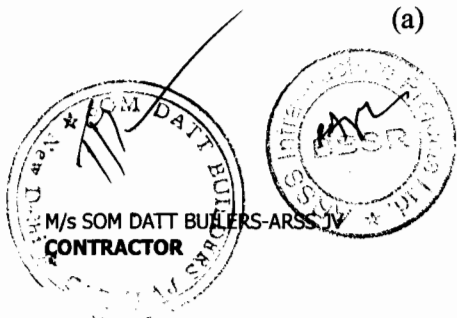
The Engineer shall have no authority to amend the Contract.

The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as stated in the Particular Conditions. The Employer shall promptly inform the Contractor of any change to the authority attributed to the Engineer.

However, whenever the Engineer exercises a specified authority for which the Employer's approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.

Except as otherwise stated in these Conditions:

- (a) whenever carrying out duties or exercising authority, specified in or implied by the Contract, the Engineer shall be deemed to act for the Employer;



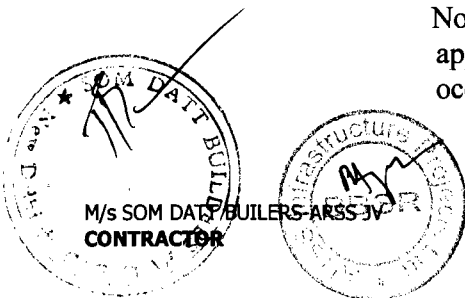
- (b) the Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract; and
- (c) any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by the Engineer (including absence of disapproval) shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances.
- (d) Any act by the Engineer in response to a Contractor's request except otherwise expressly specified shall be notified in writing to the Contractor within 28 days of receipt.

The following provisions shall apply:

The Engineer shall obtain the specific approval of the Employer before taking action under the following Sub-Clauses of these Conditions:

- (a) Sub-Clause 4.12 [Unforeseeable Physical Conditions]: Agreeing or determining an extension of time and/or additional cost.
- (b) Sub-Clause 13.1 [Right to Vary]: Instructing a Variation, except;
 - (i) in an emergency situation as determined by the Engineer, or
 - (ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.
- (c) Sub-Clause 13.3 [Variation Procedure]: Approving a proposal for Variation submitted by the Contractor in accordance with Sub Clause 13.1 [Right to Vary] or 13.2 [Value Engineering].
- (d) Sub-Clause 13.4 [Payment in Applicable Currencies]: Specifying the amount payable in each of the applicable currencies

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of




 Chief Engineer,
 World Bank Projects, Overseas
 Office, (EMPLOYER)
 Chief Engineer, Overseas

adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 [Variations and Adjustments] and shall notify the Contractor accordingly, with a copy to the Employer.

3.2 Delegation by the Engineer

The Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both Parties.

However, unless otherwise agreed by both Parties, the Engineer shall not delegate the authority to determine any matter in accordance with Sub-Clause 3.5 [Determinations].

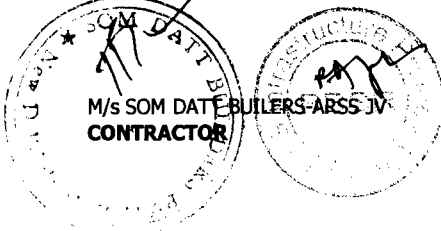
Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority, and who are fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language].

Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the Contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test, or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Engineer. However:

- (a) any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the Engineer to reject the work, Plant or Materials;
- (b) if the Contractor questions any determination or instruction of an assistant, the Contractor may refer the matter to the Engineer, who shall promptly confirm, reverse or vary the determination or instruction.

3.3 Instructions of

The Engineer may issue to the Contractor (at any time)



the Engineer

instructions and additional or modified Drawings which may be necessary for the execution of the Works and the remedying of any defects, all in accordance with the Contract. The Contractor shall only take instructions from the Engineer, or from an assistant to whom the appropriate authority has been delegated under this Clause. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.

The Contractor shall comply with the instructions given by the Engineer or delegated assistant, on any matter related to the Contract. Whenever practicable, their instructions shall be given in writing. If the Engineer or a delegated assistant:

- (a) gives an oral instruction,
- (b) receives a written confirmation of the instruction, from (or on behalf of) the Contractor, within two working days after giving the instruction, and
- (c) does not reply by issuing a written rejection and/or instruction within two working days after receiving the confirmation,

then the confirmation shall constitute the written instruction of the Engineer or delegated assistant (as the case may be).

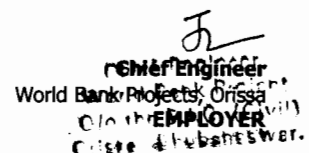
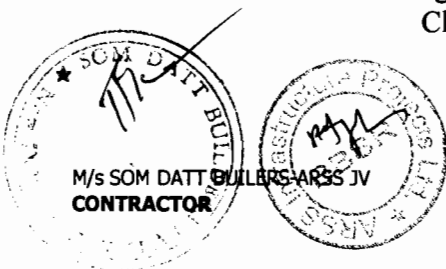
3.4 Replacement of the Engineer

If the Employer intends to replace the Engineer, the Employer shall, not less than 21 days before the intended date of replacement, give notice to the Contractor of the name, address and relevant experience of the intended replacement Engineer. If the Contractor considers the intended replacement Engineer to be unsuitable, he has the right to raise objection against him by notice to the Employer, with supporting particulars, and the Employer shall give full and fair consideration to this objection.

3.5 Determinations

Whenever these Conditions provide that the Engineer shall proceed in accordance with this Sub-Clause 3.5 to agree or determine any matter, the Engineer shall consult with each Party in an endeavour to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.

The Engineer shall give notice to both Parties of each agreement or determination, with supporting particulars within 28 days from the receipt of the corresponding claim or request except when otherwise specified. Each Party shall give effect to each agreement or determination unless and until revised under Clause 20 [Claims, Disputes and Arbitration].



4. The Contractor

4.1 Contractor's General Obligations

The Contractor shall design (to the extent specified in the Contract), execute and complete the Works in accordance with the Contract and with the Engineer's instructions, and shall remedy any defects in the Works.

The Contractor shall provide the Plant and Contractor's Documents specified in the Contract, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required in and for this design, execution, completion and remedying of defects.

All equipment, material, and services to be incorporated in or required for the Works shall have their origin in any eligible source country as defined by the Bank.

The Contractor shall be responsible for the adequacy, stability and safety of all Site operations and of all methods of construction. Except to the extent specified in the Contract, the Contractor (i) shall be responsible for all Contractor's Documents, Temporary Works, and such design of each item of Plant and Materials as is required for the item to be in accordance with the Contract, and (ii) shall not otherwise be responsible for the design or specification of the Permanent Works.

The Contractor shall, whenever required by the Engineer, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this having previously been notified to the Engineer.

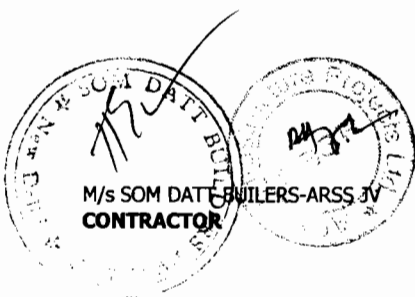
If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall submit to the Engineer the Contractor's Documents for this part in accordance with the procedures specified in the Contract;
- (b) these Contractor's Documents shall be in accordance with the Specification and Drawings, shall be written in the language for communications defined in Sub-Clause 1.4 [Law and Language], and shall include additional information required by the Engineer to add to the Drawings for co-ordination of each Party's designs;
- (c) the Contractor shall be responsible for this part and it shall, when the Works are completed, be fit for such purposes for



which the part is intended as are specified in the Contract;
and

- (d) prior to the commencement of the Tests on Completion, the Contractor shall submit to the Engineer the “as-built” documents and, if applicable, operation and maintenance manuals in accordance with the Specification and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair this part of the Works. Such part shall not be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [Taking Over of the Works and Sections] until these documents and manuals have been submitted to the Engineer.




Chief Engineer
World Bank Projects, Orissa
O/o the E.C. (Civil)
Crissa, Bhubaneswar.
EMPLOYER

4.2 Performance Security

The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount and currencies stated in the Contract Data. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.

The Contractor shall deliver the Performance Security to the Employer within 28 days after receiving the Letter of Acceptance, and shall send a copy to the Engineer. The Performance Security shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.

The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract.

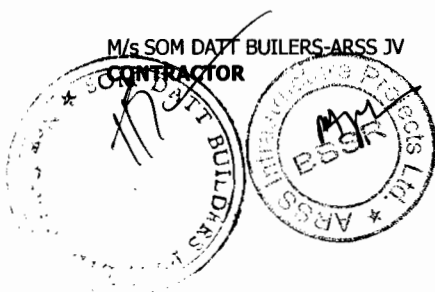
The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the claim.

The Employer shall return the Performance Security to the Contractor within 21 days after receiving a copy of the Performance Certificate.

Without limitation to the provisions of the rest of this Sub-Clause, whenever the Engineer determines an addition or a reduction to the Contract Price as a result of a change in cost and/or legislation or as a result of a Variation amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor shall at the Engineer's request promptly increase, or may decrease, as the case may be, the value of the Performance Security in that currency by an equal percentage.

4.3 Contractor's Representative

The Contractor shall appoint the Contractor's Representative and shall give him all authority necessary to act on the



Contractor's behalf under the Contract.

Unless the Contractor's Representative is named in the Contract, the Contractor shall, prior to the Commencement Date, submit to the Engineer for consent the name and particulars of the person the Contractor proposes to appoint as Contractor's Representative. If consent is withheld or subsequently revoked in terms of Sub-Clause 6.9 [Contractor's Personnel], or if the appointed person fails to act as Contractor's Representative, the Contractor shall similarly submit the name and particulars of another suitable person for such appointment.

The Contractor shall not, without the prior consent of the Engineer, revoke the appointment of the Contractor's Representative or appoint a replacement.

The whole time of the Contractor's Representative shall be given to directing the Contractor's performance of the Contract. If the Contractor's Representative is to be temporarily absent from the Site during the execution of the Works, a suitable replacement person shall be appointed, subject to the Engineer's prior consent, and the Engineer shall be notified accordingly.

The Contractor's Representative shall, on behalf of the Contractor, receive instructions under Sub-Clause 3.3 [Instructions of the Engineer].

The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Engineer has received prior notice signed by the Contractor's Representative, naming the person and specifying the powers, functions and authority being delegated or revoked.

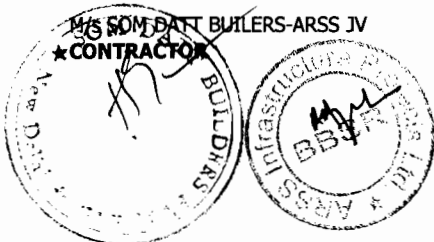
The Contractor's Representative shall be fluent in the language for communications defined in Sub-Clause 1.4 [Law and Language]. If the Contractor's Representative's delegates are not fluent in the said language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.

4.4 Subcontractors

The Contractor shall not subcontract the whole of the Works.

The Contractor shall be responsible for the acts or defaults of any Subcontractor, his agents or employees, as if they were the acts or defaults of the Contractor. Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall not be required to obtain consent to



suppliers solely of Materials, or to a subcontract for which the Subcontractor is named in the Contract;

- (b) the prior consent of the Engineer shall be obtained to other proposed Subcontractors;
- (c) the Contractor shall give the Engineer not less than 28 days' notice of the intended date of the commencement of each Subcontractor's work, and of the commencement of such work on the Site; and
- (d) each subcontract shall include provisions which would entitle the Employer to require the subcontract to be assigned to the Employer under Sub-Clause 4.5 [Assignment of Benefit of Subcontract] (if or when applicable) or in the event of termination under Sub-Clause 15.2 [Termination by Employer].

The Contractor shall ensure that the requirements imposed on the Contractor by Sub-Clause 1.12 [Confidential Details] apply equally to each Subcontractor.

Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Country to be appointed as Subcontractors.

4.5 Assignment of Benefit of Subcontract

If a Subcontractor's obligations extend beyond the expiry date of the relevant Defects Notification Period and the Engineer, prior to this date, instructs the Contractor to assign the benefit of such obligations to the Employer, then the Contractor shall do so. Unless otherwise stated in the assignment, the Contractor shall have no liability to the Employer for the work carried out by the Subcontractor after the assignment takes effect.

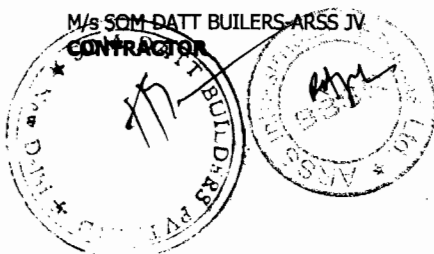
4.6 Co-operation

The Contractor shall, as specified in the Contract or as instructed by the Engineer, allow appropriate opportunities for carrying out work to:

- (a) the Employer's Personnel,
- (b) any other contractors employed by the Employer, and
- (c) the personnel of any legally constituted public authorities,

who may be employed in the execution on or near the Site of any work not included in the Contract.

Any such instruction shall constitute a Variation if and to the extent that it causes the Contractor to suffer delays and/or to incur Unforeseeable Cost. Services for these personnel and other contractors may include the use of Contractor's



Equipment, Temporary Works or access arrangements which are the responsibility of the Contractor.

If, under the Contract, the Employer is required to give to the Contractor possession of any foundation, structure, plant or means of access in accordance with Contractor's Documents, the Contractor shall submit such documents to the Engineer in the time and manner stated in the Specification.

4.7 Setting Out

The Contractor shall set out the Works in relation to original points, lines and levels of reference specified in the Contract or notified by the Engineer. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works.

The Employer shall be responsible for any errors in these specified or notified items of reference, but the Contractor shall use reasonable efforts to verify their accuracy before they are used.

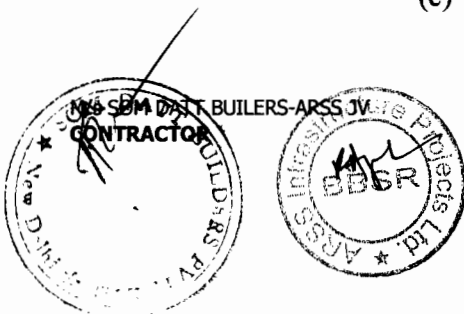
If the Contractor suffers delay and/or incurs Cost from executing work which was necessitated by an error in these items of reference, and an experienced contractor could not reasonably have discovered such error and avoided this delay and/or Cost, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent the error could not reasonably have been discovered, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.

4.8 Safety Procedures The Contractor shall:

- (a) comply with all applicable safety regulations,
- (b) take care for the safety of all persons entitled to be on the Site,
- (c) use reasonable efforts to keep the Site and Works clear of



unnecessary obstruction so as to avoid danger to these persons,

- (d) provide fencing, lighting, guarding and watching of the Works until completion and taking over under Clause 10 [Employer's Taking Over], and
- (e) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

4.9 Quality Assurance

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirements of the Contract. The system shall be in accordance with the details stated in the Contract. The Engineer shall be entitled to audit any aspect of the system.

Details of all procedures and compliance documents shall be submitted to the Engineer for information before each design and execution stage is commenced. When any document of a technical nature is issued to the Engineer, evidence of the prior approval by the Contractor himself shall be apparent on the document itself.

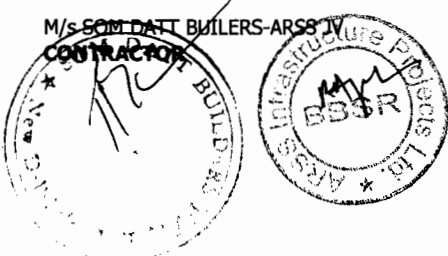
Compliance with the quality assurance system shall not relieve the Contractor of any of his duties, obligations or responsibilities under the Contract.

4.10 Site Data

The Employer shall have made available to the Contractor for his information, prior to the Base Date, all relevant data in the Employer's possession on sub-surface and hydrological conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data which come into the Employer's possession after the Base Date. The Contractor shall be responsible for interpreting all such data.

To the extent which was practicable (taking account of cost and time), the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Tender or Works. To the same extent, the Contractor shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information, and to have been satisfied before submitting the Tender as to all relevant matters, including (without limitation):

- (a) the form and nature of the Site, including sub-surface



conditions,

- (b) the hydrological and climatic conditions,
- (c) the extent and nature of the work and Goods necessary for the execution and completion of the Works and the remedying of any defects,
- (d) the Laws, procedures and labour practices of the Country, and
- (e) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services.

4.11 Sufficiency of the Accepted Contract Amount

The Contractor shall be deemed to:

- (a) have satisfied himself as to the correctness and sufficiency of the Accepted Contract Amount, and
- (b) have based the Accepted Contract Amount on the data, interpretations, necessary information, inspections, examinations and satisfaction as to all relevant matters referred to in Sub-Clause 4.10 [Site Data].

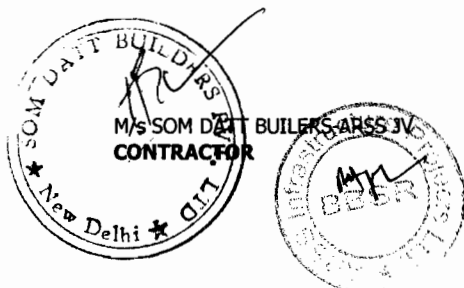
Unless otherwise stated in the Contract, the Accepted Contract Amount covers all the Contractor's obligations under the Contract (including those under Provisional Sums, if any) and all things necessary for the proper execution and completion of the Works and the remedying of any defects.

4.12 Unforeseeable Physical Conditions

In this Sub-Clause, "physical conditions" means natural physical conditions and man-made and other physical obstructions and pollutants, which the Contractor encounters at the Site when executing the Works, including sub-surface and hydrological conditions but excluding climatic conditions.

If the Contractor encounters adverse physical conditions which he considers to have been Unforeseeable, the Contractor shall give notice to the Engineer as soon as practicable.

This notice shall describe the physical conditions, so that they can be inspected by the Engineer, and shall set out the reasons why the Contractor considers them to be Unforeseeable. The Contractor shall continue executing the Works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the Engineer may give. If an instruction constitutes a Variation, Clause 13 [Variations and Adjustments] shall apply.



If and to the extent that the Contractor encounters physical conditions which are Unforeseeable, gives such a notice, and suffers delay and/or incurs Cost due to these conditions, the Contractor shall be entitled subject to notice under Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

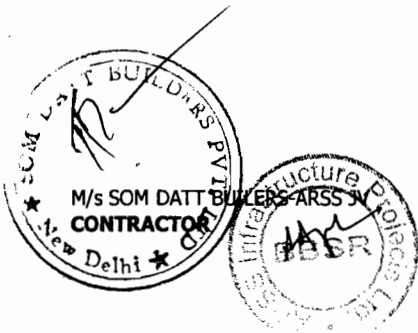
Upon receiving such notice and inspecting and/or investigating these physical conditions, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described in sub-paragraphs (a) and (b) above related to this extent.

However, before additional Cost is finally agreed or determined under sub-paragraph (ii), the Engineer may also review whether other physical conditions in similar parts of the Works (if any) were more favourable than could reasonably have been foreseen when the Contractor submitted the Tender. If and to the extent that these more favourable conditions were encountered, the Engineer may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the reductions in Cost which were due to these conditions, which may be included (as deductions) in the Contract Price and Payment Certificates. However, the net effect of all adjustments under sub-paragraph (b) and all these reductions, for all the physical conditions encountered in similar parts of the Works, shall not result in a net reduction in the Contract Price.

The Engineer shall take account of any evidence of the physical conditions foreseen by the Contractor when submitting the Tender, which shall be made available by the Contractor, but shall not be bound by the Contractor's interpretation of any such evidence.

4.13 Rights of Way and Facilities

Unless otherwise specified in the Contract the Employer shall provide access to and possession of the Site including special and/or temporary rights-of-way which are necessary for the Works. The Contractor shall obtain, at his risk and cost, any additional rights of way or facilities outside the Site which he may require for the purposes of the Works.



4.14 Avoidance of Interference

The Contractor shall not interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

4.15 Access Route

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site at Base Date. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor's traffic or by the Contractor's Personnel. These efforts shall include the proper use of appropriate vehicles and routes.

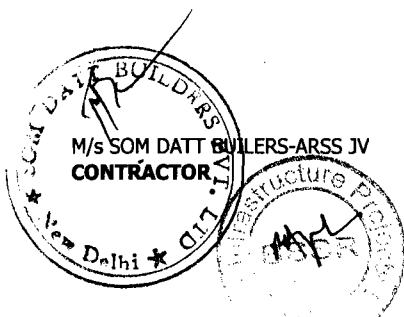
Except as otherwise stated in these Conditions:

- (a) the Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;
- (b) the Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions;
- (c) the Employer shall not be responsible for any claims which may arise from the use or otherwise of any access route;
- (d) the Employer does not guarantee the suitability or availability of particular access routes; and
- (e) Costs due to non-suitability or non-availability, for the use required by the Contractor, of access routes shall be borne by the Contractor.

4.16 Transport of Goods

Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall give the Engineer not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
- (b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting



all Goods and other things required for the Works; and

- (c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

4.17 Contractor's Equipment

The Contractor shall be responsible for all Contractor's Equipment. When brought on to the Site, Contractor's Equipment shall be deemed to be exclusively intended for the execution of the Works. The Contractor shall not remove from the Site any major items of Contractor's Equipment without the consent of the Engineer. However, consent shall not be required for vehicles transporting Goods or Contractor's Personnel off Site.

4.18 Protection of the Environment

The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.

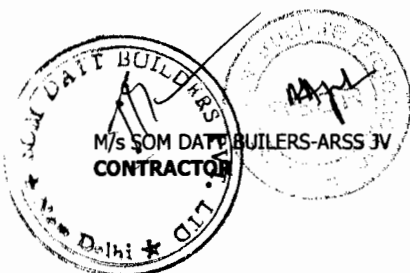
The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values stated in the Specification or prescribed by applicable Laws.

4.19 Electricity, Water and Gas

The Contractor shall, except as stated below, be responsible for the provision of all power, water and other services he may require for his construction activities and to the extent defined in the Specifications, for the tests.

The Contractor shall be entitled to use for the purposes of the Works such supplies of electricity, water, gas and other services as may be available on the Site and of which details and prices are given in the Specification. The Contractor shall, at his risk and cost, provide any apparatus necessary for his use of these services and for measuring the quantities consumed.

The quantities consumed and the amounts due (at these prices) for such services shall be agreed or determined by the Engineer in accordance with Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.



4.20 Employer's Equipment and Free-Issue Materials

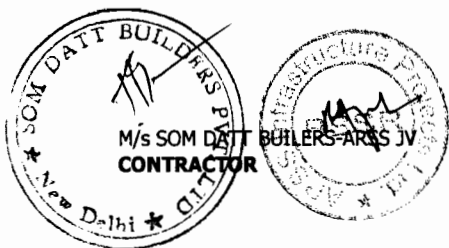
The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Specification. Unless otherwise stated in the Specification:

- (a) the Employer shall be responsible for the Employer's Equipment, except that
- (b) the Contractor shall be responsible for each item of Employer's Equipment whilst any of the Contractor's Personnel is operating it, driving it, directing it or in possession or control of it.

The appropriate quantities and the amounts due (at such stated prices) for the use of Employer's Equipment shall be agreed or determined by the Engineer in accordance with Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations]. The Contractor shall pay these amounts to the Employer.

The Employer shall supply, free of charge, the "free-issue materials" (if any) in accordance with the details stated in the Specification. The Employer shall, at his risk and cost, provide these materials at the time and place specified in the Contract. The Contractor shall then visually inspect them, and shall promptly give notice to the Engineer of any shortage, defect or default in these materials. Unless otherwise agreed by both Parties, the Employer shall immediately rectify the notified shortage, defect or default.

After this visual inspection, the free-issue materials shall come under the care, custody and control of the Contractor. The Contractor's obligations of inspection, care, custody and control shall not relieve the Employer of liability for any shortage, defect or default not apparent from a visual inspection.



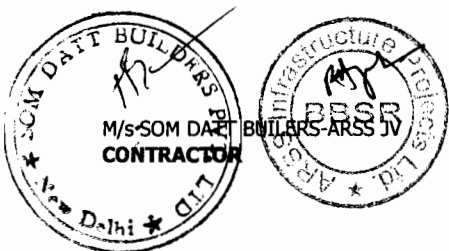
4.21 Progress Reports

Unless otherwise stated in the Particular Conditions, monthly progress reports shall be prepared by the Contractor and submitted to the Engineer in six copies. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7 days after the last day of the period to which it relates.

Reporting shall continue until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

Each report shall include:

- (a) charts and detailed descriptions of progress, including each stage of design (if any), Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection and testing; and including these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]),
- (b) photographs showing the status of manufacture and of progress on the Site;
- (c) for the manufacture of each main item of Plant and Materials, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:
 - (i) commencement of manufacture,
 - (ii) Contractor's inspections,
 - (iii) tests, and
 - (iv) shipment and arrival at the Site;
- (d) the details described in Sub-Clause 6.10 [Records of Contractor's Personnel and Equipment];
- (e) copies of quality assurance documents, test results and certificates of Materials;
- (f) list of notices given under Sub-Clause 2.5 [Employer's Claims] and notices given under Sub-Clause 20.1 [Contractor's Claims];
- (g) safety statistics, including details of any hazardous incidents and activities relating to environmental aspects



and public relations; and

- (h) comparisons of actual and planned progress, with details of any events or circumstances which may jeopardise the completion in accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

4.22 Security of the Site

Unless otherwise stated in the Particular Conditions:

- (a) the Contractor shall be responsible for keeping unauthorised persons off the Site, and
- (b) authorised persons shall be limited to the Contractor's Personnel and the Employer's Personnel; and to any other personnel notified to the Contractor, by the Employer or the Engineer, as authorised personnel of the Employer's other contractors on the Site.

4.23 Contractor's Operations on Site

The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the Site and these additional areas, and to keep them off adjacent land.

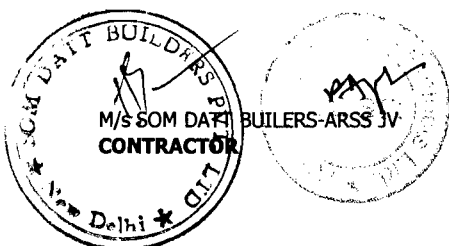
During the execution of the Works, the Contractor shall keep the Site free from all unnecessary obstruction, and shall store or dispose of any Contractor's Equipment or surplus materials. The Contractor shall clear away and remove from the Site any wreckage, rubbish and Temporary Works which are no longer required.

Upon the issue of a Taking-Over Certificate, the Contractor shall clear away and remove, from that part of the Site and Works to which the Taking-Over Certificate refers, all Contractor's Equipment, surplus material, wreckage, rubbish and Temporary Works. The Contractor shall leave that part of the Site and the Works in a clean and safe condition. However, the Contractor may retain on Site, during the Defects Notification Period, such Goods as are required for the Contractor to fulfil obligations under the Contract.

4.24 Fossils

All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer. The Contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any of these findings.

The Contractor shall, upon discovery of any such finding,



promptly give notice to the Engineer, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

5. Nominated Subcontractors

5.1 Definition of "nominated Subcontractor"

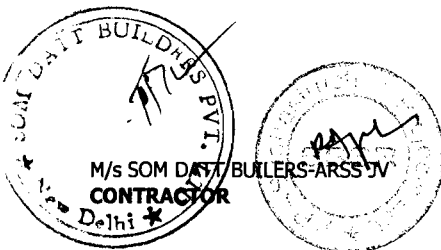
In the Contract, "nominated Subcontractor" means a Subcontractor:

- (a) who is stated in the Contract as being a nominated Subcontractor, or
- (b) whom the Engineer, under Clause 13 [Variations and Adjustments], instructs the Contractor to employ as a Subcontractor subject to Sub-Clause 5.2 [Objection to Notification].

5.2 Objection to Nomination

The Contractor shall not be under any obligation to employ a nominated Subcontractor against whom the Contractor raises reasonable objection by notice to the Engineer as soon as practicable, with supporting particulars. An objection shall be deemed reasonable if it arises from (among other things) any of the following matters, unless the Employer agrees in writing to indemnify the Contractor against and from the consequences of the matter:

- (a) there are reasons to believe that the Subcontractor does not have sufficient competence, resources or financial strength;
- (b) the nominated Subcontractor does not accept to indemnify the Contractor against and from any negligence or misuse of Goods by the nominated Subcontractor, his agents and employees; or
- (c) the nominated Subcontractor does not accept to enter into a subcontract which specifies that, for the subcontracted work (including design, if any), the nominated



Subcontractor shall:

- (i) undertake to the Contractor such obligations and liabilities as will enable the Contractor to discharge his obligations and liabilities under the Contract;
- (ii) indemnify the Contractor against and from all obligations and liabilities arising under or in connection with the Contract and from the consequences of any failure by the Subcontractor to perform these obligations or to fulfil these liabilities; and
- (iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.3 [Payment to nominated Subcontractors].

5.3 Payments to nominated Subcontractors

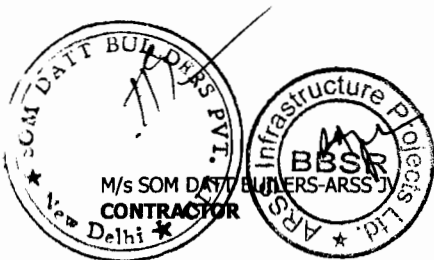
The Contractor shall pay to the nominated Subcontractor the amounts shown on the nominated Subcontractor's invoices approved by the Contractor which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with sub-paragraph (b) of Sub-Clause 13.5 [Provisional Sums], except as stated in Sub-Clause 5.4 [Evidence of Payments].

5.4 Evidence of Payments

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

- (a) submits this reasonable evidence to the Engineer, or
- (b)
 - (i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and
 - (ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,

then the Employer may (at his sole discretion) pay, direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has



failed to submit the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

6. Staff and Labour

6.1 Engagement of Staff and Labour

Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labour, local or otherwise, and for their payment, feeding, transport, and, when appropriate, housing.

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.

6.2 Rates of Wages and Conditions of Labour

The Contractor shall pay rates of wages, and observe conditions of labour, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the Laws of the Country for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

6.3 Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.

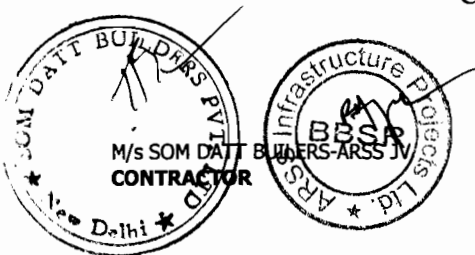
6.4 Labour Laws

The Contractor shall comply with all the relevant labour Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work.

6.5 Working Hours

No work shall be carried out on the Site on locally recognised days of rest, or outside the normal working hours stated in the Contract Data, unless:



- (a) otherwise stated in the Contract,
- (b) the Engineer gives consent, or
- (c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer.

6.6 Facilities for Staff and Labour

Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Specification.

The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

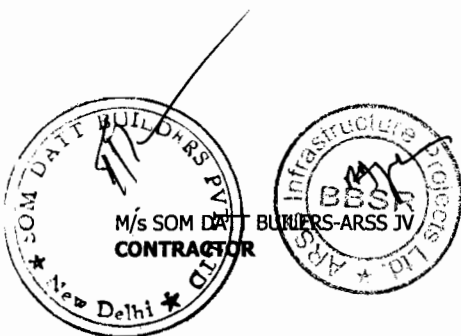
6.7 Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the execution of the Works, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send, to the Engineer, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.

HIV-AIDS Prevention. The Contractor shall conduct an HIV-AIDS awareness programme via an approved service provider, and shall undertake such other measures as are specified in this Contract to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local




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community, to promote early diagnosis and to assist affected individuals.

The Contractor shall throughout the contract (including the Defects Notification Period): (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Consultants' employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labor as appropriate; and (iii) provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.

The Contractor shall include in the program to be submitted for the execution of the Works under Sub-Clause 8.3 [Programme] an alleviation program for Site staff and labour and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this program shall not exceed the Provisional Sum dedicated for this purpose.

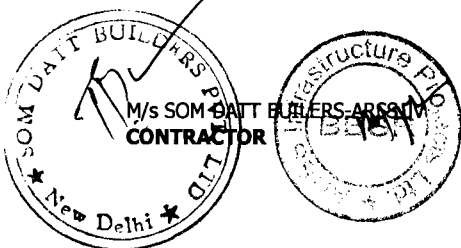
6.8 Contractor's Superintendence


Throughout the execution of the Works, and as long thereafter as is necessary to fulfil the Contractor's obligations, the Contractor shall provide all necessary superintendence to plan, arrange, direct, manage, inspect and test the work.

Superintendence shall be given by a sufficient number of persons having adequate knowledge of the language for communications (defined in Sub-Clause 1.4 [Law and Language]) and of the operations to be carried out (including the methods and techniques required, the hazards likely to be encountered and methods of preventing accidents), for the satisfactory and safe execution of the Works.

6.9 Contractor's

The Contractor's Personnel shall be appropriately qualified,




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Cuttack, Bhubaneswar.

Personnel

skilled and experienced in their respective trades or occupations. The Engineer may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Contractor's Representative if applicable, who:

- (a) persists in any misconduct or lack of care,
- (b) carries out duties incompetently or negligently,
- (c) fails to conform with any provisions of the Contract, or
- (d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment.

If appropriate, the Contractor shall then appoint (or cause to be appointed) a suitable replacement person.

6.10 Records of Contractor's Personnel and Equipment

The Contractor shall submit, to the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Engineer, until the Contractor has completed all work which is known to be outstanding at the completion date stated in the Taking-Over Certificate for the Works.

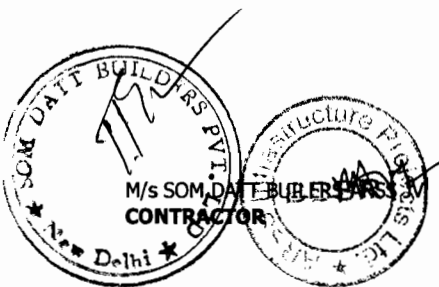
6.11 Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst the Contractor's Personnel, and to preserve peace and protection of persons and property on and near the Site.

6.12 Foreign Personnel

The Contractor may bring in to the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use his best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.

The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.



6.13 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

6.14 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

6.15 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

6.16 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal thereto by Contractor's Personnel.

6.17 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

6.18 Festivals and Religious Customs

The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.

6.19 Funeral Arrangements

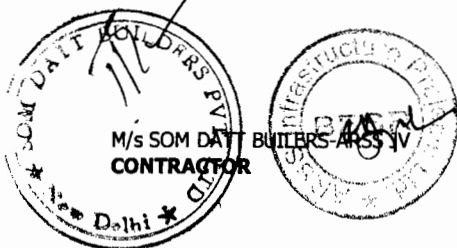
The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of his local employees who may die while engaged upon the Works.

6.20 Prohibition of Forced or Compulsory Labour

The contractor shall not employ "forced or compulsory labour" in any form. "Forced or compulsory labour" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

6.21 Prohibition of Harmful Child Labour

The Contractor shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social



development.

6.22 Employment Records of Workers

The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer, and these records shall be available for inspection by Auditors during normal working hours. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Records of Contractor's Personnel and Equipment].

7. Plant, Materials and Workmanship

7.1 Manner of Execution

The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:

- (a) in the manner (if any) specified in the Contract,
- (b) in a proper workmanlike and careful manner, in accordance with recognised good practice, and
- (c) with properly equipped facilities and non-hazardous Materials, except as otherwise specified in the Contract.

7.2 Samples

The Contractor shall submit the following samples of Materials, and relevant information, to the Engineer for consent prior to using the Materials in or for the Works:

- (a) manufacturer's standard samples of Materials and samples specified in the Contract, all at the Contractor's cost, and
- (b) additional samples instructed by the Engineer as a Variation.

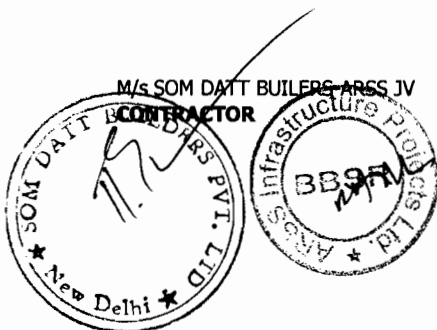
Each sample shall be labelled as to origin and intended use in the Works.

7.3 Inspection

The Employer's Personnel shall at all reasonable times:

- (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
- (b) during production, manufacture and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing



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O/o the E.T.C. (Civil)
Bhubaneswar.

access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

The Contractor shall give notice to the Engineer whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Engineer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

7.4 Testing

This Sub-Clause shall apply to all tests specified in the Contract, other than the Tests after Completion (if any).

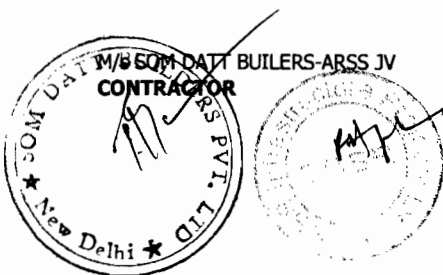
Except as otherwise specified in the Contract, the Contractor shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Contractor shall agree, with the Engineer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.

The Engineer may, under Clause 13 [Variations and Adjustments], vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Engineer shall give the Contractor not less than 24 hours' notice of the Engineer's intention to attend the tests. If the Engineer does not attend at the time and place agreed, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, and the tests shall then be deemed to have been made in the Engineer's presence.

If the Contractor suffers delay and/or incurs Cost from complying with these instructions or as a result of a delay for which the Employer is responsible, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time



for Completion], and

- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

The Contractor shall promptly forward to the Engineer duly certified reports of the tests. When the specified tests have been passed, the Engineer shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Engineer has not attended the tests, he shall be deemed to have accepted the readings as accurate.

7.5 Rejection

If, as a result of an examination, inspection, measurement or testing, any Plant, Materials or workmanship is found to be defective or otherwise not in accordance with the Contract, the Engineer may reject the Plant, Materials or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the defect and ensure that the rejected item complies with the Contract.

If the Engineer requires this Plant, Materials or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause the Employer to incur additional costs, the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay these costs to the Employer.

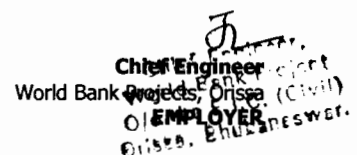
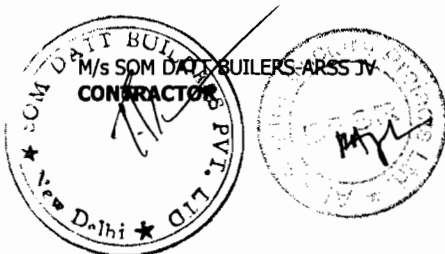
7.6 Remedial Work

Notwithstanding any previous test or certification, the Engineer may instruct the Contractor to:

- (a) remove from the Site and replace any Plant or Materials which is not in accordance with the Contract,
- (b) remove and re-execute any other work which is not in accordance with the Contract, and
- (c) execute any work which is urgently required for the safety of the Works, whether because of an accident, unforeseeable event or otherwise.

The Contractor shall comply with the instruction within a reasonable time, which shall be the time (if any) specified in the instruction, or immediately if urgency is specified under subparagraph (c).

If the Contractor fails to comply with the instruction, the



Employer shall be entitled to employ and pay other persons to carry out the work. Except to the extent that the Contractor would have been entitled to payment for the work, the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay to the Employer all costs arising from this failure.

7.7 Ownership of Plant and Materials

Except otherwise specified in the Contract, each item of Plant and Materials shall, to the extent consistent with the Laws of the Country, become the property of the Employer at whichever is the earlier of the following times, free from liens and other encumbrances:

- (a) when it is incorporated in the Works;
- (b) when the Contractor is paid the corresponding value of the Plant and Materials under Sub-Clause 8.10 [Payment for Plant and Materials in Event of Suspension].

7.8 Royalties

Unless otherwise stated in the Specification, the Contractor shall pay all royalties, rents and other payments for:

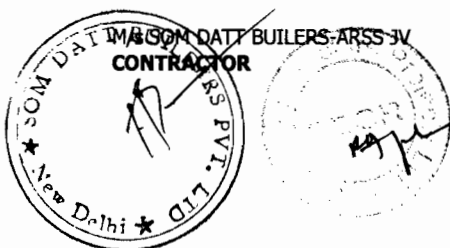
- (a) natural Materials obtained from outside the Site, and
- (b) the disposal of material from demolitions and excavations and of other surplus material (whether natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.


8. Commencement, Delays and Suspension

8.1 Commencement of Works

Except otherwise specified in the Particular Conditions, the Commencement Date shall be the date at which the following precedent conditions have all been fulfilled and the Engineer's instruction recording the agreement of both Parties on such fulfilment and instructing to commence the Works is received by the Contractor:

- (a) signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities in the Country;
- (b) delivery to the Contractor of reasonable evidence of the Employer's Financial arrangements (under Sub-Clause 2.4 [Employer's Financial Arrangements])
- (c) except if otherwise specified in the Contract Data, possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.13 [Compliance with Laws] as required for the




Chief Engineer.
World Bank Projects, Orissa
On the **EMPLOYER**
Orissa, Bhubaneswar.

commencement of the Works; and

- (d) receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 [Advance Payment] provided that the corresponding bank guarantee has been delivered by the Contractor.
- (e) If the said Engineer's instruction is not received by the Contractor within 180 days from his receipt of the Letter of Acceptance, the Contractor shall be entitled to terminate the Contract under Sub-Clause 16.2 [Termination by Contractor].

The Contractor shall commence the execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay.

8.2 Time for Completion

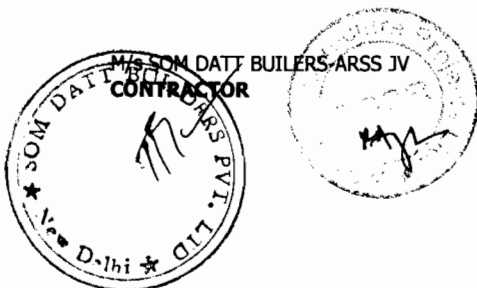
The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including:

- (a) achieving the passing of the Tests on Completion, and
- (b) completing all work which is stated in the Contract as being required for the Works or Section to be considered to be completed for the purposes of taking-over under Sub-Clause 10.1 [Taking Over of the Works and Sections].

8.3 Programme

The Contractor shall submit a detailed time programme to the Engineer within 28 days after receiving the notice under Sub-Clause 8.1 [Commencement of Works]. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:

- (a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing,
- (b) each of these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]),
- (c) the sequence and timing of inspections and tests specified in the Contract, and



- (d) a supporting report which includes:
- (i) a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and
 - (ii) details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage.

Unless the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.

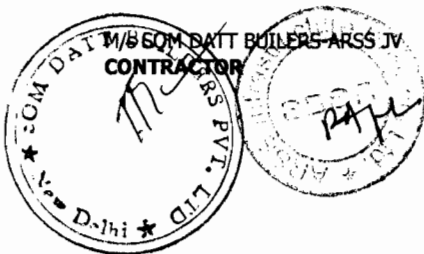
The Contractor shall promptly give notice to the Engineer of specific probable future events or circumstances which may adversely affect the work, increase the Contract Price, or delay the execution of the Works. The Engineer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances, and/or a proposal under Sub-Clause 13.3 [Variation Procedure].

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer in accordance with this Sub-Clause.

8.4 Extension of Time for Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [Taking-Over of the Works and Sections] is or will be delayed by any of the following causes:

- (a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [Variation Procedure]) or other substantial change in the quantity of an item of work included in the Contract,
- (b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions,
- (c) exceptionally adverse climatic conditions,
- (d) Unforeseeable shortages in the availability of personnel or



Goods caused by epidemic or governmental actions, or

- (e) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer in accordance with Sub-Clause 20.1 [Contractor's Claims]. When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

8.5 Delays Caused by Authorities

If the following conditions apply, namely:

- (a) the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
- (b) these authorities delay or disrupt the Contractor's work, and
- (c) the delay or disruption was Unforeseeable,

then this delay or disruption will be considered as a cause of delay under sub-paragraph (b) of Sub-Clause 8.4 [Extension of Time for Completion].

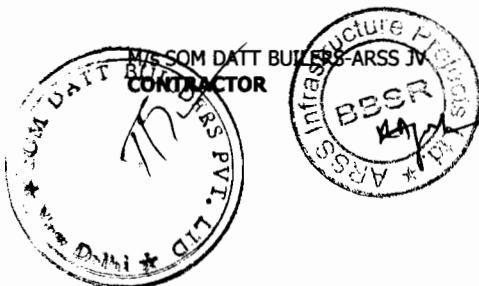
8.6 Rate of Progress

If, at any time:

- (a) actual progress is too slow to complete within the Time for Completion, and/or
- (b) progress has fallen (or will fall) behind the current programme under Sub-Clause 8.3 [Programme],

other than as a result of a cause listed in Sub-Clause 8.4 [Extension of Time for Completion], then the Engineer may instruct the Contractor to submit, under Sub-Clause 8.3 [Programme], a revised programme and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.

Unless the Engineer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to notice under Sub-Clause 2.5



[Employer's Claims] pay these costs to the Employer, in addition to delay damages (if any) under Sub-Clause 8.7 [Delay Damages] below.

Additional costs of revised methods, including acceleration measures, instructed by the Engineer to reduce delays resulting from causes listed under Sub-Clause 8.4 [Extension of Time for Completion] shall be paid by the Employer, without generating, however, any other additional payment benefit to the Contractor.

8.7 Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], the Contractor shall be subject to notice under Sub-Clause 2.5 [Employer's Claims] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data.

These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [Termination by Employer] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

8.8 Suspension of Work

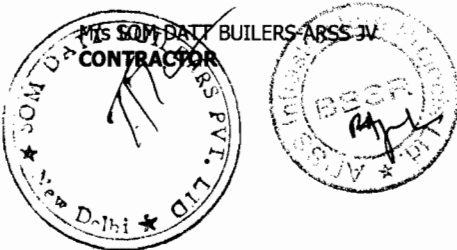
The Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.

The Engineer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9 [Consequences of Suspension], 8.10 [Payment for Plant and Materials in Event of Suspension] and 8.11 [Prolonged Suspension] shall not apply.

8.9 Consequences of Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions under Sub-Clause 8.8 [Suspension of Work] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time



for Completion], and

- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [Suspension of Work].

8.10 Payment for Plant and Materials in Event of Suspension

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

- (a) the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days, and
- (b) the Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Engineer's instructions.

8.11 Prolonged Suspension

If the suspension under Sub-Clause 8.8 [Suspension of Work] has continued for more than 84 days, the Contractor may request the Engineer's permission to proceed. If the Engineer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Engineer, treat the suspension as an omission under Clause 13 [Variations and Adjustments] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [Termination by Contractor].

8.12 Resumption of Work

After the permission or instruction to proceed is given, the Contractor and the Engineer shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension after receiving from the Engineer an instruction to this effect under Clause 13 [Variations and Adjustments].


9. Tests on Completion

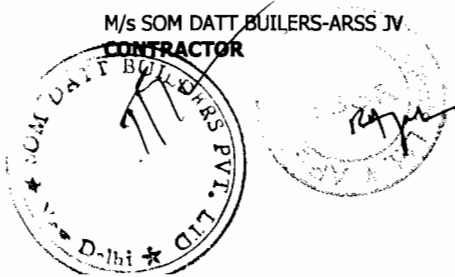
9.1 Contractor's Obligations

The Contractor shall carry out the Tests on Completion in accordance with this Clause and Sub-Clause 7.4 [Testing], after

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providing the documents in accordance with sub-paragraph (d) of Sub-Clause 4.1 [Contractor's General Obligations].

The Contractor shall give to the Engineer not less than 21 days' notice of the date after which the Contractor will be ready to carry out each of the Tests on Completion. Unless otherwise agreed, Tests on Completion shall be carried out within 14 days after this date, on such day or days as the Engineer shall instruct.

In considering the results of the Tests on Completion, the Engineer shall make allowances for the effect of any use of the Works by the Employer on the performance or other characteristics of the Works. As soon as the Works, or a Section, have passed any Tests on Completion, the Contractor shall submit a certified report of the results of these Tests to the Engineer.

9.2 Delayed Tests

If the Tests on Completion are being unduly delayed by the Employer, Sub-Clause 7.4 [Testing] (fifth paragraph) and/or Sub-Clause 10.3 [Interference with Tests on Completion] shall be applicable.

If the Tests on Completion are being unduly delayed by the Contractor, the Engineer may by notice require the Contractor to carry out the Tests within 21 days after receiving the notice. The Contractor shall carry out the Tests on such day or days within that period as the Contractor may fix and of which he shall give notice to the Engineer.

If the Contractor fails to carry out the Tests on Completion within the period of 21 days, the Employer's Personnel may proceed with the Tests at the risk and cost of the Contractor. The Tests on Completion shall then be deemed to have been carried out in the presence of the Contractor and the results of the Tests shall be accepted as accurate.

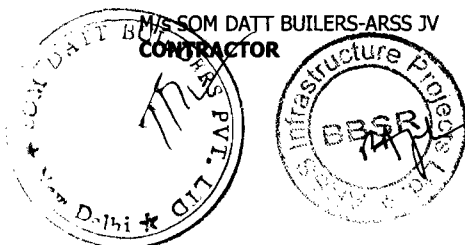
9.3 Retesting

If the Works, or a Section, fail to pass the Tests on Completion, Sub-Clause 7.5 [Rejection] shall apply, and the Engineer or the Contractor may require the failed Tests, and Tests on Completion on any related work, to be repeated under the same terms and conditions.

9.4 Failure to Pass Tests on Completion

If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [Retesting], the Engineer shall be entitled to:

- (a) order further repetition of Tests on Completion under Sub-Clause 9.3;
- (b) if the failure deprives the Employer of substantially the



whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in sub-paragraph (c) of Sub-Clause 11.4 [Failure to Remedy Defects]; or

- (c) issue a Taking-Over Certificate, if the Employer so requests.

In the event of sub-paragraph (c), the Contractor shall proceed in accordance with all other obligations under the Contract, and the Contract Price shall be reduced by such amount as shall be appropriate to cover the reduced value to the Employer as a result of this failure. Unless the relevant reduction for this failure is stated (or its method of calculation is defined) in the Contract, the Employer may require the reduction to be (i) agreed by both Parties (in full satisfaction of this failure only) and paid before this Taking-Over Certificate is issued, or (ii) determined and paid under Sub-Clause 2.5 [Employer's Claims] and Sub-Clause 3.5 [Determinations].

10. Employer's Taking Over

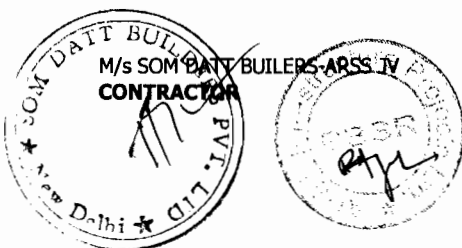
10.1 Taking Over of the Works and Sections

Except as stated in Sub-Clause 9.4 [Failure to Pass Tests on Completion], the Works shall be taken over by the Employer when (i) the Works have been completed in accordance with the Contract, including the matters described in Sub-Clause 8.2 [Time for Completion] and except as allowed in sub-paragraph (a) below, and (ii) a Taking-Over Certificate for the Works has been issued, or is deemed to have been issued in accordance with this Sub-Clause.

The Contractor may apply by notice to the Engineer for a Taking-Over Certificate not earlier than 14 days before the Works will, in the Contractor's opinion, be complete and ready for taking over. If the Works are divided into Sections, the Contractor may similarly apply for a Taking-Over Certificate for each Section.

The Engineer shall, within 28 days after receiving the Contractor's application:

- (a) issue the Taking-Over Certificate to the Contractor, stating the date on which the Works or Section were completed in accordance with the Contract, except for any minor outstanding work and defects which will not substantially affect the use of the Works or Section for their intended purpose (either until or whilst this work is completed and these defects are remedied); or
- (b) reject the application, giving reasons and specifying the work required to be done by the Contractor to enable the



Taking-Over Certificate to be issued. The Contractor shall then complete this work before issuing a further notice under this Sub-Clause.

If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued on the last day of that period.

10.2 Taking Over of Parts of the Works

The Engineer may, at the sole discretion of the Employer, issue a Taking-Over Certificate for any part of the Permanent Works.

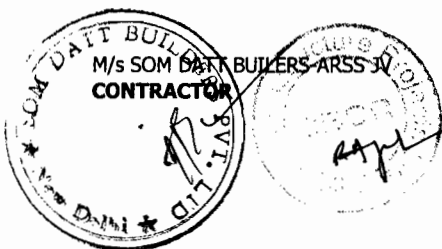
The Employer shall not use any part of the Works (other than as a temporary measure which is either specified in the Contract or agreed by both Parties) unless and until the Engineer has issued a Taking-Over Certificate for this part. However, if the Employer does use any part of the Works before the Taking-Over Certificate is issued:

- (a) the part which is used shall be deemed to have been taken over as from the date on which it is used,
- (b) the Contractor shall cease to be liable for the care of such part as from this date, when responsibility shall pass to the Employer, and
- (c) if requested by the Contractor, the Engineer shall issue a Taking-Over Certificate for this part.

After the Engineer has issued a Taking-Over Certificate for a part of the Works, the Contractor shall be given the earliest opportunity to take such steps as may be necessary to carry out any outstanding Tests on Completion. The Contractor shall carry out these Tests on Completion as soon as practicable before the expiry date of the relevant Defects Notification Period.

If the Contractor incurs Cost as a result of the Employer taking over and/or using a part of the Works, other than such use as is specified in the Contract or agreed by the Contractor, the Contractor shall (i) give notice to the Engineer and (ii) be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to payment of any such Cost plus profit, which shall be included in the Contract Price. After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine this Cost and profit.

If a Taking-Over Certificate has been issued for a part of the



Works (other than a Section), the delay damages thereafter for completion of the remainder of the Works shall be reduced. Similarly, the delay damages for the remainder of the Section (if any) in which this part is included shall also be reduced. For any period of delay after the date stated in this Taking-Over Certificate, the proportional reduction in these delay damages shall be calculated as the proportion which the value of the part so certified bears to the value of the Works or Section (as the case may be) as a whole. The Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these proportions. The provisions of this paragraph shall only apply to the daily rate of delay damages under Sub-Clause 8.7 [Delay Damages], and shall not affect the maximum amount of these damages.

10.3 Interference with Tests on Completion

If the Contractor is prevented, for more than 14 days, from carrying out the Tests on Completion by a cause for which the Employer is responsible, the Employer shall be deemed to have taken over the Works or Section (as the case may be) on the date when the Tests on Completion would otherwise have been completed.

The Engineer shall then issue a Taking-Over Certificate accordingly, and the Contractor shall carry out the Tests on Completion as soon as practicable, before the expiry date of the Defects Notification Period. The Engineer shall require the Tests on Completion to be carried out by giving 14 days' notice and in accordance with the relevant provisions of the Contract.

If the Contractor suffers delay and/or incurs Cost as a result of this delay in carrying out the Tests on Completion, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.



10.4 Surfaces Requiring Reinstatement

Except as otherwise stated in a Taking-Over Certificate, a certificate for a Section or part of the Works shall not be deemed to certify completion of any ground or other surfaces requiring reinstatement.

11. Defects Liability

11.1 Completion of Outstanding Work and Remedying Defects

In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

- (a) complete any work which is outstanding on the date stated in a Taking-Over Certificate, within such reasonable time as is instructed by the Engineer, and
- (b) execute all work required to remedy defects or damage, as may be notified by (or on behalf of) the Employer on or before the expiry date of the Defects Notification Period for the Works or Section (as the case may be).

If a defect appears or damage occurs, the Contractor shall be notified accordingly, by (or on behalf of) the Employer.

11.2 Cost of Remedying Defects

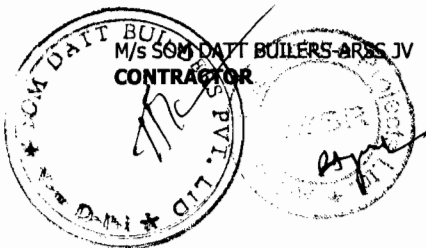
All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [Completion of Outstanding Work and Remedying Defects] shall be executed at the risk and cost of the Contractor, if and to the extent that the work is attributable to:

- (a) any design for which the Contractor is responsible,
- (b) Plant, Materials or workmanship not being in accordance with the Contract, or
- (c) failure by the Contractor to comply with any other obligation.

If and to the extent that such work is attributable to any other cause, the Contractor shall be notified promptly by (or on behalf of) the Employer and Sub-Clause 13.3 [Variation Procedure] shall apply.

11.3 Extension of Defects Notification Period

The Employer shall be entitled subject to Sub-Clause 2.5 [Employer's Claims] to an extension of the Defects Notification Period for the Works or a Section if and to the extent that the Works, Section or a major item of Plant (as the case may be, and after taking over) cannot be used for the purposes for which they are intended by reason of a defect or by reason of a damage attributable to the Contractor. However, a Defects Notification



Period shall not be extended by more than two years.

If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [Suspension of Work] or Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the Defects Notification Period for the Plant and/or Materials would otherwise have expired.

11.4 Failure to Remedy Defects

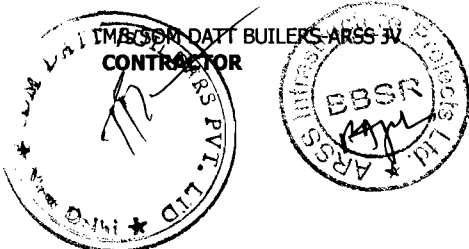
If the Contractor fails to remedy any defect or damage within a reasonable time, a date may be fixed by (or on behalf of) the Employer, on or by which the defect or damage is to be remedied. The Contractor shall be given reasonable notice of this date.


If the Contractor fails to remedy the defect or damage by this notified date and this remedial work was to be executed at the cost of the Contractor under Sub-Clause 11.2 [Cost of Remedying Defects], the Employer may (at his option):

- (a) carry out the work himself or by others, in a reasonable manner and at the Contractor's cost, but the Contractor shall have no responsibility for this work; and the Contractor shall subject to Sub-Clause 2.5 [Employer's Claims] pay to the Employer the costs reasonably incurred by the Employer in remedying the defect or damage;
- (b) require the Engineer to agree or determine a reasonable reduction in the Contract Price in accordance with Sub-Clause 3.5 [Determinations]; or
- (c) if the defect or damage deprives the Employer of substantially the whole benefit of the Works or any major part of the Works, terminate the Contract as a whole, or in respect of such major part which cannot be put to the intended use. Without prejudice to any other rights, under the Contract or otherwise, the Employer shall then be entitled to recover all sums paid for the Works or for such part (as the case may be), plus financing costs and the cost of dismantling the same, clearing the Site and returning Plant and Materials to the Contractor.

11.5 Removal of Defective Work

If the defect or damage cannot be remedied expeditiously on the Site and the Employer gives consent, the Contractor may remove from the Site for the purposes of repair such items of Plant as are defective or damaged. This consent may require the Contractor to increase the amount of the Performance Security by the full replacement cost of these items, or to provide other appropriate security.




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World Bank Projects, Orissa
EMPLOYER
O/o the E.P.C. (Civil)
Cuttack, Subanswar.

11.6 Further Tests

If the work of remedying of any defect or damage may affect the performance of the Works, the Engineer may require the repetition of any of the tests described in the Contract. The requirement shall be made by notice within 28 days after the defect or damage is remedied.

These tests shall be carried out in accordance with the terms applicable to the previous tests, except that they shall be carried out at the risk and cost of the Party liable, under Sub-Clause 11.2 [Cost of Remedying Defects], for the cost of the remedial work.

11.7 Right of Access

Until the Performance Certificate has been issued, the Contractor shall have such right of access to the Works as is reasonably required in order to comply with this Clause, except as may be inconsistent with the Employer's reasonable security restrictions.

11.8 Contractor to Search

The Contractor shall, if required by the Engineer, search for the cause of any defect, under the direction of the Engineer. Unless the defect is to be remedied at the cost of the Contractor under Sub-Clause 11.2 [Cost of Remedying Defects], the Cost of the search plus profit shall be agreed or determined by the Engineer in accordance with Sub-Clause 3.5 [Determinations] and shall be included in the Contract Price.

11.9 Performance Certificate

Performance of the Contractor's obligations shall not be considered to have been completed until the Engineer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract.

The Engineer shall issue the Performance Certificate within 28 days after the latest of the expiry dates of the Defects Notification Periods, or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. A copy of the Performance Certificate shall be issued to the Employer.

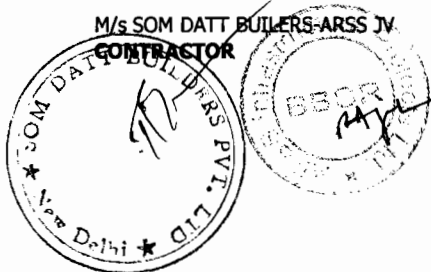
Only the Performance Certificate shall be deemed to constitute acceptance of the Works.

11.10 Unfulfilled Obligations

After the Performance Certificate has been issued, each Party shall remain liable for the fulfilment of any obligation which remains unperformed at that time. For the purposes of determining the nature and extent of unperformed obligations, the Contract shall be deemed to remain in force.

11.11 Clearance of Site

Upon receiving the Performance Certificate, the Contractor shall remove any remaining Contractor's Equipment, surplus



material, wreckage, rubbish and Temporary Works from the Site.

If all these items have not been removed within 28 days after receipt by the Contractor of the Performance Certificate, the Employer may sell or otherwise dispose of any remaining items. The Employer shall be entitled to be paid the costs incurred in connection with, or attributable to, such sale or disposal and restoring the Site.

Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

12. Measurement and Evaluation

12.1 Works to be Measured

The Works shall be measured, and valued for payment, in accordance with this Clause. The Contractor shall show in each application under Sub-Clauses 14.3 [Application for Interim Payment Certificates], 14.10 [Statement at Completion], and 14.11 [Application for Final Payment Certificate] the quantities and other particulars detailing the amounts which he considers to be entitled under the Contract.

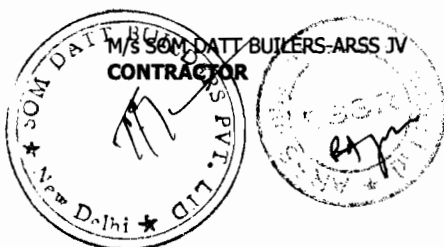
Whenever the Engineer requires any part of the Works to be measured, reasonable notice shall be given to the Contractor's Representative, who shall:

- (a) promptly either attend or send another qualified representative to assist the Engineer in making the measurement, and
- (b) supply any particulars requested by the Engineer.

If the Contractor fails to attend or send a representative, the measurement made by (or on behalf of) the Engineer shall be accepted as accurate.

Except as otherwise stated in the Contract, wherever any Permanent Works are to be measured from records, these shall be prepared by the Engineer. The Contractor shall, as and when requested, attend to examine and agree the records with the Engineer, and shall sign the same when agreed. If the Contractor does not attend, the records shall be accepted as accurate.

If the Contractor examines and disagrees the records, and/or does not sign them as agreed, then the Contractor shall give notice to the Engineer of the respects in which the records are asserted to be inaccurate. After receiving this notice, the Engineer shall review the records and either confirm or vary



them and certify the payment of the undisputed part. If the Contractor does not so give notice to the Engineer within 14 days after being requested to examine the records, they shall be accepted as accurate.

12.2 Method of Measurement

Except as otherwise stated in the Contract and notwithstanding local practice:

- (b) measurement shall be made of the net actual quantity of each item of the Permanent Works, and
- (c) the method of measurement shall be in accordance with the Bill of Quantities or other applicable Schedules.

12.3 Evaluation

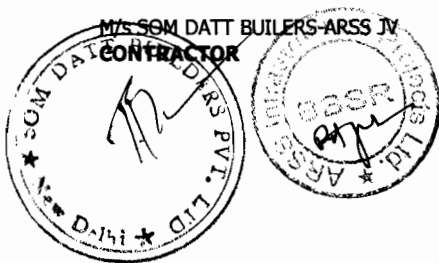
Except as otherwise stated in the Contract, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the Contract Price by evaluating each item of work, applying the measurement agreed or determined in accordance with the above Sub-Clauses 12.1 [Works to be Measured] and 12.2 [Method of Measurement] and the appropriate rate or price for the item.

For each item of work, the appropriate rate or price for the item shall be the rate or price specified for such item in the Contract or, if there is no such item, specified for similar work.

Any item of work included in the Bill of Quantities for which no rate or price was specified shall be considered as included in other rates and prices in the Bill of Quantities and will not be paid for separately.

However, a new rate or price shall be appropriate for an item of work if:

- (a)
 - (i) the measured quantity of the item is changed by more than 25% from the quantity of this item in the Bill of Quantities or other Schedule,
 - (ii) this change in quantity multiplied by such specified rate for this item exceeds 0.25% of the Accepted Contract Amount,
 - (iii) this change in quantity directly changes the Cost per unit quantity of this item by more than 1%, and
 - (iv) this item is not specified in the Contract as a “fixed rate item”;



or

(b)

- (i) the work is instructed under Clause 13 [Variations and Adjustments],
- (ii) no rate or price is specified in the Contract for this item, and
- (iii) no specified rate or price is appropriate because the item of work is not of similar character, or is not executed under similar conditions, as any item in the Contract.

Each new rate or price shall be derived from any relevant rates or prices in the Contract, with reasonable adjustments to take account of the matters described in sub-paragraph (a) and/or (b), as applicable. If no rates or prices are relevant for the derivation of a new rate or price, it shall be derived from the reasonable Cost of executing the work, together with profit, taking account of any other relevant matters.

Until such time as an appropriate rate or price is agreed or determined, the Engineer shall determine a provisional rate or price for the purposes of Interim Payment Certificates as soon as the concerned Works commences.

12.4 Omissions

Whenever the omission of any work forms part (or all) of a Variation, the value of which has not been agreed, if:

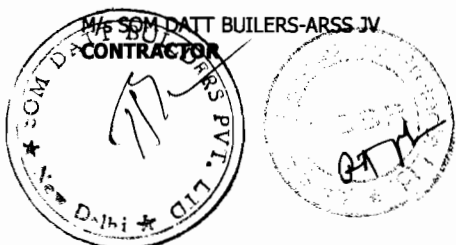
- (a) the Contractor will incur (or has incurred) cost which, if the work had not been omitted, would have been deemed to be covered by a sum forming part of the Accepted Contract Amount;
- (b) the omission of the work will result (or has resulted) in this sum not forming part of the Contract Price; and
- (c) this cost is not deemed to be included in the evaluation of any substituted work;

then the Contractor shall give notice to the Engineer accordingly, with supporting particulars. Upon receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine this cost, which shall be included in the Contract Price.

13. Variations and Adjustments

13.1 Right to Vary

Variations may be initiated by the Engineer at any time prior to



issuing the Taking-Over Certificate for the Works, either by an instruction or by a request for the Contractor to submit a proposal.

The Contractor shall execute and be bound by each Variation, unless the Contractor promptly gives notice to the Engineer stating (with supporting particulars) that (i) the Contractor cannot readily obtain the Goods required for the Variation, or (ii) such Variation triggers a substantial change in the sequence or progress of the Works. Upon receiving this notice, the Engineer shall cancel, confirm or vary the instruction.

Each Variation may include:

- (a) changes to the quantities of any item of work included in the Contract (however, such changes do not necessarily constitute a Variation),
- (b) changes to the quality and other characteristics of any item of work,
- (c) changes to the levels, positions and/or dimensions of any part of the Works,
- (d) omission of any work unless it is to be carried out by others,
- (e) any additional work, Plant, Materials or services necessary for the Permanent Works, including any associated Tests on Completion, boreholes and other testing and exploratory work, or
- (f) changes to the sequence or timing of the execution of the Works.

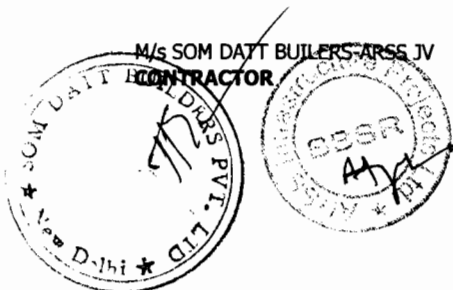
The Contractor shall not make any alteration and/or modification of the Permanent Works, unless and until the Engineer instructs or approves a Variation.

13.2 Value Engineering

The Contractor may, at any time, submit to the Engineer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Employer of executing, maintaining or operating the Works, (iii) improve the efficiency or value to the Employer of the completed Works, or (iv) otherwise be of benefit to the Employer.

The proposal shall be prepared at the cost of the Contractor and shall include the items listed in Sub-Clause 13.3 [Variation Procedure].

If a proposal, which is approved by the Engineer, includes a



change in the design of part of the Permanent Works, then unless otherwise agreed by both Parties:

- (a) the Contractor shall design this part,
- (b) sub-paragraphs (a) to (d) of Sub-Clause 4.1 [Contractor's General Obligations] shall apply, and
- (c) if this change results in a reduction in the contract value of this part, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine a fee, which shall be included in the Contract Price. This fee shall be half (50%) of the difference between the following amounts:
 - (i) such reduction in contract value, resulting from the change, excluding adjustments under Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost], and
 - (ii) the reduction (if any) in the value to the Employer of the varied works, taking account of any reductions in quality, anticipated life or operational efficiencies.

However, if amount (i) is less than amount (ii), there shall not be a fee.

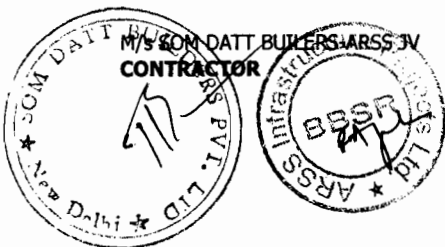
13.3 Variation Procedure

If the Engineer requests a proposal, prior to instructing a Variation, the Contractor shall respond in writing as soon as practicable, either by giving reasons why he cannot comply (if this is the case) or by submitting:

- (a) a description of the proposed work to be performed and a programme for its execution,
- (b) the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 8.3 [Programme] and to the Time for Completion, and
- (c) the Contractor's proposal for evaluation of the Variation.

The Engineer shall, as soon as practicable after receiving such proposal (under Sub-Clause 13.2 [Value Engineering] or otherwise), respond with approval, disapproval or comments. The Contractor shall not delay any work whilst awaiting a response.

Each instruction to execute a Variation, with any requirements for the recording of Costs, shall be issued by the Engineer to the



Contractor, who shall acknowledge receipt.

Each Variation shall be evaluated in accordance with Clause 12 [Measurement and Evaluation], unless the Engineer instructs or approves otherwise in accordance with this Clause.

13.4 Payment in Applicable Currencies

If the Contract provides for payment of the Contract Price in more than one currency, then whenever an adjustment is agreed, approved or determined as stated above, the amount payable in each of the applicable currencies shall be specified. For this purpose, reference shall be made to the actual or expected currency proportions of the Cost of the varied work, and to the proportions of various currencies specified for payment of the Contract Price.

13.5 Provisional Sums

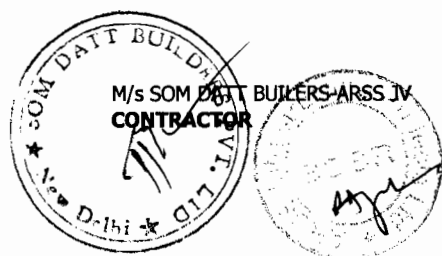
Each Provisional Sum shall only be used, in whole or in part, in accordance with the Engineer's instructions, and the Contract Price shall be adjusted accordingly. The total sum paid to the Contractor shall include only such amounts, for the work, supplies or services to which the Provisional Sum relates, as the Engineer shall have instructed. For each Provisional Sum, the Engineer may instruct:

- (a) work to be executed (including Plant, Materials or services to be supplied) by the Contractor and valued under Sub-Clause 13.3 [Variation Procedure]; and/or
- (b) Plant, Materials or services to be purchased by the Contractor, from a nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors]) or otherwise; and for which there shall be included in the Contract Price:
 - (i) the actual amounts paid (or due to be paid) by the Contractor, and
 - (ii) a sum for overhead charges and profit, calculated as a percentage of these actual amounts by applying the relevant percentage rate (if any) stated in the appropriate Schedule. If there is no such rate, the percentage rate stated in the Contract Data shall be applied.

The Contractor shall, when required by the Engineer, produce quotations, invoices, vouchers and accounts or receipts in substantiation.

13.6 Daywork

For work of a minor or incidental nature, the Engineer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the Daywork Schedule included in the Contract, and the following procedure shall apply. If a Daywork Schedule is not included in the



Contract, this Sub-Clause shall not apply.

Before ordering Goods for the work, the Contractor shall submit quotations to the Engineer. When applying for payment, the Contractor shall submit invoices, vouchers and accounts or receipts for any Goods.

Except for any items for which the Daywork Schedule specifies that payment is not due, the Contractor shall deliver each day to the Engineer accurate statements in duplicate which shall include the following details of the resources used in executing the previous day's work:

- (a) the names, occupations and time of Contractor's Personnel,
- (b) the identification, type and time of Contractor's Equipment and Temporary Works, and
- (c) the quantities and types of Plant and Materials used.

One copy of each statement will, if correct, or when agreed, be signed by the Engineer and returned to the Contractor. The Contractor shall then submit priced statements of these resources to the Engineer, prior to their inclusion in the next Statement under Sub-Clause 14.3 [Application for Interim Payment Certificates].

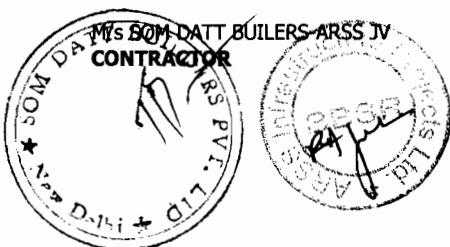
13.7 Adjustments for Changes in Legislation

The Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws) or in the judicial or official governmental interpretation of such Laws, made after the Base Date, which affect the Contractor in the performance of obligations under the Contract.

If the Contractor suffers (or will suffer) delay and/or incurs (or will incur) additional Cost as a result of these changes in the Laws or in such interpretations, made after the Base Date, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or



determine these matters.

Notwithstanding the foregoing, the Contractor shall not be entitled to such an extension of time if the relevant delay has already have been taken into account in determining an extension and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the table of adjustment data in accordance with the provisions of Sub-Clause 13.8 [Adjustments for Changes in Cost] .

13.8 Adjustments for Changes in Cost

In this Sub-Clause, “table of adjustment data” means the completed table of adjustment data for local and foreign currencies included in the Schedules. If there is no such table of adjustment data, this Sub-Clause shall not apply.

If this Sub-Clause applies, the amounts payable to the Contractor shall be adjusted for rises or falls in the cost of labour, Goods and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in Costs is not covered by the provisions of this or other Clauses, the Accepted Contract Amount shall be deemed to have included amounts to cover the contingency of other rises and falls in costs.

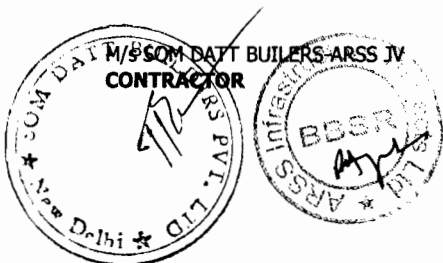
The adjustment to be applied to the amount otherwise payable to the Contractor, as valued in accordance with the appropriate Schedule and certified in Payment Certificates, shall be determined from formulae for each of the currencies in which the Contract Price is payable. No adjustment is to be applied to work valued on the basis of Cost or current prices. The formulae shall be of the following general type:

$P_n = a + b L_n / L_o + c E_n / E_o + d M_n / M_o + \dots$ where:

“P_n” is the adjustment multiplier to be applied to the estimated contract value in the relevant currency of the work carried out in period “n”, this period being a month unless otherwise stated in the Contract Data ;

“a” is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

“b”, “c”, “d”, ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as



labour, equipment and materials;

“Ln”, “En”, “Mn”, ... are the current cost indices or reference prices for period “n”, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 49 days prior to the last day of the period (to which the particular Payment Certificate relates); and

“Lo”, “Eo”, “Mo”, ... are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date.

The cost indices or reference prices stated in the table of adjustment data shall be used. If their source is in doubt, it shall be determined by the Engineer. For this purpose, reference shall be made to the values of the indices at stated dates (quoted in the fourth and fifth columns respectively of the table) for the purposes of clarification of the source; although these dates (and thus these values) may not correspond to the base cost indices.

In cases where the “currency of index” (stated in the table) is not the relevant currency of payment, each index shall be converted into the relevant currency of payment at the selling rate, established by the central bank of the Country, of this relevant currency on the above date for which the index is required to be applicable.

Until such time as each current cost index is available, the Engineer shall determine a provisional index for the issue of Interim Payment Certificates. When a current cost index is available, the adjustment shall be recalculated accordingly.

If the Contractor fails to complete the Works within the Time for Completion, adjustment of prices thereafter shall be made using either (i) each index or price applicable on the date 49 days prior to the expiry of the Time for Completion of the Works, or (ii) the current index or price: whichever is more favourable to the Employer.

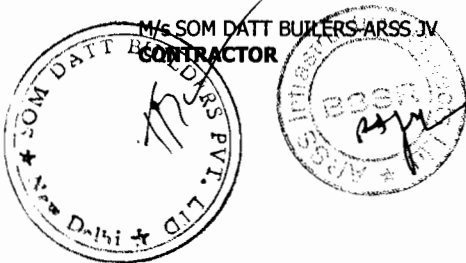
The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.

14. Contract Price and Payment

Unless otherwise stated in the Particular Conditions:

(a) the Contract Price shall be agreed or determined under

14.1 The Contract Price




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Orissa

Sub-Clause 12.3 [Evaluation] and be subject to adjustments in accordance with the Contract;

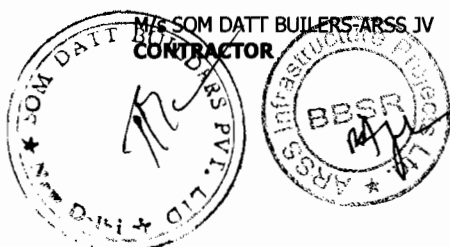
- (b) the Contractor shall pay all taxes, duties and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs except as stated in Sub-Clause 13.7 [Adjustments for Changes in Legislation];
- (c) any quantities which may be set out in the Bill of Quantities or other Schedule are estimated quantities and are not to be taken as the actual and correct quantities:
 - (i) of the Works which the Contractor is required to execute, or
 - (ii) for the purposes of Clause 12 [Measurement and Evaluation]; and
- (d) the Contractor shall submit to the Engineer, within 28 days after the Commencement Date, a proposed breakdown of each lump sum price in the Schedules. The Engineer may take account of the breakdown when preparing Payment Certificates, but shall not be bound by it.
- (e) Notwithstanding the provisions of subparagraph (b), Contractor's Equipment, including essential spare parts therefor, imported by the Contractor for the sole purpose of executing the Contract shall be exempt from the payment of import duties and taxes upon importation.

14.2 Advance Payment

The Employer shall make an advance payment, as an interest-free loan for mobilisation and cash flow support, when the Contractor submits a guarantee in accordance with this Sub-Clause. The total advance payment, the number and timing of instalments (if more than one), and the applicable currencies and proportions, shall be as stated in the Contract Data.

Unless and until the Employer receives this guarantee, or if the total advance payment is not stated in the Contract Data, this Sub-Clause shall not apply.

The Engineer shall deliver to the Employer and to the Contractor an Interim Payment Certificate for the advance payment or its first instalment after receiving a Statement (under Sub-Clause 14.3 [Application for Interim Payment Certificates]) and after the Employer receives (i) the Performance Security in accordance with Sub-Clause 4.2 [Performance Security] and (ii) a guarantee in amounts and currencies equal to the advance



payment. This guarantee shall be issued by an entity and from within a country (or other jurisdiction) approved by the Employer, and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.

The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount shall be progressively reduced by the amount repaid by the Contractor as indicated in the Payment Certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.

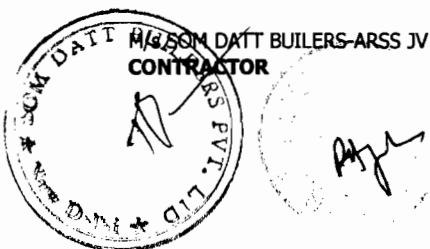
Unless stated otherwise in the Contract Data, the advance payment shall be repaid through percentage deductions from the interim payments determined by the Engineer in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates], as follows:.

- (a) deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds 30 percent (30%) of the Accepted Contract Amount less Provisional Sums; and
- (b) deductions shall be made at the amortisation rate stated in the Contract Data of the amount of each Interim Payment Certificate (excluding the advance payment and deductions for its repayments as well as deductions for retention money) in the currencies and proportions of the advance payment until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the time when 90 per cent (90%) of the Accepted Contract Amount less Provisional Sums has been certified for payment.

If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [Termination by Employer], Clause 16 [Suspension and Termination by Contractor] or Clause 19 [Force Majeure] (as the case may be), the whole of the balance then outstanding shall immediately become due and in case of termination under Clause 15 [Termination by Employer] and Sub-Clause 19.6 [Optional Termination, Payment and Release], payable by the Contractor to the Employer.

14.3 Application for Interim Payment

The Contractor shall submit a Statement in six copies to the Engineer after the end of each month, in a form approved by the



Certificates

Engineer, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the report on the progress during this month in accordance with Sub-Clause 4.21 [Progress Reports].

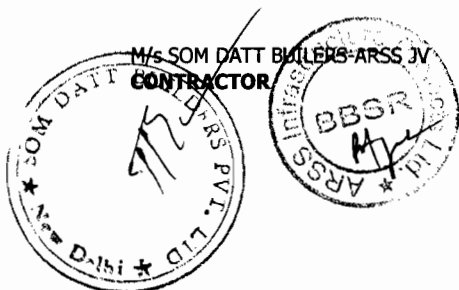
The Statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:

- (a) the estimated contract value of the Works executed and the Contractor's Documents produced up to the end of the month (including Variations but excluding items described in sub-paragraphs (b) to (g) below);
- (b) any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost];
- (c) any amount to be deducted for retention, calculated by applying the percentage of retention stated in the Contract Data to the total of the above amounts, until the amount so retained by the Employer reaches the limit of Retention Money (if any) stated in the Contract Data;
- (d) any amounts to be added for the advance payment and (if more than one instalment) and to be deducted for its repayments in accordance with Sub-Clause 14.2 [Advance Payment];
- (e) any amounts to be added and deducted for Plant and Materials in accordance with Sub-Clause 14.5 [Plant and Materials intended for the Works];
- (f) any other additions or deductions which may have become due under the Contract or otherwise, including those under Clause 20 [Claims, Disputes and Arbitration]; and
- (g) the deduction of amounts certified in all previous Payment Certificates.

14.4 Schedule of Payments

If the Contract includes a schedule of payments specifying the instalments in which the Contract Price will be paid, then unless otherwise stated in this schedule:

- (a) the instalments quoted in this schedule of payments shall be the estimated contract values for the purposes of sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payment Certificates];



- (b) Sub-Clause 14.5 [Plant and Materials intended for the Works] shall not apply; and
- (c) if these instalments are not defined by reference to the actual progress achieved in executing the Works, and if actual progress is found to be less or more than that on which this schedule of payments was based, then the Engineer may proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine revised instalments, which shall take account of the extent to which progress is less or more than that on which the instalments were previously based.

If the Contract does not include a schedule of payments, the Contractor shall submit non-binding estimates of the payments which he expects to become due during each quarterly period. The first estimate shall be submitted within 42 days after the Commencement Date. Revised estimates shall be submitted at quarterly intervals, until the Taking-Over Certificate has been issued for the Works.

14.5 Plant and Materials intended for the Works

If this Sub-Clause applies, Interim Payment Certificates shall include, under sub-paragraph (e) of Sub-Clause 14.3, (i) an amount for Plant and Materials which have been sent to the Site for incorporation in the Permanent Works, and (ii) a reduction when the contract value of such Plant and Materials is included as part of the Permanent Works under sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payment Certificates].

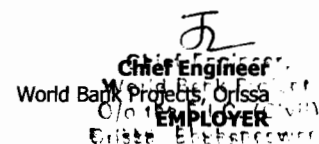
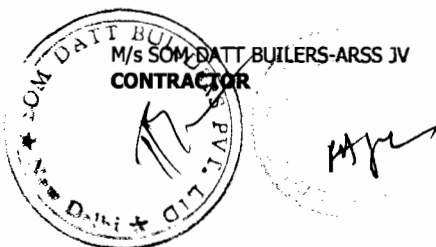
If the lists referred to in sub-paragraphs (b)(i) or (c)(i) below are not included in the Schedules, this Sub-Clause shall not apply.

The Engineer shall determine and certify each addition if the following conditions are satisfied:

- (a) the Contractor has:
 - (i) kept satisfactory records (including the orders, receipts, Costs and use of Plant and Materials) which are available for inspection, and
 - (ii) submitted a statement of the Cost of acquiring and delivering the Plant and Materials to the Site, supported by satisfactory evidence;

and either:

- (b) the relevant Plant and Materials:
 - (i) are those listed in the Schedules for payment when



shipped,

- (ii) have been shipped to the Country, en route to the Site, in accordance with the Contract; and
- (iii) are described in a clean shipped bill of lading or other evidence of shipment, which has been submitted to the Engineer together with evidence of payment of freight and insurance, any other documents reasonably required, and a bank guarantee in a form and issued by an entity approved by the Employer in amounts and currencies equal to the amount due under this Sub-Clause: this guarantee may be in a similar form to the form referred to in Sub-Clause 14.2 [Advance Payment] and shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration;

or

(c) the relevant Plant and Materials:

- (i) are those listed in the Schedules for payment when delivered to the Site, and
- (ii) have been delivered to and are properly stored on the Site, are protected against loss, damage or deterioration, and appear to be in accordance with the Contract.

The additional amount to be certified shall be the equivalent of eighty percent of the Engineer's determination of the cost of the Plant and Materials (including delivery to Site), taking account of the documents mentioned in this Sub-Clause and of the contract value of the Plant and Materials.

The currencies for this additional amount shall be the same as those in which payment will become due when the contract value is included under sub-paragraph (a) of Sub-Clause 14.3 [Application for Interim Payment Certificates]. At that time, the Payment Certificate shall include the applicable reduction which shall be equivalent to, and in the same currencies and proportions as, this additional amount for the relevant Plant and Materials.

14.6 Issue of Interim Payment Certificates

No amount will be certified or paid until the Employer has received and approved the Performance Security. Thereafter, the Engineer shall, within 28 days after receiving a Statement and supporting documents, deliver to the Employer and to the Contractor an Interim Payment Certificate which shall state the amount which the Engineer fairly determines to be due, with all



supporting particulars for any reduction or withholding made by the Engineer on the Statement if any.

However, prior to issuing the Taking-Over Certificate for the Works, the Engineer shall not be bound to issue an Interim Payment Certificate in an amount which would (after retention and other deductions) be less than the minimum amount of Interim Payment Certificates (if any) stated in the Contract Data. In this event, the Engineer shall give notice to the Contractor accordingly.

An Interim Payment Certificate shall not be withheld for any other reason, although:

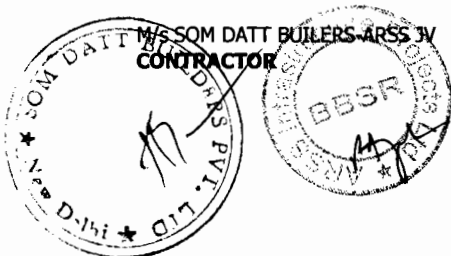
- (a) if any thing supplied or work done by the Contractor is not in accordance with the Contract, the cost of rectification or replacement may be withheld until rectification or replacement has been completed; and/or
- (b) if the Contractor was or is failing to perform any work or obligation in accordance with the Contract, and had been so notified by the Engineer, the value of this work or obligation may be withheld until the work or obligation has been performed.

The Engineer may in any Payment Certificate make any correction or modification that should properly be made to any previous Payment Certificate. A Payment Certificate shall not be deemed to indicate the Engineer's acceptance, approval, consent or satisfaction.

14.7 Payment

The Employer shall pay to the Contractor:

- (a) the first instalment of the advance payment within 42 days after issuing the Letter of Acceptance or within 21 days after receiving the documents in accordance with Sub-Clause 4.2 [Performance Security] and Sub-Clause 14.2 [Advance Payment], whichever is later;
- (b) the amount certified in each Interim Payment Certificate within 56 days after the Engineer receives the Statement and supporting documents or, at a time when the Bank's loan or credit (from which part of the payments to the Contractor is being made) is suspended, the amount shown on any statement submitted by the Contractor, within 14 days after such statement is submitted, any discrepancy being rectified in the next payment to the Contractor; and
- (c) the amount certified in the Final Payment Certificate within 56 days after the Employer receives this Payment



Certificate or, at a time when the Bank's loan or credit (from which part of the payments to the Contractor is being made) is suspended, the undisputed amount shown in the Final Statement, within 56 days after the date of notification of the suspension in accordance with Sub-Clause 16.2.

Payment of the amount due in each currency shall be made into the bank account, nominated by the Contractor, in the payment country (for this currency) specified in the Contract.

14.8 Delayed Payment

If the Contractor does not receive payment in accordance with Sub-Clause 14.7 [Payment], the Contractor shall be entitled to receive financing charges compounded monthly on the amount unpaid during the period of delay. This period shall be deemed to commence on the date for payment specified in Sub-Clause 14.7 [Payment], irrespective (in the case of its sub-paragraph (b)) of the date on which any Interim Payment Certificate is issued.

Unless otherwise stated in the Particular Conditions, these financing charges shall be calculated at the annual rate of three percentage points above the discount rate of the central bank in the country of the currency of payment, or if not available, the interbank offered rate, and shall be paid in such currency.

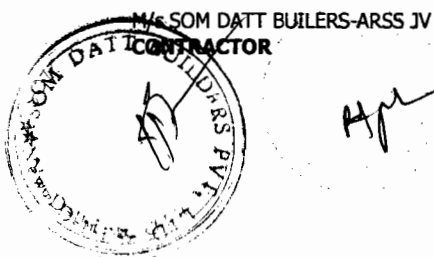
The Contractor shall be entitled to this payment without formal notice or certification, and without prejudice to any other right or remedy.

14.9 Payment of Retention Money

When the Taking-Over Certificate has been issued for the Works, the first half of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a

Taking-Over Certificate is issued for a Section or part of the Works, a proportion of the Retention Money shall be certified and paid. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section or part, by the estimated final Contract Price.

Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate was issued for a Section, a proportion of the second half of the Retention Money shall be certified and paid promptly after the expiry date of the Defects Notification Period for the Section. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section by the estimated final



Contract Price.

However, if any work remains to be executed under Clause 11 [Defects Liability], the Engineer shall be entitled to withhold certification of the estimated cost of this work until it has been executed.

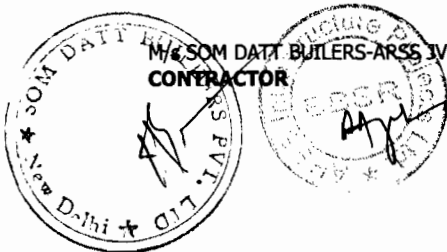
When calculating these proportions, no account shall be taken of any adjustments under Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost].

Unless otherwise stated in the Particular Conditions, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and provided by an entity approved by the Employer, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the second half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security in Sub-Clause 4.2. On receipt by the Employer of the required guarantee, the Engineer shall certify and the Employer shall pay the second half of the Retention Money. The release of the second half of the Retention Money against a guarantee shall then be in lieu of the release under the second paragraph of this Sub-Clause. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate.

If the Performance Security required under Sub-Clause 4.2 is in the form of a demand guarantee, and the amount guaranteed under it when the Taking-Over Certificate is issued is more than half of the Retention Money, then the Retention Money guarantee will not be required. If the amount guaranteed under the Performance Security when the Taking-Over Certificate is issued is less than half of the Retention Money, the Retention Money guarantee will only be required for the difference between half of the Retention Money and the amount guaranteed under the Performance Security.

14.10 Statement at Completion

Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Engineer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 14.3 [Application for Interim



Payment Certificates], showing:

- (a) the value of all work done in accordance with the Contract up to the date stated in the Taking-Over Certificate for the Works,
- (b) any further sums which the Contractor considers to be due, and
- (c) an estimate of any other amounts which the Contractor considers will become due to him under the Contract. Estimated amounts shall be shown separately in this Statement at completion.

The Engineer shall then certify in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates].

14.11 Application for Final Payment Certificate

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Engineer, six copies of a draft final statement with supporting documents showing in detail in a form approved by the Engineer:

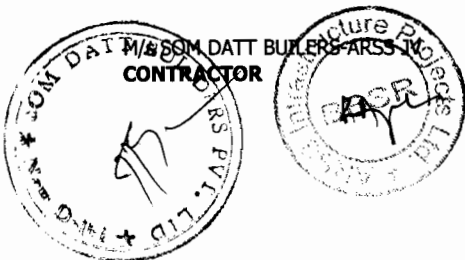
- (a) the value of all work done in accordance with the Contract, and
- (b) any further sums which the Contractor considers to be due to him under the Contract or otherwise.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer may reasonably require within 28 days from receipt of the said draft and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the final statement as agreed. This agreed statement is referred to in these Conditions as the "Final Statement".

However if, following discussions between the Engineer and the Contractor and any changes to the draft final statement which are agreed, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer (with a copy to the Contractor) an Interim Payment Certificate for the agreed parts of the draft final statement. Thereafter, if the dispute is finally resolved under Sub-Clause 20.4 [Obtaining Dispute Board's Decision] or Sub-Clause 20.5 [Amicable Settlement], the Contractor shall then prepare and submit to the Employer (with a copy to the Engineer) a Final Statement.

14.12 Discharge

When submitting the Final Statement, the Contractor shall submit a discharge which confirms that the total of the Final Statement represents full and final settlement of all moneys due



to the Contractor under or in connection with the Contract. This discharge may state that it becomes effective when the Contractor has received the Performance Security and the outstanding balance of this total, in which event the discharge shall be effective on such date.

14.13 Issue of Final Payment Certificate

Within 28 days after receiving the Final Statement and discharge in accordance with Sub-Clause 14.11 [Application for Final Payment Certificate] and Sub-Clause 14.12 [Discharge], the Engineer shall deliver to the Employer and to the Contractor, the Final Payment Certificate which shall state:

- (a) the amount which he fairly determines is finally due, and
- (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled, the balance (if any) due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be.

If the Contractor has not applied for a Final Payment Certificate in accordance with Sub-Clause 14.11 [Application for Final Payment Certificate] and Sub-Clause 14.12 [Discharge], the Engineer shall request the Contractor to do so. If the Contractor fails to submit an application within a period of 28 days, the Engineer shall issue the Final Payment Certificate for such amount as he fairly determines to be due.

14.14 Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing under or in connection with the Contract or execution of the Works, except to the extent that the Contractor shall have included an amount expressly for it:

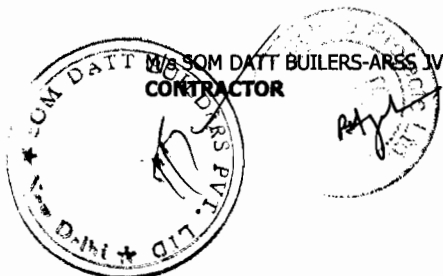
- (a) in the Final Statement and also
- (b) (except for matters or things arising after the issue of the Taking-Over Certificate for the Works) in the Statement at completion described in Sub-Clause 14.10 [Statement at Completion].

However, this Sub-Clause shall not limit the Employer's liability under his indemnification obligations, or the Employer's liability in any case of fraud, deliberate default or reckless misconduct by the Employer.

14.15 Currencies of Payment

The Contract Price shall be paid in the currency or currencies named in the Schedule of Payment Currencies. If more than one currency is so named, payments shall be made as follows:

- (a) if the Accepted Contract Amount was expressed in Local



Currency only:

- (i) the proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Schedule of Payment Currencies, except as otherwise agreed by both Parties;
 - (ii) payments and deductions under Sub-Clause 13.5 [Provisional Sums] and Sub-Clause 13.7 [Adjustments for Changes in Legislation] shall be made in the applicable currencies and proportions; and
 - (iii) other payments and deductions under sub-paragraphs (a) to (d) of Sub-Clause 14.3 [Application for Interim Payment Certificates] shall be made in the currencies and proportions specified in sub-paragraph (a)(i) above;
- (b) payment of the damages specified in the Contract Data, shall be made in the currencies and proportions specified in the Schedule of Payment Currencies;
 - (c) other payments to the Employer by the Contractor shall be made in the currency in which the sum was expended by the Employer, or in such currency as may be agreed by both Parties;
 - (d) if any amount payable by the Contractor to the Employer in a particular currency exceeds the sum payable by the Employer to the Contractor in that currency, the Employer may recover the balance of this amount from the sums otherwise payable to the Contractor in other currencies; and
 - (e) if no rates of exchange are stated in the Schedule of Payment Currencies, they shall be those prevailing on the Base Date and determined by the central bank of the Country.

15. Termination by Employer

15.1 Notice to Correct

If the Contractor fails to carry out any obligation under the Contract, the Engineer may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.

15.2 Termination by Employer

The Employer shall be entitled to terminate the Contract if the



Contractor:

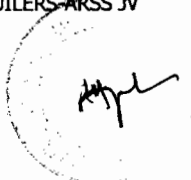
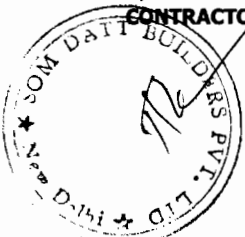
- (a) fails to comply with Sub-Clause 4.2 [Performance Security] or with a notice under Sub-Clause 15.1 [Notice to Correct],
- (b) abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
- (c) without reasonable excuse fails:
 - (i) to proceed with the Works in accordance with Clause 8 [Commencement, Delays and Suspension], or
 - (ii) to comply with a notice issued under Sub-Clause 7.5 [Rejection] or Sub-Clause 7.6 [Remedial Work], within 28 days after receiving it,
- (d) subcontracts the whole of the Works or assigns the Contract without the required agreement,
- (e) becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events, or
- (f) gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward:
 - (i) for doing or forbearing to do any action in relation to the Contract, or
 - (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract,

or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

In any of these events or circumstances, the Employer may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the Site. However, in the case of sub-paragraph (e) or (f), the Employer may by notice

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CONTRACTOR



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Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Office: E.T.C. (Civil)
C/Secy, Bhubaneswar

terminate the Contract immediately.

The Employer's election to terminate the Contract shall not prejudice any other rights of the Employer, under the Contract or otherwise.

The Contractor shall then leave the Site and deliver any required Goods, all Contractor's Documents, and other design documents made by or for him, to the Engineer. However, the Contractor shall use his best efforts to comply immediately with any reasonable instructions included in the notice (i) for the assignment of any subcontract, and (ii) for the protection of life or property or for the safety of the Works.

After termination, the Employer may complete the Works and/or arrange for any other entities to do so. The Employer and these entities may then use any Goods, Contractor's Documents and other design documents made by or on behalf of the Contractor.

The Employer shall then give notice that the Contractor's Equipment and Temporary Works will be released to the Contractor at or near the Site. The Contractor shall promptly arrange their removal, at the risk and cost of the Contractor. However, if by this time the Contractor has failed to make a payment due to the Employer, these items may be sold by the Employer in order to recover this payment. Any balance of the proceeds shall then be paid to the Contractor.

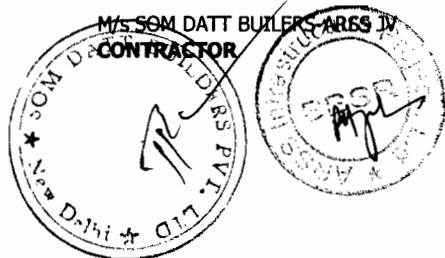
15.3 Valuation at Date of Termination

As soon as practicable after a notice of termination under Sub-Clause 15.2 [Termination by Employer] has taken effect, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine the value of the Works, Goods and Contractor's Documents, and any other sums due to the Contractor for work executed in accordance with the Contract.

15.4 Payment after Termination

After a notice of termination under Sub-Clause 15.2 [Termination by Employer] has taken effect, the Employer may:

- (a) proceed in accordance with Sub-Clause 2.5 [Employer's Claims],
- (b) withhold further payments to the Contractor until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any), and all other costs incurred by the Employer, have been established, and/or
- (c) recover from the Contractor any losses and damages incurred by the Employer and any extra costs of



completing the Works, after allowing for any sum due to the Contractor under Sub-Clause 15.3 [Valuation at Date of Termination]. After recovering any such losses, damages and extra costs, the Employer shall pay any balance to the Contractor.

15.5 Employer's Entitlement to Termination for Convenience

The Employer shall be entitled to terminate the Contract, at any time for the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after the later of the dates on which the Contractor receives this notice or the Employer returns the Performance Security. The Employer shall not terminate the Contract under this Sub-Clause in order to execute the Works himself or to arrange for the Works to be executed by another contractor or to avoid a termination of the Contract by the Contractor under Sub-Clause 16.4 [Payment on Termination].

After this termination, the Contractor shall proceed in accordance with Sub-Clause 16.3 [Cessation of Work and Removal of Contractor's Equipment] and shall be paid in accordance with Sub-Clause 19.6 [Optional Termination, Payment and Release].

15.6 Corrupt or Fraudulent Practices

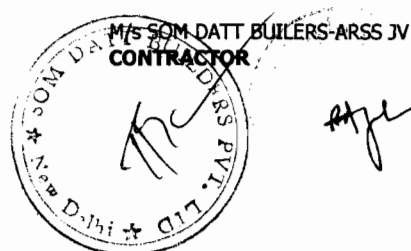
If the Employer determines that the Contractor has engaged in corrupt, fraudulent, collusive coercive, or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 15 shall apply as if such expulsion had been made under Sub-Clause 15.2 [Termination by Employer].


Should any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or obstructive practice during the execution of the Works, then that employee shall be removed in accordance with Sub-Clause 6.9 [Contractor's Personnel].

For the purposes of this Sub-Clause:

- (i) "corrupt practice"¹ is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

¹ "another party" refers to a public official acting in relation to the procurement process or contract execution]. In this context, "public official" includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/O. the E.P.C. (Orissa)
Cuttack, Bhubaneswar.

- (ii) “fraudulent practice”² is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
- (iii) “collusive practice”³ is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- (iv) “coercive practice”⁴ is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- (v) “obstructive practice” is
 - (aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
 - (bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under Sub-Clause 1.15 [Inspections and Audits by the Bank].

16. Suspension and Termination by Contractor

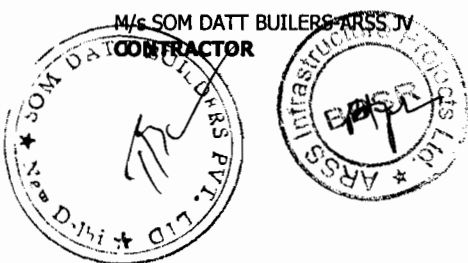
16.1 Contractor’s Entitlement to Suspend Work

If the Engineer fails to certify in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates] or the Employer fails to comply with Sub-Clause 2.4 [Employer’s Financial Arrangements] or Sub-Clause 14.7 [Payment], the Contractor may, after giving not less than 21 days’ notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the Payment Certificate, reasonable evidence or payment, as the case

² a “party” refers to a public official; the terms “benefit” and “obligation” relate to the procurement process or contract execution; and the “act or omission” is intended to influence the procurement process or contract execution.

³ “parties” refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

⁴ a “party” refers to a participant in the procurement process or contract execution.



may be and as described in the notice.

Notwithstanding the above, if the Bank has suspended disbursements under the loan or credit from which payments to the Contractor are being made, in whole or in part, for the execution of the Works, and no alternative funds are available as provided for in Sub-Clause 2.4 [Employer's Financial Arrangements], the Contractor may by notice suspend work or reduce the rate of work at any time, but not less than 7 days after the Borrower having received the suspension notification from the Bank.

The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.8 [Delayed Payment] and to termination under Sub-Clause 16.2 [Termination by Contractor].

If the Contractor subsequently receives such Payment Certificate, evidence or payment (as described in the relevant Sub-Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.

If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

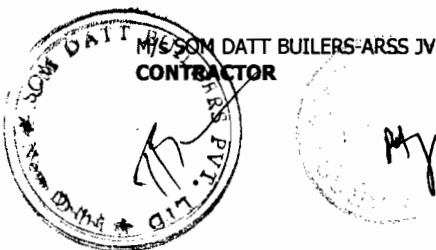
- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

16.2 Termination by Contractor

The Contractor shall be entitled to terminate the Contract if:

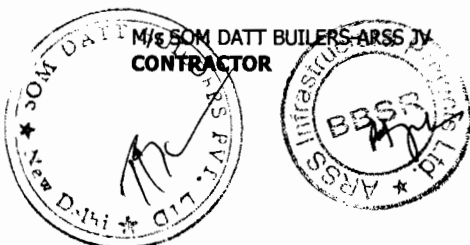
- (a) the Contractor does not receive the reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work] in respect of a failure to comply with Sub-Clause 2.4 [Employer's Financial Arrangements],
- (b) the Engineer fails, within 56 days after receiving a




Statement and supporting documents, to issue the relevant Payment Certificate,

- (c) the Contractor does not receive the amount due under an Interim Payment Certificate within 42 days after the expiry of the time stated in Sub-Clause 14.7 [Payment] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [Employer's Claims]),
- (d) the Employer substantially fails to perform his obligations under the Contract in such manner as to materially and adversely affect the economic balance of the Contract and/or the ability of the Contractor to perform the Contract,
- (e) the Employer fails to comply with Sub-Clause 1.6 [Contract Agreement] or Sub-Clause 1.7 [Assignment],
- (f) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [Prolonged Suspension], or
- (g) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events.
- (h) In the event the Bank suspends the loan or credit from which part of the payments to the Contractor are being made, if the Contractor has not received the sums due to him upon expiration of the 14 days referred to in Sub-Clause 14.7 [Payment] for payments under Interim Payment certificates, the Contractor may, without prejudice to the Contractor's entitlement to financing charges under Sub-Clause 14.8 [Delayed Payment], take one or both of the following actions, namely (i) suspend work or reduce the rate of work, and (ii) terminate his employment under the Contract by giving notice to the Employer, with a copy to the Engineer, such termination to take effect 14 days after the giving of the notice.
- (i) the Contractor does not receive the Engineer's instruction recording the agreement of both Parties on the fulfilment of the conditions for the Commencement of Works under Sub-Clause 8.1 [Commencement of Works].

In any of these events or circumstances, the Contractor may,




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Chief Engineer,
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Orissa, Bhubaneswar.

upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of sub-paragraph (f) or (g), the Contractor may by notice terminate the Contract immediately.

The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.

16.3 Cessation of Work and Removal of Contractor's Equipment

After a notice of termination under Sub-Clause 15.5 [Employer's Entitlement to Termination for Convenience], Sub-Clause 16.2 [Termination by Contractor] or Sub-Clause 19.6 [Optional Termination, Payment and Release] has taken effect, the Contractor shall promptly:

- (a) cease all further work, except for such work as may have been instructed by the Engineer for the protection of life or property or for the safety of the Works,
- (b) hand over Contractor's Documents, Plant, Materials and other work, for which the Contractor has received payment, and
- (c) remove all other Goods from the Site, except as necessary for safety, and leave the Site.

16.4 Payment on Termination

After a notice of termination under Sub-Clause 16.2 [Termination by Contractor] has taken effect, the Employer shall promptly:

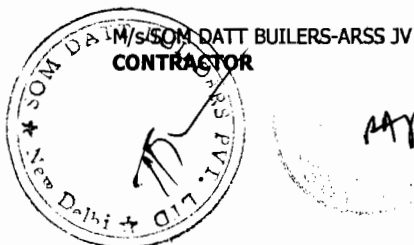
- (a) return the Performance Security to the Contractor,
- (b) pay the Contractor in accordance with Sub-Clause 19.6 [Optional Termination, Payment and Release], and
- (c) pay to the Contractor the amount of any loss or damage sustained by the Contractor as a result of this termination.

17. Risk and Responsibility

17.1 Indemnities

The Contractor shall indemnify and hold harmless the Employer, the Employer's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of:

- (a) bodily injury, sickness, disease or death, of any person whatsoever arising out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's



Personnel, or any of their respective agents, and

- (b) damage to or loss of any property, real or personal (other than the Works), to the extent that such damage or loss arises out of or in the course of or by reason of the Contractor's design (if any), the execution and completion of the Works and the remedying of any defects, unless and to the extent that any such damage or loss is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, their respective agents, or anyone directly or indirectly employed by any of them.

The Employer shall indemnify and hold harmless the Contractor, the Contractor's Personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of (1) bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of the Contract by the Employer, the Employer's Personnel, or any of their respective agents, and (2) the matters for which liability may be excluded from insurance cover, as described in sub-paragraphs (d)(i), (ii) and (iii) of Sub-Clause 18.3 [Insurance Against Injury to Persons and Damage to Property].

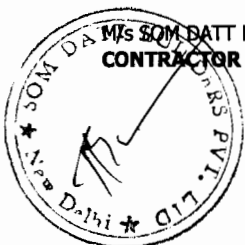
17.2 Contractor's Care of the Works

The Contractor shall take full responsibility for the care of the Works and Goods from the Commencement Date until the Taking-Over Certificate is issued (or is deemed to be issued under Sub-Clause 10.1 [Taking Over of the Works and Sections]) for the Works, when responsibility for the care of the Works shall pass to the Employer. If a Taking-Over Certificate is issued (or is so deemed to be issued) for any Section or part of the Works, responsibility for the care of the Section or part shall then pass to the Employer.

After responsibility has accordingly passed to the Employer, the Contractor shall take responsibility for the care of any work which is outstanding on the date stated in a Taking-Over Certificate, until this outstanding work has been completed.

If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [Employer's Risks], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that the Works, Goods and Contractor's Documents conform with the Contract.

The Contractor shall be liable for any loss or damage caused by any actions performed by the Contractor after a Taking-Over



Certificate has been issued. The Contractor shall also be liable for any loss or damage which occurs after a Taking-Over Certificate has been issued and which arose from a previous event for which the Contractor was liable.

17.3 Employer's Risks

The risks referred to in Sub-Clause 17.4 [Consequences of Employer's Risks] below, insofar as they directly affect the execution of the Works in the Country, are:

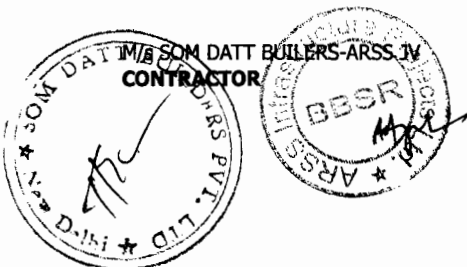
- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war, within the Country,
- (c) riot, commotion or disorder within the Country by persons other than the Contractor's Personnel,
- (d) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, within the Country, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity,
- (e) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (f) use or occupation by the Employer of any part of the Permanent Works, except as may be specified in the Contract,
- (g) design of any part of the Works by the Employer's Personnel or by others for whom the Employer is responsible, and
- (h) any operation of the forces of nature which is Unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventative precautions.

17.4 Consequences of Employer's Risks

If and to the extent that any of the risks listed in Sub-Clause 17.3 above results in loss or damage to the Works, Goods or Contractor's Documents, the Contractor shall promptly give notice to the Engineer and shall rectify this loss or damage to the extent required by the Engineer.

If the Contractor suffers delay and/or incurs Cost from rectifying this loss or damage, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is



or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and

- (b) payment of any such Cost, which shall be included in the Contract Price. In the case of sub-paragraphs (f) and (g) of Sub-Clause 17.3 [Employer's Risks], Cost plus profit shall be payable.

After receiving this further notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

17.5 Intellectual and Industrial Property Rights

In this Sub-Clause, "infringement" means an infringement (or alleged infringement) of any patent, registered design, copyright, trade mark, trade name, trade secret or other intellectual or industrial property right relating to the Works; and "claim" means a claim (or proceedings pursuing a claim) alleging an infringement.

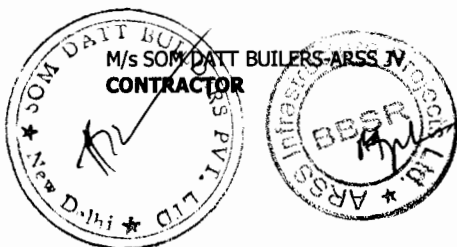
Whenever a Party does not give notice to the other Party of any claim within 28 days of receiving the claim, the first Party shall be deemed to have waived any right to indemnity under this Sub-Clause.

The Employer shall indemnify and hold the Contractor harmless against and from any claim alleging an infringement which is or was:

- (a) an unavoidable result of the Contractor's compliance with the Contract, or
- (b) a result of any Works being used by the Employer:
 - (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
 - (ii) in conjunction with any thing not supplied by the Contractor, unless such use was disclosed to the Contractor prior to the Base Date or is stated in the Contract.

The Contractor shall indemnify and hold the Employer harmless against and from any other claim which arises out of or in relation to (i) the manufacture, use, sale or import of any Goods, or (ii) any design for which the Contractor is responsible.

If a Party is entitled to be indemnified under this Sub-Clause, the indemnifying Party may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it. The other Party shall, at the request and cost of the



indemnifying Party, assist in contesting the claim. This other Party (and its Personnel) shall not make any admission which might be prejudicial to the indemnifying Party, unless the indemnifying Party failed to take over the conduct of any negotiations, litigation or arbitration upon being requested to do so by such other Party.

17.6 Limitation of Liability

Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than as specifically provided in Sub-Clause 8.7 [Delay Damages]; Sub-Clause 11.2 [Cost of Remedying Defects]; Sub-Clause 15.4 [Payment after Termination]; Sub-Clause 16.4 [Payment on Termination]; Sub-Clause 17.1 [Indemnities]; Sub-Clause 17.4 (b) [Consequences of Employer's Risks] and Sub-Clause 17.5 [Intellectual and Industrial Property Rights].

The total liability of the Contractor to the Employer, under or in connection with the Contract other than under Sub-Clause 4.19 [Electricity, Water and Gas], Sub-Clause 4.20 [Employer's Equipment and Free-Issue Material], Sub-Clause 17.1 [Indemnities] and Sub-Clause 17.5 [Intellectual and Industrial Property Rights], shall not exceed the sum resulting from the application of a multiplier (less or greater than one) to the Accepted Contract Amount, as stated in the Contract Data, or (if such multiplier or other sum is not so stated), the Accepted Contract Amount.

This Sub-Clause shall not limit liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

17.7 Use of Employer's Accommodation/Facilities

The Contractor shall take full responsibility for the care of the Employer provided accommodation and facilities, if any, as detailed in the Specification, from the respective dates of hand-over to the Contractor until cessation of occupation (where hand-over or cessation of occupation may take place after the date stated in the Taking-Over Certificate for the Works).

If any loss or damage happens to any of the above items while the Contractor is responsible for their care arising from any cause whatsoever other than those for which the Employer is liable, the Contractor shall, at his own cost, rectify the loss or damage to the satisfaction of the Engineer.

18. Insurance

18.1 General Requirements for Insurances

In this Clause, "insuring Party" means, for each type of insurance, the Party responsible for effecting and maintaining the insurance specified in the relevant Sub-Clause.

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Wherever the Contractor is the insuring Party, each insurance shall be effected with insurers and in terms acceptable to the Contractor. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.

Wherever the Employer is the insuring Party, each insurance shall be effected with insurers and in terms acceptable to the Contractor. These terms shall be consistent with any terms agreed by both Parties before the date of the Letter of Acceptance. This agreement of terms shall take precedence over the provisions of this Clause.

If a policy is required to indemnify joint insured, the cover shall apply separately to each insured as though a separate policy had been issued for each of the joint insured. If a policy indemnifies additional joint insured, namely in addition to the insured specified in this Clause, (i) the Contractor shall act under the policy on behalf of these additional joint insured except that the Employer shall act for Employer's Personnel, (ii) additional joint insured shall not be entitled to receive payments directly from the insurer or to have any other direct dealings with the insurer, and (iii) the insuring Party shall require all additional joint insured to comply with the conditions stipulated in the policy.

Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify the loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage.

The relevant insuring Party shall, within the respective periods stated in the Contract Data (calculated from the Commencement Date), submit to the other Party:

- (a) evidence that the insurances described in this Clause have been effected, and
- (b) copies of the policies for the insurances described in Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment] and Sub-Clause 18.3 [Insurance against Injury to Persons and Damage to Property].

When each premium is paid, the insuring Party shall submit evidence of payment to the other Party. Whenever evidence or policies are submitted, the insuring Party shall also give notice to the Engineer.



Each Party shall comply with the conditions stipulated in each of the insurance policies. The insuring Party shall keep the insurers informed of any relevant changes to the execution of the Works and ensure that insurance is maintained in accordance with this Clause.

Neither Party shall make any material alteration to the terms of any insurance without the prior approval of the other Party. If an insurer makes (or attempts to make) any alteration, the Party first notified by the insurer shall promptly give notice to the other Party.

If the insuring Party fails to effect and keep in force any of the insurances it is required to effect and maintain under the Contract, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the other Party may (at its option and without prejudice to any other right or remedy) effect insurance for the relevant coverage and pay the premiums due. The insuring Party shall pay the amount of these premiums to the other Party, and the Contract Price shall be adjusted accordingly.

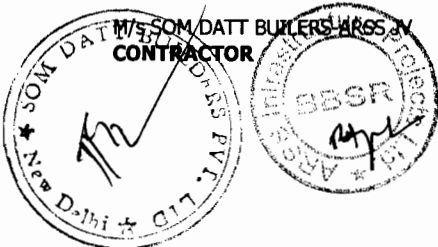
Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor and/or the Employer in accordance with these obligations, liabilities or responsibilities. However, if the insuring Party fails to effect and keep in force an insurance which is available and which it is required to effect and maintain under the Contract, and the other Party neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which should have been recoverable under this insurance shall be paid by the insuring Party.

Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [Employer's Claims] or Sub-Clause 20.1 [Contractor's Claims], as applicable.

The Contractor shall be entitled to place all insurance relating to the Contract (including, but not limited to the insurance referred to Clause 18) with insurers from any eligible source country.

18.2 Insurance for Works and Contractor's Equipment

The insuring Party shall insure the Works, Plant, Materials and Contractor's Documents for not less than the full reinstatement cost including the costs of demolition, removal of debris and professional fees and profit. This insurance shall be effective from the date by which the evidence is to be submitted under sub-paragraph (a) of Sub-Clause 18.1 [General Requirements



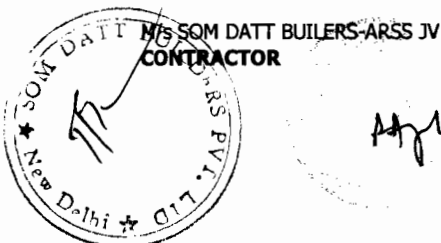
for Insurances], until the date of issue of the Taking-Over Certificate for the Works.

The insuring Party shall maintain this insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate, and for loss or damage caused by the Contractor in the course of any other operations (including those under Clause 11 [Defects Liability]).

The insuring Party shall insure the Contractor's Equipment for not less than the full replacement value, including delivery to Site. For each item of Contractor's Equipment, the insurance shall be effective while it is being transported to the Site and until it is no longer required as Contractor's Equipment.

Unless otherwise stated in the Particular Conditions, insurances under this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,
- (b) shall be in the joint names of the Parties, who shall be jointly entitled to receive payments from the insurers, payments being held or allocated to the Party actually bearing the costs of rectifying the loss or damage,
- (c) shall cover all loss and damage from any cause not listed in Sub-Clause 17.3 [Employer's Risks],
- (d) shall also cover, to the extent specifically required in the bidding documents of the Contract, loss or damage to a part of the Works which is attributable to the use or occupation by the Employer of another part of the Works, and loss or damage from the risks listed in sub-paragraphs (c), (g) and (h) of Sub-Clause 17.3 [Employer's Risks], excluding (in each case) risks which are not insurable at commercially reasonable terms, with deductibles per occurrence of not more than the amount stated in the Contract Data (if an amount is not so stated, this sub-paragraph (d) shall not apply), and
- (e) may however exclude loss of, damage to, and reinstatement of:
 - (i) a part of the Works which is in a defective condition due to a defect in its design, materials or workmanship (but cover shall include any other parts



which are lost or damaged as a direct result of this defective condition and not as described in sub-paragraph (ii) below),

- (ii) a part of the Works which is lost or damaged in order to reinstate any other part of the Works if this other part is in a defective condition due to a defect in its design, materials or workmanship,
- (iii) a part of the Works which has been taken over by the Employer, except to the extent that the Contractor is liable for the loss or damage, and
- (iv) Goods while they are not in the Country, subject to Sub-Clause 14.5 [Plant and Materials intended for the Works].

If, more than one year after the Base Date, the cover described in sub-paragraph (d) above ceases to be available at commercially reasonable terms, the Contractor shall (as insuring Party) give notice to the Employer, with supporting particulars. The Employer shall then (i) be entitled subject to Sub-Clause 2.5 [Employer's Claims] to payment of an amount equivalent to such commercially reasonable terms as the Contractor should have expected to have paid for such cover, and (ii) be deemed, unless he obtains the cover at commercially reasonable terms, to have approved the omission under Sub-Clause 18.1 [General Requirements for Insurances].

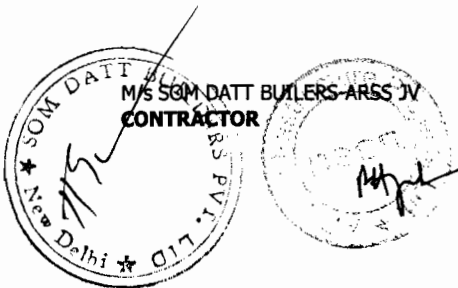
18.3 Insurance against Injury to Persons and Damage to Property

The insuring Party shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment]) or to any person (except persons insured under Sub-Clause 18.4 [Insurance for Contractor's Personnel]), which may arise out of the Contractor's performance of the Contract and occurring before the issue of the Performance Certificate.

This insurance shall be for a limit per occurrence of not less than the amount stated in the Contract Data, with no limit on the number of occurrences. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.

Unless otherwise stated in the Particular Conditions, the insurances specified in this Sub-Clause:

- (a) shall be effected and maintained by the Contractor as insuring Party,



- (b) shall be in the joint names of the Parties,
- (c) shall be extended to cover liability for all loss and damage to the Employer's property (except things insured under Sub-Clause 18.2) arising out of the Contractor's performance of the Contract, and
- (d) may however exclude liability to the extent that it arises from:
 - (i) the Employer's right to have the Permanent Works executed on, over, under, in or through any land, and to occupy this land for the Permanent Works,
 - (ii) damage which is an unavoidable result of the Contractor's obligations to execute the Works and remedy any defects, and
 - (iii) a cause listed in Sub-Clause 17.3 [Employer's Risks], except to the extent that cover is available at commercially reasonable terms.

18.4 Insurance for Contractor's Personnel

The Contractor shall effect and maintain insurance against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The insurance shall cover the Employer and the Engineer against liability for claims, damages, losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

19. Force Majeure

19.1 Definition of Force Majeure

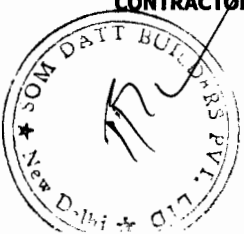
In this Clause, "Force Majeure" means an exceptional event or circumstance:

- (a) which is beyond a Party's control,

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Signature

- (b) which such Party could not reasonably have provided against before entering into the Contract,
- (c) which, having arisen, such Party could not reasonably have avoided or overcome, and
- (d) which is not substantially attributable to the other Party.

Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:

- (i) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (ii) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war,
- (iii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel,
- (iv) munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and
- (v) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

19.2 Notice of Force Majeure

If a Party is or will be prevented from performing its substantial obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

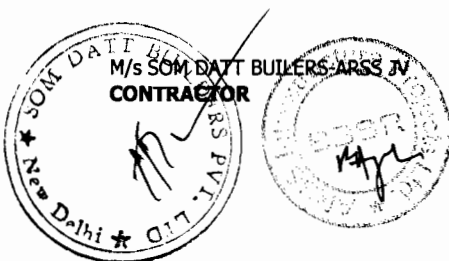
The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.

Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

19.3 Duty to Minimise Delay

Each Party shall at all times use all reasonable endeavours to minimise any delay in the performance of the Contract as a result of Force Majeure.

A Party shall give notice to the other Party when it ceases to be



affected by the Force Majeure.

19.4 Consequences of Force Majeure

If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 [Notice of Force Majeure], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) if the event or circumstance is of the kind described in sub-paragraphs (i) to (iv) of Sub-Clause 19.1 [Definition of Force Majeure] and, in the case of sub-paragraphs (ii) to (iv), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment].

After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

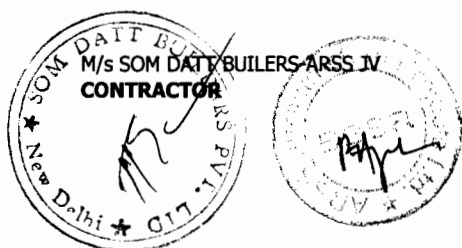
19.5 Force Majeure Affecting Subcontractor

If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's non-performance or entitle him to relief under this Clause.

19.6 Optional Termination, Payment and Release

If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under Sub-Clause 19.2 [Notice of Force Majeure], or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with Sub-Clause 16.3 [Cessation of Work and Removal of Contractor's Equipment].

Upon such termination, the Engineer shall determine the value of the work done and issue a Payment Certificate which shall include:



- (a) the amounts payable for any work carried out for which a price is stated in the Contract;
- (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
- (c) other Costs or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works;
- (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and
- (e) the Cost of repatriation of the Contractor's staff and labour employed wholly in connection with the Works at the date of termination.

19.7 Release from Performance

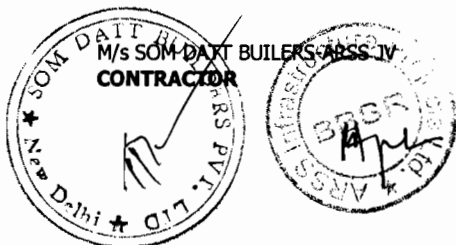
Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises which makes it impossible or unlawful for either or both Parties to fulfil its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance:

- (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract, and
- (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under Sub-Clause 19.6 [Optional Termination, Payment and Release] if the Contract had been terminated under Sub-Clause 19.6.

20. Claims, Disputes and Arbitration

20.1 Contractor's Claims

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to




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 Cuttack, Bhubaneswar.

the Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

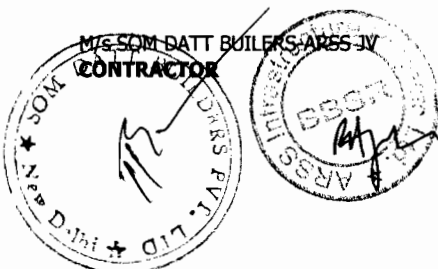
The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Engineer. Without admitting the Employer's liability, the Engineer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Engineer to inspect all these records, and shall (if instructed) submit copies to the Engineer.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Engineer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Engineer may reasonably require; and
- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Engineer.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Engineer and approved by the Contractor,



the Engineer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within the above defined time period.

Within the above defined period of 42 days, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [Extension of Time for Completion], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

Each Payment Certificate shall include such additional payment for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

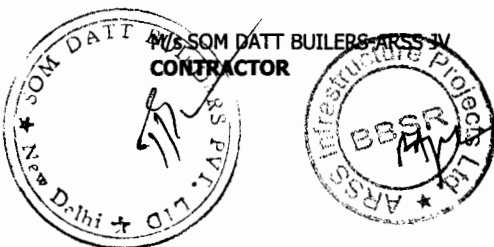
If the Engineer does not respond within the timeframe defined in this Clause, either Party may consider that the claim is rejected by the Engineer and any of the Parties may refer it to the Dispute Board in accordance with Sub-Clause 20.4 [Obtaining Dispute Board's Decision].


The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

20.2 Appointment of the Dispute Board

Disputes shall be referred to a DB for decision in accordance with Sub-Clause 20.4 [Obtaining Dispute Board's Decision]. The Parties shall appoint a DB by the date stated in the Contract Data.

The DB shall comprise, as stated in the Contract Data, either one or three suitably qualified persons ("the members"), each of whom shall be fluent in the language for communication defined in the Contract and shall be a professional experienced in the type of construction involved in the Works and with the interpretation of contractual documents. If the number is not so stated and the Parties do not agree otherwise, the DB shall comprise three persons.




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If the Parties have not jointly appointed the DB 21 days before the date stated in the Contract Data and the DB is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The first two members shall recommend and the Parties shall agree upon the third member, who shall act as chairman.

However, if a list of potential members has been agreed by the Parties and is included in the Contract, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DB.

The agreement between the Parties and either the sole member or each of the three members shall incorporate by reference the General Conditions of Dispute Board Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.

The terms of the remuneration of either the sole member or each of the three members, including the remuneration of any expert whom the DB consults, shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration.

If at any time the Parties so agree, they may jointly refer a matter to the DB for it to give its opinion. Neither Party shall consult the DB on any matter without the agreement of the other Party.

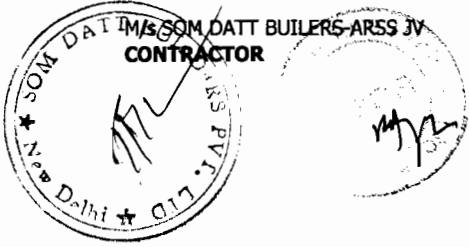
If a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment, a replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DB (including each member) shall expire when the discharge referred to in Sub-Clause 14.12 [Discharge] shall have become effective.

20.3 Failure to Agree on the Composition of the Dispute Board

If any of the following conditions apply, namely:

- (a) the Parties fail to agree upon the appointment of the sole member of the DB by the date stated in the first paragraph of Sub-Clause 20.2, [Appointment of the Dispute Board],
- (b) either Party fails to nominate a member (for approval by the other Party), or fails to approve a member nominated



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- by the other Party, of a DB of three persons by such date,
- (c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DB by such date, or
 - (d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official named in the Contract Data shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

**20.4 Obtaining
Dispute Board's
Decision**

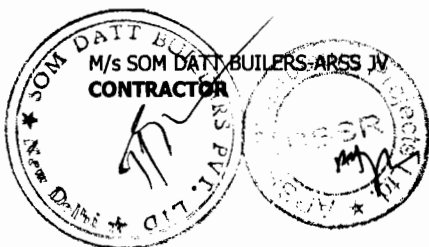
If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Engineer, either Party may refer the dispute in writing to the DB for its decision, with copies to the other Party and the Engineer. Such reference shall state that it is given under this Sub-Clause.

For a DB of three persons, the DB shall be deemed to have received such reference on the date when it is received by the chairman of the DB.

Both Parties shall promptly make available to the DB all such additional information, further access to the Site, and appropriate facilities, as the DB may require for the purposes of making a decision on such dispute. The DB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or within such other period as may be proposed by the DB and approved by both Parties, the DB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the Works in accordance with the Contract.

If either Party is dissatisfied with the DB's decision, then either Party may, within 28 days after receiving the decision, give notice to the other Party of its dissatisfaction and intention to



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commence arbitration. If the DB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference, then either Party may, within 28 days after this period has expired, give notice to the other Party of its dissatisfaction and intention to commence arbitration.

In either event, this notice of dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in Sub-Clause 20.7 [Failure to Comply with Dispute Board's Decision] and Sub-Clause 20.8 [Expiry of Dispute Board's Appointment], neither Party shall be entitled to commence arbitration of a dispute unless a notice of dissatisfaction has been given in accordance with this Sub-Clause.

If the DB has given its decision as to a matter in dispute to both Parties, and no notice of dissatisfaction has been given by either Party within 28 days after it received the DB's decision, then the decision shall become final and binding upon both Parties.

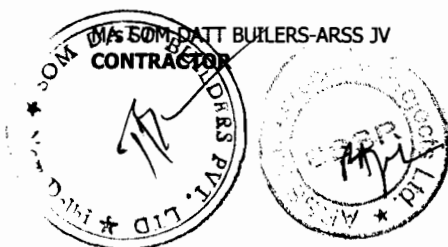
20.5 Amicable Settlement

Where notice of dissatisfaction has been given under Sub-Clause 20.4 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which a notice of dissatisfaction and intention to commence arbitration was given, even if no attempt at amicable settlement has been made.

20.6 Arbitration

Unless indicated otherwise in the Particular Conditions, any dispute not settled amicably and in respect of which the DB's decision (if any) has not become final and binding shall be finally settled by arbitration. Unless otherwise agreed by both Parties:

- (a) For contracts with foreign contractors, international arbitration with proceedings administered by the international arbitration institution appointed in the Contract Data, conducted in accordance with the rules of arbitration of the appointed institution, if any, or in accordance with UNCITRAL arbitration rules, at the choice of the appointed institution,
- (b) the place of arbitration shall be the city where the headquarters of the appointed arbitration institution is located,
- (c) the arbitration shall be conducted in the language for communications defined in Sub-Clause 1.4 [Law



and Language], and

- (d) For contracts with domestic contractors, arbitration with proceedings conducted in accordance with the laws of the Employer's country.

The arbitrators shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Engineer, and any decision of the DB, relevant to the dispute. Nothing shall disqualify representatives of the Parties and the Engineer from being called as a witness and giving evidence before the arbitrators on any matter whatsoever relevant to the dispute.

Neither Party shall be limited in the proceedings before the arbitrators to the evidence or arguments previously put before the DB to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the DB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Engineer and the DB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

20.7 Failure to Comply with Dispute Board's Decision

In the event that a Party fails to comply with a final and binding DB decision, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.6 [Arbitration]. Sub-Clause 20.4 [Obtaining Dispute Board's Decision] and Sub-Clause 20.5 [Amicable Settlement] shall not apply to this reference.

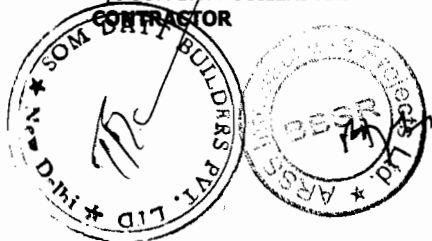
20.8 Expiry of Dispute Board's Appointment

If a dispute arises between the Parties in connection with, or arising out of, the Contract or the execution of the Works and there is no DB in place, whether by reason of the expiry of the DB's appointment or otherwise:

- (a) Sub-Clause 20.4 [Obtaining Dispute Board's Decision] and Sub-Clause 20.5 [Amicable Settlement] shall not apply, and
- (b) the dispute may be referred directly to arbitration under Sub-Clause 20.6 [Arbitration].

M/s SOM DATT BUILDERS-ARSS JV

CONTRACTOR



Volume – II - Page No. 123


Chief Engineer
World Bank Projects, Orissa
C/o EMPLOYER
Orissa, Bhubaneswar.

APPENDIX

A General Conditions of Dispute Board Agreement

- 1. Definitions** Each "Dispute Board Agreement" is a tripartite agreement by and between:
- (a) the "Employer";
 - (b) the "Contractor"; and
 - (c) the "Member" who is defined in the Dispute Board Agreement as being:
 - (i) the sole member of the "DB" and, where this is the case, all references to the "Other Members" do not apply, or
 - (ii) one of the three persons who are jointly called the "DB" (or "Dispute Board") and, where this is the case, the other two persons are called the "Other Members."

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

- 2. General Provisions** Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:
- (a) the Commencement Date defined in the Contract,
 - (b) when the Employer, the Contractor and the Member have each signed the Dispute Board Agreement, or
 - (c) when the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Agreement shall terminate upon the expiry of this period.

- 3. Warranties** The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Engineer. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.



When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:

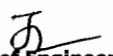
- (a) experienced in the work which the Contractor is to carry out under the Contract,
- (b) experienced in the interpretation of contract documentation, and
- (c) fluent in the language for communications defined in the Contract.

4. General Obligations of the Member

The Member shall:

- (a) have no interest financial or otherwise in the Employer, the Contractor or Engineer, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
- (e) comply with the annexed procedural rules and with Sub-Clause 20.4 of the Conditions of Contract;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board




Chief Engineer
World Bank Projects, Office
World Bank
EMPLOYER
C/o the E.T.C. (Civil)
Gisaa, Khabarovsk.

Agreement;

- (h) ensure his/her availability for all site visits and hearings as are necessary;
- (i) become conversant with the Contract and with the progress of the Works (and of any other parts of the project of which the Contract forms part) by studying all documents received which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the DB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any); and
- (k) be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

**5. General
Obligations of the
Employer and the
Contractor**

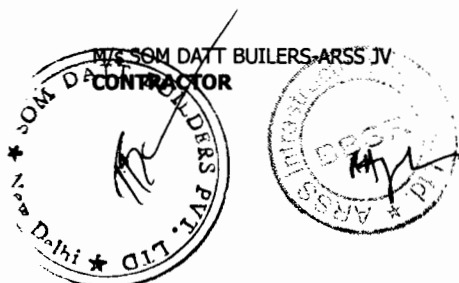
The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DB's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):

- (a) be appointed as an arbitrator in any arbitration under the Contract;
- (b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- (c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the DB under Sub-Clause 20.4 of the Conditions of Contract, which



will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6. Payment

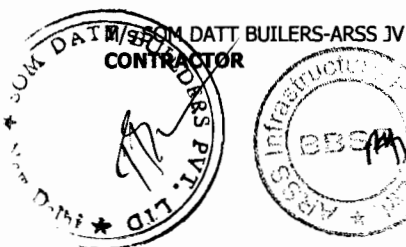
The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for:
 - (i) being available on 28 days' notice for all site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in sub-paragraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee which shall be considered as payment in full for:
 - (i) each day or part of a day up to a maximum of two days' travel time in each direction for the journey between the Member's home and the site, or another location of a meeting with the Other Members (if any);
 - (ii) each working day on Site visits, hearings or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.
- (c) all reasonable expenses including necessary travel expenses



(air fare in less than first class, hotel and subsistence and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, faxes and telexes: a receipt shall be required for each item in excess of five percent of the daily fee referred to in sub-paragraph (b) of this Clause;

- (d) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

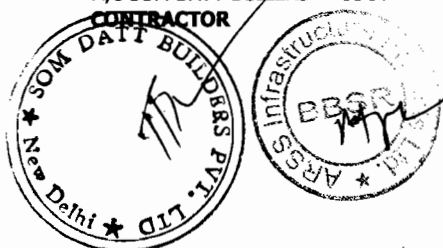
If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in Sub-Clause 14.8 of the Conditions of Contract.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is



received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7. Termination

At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

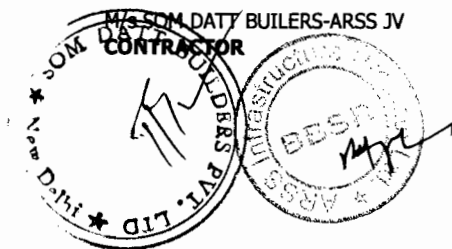
8. Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 (a) - (d) above, he shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

If the Member fails to comply with any of his obligations under Clause 4 (e) - (k) above, he shall not be entitled to any fees or expenses hereunder from the date and to the extent of the non-compliance and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses already received by the Member, for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

9. Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.



PROCEDURAL RULES

Unless otherwise agreed by the Employer and the Contractor, the DB shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.

The timing of and agenda for each site visit shall be as agreed jointly by the DB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DB. The purpose of site visits is to enable the DB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to endeavour to prevent potential problems or claims from becoming disputes.

Site visits shall be attended by the Employer, the Contractor and the Engineer and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the DB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.

The Employer and the Contractor shall furnish to the DB one copy of all documents which the DB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the DB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.

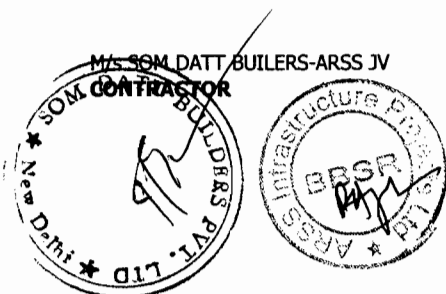
If any dispute is referred to the DB in accordance with Sub-Clause 20.4 of the Conditions of Contract, the DB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DB shall:

- (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
- (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.

The DB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.

Except as otherwise agreed in writing by the Employer and the Contractor, the DB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor and the Engineer, and to proceed in the absence of any party who the DB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

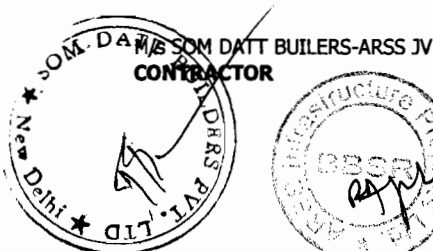
The Employer and the Contractor empower the DB, among other things, to:



- (a) establish the procedure to be applied in deciding a dispute,
- (b) decide upon the DB's own jurisdiction, and as to the scope of any dispute referred to it,
- (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules,
- (d) take the initiative in ascertaining the facts and matters required for a decision,
- (e) make use of its own specialist knowledge, if any,
- (f) decide upon the payment of financing charges in accordance with the Contract,
- (g) decide upon any provisional relief such as interim or conservatory measures, and
- (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.

The DB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DB shall make and give its decision in accordance with Sub-Clause 20.4, or as otherwise agreed by the Employer and the Contractor in writing. If the DB comprises three persons:

- (a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
- (b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
- (c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members not to make a decision.



J
Chief Engineer
 World Bank Projects, Orissa
 Chief Engineer
 Orissa Electricity
 Corporation

AGREEMENT No 4 of 2008 - 09



**GOVERNMENT OF ORISSA
WORKS DEPARTMENT**

CIVIL WORKS CONTRACT

[PACKAGE No. OSRP-CW-ICB-Y1-P02]

For

*Widening & Strengthening of existing carriageway to 2-lane road for
Chandabali-Bhadrak-Anandapur road
(Km. 0/0 to Km. 45/0 of SH – 9 & Km. 0/0 to Km. 50/0 of SH-53)*

*under
Orissa State Roads Project*

between

**Chief Engineer, World Bank Projects, Orissa
on behalf of
Orissa Works Department, Government of Orissa**

and

**SOM DATT BUILDERS – ARSS JV
Plot No. 38, SECTOR – A, Zone – D
Mancheswar Industrial Estate, Mancheswar, Bhubaneswar – 751010 [INDIA]**

[VOLUME – III: SPECIFICATIONS]
Agreement Value: Rs. 216,23,17,622.00

*Project Management Unit, Orissa State Roads Project
Office of the Engineer-in-Chief (Civil), Orissa,
Nirman Soudha, Keshari Nagar, Unit – V, Bhubaneswar – 751 001*

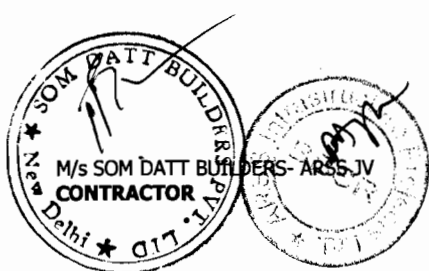
Dated: 3rd November, 2008


CONTENTS of CONTRACT

Volume – I	:	Letter of Acceptance, Letter Bid and addenda
Volume – II	:	Particular Conditions and the General Conditions;
Volume – III	:	Specifications
Volume – IV	:	Drawings
Volume – V	:	Completed Schedules,

CONTENTS of VOLUME III

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Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Chief Engineer,
World Bank Project
C/o the E.I.C. (Civil)
Orissa, Bhubaneswar.

Scope of Works

BACKGROUND

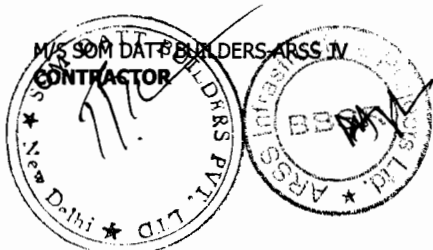
- 1.1 The Government of Orissa through Government of India has applied for financial assistance in the form of a Loan from the International Bank for Reconstruction and Development (the Bank) for the Orissa State Roads Project. Part of this financial assistance will be applied towards civil works for the widening and strengthening of about 900 km of State Highways (SH).
- 1.2 The executing agency for the Orissa State Road Project is the Orissa Works Department (OWD). The OWD has established a Project Implementation Unit (PIU) exclusively to be in-charge of the Orissa State Road Project. The PIU is headed by the Chief Engineer, World Bank Projects, Orissa assisted by appropriate professional and support staff.
- 1.3 The proposed construction packages to be taken up in the first year of the project are as follows:

Sl.	Package No.	Name of the Road	Approximate Length of Construction in Km	Period of Construction
1	OSRP-CW- Y1-P02	Chandbali – Bhadrak – Anadpur (Km. 0/0 to Km. 45/0 of SH – 9 and Km. 0/0 to Km. 50/0 of SH – 53)	95 kms	30 Months

Geographical & Climatic Information

1.3.1 A. Bhadrak – Chandbali Corridor

This road located in the Eastern part of Orissa, takes off from NH 5 at 155/0 km and terminates at 52.600 km on SH -9 at Chandbali after river Baitarani. The total length of the road is 52.6 km and in the project corridor 45km of the length from Bhadrak has been considered for improvement under year-I. The road passes through Bhadrak district. This road is located in the Mahanadi Delta area and the major river located at Chandbali is river Baitarani. The terrain is plain and the drop in level in the entire 45 km is about 9m. This road suffers from inundation during rainy season as many stretches are having level lower than the high Water Level. This area experiences rainfall of average 1200mm to 1500mm per annum and bulk of the rainfall occurs during June to October, which is the monsoon period in Orissa. Highest temperature in the area during, March to May is 45 degree Celsius and the temperature dips to the lowest of 10 degree Celsius during winter season.



This road passes through Bhadrak; the district head quarter, Tihidi, Motto villages/semi urban area.

B. Bhadrak – Anandpur

This road takes off from NH 5 at 155/0 km near Bhadrak. This road is having a total length of 57 km, but in the year-I improvement of first 50 km has been considered. The road passes through Bhadrak district and Keonjhar district. This area experiences rainfall of average 1200 to 1500mm per annum and bulk of the rainfall occurs during June to October, which is the monsoon period in Orissa. Highest temperature in the area during , March to May is 45 degree Celsius and the temperature dips to the lowest of 8 degree Celsius during winter season. This road passes Bhadrak, Barapada, Both, Basantia, Hatadihi, Anandpur villages/semi urban area.

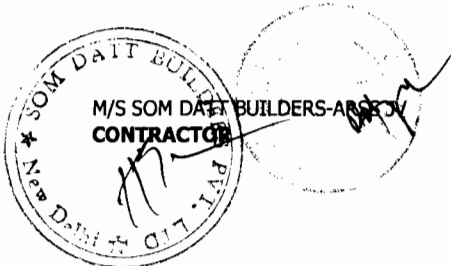
2.0 WORKS

The civil works will comprise of the following, as required, mostly on existing alignments.

- a. Improvement of road geometry;
- b. Raising & Widening of embankments considering drainage and road geometry
- c. Sub base, base and bituminous pavement with limited concrete pavements in built up areas and toll plazas;
- d. Widening and paving of carriageway and shoulders;
- e. Improvement of side drainage & improvement to or replacement and widening of culverts;
- f. Repair and rehabilitation of bridges;
- g. Construction of new Culverts and Bridges;
- h. Traffic safety features;
- i. Road signs and road markings;
- j. Environmental protection and management measures during construction stage;
- k. Traffic diversion and management during the construction;
- l. Routine Maintenance of Project Corridors during the construction period;
- m. Construction and maintenance of Diversion roads

The Chief Engineer, World Bank Projects, Orissa, hereinafter the “Employer’s Representative”, on behalf of the Government of Orissa in Works Department, hereinafter the “Employer”, now wishes to engage a contractor/Joint venture of construction firms of multi-disciplinary international and local expertise, hereafter the “Contractor”, to carry out construction work of the proposed project in accordance with the terms of reference below.

The supervision of the civil works will be carried out by qualified consultants with satisfactory experience in implementing projects of similar nature and size.



3. REPORTING REQUIREMENTS

The Contractor shall prepare and submit to the Employer alongwith softcopy of each of the following reports:

SI	Document	Number of Copies	Time
1	Work Programme	5	Two weeks of commencement of Works.
2	Monthly progress report	5	10 business days after end of month
3	Quarterly progress report	5	15 business days after end of quarter
4	Maintenance Manual for Defect liability Period	5	12 months after commencement of Works.
5	RFI Database month wise	5	1 months after commencement of Works.
6	Sectional/Substantial Completion Reports	5	After substantial completion

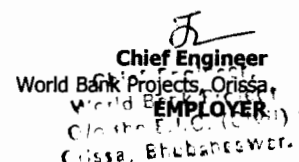
MONTHLY REPORT:

- a) The Contractor will, no later than 10th of each month, prepare a brief progress report summarizing the work accomplished by the supervision team for the preceding month. The report will outline any problems encountered (administrative, technical or financial) and propose suggestions on how these problems may be overcome. Brief work progress summaries will be included for on going road and bridge works, outlining problems encountered and required solutions. The report should record the status of payment of contractors monthly certificates, previous month payments and cumulative payments of all claims for cost or time extensions, and of action required of government and other agencies to permit unconstrained works implementation.

The monthly progress report shall also include one chapter each on environmental, signage, safety utility and community asset shifting, tree felling, details of initial rectification, routine maintenance and traffic diversion during construction. The PERT chart in Microsoft Project for all activities shall be enclosed with the monthly progress report.

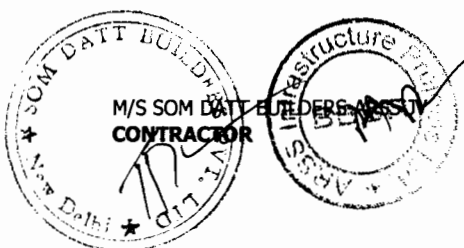
b) QUARTERLY PROGRESS REPORTS

The Contractor will prepare a comprehensive report summarizing all activities under the services at the end of each quarter, and also at other times when considered warranted by either the Consultant or the Employer because of delay of the construction works or because of the occurrence of technical or contractual difficulties. Such reports shall the status of Contractor's claims, if any and will include brief descriptions of the technical and contractual problems being encountered, physical and financial progress on approved formats, financial status of the contracts as a whole consisting the cost incurred, and cost forecast and other relevant information for the ongoing contracts.



c) SECTIONAL AND SUBSTANTIAL / FINAL COMPLETION REPORTS

The Contractor will prepare a comprehensive final Completion Report for each defined section of the construction contract, after such sections reaches a stage of substantial completion during the period of the services. These reports must be submitted immediately after the completion of the work by the contractor and before taking over of such sections by the Employer. The report shall incorporate summary of the method of construction, as built construction drawings problems encountered & solutions undertaken thereon.




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank Project
On the E.T.C. (CIVIL)
Orissa, Bhubaneswar.

Specification

a. GENERAL TECHNICAL SPECIFICATIONS

1. The General Technical Specifications shall be the “SPECIFICATIONS FOR ROAD AND BRIDGE WORKS” (FOURTH REVISION-2001) published by the Indian Roads Congress (IRC), hereinafter referred to as MORTH Specifications with a cross reference to relevant Bureau of Indian Standards (BIS) for materials or other aspects not covered by the IRC.
2. In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specifications of IRC and BIS in that order with the approval of Engineer. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approved by the Engineer and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer shall be final and binding on the Contractor.
3. The provisions of special conditions of contract, those specified elsewhere in the tender document, as well as execution drawings and notes, or other specifications issued in writing by the Engineer shall form part of the technical specifications of this project.

b. SUPPLEMENTARY TECHNICAL SPECIFICATION

(AMENDEMENTS/ MODIFICATIONS/ ADDITIONS TO EXISTING CLAUSES OF
GENERAL TECHNICAL SPECIFICATIONS)



PART-I

GENERAL TECHNICAL REQUIREMENTS

1.0. GENERAL REQUIREMENTS

The Technical Specifications in accordance with which the entire work described hereinafter shall be constructed and completed by the Contractor, and comprise of the following:

1.1 PART – I - General Technical Specifications

The General Technical Specifications shall be the “SPECIFICATIONS FOR ROAD AND BRIDGE WORKS” (FOURTH REVISION – 2001, Reprint 2006), as corrected in the original issued by the Ministry of Shipping , Road Transport & Highways(MORTH), Government of India and published by the Indian Roads Congress (IRC), with a cross reference to relevant Bureau of Indian Standards (BIS) for materials or other aspects not covered by the IRC.

1.2 PART - II - Supplementary Technical Specifications

The Supplementary Technical Specifications shall comprise various Amendments/Modifications/Additions to the “SPECIFICATIONS FOR ROAD AND BRIDGE WORKS” referred to in PART - I above and also **Additional Specifications** for particular item of works not already covered in PART-I.

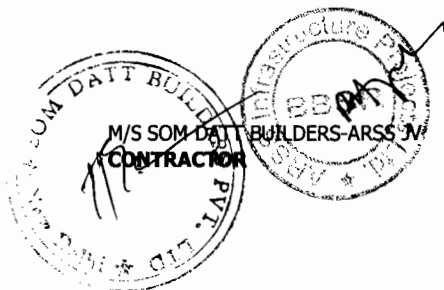
1.2.1 A particular Clause or a part thereof in “SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FOURTH REVISION - 2001, Reprint 2006)” as corrected in the original referred in PART - I above, where Amended/Modified/Added upon, and incorporated in PART-II, referred to above, such Amendment/Modification/Addition supersedes the relevant Clause or part of the Clause.

1.2.2 When an Amended/Modified/Added Clause supersedes a Clause or part thereof in the said Specifications, then any reference to the superseded Clause shall be deemed to refer to the Amended/Modified/Added Clause or part thereof.

1.2.3 In so far as Amended/Modified/Added Clause may come in conflict or be inconsistent with any of the provisions of the said Specifications under reference, the Amended/Modified/Added Clause shall always prevail.

1.2.4 The Additional Specifications shall comprise specifications for particular item of works not already covered in PART - I.

1.2.5 The Sub-Clauses of the following Sections in the “Specifications for Road and Bridge Works (Fourth Revision – 2001, Reprint 2006) have been amended/modified/added upon 100, 200, 300, 400, 500, 600, 800, 900, 1000, 1500, 1600, 1700, 2000, 2200, 2600 & 2800.



1.2.6 Additional Specifications

The following Clauses have been added to the 'SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FOURTH REVISION – 2001, Reprint 2006)'.

A-1 Diversion and filling of existing water courses along the road alignment.

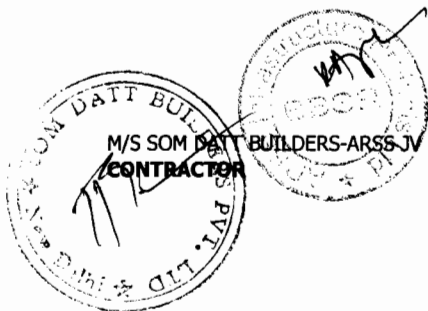
A-2 Plantation of trees.

A-3 Void Former.

A-4 Embankment Construction with Fly Ash Modified Soil

1.2.7 In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specifications of IRC and IS in that order. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approved by the Engineer and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer shall be final and binding on the Contractor.

1.2.8 The provisions of special conditions of contract, those specified elsewhere in the tender document, as well as execution drawings and notes, or other specifications issued in writing by the Engineer shall form part of the technical specifications of this project.



PART- II
SUPPLEMENTARY TECHNICAL SPECIFICATION
(AMENDEMENTS/ MODIFICATIONS/ ADDITIONS TO EXITING CLAUSES OF
GENERAL TECHNICAL SPECIFICATIONS-PART-I)

SECTION 100

GENERAL

Clause 102

Definitions

The following abbreviations shall be added in this Clause.

“MORTH” - Ministry of Road Transport & Highways (This has been renamed as Ministry of Shipping, Road Transport and Highways)

“WBM” - Water Bound Macadam

“WMM” - Wet Mix Macadam

“MDD” - Maximum Dry Density (as per IS: 2720-Part 8)

“OMC” - Optimum Moisture Content

Wherever in the Specification, the phrase “Condition of Contract” is Mentioned, it shall mean Conditions of Contract part-I and II Contained in Section..of Bidding Documents.

Clause 103

Add at the end of the clause

The latest edition of these standards or any other relevant standards till 30 (thirty) days before the final date of submission of the tender shall be adopted.

Clause 105

Scope of Work

Clause 105.3

Add the following below the existing clause

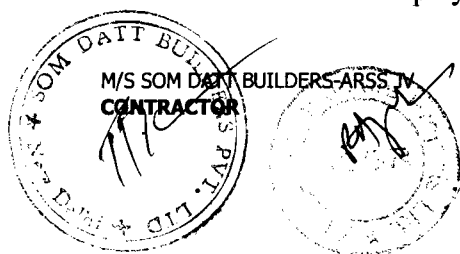
The contractor shall establish, adhere to monitor and maintain an adequate quality assurance programme (QA-Programme)

The QA-programme shall cover the quality assurance aspects of all services rendered, all items to be supplied and all construction activities to be performed under the Contract, also including temporary structures and equipment which will influence the quality of the completed works or the progress of the Contract.

The QA-programme shall as a minimum, cover subjects listed below:

- Organization and Management Responsibility
- Document and data control
- Construction programme
- Method statements
- Process Control
- Working, inspection, testing and documentation procedures
- Safety and emergency procedures
- Control and documentation of purchasing and handling of materials
- Non-conformity and corrective action.
- Internal quality audits
- Servicing
- Education and training of staff
- Site Environment Plan

The general procedures of the QA-programme shall be submitted to the Employer and Engineer for approval not later than twenty eight days



after the date of receipt of letter of acceptance. The special part of the QA-programme shall be submitted successively to the effect that it shall have been approved prior to the commencement of the activities to which the programme shall apply.

Clause 105.4

Replace the following

Word "15 days" with "28 days" in first line

Add as the penultimate sentence

"If the Quality Assurance plan of the project as finalized and approved by the Engineer demands other time schedule for various submissions and approvals, the QA plan requirement will prevail".

Clause 106

Construction Equipment

Add the following below sub Para (f)

g) Adequate standby equipment including spare parts shall be available at site as decided in consultation with the Engineer.

h) All measuring devices and gauges shall be in good working condition. Measuring devices that can affect product quality shall be calibrated prior to use and at prescribed intervals against certified equipment. Calibration procedures shall be established maintained and documented and corrective actions taken when results are unsatisfactory. Accuracy and fitness of measuring devices shall be ensured by proper maintenance.

Clause 106 (a)

Add the following sentence.

"The trial run is to be carried out laying the relevant pavement material and it is not to be part of the permanent works. The trial is to be carried out on prior approval of equipment by the Engineer-in-Charge."

Clause 106 (b)

Add the following sentence"

The Contractor shall furnish to the engineer the detailed technical literature and other relevant documents regarding the performance of plant/equipment to Engineer for approval prior to its purchase or mobilization on site."

Clause 107

Contract Drawings

Clause 107.1

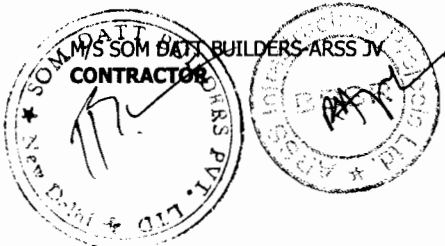
Add the following after the end of the para

Contractor shall ensure that the design and drawings for the bridges and Road Over Bridge are vetted by Engineer through the Employer.

Clause 107.3

Add the following after the end of the para

After careful study of the drawings issued by the Engineer, the Contractor shall, prepare, where necessary all supplementary and working drawings with necessary field/construction information and check for adequacy of construction methods and procedure etc. and shall submit the same to the engineer for approval prior to construction. Engineer shall be given not less than 21 days for review of these supplementary/working drawings and as directed, the contractor shall modify the drawings incorporating the comments and requirements of the Engineer.



The Contractor shall prepare detailed construction drawings for each culvert on the basis of the drawings given in Bid Documents and get them approved by the Engineer. The drawings shall be submitted to the engineer at least **4 weeks** before commencement of construction of culverts.

Clause 108 Site Information

Clause 108.4 This Clause shall be replaced as follows

The Contractor shall identify quarries, borrow areas and other sources of materials required for the work. He shall satisfy himself that the required materials are available in adequate quantities and complying with the requirements of specifications. No claims shall be entertained on account of non-availability of materials and increase in leads.

It is the sole responsibility of the contractor to arrange the quarries, borrow areas etc. on license / lease basis or otherwise, and study in detail before tendering the scope of taking the quarry on lease. Advance information must be collected by the contractor regarding the procedure laid down and the consequent delay in arranging the quarries on lease and must make alternative arrangement to procure the quarry products from lease holders. No separate payment will be made for arranging such quarries, borrow areas.”

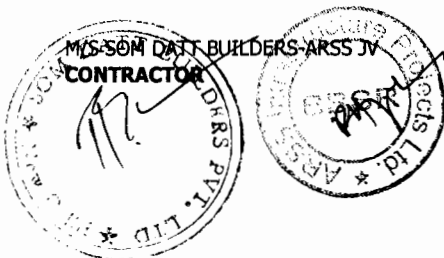
Clause 109 Setting Out

Clause 109.8 Add the following Para in the end of Clause 109.8

Surveying Equipments and Personnel

The Contractor shall provide the necessary surveying equipment, accessories, and surveyors and labours required for setting out and related measurements, including making available these to the Engineer and his representatives at different stages of the work. The surveying equipment shall be of high quality standard as approved by the Engineer, in good working condition with adequate numbers and shall include interaila the following.

- i) Precision automatic level with micrometer attachment with tripods and leveling staff reading to 5mm accuracy by direct observation and to 1mm accuracy by estimation or better.
- ii) Theodolites with tripod – Electronically operated with computerized output attachment reading to 20 seconds of angle accuracy or better.
- iii) Total station with 2 spare batteries and a charger, three tripods plus tangents sufficient for a 4km. range, together with an electronic data recorder, 6 data packs and all necessary software for operation.
- iv) Precision staff.
- v) 3 meter straight edge and measuring wedge fitted with handles wedges 100 mm ht. and 1 mm accuracy.
- vi) Field Umbrellas
- vii) Ranging rods 50mm dia. 3m long straight with one end each metallic conical and painted alternatively black and white along the length.
- viii) Camber templates 2 lane fitted with handles



- ix) Sprit Level
- x) Invar/Steel tape graduated in meters, centimeter and millimeter.
 - a) 10m long
 - b) 20m long
 - c) 50m long
 - d) Reference markers and pegs

The Contractor shall maintain the surveying equipment in good condition during the full duration of works and replace the ones, which get worn out otherwise become unworkable.

The surveying equipment and related resources shall be provided under the general obligations of the Contractor requiring no separate payment.

Clause 109.10 Add new sub-clause

“Before carrying out any survey work the Contractor shall submit to the Engineer in writing for the approval of programme and methodology for the calibration of all optical and electronic survey equipment to be used on site during construction of the works. The Contractor will maintain calibration records for all such equipment in his site office, available at all times for inspection by the Engineer.”

Clause 110 Public Utilities

Clause 110.1 Revise the clause as under

Existing services like water pipes, sewers, oil pipelines, cables, gas ducts etc. owned by various authorities including Public Undertaking and Local Authorities shall be checked and located by the Contractor prior to commencement of work.

Clause 110.2 Revise the clause as under

The Contractor’s programme must take into account the period of notice and duration of diversionary works of each body as existing at site. The Contractor must also allow for any effect or these services and alterations upon the Works and for arranging regular meetings with the various bodies at the commencement of the Contract and throughout the period of the Works in order to maintain the required co-ordination. During the period of the Works, the contractor shall have no objection if the public utility bodies vary their decisions in the execution of their proposals in terms of programme and construction, provided that, in the opinion of the Engineer, the Contractor has received reasonable notice thereof before the relevant alterations are put in hand.

Clause 110.3 This Clause shall read as under

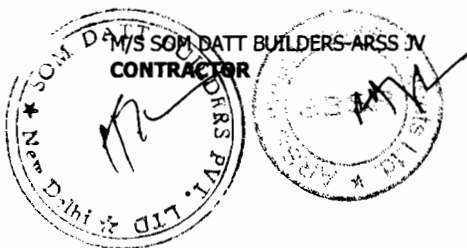
Any utility services likely to be affected by the contractor’s work shall be brought to the notice of the Engineer/ employer and such work shall be undertaken only after getting written clearance from the Engineer.


Clause 111 Precautions for Safeguarding the Environment

This whole clause shall be modified by following.

Clause 111.1 General

The clause shall be read as follows




Chief Engineer
 World Bank Projects Office,
 EMPLOYER
 C/o the P. U. C. (C&M)
 Crissa, Ehubandwan.

The contractor shall take all precautions for safeguarding the environment during the course of the construction of works. He shall abide by all rules, regulations and laws in force governing pollution and environmental protection that are applicable to the area where the works are situated. On completion of the Works, all areas disturbed by the Contractor's construction activities shall be restored in their original condition, or as may be acceptable to the Engineer. The cost of this work shall be deemed to be included in the rates generally.

Clause 111.2 Borrow pits for Embankment Construction

The clause shall be read as follows

Borrow pits shall not be dug within the Right-of-Way of the road Contractor will ensure that proper excavation techniques are used to improve stability and safety of the borrow area. The excavation shall be carried out in such a way that the area does not inundate during monsoons and generate cesspools of water for breeding site. The stipulations in Clause- 305.2.2 shall govern.

Clause 111.3 Quarry Operations

The clause shall be read as follows

The contractor shall obtain material from licensed quarries only after the consent of the forest department or other concerned authorities. The quarry operations shall be undertaken within the purview of the rules and regulations in force. Contractor shall ensure scheduling the movement of transport carrying material to and from site during non-peak hours. The trucks carrying all types of construction material shall be covered with tarpaulin to prevent spillage and air pollution. Stockpiling of material shall be properly planned so as to ensure that no traffic jam takes place on the highway. In no case overloading than the allowable capacity of vehicle shall be permitted.

Clause 111.5 Pollution from Hot Mix Plants and Batching Plants

Add the following paragraph at the end of this Sub-clause.

The contractor shall ensure the use of relatively new, well maintained batching plant so that noise and emission conforms to the regulatory norms and be fitted with dust extraction unit to avoid prolonged engine powered equipment idleness.

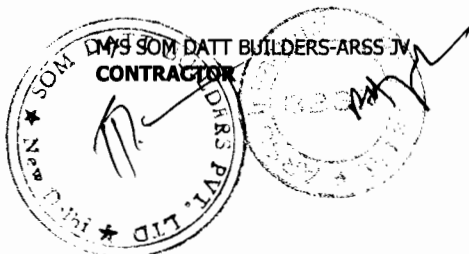
Clause 111.6 Substances hazardous to health

Add the following as 111.6.1 & 111.6.2

Clause 111.6.1 Precautions against Toxic Chemicals

The use of any herbicide or other toxic chemical shall be strictly in accordance with the manufacture's instructions. The Engineer shall be given at least 6 working day's notice of the proposed use of any herbicide or toxic chemical.

A register of all herbicides and other toxic chemicals delivered to the site shall be kept and maintained up to date by the contractor. The register shall include name physical properties and characteristics, chemical ingredients, health and safety hazard information, safe



handling and storage procedures, and emergency and first aid procedures for the product.”

Clause 111.6.2

Precautions against generation of hazardous materials

The contractor shall not use or generate any material in the process work, which are hazardous to the health of persons, animals or vegetation. Where it is necessary to use some substance, which can cause injury to the health of the workers, the contractor shall provide suitable clothing or appliances to his workers, viz. ear plugs, helmets or dust masks or any other suitable devices.

Clause 111.9.1

Add new clause as follows

Haulage Road

Same steps as above are to be taken for all of the haulage roads made by the contractor for the work.

Clause 111.10.1

Add the new clause as follows

Sanitation & Waste Disposal in Construction Camp

Contractor shall ensure that construction camps are located at a distance of minimum 200m, from water sources. Construction camps are to be located away from vulnerable people and adequate health care is to be provided for the work force. All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. . At every workplace, good & sufficient water supply will be maintained to avoid waterborne/ water related diseases. The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses take place. Compliance with relevant legislation must be strictly adhered to, Garbage bins must be provided in the camp and regularly emptied and the garbage disposed of in a hygienic manner.

Contractor shall provide adequate measures for the health care of workers and arrange their regular medical check-up to ensure that they do not suffer from communicable diseases. If any pits are dug at construction/ camp site which are not filled and may turn into mosquito breeding sites during monsoons, either these shall be filled up properly so that no water gets accumulated. The area shall also be sprayed frequently with pesticides to prevent mosquito breeding.

Clause 111.10.2

Environmental Monitoring

Add new clause as follows:

In order to carry out periodic checks environmental monitoring will be carried out by the Engineer as per schedule and if any parameter is found above the acceptable standards, mitigation measures/ control measures as decided by the Engineer shall be complied with by the Contractor.

NOISE:



The Contractor shall mitigate against any sustained increase in base line ambient sound levels at sensitive receptors during construction of work.

All construction operations shall be performed in a manner to minimize noise and Vibration. The parameters for noise are detailed below.

- 70 dB(A) for day and night;
- 50 dB (A) for day and 45 dB(A) for night for sensitive receptors

If the noise level are found to be above these standards and it is determined by the Engineer that these levels are due to the equipments or plants being deployed by the Contractor, he shall undertake, at his own cost measures as approved by the Engineer, to bring these levels down to the specified levels. Blasting should be done as per Indian Explosive Act. People living near such blasting sites shall have prior information of operational hazards. Blasting will not be undertaken normally in night. Worker at blasting sites will be provided with earplug. Material haulage road will be properly regulated.

Labour shall be warned against the hunting of wild life, if any. No archaeological site shall be disturbed, vandalized.

Clause 111.10.3 Add as new sub clause

Protection of Existing Trees

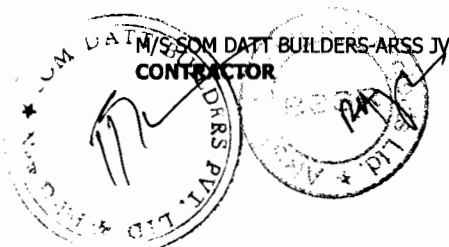
The Employer prior to handing over of the site to the contractor will cut some of the existing trees within the right of way. The contractor shall take all necessary measures to ensure safety and protection of the remaining trees from any action whatsoever relating to his construction operations in the adjoining areas. Giant neighborhood trees recognized locally as important shall be preserved and engineering designs modified to accommodate these.

All works are to be carried out in such a fashion that the damage or disruption to the flora and fauna is reduced to a minimum wherever possible. Trees or shrubs will only be felled or removed that impinge directly on the permanent works or necessary temporary works, after seeking approval of the Engineer.

Clause 111.10.4 Add as new sub-clause

Disposal of Materials outside Work Site

Notwithstanding other relevant provision in the contract, the excess material generated by dismantling, excavation, waste material and lubricants, used oil, gasoline and other such substance etc., shall be removed from site, outside the right of way at regular intervals and site shall kept clean from all such disposable materials. Grease, cotton and other wastes construction material will be disposed off in shallow soakage wells constructed in each construction site. Such intervals shall not exceed one month under any circumstances. The selection of the disposal site shall be the responsibility of the contractor and he



shall insure that the selected site does not result in any claim for damages to the employer or violation of any existing laws.

Clause 111.10.5 Add as new sub-clause

:

“The Discharge Standards promulgated under the Environment Protection Act, 1986 shall be adhered to strictly. All waste arising from the project is to be disposed of in a manner, which is acceptable to the State Pollution Control Board and the Engineer.”

All vehicles and machinery employed in the execution of the works shall be regularly maintained to ensure that pollutant emission levels comply with the relevant requirements of current pollution control legislation. During routine servicing operations, the effectiveness of exhaust silencers must be checked and if found to be defective must be replaced. Notwithstanding this requirement, noise levels from any item of plant must comply with the relevant legislation for levels of sound emission. Non-compliant plant is to be removed from site.

Vehicle maintenance and refueling shall be carried out in such a fashion that spillage of fuels and lubricants do not contaminate the ground or nearby watercourse. An “oil interceptor” shall be provided for wash down and refueling areas. Fuel storage shall be in proper bounded areas. All spilt and collected petroleum products shall be disposed of in accordance with the relevant legislation.

Construction vehicles machinery & equipment will move or be stationed in the designated area to avoid compaction of soil to ensure the perseverance of the top- soil for agriculture.

Clause 111.10.6 Compliance with the foregoing will not relieve the contractor of any responsibility for complying with the requirement of any Highway Authority in respect of the roads used and constructed by him.

Clause 112 Arrangement for Traffic during Construction

Clause 112.1 General

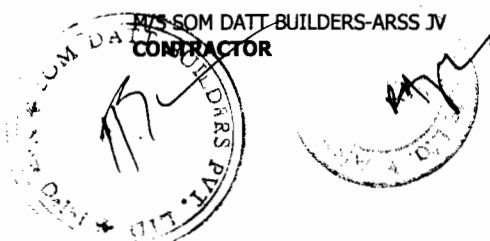
Delete the last sentence and add the following

“One week before undertaking work which would involve any obstruction whatsoever to traffic, the Contractor shall submit, for the Engineer’s approval, a Traffic Control Plan.

The plan shall include:

- i) Typical drawing for temporary diversions in accordance with Sub Clause 112.3
- ii) Typical details of arrangements for construction under traffic including details of traffic arrangements proposed to be in place after the cessation of work each day.

Special consideration shall be given in the preparation of the Traffic Control Plan for the safety of pedestrian and works delineation of the roadway at night.



Clause 112.2

Temporary diversions will be constructed only with the approval of the Engineer.

Passage of Traffic along a part of the Existing Carriage way under improvement:

Replace the clause as follows

If the existing road is used as diversion, then contractor will maintain it at his cost only.

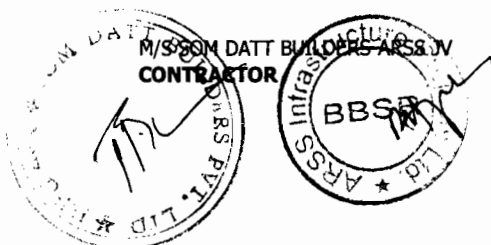
Most of the carriageway of the project has single/intermediate lane carriageway. Due to poor in geometries and drainage consideration the finished road surface shall require raising. The average formation width in plain terrain is about 8m to 10m and in the hilly terrain about 7m to 10m. None of the roads have granular sub base extending to the full formation width. For strengthening/widening of existing carriage way, part of the existing carriage way & shoulders shall be used for passage of traffic.

1. Passage of traffic in Plain/Rolling terrain

For facilitating passage of traffic during construction, following methodology shall be followed. However the contractor may suggest any improved method to be approved by the Engineer. If in the opinion of the Engineer, the arrangement suggested by the Contractor is better and shall ease the traffic movement, the same shall be adopted. But in such case the Contractor shall furnish the full traffic management plan along with the methodology of construction. The method is for general locations and any site specific arrangement shall be finalized in consultation with the Engineer.

The work shall be carried out on half-half basis. The length of widening/strengthening work on one side shall be limited to 500m at a place for which the traffic diversion shall be provided. There should be minimum 20m gap between the two successive patches. In case longer stretches are allowed, trapezoidal passing places of 20m outer edge with granular base course overlaid with surface dressing with additional width of 2.5m shall be provided at every 500m interval. But in no case the total length of work on one side should exceed 2000m except in the case if permitted by the Engineer. The next length of 2000m or less may be planned on the opposite side with a minimum clear distance of 200m from the preceding patch.

The proposed centerline of the alignment shall be marked. The toe line of the embankment shall be marked on both sides of the alignment. After clearing & grubbing, benching the slope & compacting the original ground, earth work in embankment with approved material shall be taken up to the design sub grade level in the side on which the traffic is proposed to be allowed. The type of earth and compaction requirement shall match the requirement of embankment or sub grade for which the section has been planned, as this section shall be retained as part of the road section. GSB (two layers) as per design requirement, conforming to the specification requirement of clause 401 of MORTH shall be provided up to the end of formation level and compacted. Over this granular base lower layer (WMM1) shall be provided up to the end



of formation level and compacted. Over this primer and surface dressing shall be provided to allow the vehicles to ply on the prepared surface. During such time the existing carriageway width of minimum 3.5m and one side of treated shoulder (total of 5.0 m) shall be left for plying of vehicles. The prepared surface for traffic flow should be min of 4.0m. The work for the other side including the carriageway portion shall be taken up, up to the sub base/sub grade/embankment level to match with the sub base of the former side and if decided, continue construction of granular base (two layers). Bituminous work as per design requirement is taken up over the prepared granular base, to allow the vehicles to ply on the prepared surface. The work for the other side from the granular base second layer (upper layer) shall be taken up and constructed till all the layers to reach the proposed formation level. The Contractor in consultation with the Engineer shall decide whether the side allowed to traffic can be taken up for construction of Granular base layer.

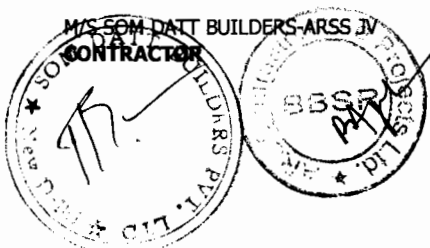
The work of providing earth embankment, sub-grade and granular sub-base material so carried out shall be paid under relevant items of bill of quantities. It may be ensured to provide minimum availability of width of 4.0m for plying of vehicles. At the end of diversion, a suitable link with proper gradient should be provided.

The contractor shall maintain the bypass/diversion made with the granular base material during the period of construction by way of watering, compacting, and making good loss of material after filling up of the rutting/depression etc. by additional quantity of granular materials. The cost of maintenance, making good the loss of material, watering, compacting, leveling and dressing along with additional quantity of granular base material shall be considered as incidental to the work.

The side on which the traffic was plying till then shall be made good after rolling, leveling, dressing along with any additional material required to bring the same to the required camber or super-elevation as the case may be and compacted to achieve the desired density to receive the next course of granular sub-base or base to match the other half.

The treated shoulder of the additional width if required to meet the minimum width criteria or passing of vehicles shall be either dismantled or retained. In case of dismantling the debris disposed off or reused as directed by the Engineer.

Where the excavation of the earth is required below the existing ground level, the toe line of the embankment shall be marked on both sides of the alignment. Then excavate the earth till the bottom of proposed sub grade level on one side from existing embankment toe line. Earth work in embankment with approved material shall be taken up to the design sub grade level in the side on which the traffic is



proposed to be allowed. The type of earth and compaction requirement shall match the requirement of embankment or sub grade for which the section has been planned. Over this the same construction methodology should be adopted as mentioned above.

The work of providing earth embankment, sub-grade and granular sub-base material so carried out shall be paid under relevant items of bill of quantities. It may be ensured to provide minimum availability of width of 4.0m for plying of vehicles.

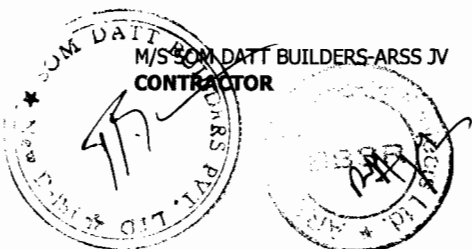
2. Passage of traffic in Hilly/Mountaneous terrain

For facilitating passage of traffic during construction, following methodology shall be followed. However the contractor may discuss any improved method with the Engineer and the client. If in the opinion of the Engineer, the arrangement suggested by the Contractor is better and shall ease the traffic movement, the same shall be adopted. But in such case the Contractor shall furnish the full traffic management plan along with the methodology of construction. The method is for general locations and any site specific arrangement shall be finalized in consultation with the Engineer.

The work shall be carried out on half-half basis. The length of widening/strengthening work on one side shall be limited to 500m at a place for which the traffic diversion shall be provided. There should be minimum 20m gap between the two successive patches. In case longer stretches are allowed, at 50 m long passing places having gradient below 4% with granular sub base with minimum width of 4.0 m shall be provided at 200m interval. If the appropriate gradient is not available, the hill side may be leveled to achieve the required gradient. Work in one stretch should not exceed 1000 m.

The proposed centerline of the alignment shall be marked. The toe line of the embankment shall be marked on both sides of the alignment. If the embankment toe line falls in the hill, cut the hill up to proposed embankment toe line till the proposed sub grade bottom level by blasting or any other means. After clearing & grubbing, benching the slope & compacting the original ground, earth work in embankment with approved material shall be taken up to the design sub grade level in the side on which the traffic is proposed to be allowed. The type of earth and compaction requirement shall match the requirement of embankment or sub grade for which the section has been planned, as this section shall be retained as part of the road section. Over this the same construction methodology should be adopted as mentioned above. Provision of drain as per drawing shall be taken up simultaneous to the construction of GSB. During such time the existing carriageway width of minimum 3.5m and one side of treated shoulder (total of 4.5 m) shall be left for plying of vehicles.

The contractor shall maintain the bypass/diversion made with the granular base material during the period of construction by way of



watering, compacting, and making good loss of material after filling up of the rutting/depression etc., by additional quantity of granular materials. The cost of maintenance, making good the loss of material, watering, compacting, leveling and dressing along with additional quantity of granular base material shall be considered as incidental to the work.

The side on which the traffic was plying till then shall be made good after rolling, leveling, dressing along with any additional material required to bring the same to the required camber or super-elevation as the case may be and compacted to achieve the desired density to receive the next course of granular sub-base or base to match the other half.

The treated shoulder of the additional width if required to meet the minimum width criteria or passing of vehicles shall be either dismantled or retained. In case of dismantling the debris disposed off or reused as directed by the Engineer.

Where the excavation of the earth is required below the existing ground level, the toe line of the embankment shall be marked on both sides of the alignment. Then excavate the earth till the bottom of proposed sub grade level on one side (hill side) from existing embankment toe line. Earth work in embankment with approved material shall be taken up to the design sub grade level in the side on which the traffic is proposed to be allowed. The type of earth and compaction requirement shall match the requirement of embankment or sub grade for which the section has been planned. Over this the same construction methodology should be adopted as mentioned above.

If the excavation is only for temporary traffic diversion, the excavation height should not be more than 1.0 m. If the excavation is more than 1.0m in depth, alternate route should be planned for traffic diversion.

The work of providing earth embankment, sub-grade and granular sub-base material so carried out shall be paid under relevant items of bill of quantities. It may be ensured to provide minimum availability of width of 4.0m for plying of vehicles.

Clause 112.3

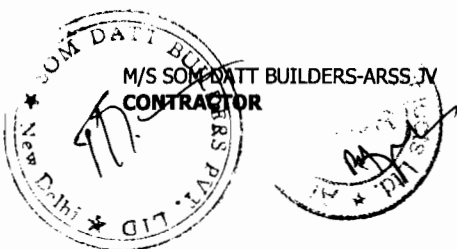
Passage of Traffic along a Temporary Diversion

Replace the clause with following

Temporary diversion to carry traffic, either at the site of cross drainage structures which are to be replaced or at any other locations, shall comply with the following:

Embankments as per clause 305. The use of fly ash in temporary diversions will not be permitted.

Pavement 5.5m wide consisting of 200mm granular sub-base as per clause 401, 225mm granular base course as per clause 404, 405 or 406 and a 20mm premix carpet with seal coat as per clause 511 or mix seal surfacing as per clause 512



Earth shoulders 2.5m wide on both side of the pavement as per clause 407

Minimum horizontal radius on curves 50m

(v) Maximum gradient 5 percent and minimum camber of 2.5 percent

Restriction of maximum speed to 30kmph

Cross drainage structures (if any) shall be adequate to deal with the water flow at all seasons at that location. Account should be taken of the waterway area and other relevant parameters of the existing and proposed replacement structures as given in the drawings. Causeways may only be overtopped and the road closed to traffic for short periods in extreme flood conditions. Adequate erosion protection must be provided.

The Contractor shall be responsible for the design of temporary diversions and submit the designs to the Engineer for his approval. If the contractor finds it necessary to construct part of any diversion outside the Right of Way the temporary use of additional land shall be arranged for by him at his expense. Any roadside trees that have to be removed for the construction of temporary diversions shall be the responsibility of the Contractor. The Contractor shall provide adequate warning signs, speed breakers, barriers, marker posts etc., as per IRC: SP 55 - 2001 as well as other stipulations given in clause 112.4 to ensure safety of the traffic, all to the approval of the Engineer. The Contractor shall be responsible for the dismantling and disposal of all temporary diversions when approved by the Engineer.

Clause 112.4

Traffic safety and Control

Add as the continuation of the first paragraph

If there is traffic jams during construction, measures shall be taken to relieve the congestion with the assistance of traffic police. Safety of workers undertaking various operations during construction will be ensured by providing helmets, masks, safety goggles etc.

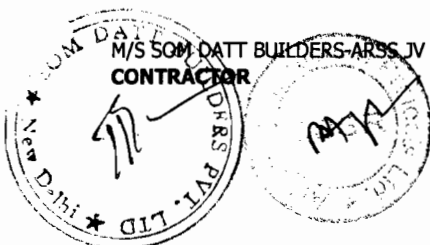
Add the following sub-clauses under 112.4

Clause 112.4.1 Side Roads and Property Accesses

At all times, the Contractor shall provide safe and convenient passage for vehicles pedestrians and livestock to and from side roads.

Clause 112.4.2 Plant and Equipment

“During the day, plant and equipment working in a position adjacent to traffic and having a projection beyond the normal width of the item, for example, a grader blade shall have a fluorescent red marker attached to the outer end of the projection. During poor light conditions



an additional traffic controller with an illuminated red marker shall direct traffic around such plant and equipment.

At night, all plant items and similar obstructions shall be removed from the normal path of vehicles, to provide a lateral clearance of at least 6m where practicable, with a minimum clearance of 1.2m.

Plant and equipment, within 6m of the normal path of vehicles, shall be lit by not less than two yellow steady lamps suspended vertically from the point of the obstruction nearest to a traffic lane, and one yellow steady lamp at each end of the obstruction on the side farthest away from the traffic lane”.

Clause 112.6 Measurements for Payments and Rate

Add below the second paragraph as follows

The contract rate also includes traffic safety and control as per clause 112.4 and maintenance of diversion of Traffic control devices as per clause 112.5. Failure to carry out the above activities, contractor shall be liable to be imposed with penalty for the first week of non-compliance report as mentioned in the contract documents. Beyond first week the same work will be carried out by third party, the cost of which is to be deducted from the contractor’s IPC in the same month.

Clause 113 General Rules for the Measurement of Works for Payment:

Clause 113.2 Measurements for Lead of Materials

Delete this Clause and replace with

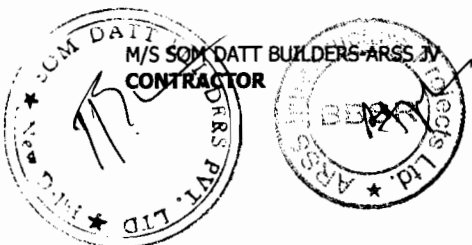
“The rates in the Bill of Quantities are deemed to include the costs of haulage from source of supply to the plant as well as to the construction site as the case may be for all materials required for the Works.”


Clause 114 Scope of Rates for Different Items of Work

Clause 114.2 Item (ii) of clause 114.2 shall read as follows

A detailed resource based construction programme (using Microsoft Project software) in a form, which facilitate control of the progress of the works and consequences of any changes in terms of time. The programme shall also include detailed network activities for the submission and approval of materials, procurement of critical materials and equipment fabrication of special products/ equipment and their installation and testing and for all activities of the Contractor that are likely to affect the progress of work etc. including updating all such activities on the basis of decisions taken at the periodic site review meetings or as directed by the Engineer. The Contractor shall submit data via electronic media to the engineer in a form approved by the Engineer.

Add the following as item (xvii) of the sub-clause 114.2




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Chief Engineer
World Bank Projects
Orissa, Bhubaneswar.

Cost of all provisions for executing the work safely including all protective clothing, barriers, earplugs, shoes ,helmets etc.

Clause 114.4

Add the following new Clause as 114.4

If any work executed by the Contractor does not meet the specifications, it shall be deemed as rejected. The Engineer, in his sole discretion, may consider a proposal by the Contractor to retain, the element or part of the structure. The Contractor's proposal shall be supported by calculations, drawings and other data to prove the soundness of the proposal and shall clearly describe the additional measures required to ensure the intended performance of the structure. Rate/ price for the rehabilitation structure shall be settle mutually between the Engineer and the Contractor and in case of failure to arrive at an agreed rate, the Engineer's decision regarding the rate shall be final and binding.

Clause 115

Methodology and Sequence of Work

The Clause shall be read as follows

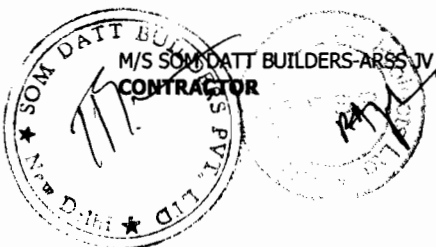
The Contractor shall submit methods statement. The methods statement shall be submitted in two parts.

The General part of the methods statement shall describe the Contractor's proposals regarding preliminary works, common facilities, and items that require consideration at the early stage of the contract. The General part shall be issued along with the first issue of the construction programme (refer clause 114.2) and shall include information on

- a) Sources of materials like coarse aggregate and fine aggregate, quantity and quality of materials available in different sources.
- b) Sources of manufactured materials like cement, steel, bitumen, emulsion, expansion joints, and bearings etc.. The contractor shall identify at least two sources for each of the items, he shall also submit samples/ test certificates of recently manufactured materials for the consideration of the Engineer.
- c) Location of site accommodation facilities, batching plant, hot mix plant, aggregate processing plant, WMM plant, field laboratory.
- d) Details of facilities/approaches for transportation of men, equipment and materials like concrete for construction of pavements, foundations and substructure in river bed.
- e) Information on procedures to be adopted by the contractor for prevention and mitigation of negative environmental impact due to construction activities.
- f) Any other information required by the Engineer subsequent to the scrutiny of method statement submitted along with the bid.

The general part of the Q.A. Programme shall accompany the methods statement.

Special parts of the methods statement shall be submitted to the Engineer by the Contractor for each important item of work like



construction of embankment and sub-grade, flexible & Rigid pavements, drain, pile foundations, concreting, repair and rehabilitation of existing structures, maintenance of project roads, diversions, concrete superstructure and for any other item as directed by the Engineer. These statements shall be submitted at least **28 days** in advance of the commencement of the activity or item of work, unless otherwise stipulated in the contract. The statement shall give information on

- i) Details of personnel both for execution and quality control of the work.
- ii) Equipment deployment with details of number of units, capacity, standby arrangements.
- iii) Sequence of construction, details of temporary or enabling work like diversions, cofferdams, formwork including specialized formwork for superstructure, details of borrow area, method of construction of embankment and sub-grade, pavements, piles, concreting procedures, details of proprietary process and products (e.g. details of proprietary pilling systems, bearings, expansion joints etc.) and details of equipment to be deployed. Wherever necessary, technical literature, design calculations and drawings shall be included in the methods statement.
- iv) Testing and acceptance procedures including documentation.
- v) Special part of the Q.A. programme referred in clause 105.3 for the particular item of work shall be submitted along with the methods statement for the concerned activity.
- vi) Engineer shall examine and approve the methods statement or direct the contractor to resubmit the statement with required modifications. The modified statement shall be submitted within **4 days** of receipt of Engineer's comments.

The sole responsibility for the safety and adequacy of the methods adopted by the contractor shall rest on the contractor irrespective of any approval given by the Engineer.

Clause 115.1

Approval of proprietary product/ process/ system

Only proprietary products proven by International usage in comparable projects shall be permitted to be used. Fully authenticated details of licensing and collaboration arrangement shall be submitted by the manufacturer, where relevant.

Within 90 days of award of work the contractor shall submit the following information for all proprietary products for approval by the Engineer.

- i) Name of manufacturer name of product/ process/ system complete details of the manufacturer of the product/ process / system shall be furnished. Details of projects where similar product/ process / system have been successfully used shall be furnished. Authenticated copies of license/ collaboration agreement shall be furnished.



- ii) General features of the product/ product process/ system
Detailed write up with methods statements shall be furnished for each product/process/ system. This shall include complete working drawings & installation drawings, technical specifications covering fabrication, materials, system of corrosion protection etc.
- iii) Details of product development and development testing
- iv) Acceptance test and criteria
Manufacturer shall submit a quality assurance system document. Details of acceptance test and criteria of acceptance shall be furnished in this document.
- v) Installation procedure& demonstration
- vi) Maintenance procedure and schedule
- vii) Warranty proposal

The Engineer may order any additional test for the purpose of accepting the product. The facility for such additional tests shall be made available by the manufacturer. The charges of these additional tests shall be borne by the Employer.

Clause 120 Site office for Engineer and other Supervisory Staff Deleted

Clause 121 Field Laboratory

Clause 121.1 Add the following at the end of the clause

This facility including its erection, running will be provided and maintained by the Contractor, as incident to work and no separate payment shall be made for this item.

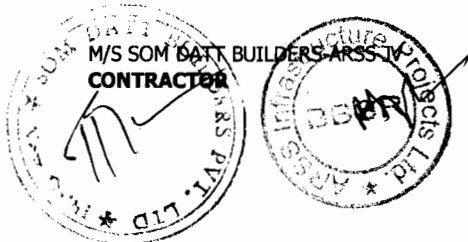
Clause 121.2 Description

Delete this Clause and replace with

“The Contractor shall construct a fully furnished and equipped field laboratory. All equipment shall conform to accepted national and international standards and shall be subject to the approval of the Engineer.

The laboratory will be located at a site approved by the Engineer and must be of adequate size to perform all the tests required under the contract including sufficient light, uninterrupted electricity and water supply etc. Office space of about 30 Sqm must be provided in the laboratory for the exclusive use of the Engineer and Employer / Employer’s representative with adequate facilities such as toilets, Air conditioners, first aid box, uninturrepted power and water supply etc. The contractor shall provide the field laboratory within one month from the date of the commencement of the work. Prior to this, the contractor must make suitable alternative arrangements for the testing of materials at his cost, which are acceptable to the Engineer.

The Contractor shall be responsible for the provision of adequately experienced and qualified laboratory staff, in sufficient numbers to be able to meet all testing requirements to the approval of the Engineer, and for the supply of all transportation of staff, testing equipment and



sample necessary to allow the testing to be performed in a time scale compatible with the needs of the Site.

Contractor shall arrange to maintain the laboratory in satisfactory manner and will carry stocks of spare equipment and laboratory consumables until the issue of Taking Over Certificate.

Clause 121.3

Laboratory Equipment

This Clause shall read as under

“The following items of laboratory equipment procured from reputed manufacturers duly approved by the Engineer shall be provided in the field laboratory.”

Laboratory equipment shall be provided by the Contractor for laboratory, sufficient to carry out all the field and site quality acceptance testing required in the Specifications. It shall include the following:

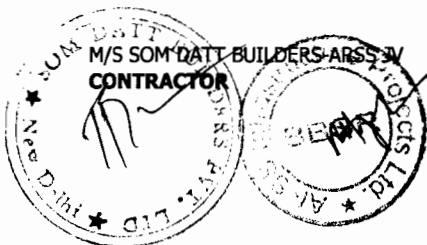
A.

General

i)

Balance

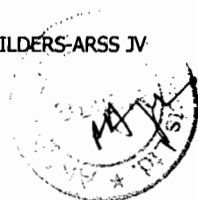
- | | | |
|------|---|--------|
| a) | 10 kg capacity semi-self indicating type – Accuracy 1 gm | |
| | ELECTRONIC | 1 No. |
| | MECHANICAL | 1 No. |
| b) | 500 gm capacity – Accuracy 0.01 gm | |
| | ELECTRONIC | 1 No. |
| | Mechanical (semi-self indicating) | 1 No. |
| c) | Chemical balance (electronic) 100 gm capacity | |
| | Accuracy 0.001 gm | 1 No. |
| d) | Pan balance 5 kg capacity Accuracy 0.5 gm. | 3 Nos. |
| e) | Platform scale – 300 kg capacity | 1 No. |
| f) | Triple beam balance – 25 kg capacity Accuracy 1 gm | 2 Nos. |
| ii) | Oven-electrically operated, thermostatically controlled (including thermometer), stainless steel interior | |
| a) | Temperature range ambient to 300° C, Sensitivity 1° C, capacity 120 Litre. | 1 No. |
| b) | Temperature range, ambient to 150° C, sensitivity 1° C, capacity 250 Litre. | 1 No. |
| iii) | Sieves : As per IS 460:1962 | |
| a) | Test sieve of G.I 450mm internal dia. as per IS complete with lid and pan of hole sizes 75mm, 63mm, 53mm, 37.5mm, 26.5mm, 13.2mm, 9.5mm, 6.7mm, and 4.75mm. | 2 Sets |
| b) | Test sieve set 200mm internal dia (brass frame and steel/or brass wire cloth mesh) as per IS complete with lid and pan of aperture sizes 2.36mm, 2mm, 1.18mm, 600micron, 425micron, 300micron, 150micron ,90 micron and 75micron. | 2 Sets |
| iv) | Sieve shaker capable of taking 200mm and 450mm dia sieves-electrically operated with time switch assembly | 1 No. |
| v) | 200 tonnes compression testing machine electric cum manually operated | 2 Nos. |
| vi) | Stop watches 1/5 sec. accuracy | 2 Nos. |



vii)	Glassware comprising beakers, pipettes, dishes, measuring cylinders (100 to 1000cc capacity) glass rods and funnels, glass thermometers range 0° C to 100° C and metallic thermometers range upto 300° C.	1 Doz Each
viii)	Hot plates 200mm dia (1500 watt.)	6 Nos.
ix)	Enamel trays	
	a) 600mm x 450mm x 50mm	6 Nos.
	b) 450mm x 300mm x 40mm	6 Nos.
	c) 300mm x 250mm x 40mm	6 Nos.
	d) Circular plates of 250mm dia	6 Nos.
x)	Water still, 3litre/hr. with fittings and accessories	1 Set
xi)	Aluminium Tins	
	a) 50mm x 30mm	36 Nos.
	b) 55mm x 35mm	36 Nos.
	c) 70mm x 45mm	36 Nos.
	d) 70mm x 50mm	36 Nos.
	e) 80mm x 50mm	36 Nos.
xii)	Riffle box of slot size 50mm	1 No.
xiii)	Spatula set of 100 and 200 long	3 Sets
xiv)	Water testing kit	1 Set
xv)	Chemicals solutions and consumable	As reqd.
xvi)	Chloride Testing kit for chemical analysis of chloride content	1 No.
xvii)	ION Exchange kit for rapid determination of sulphate content	1 No.
xviii)	First aid box	1 Set

B. For Soils and Aggregates

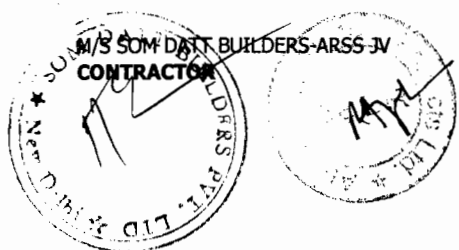
i)	Liquid limit and plastic limit	
	a) Liquid limit device with Casagrande and grooving tools and as per IS – 2720	2 Nos.
	b) Single point LL device	1 No.
	c) Moisture content cans	50 Nos.
	d) Ground glass plate with rounded edges 600mm x 600mm x 10mm	2 Nos.
ii)	Hydrometer analysis	
	a) High speed stirrer with stainless still beaker	1 No.
	b) Soil hydrometer set including jar	1 Set
iii)	Sampling pipettes fitted with pressure and suction inlets, 10ml. Capacity	1 Set
iv)	Laboratories compaction	
	a) Compaction apparatus (Proctor) complete with collar, base plate & 2.5kg rammer	2 Nos.
	b) Compaction apparatus (heavy) complete with collar, base plate and 4.5kg rammer	3 Nos.
v)	Sand pouring cylinder (150mm) with conical funnel and top and base plate (with 152mm dia of sand cone)	4 Sets
vi)	Sampling tins with lids 100mm dia x 75mm ht. 1/2kg capacity	30 Nos.



vii)	Laboratory C.B.R. testing equipment to the requirements of IS and consisting of following :	1 Set
a)	Floor mounted electro-mechanical load frame 5 tonne capacity with automatic strain control	1 No.
b)	CBR moulds complete with collar, base plate, etc.	18 Nos.
c)	Swell stands for holding dial gauge	9 Nos.
d)	CBR plunger with penetration dial gauge holder	1 No.
e)	Surcharge weight with central hole of 2 kg. weight	40 Nos.
f)	Spacer disc with handle	2 Nos.
g)	Perforated brass swell plate with adjustable cap on handle	18 Nos.
h)	Soaking tank for accommodating 9 CBR moulds	1 No.
i)	High tensile steel calibrated proving rings of 1000 kg. 2500 kg and 5000 kg capacity	1 Set
j)	Dial gauge, 25mm travel-0.01mm/division	12 Nos.
x)	Nuclear gauge for density and moisture content determination	1 Set
xii)	Speedy moisture tester complete with carrying case and supply of reagent	2 Nos.
xiii)	Sand equivalent apparatus complete along with chemicals to the requirements of IS	1 Set
xiv)	Reagent grade Sodium Sulphate for soundness test of aggregate chemical Sodium Sulphate	30 kgs.
xvii)	Core cutter apparatus 10cm dia. 10/15cum length height complete with 20kg hammer	1 Set
xix)	Standard measures of 30, 15, 3 litre capacity along with tamping rod	1 Set
xx)	Unconfined compression test apparatus	1 Set
xxi)	Flakiness index test apparatus	1 No.
xxii)	Elongation index test apparatus	1 No.
xxiii)	Aggregate crushing value / impact test apparatus	1 No.
xxiv)	Los-Angeles abrasion apparatus as per IS 2386 (Part 4) 1963	1 No
xxv)	Standard Penetration equipment	1 No

C. For Bitumen and Bituminous Mixes

i)	Constant temperature water bath for accommodating bitumen test specimen, electrically operated, and thermostatically controlled, stainless steel interior, temperature range ambient to 80° C	1 No.
ii)	Bitumen penetrometer automatic type, including adjustable weight arrangement, and needles	1 Set
iii)	Centrifugal type motorized bitumen extraction apparatus with stock of solvent & filter papers	1 Set
iv)	Bitumen laboratory mixer planetary action, 2 litre capacity, including required accessories electrically operated and fitted with heating jacket	1 No.
v)	Marshall compaction apparatus and complete with electrically operated automatic loading unit, compaction pedestal, heating unit, head breaking assembly, flow meter, load transfer bar, specimen moulds 100mm dia	1 Set



with base plate, collars, specimen extractor, compaction hammer 4.53kg x 457mm fall, (excluding constant temperature bath)

- vi) Digital type thermometer reading 0-300° C range, accuracy 2° C 2 Nos.
- viii) Ring and Ball Apparatus as per IS 1205 - 1978 1 Set
- x) Tar Viscometer IS 1206 (Part III) – 1978 1 Set
- xi) Apparatus for Determination of Ductility Test as per IS 1208 – 1978 1 Set
- xii) Pen Sky – Marten closed Tester for testing flash and fire point as per IS 1209 – 1978 1 Set
- xv) Apparatus for Determination of Loss on Heating IS-1212-1978 1 Set
- xvi) Apparatus of Determination of specific Gravity IS-1202-1978 1 Set
- xv) Automated Asphalt content gauge (Nuclear or equivalent) 1 Set

D. For control of profile and surface evenness

- iii) Towed Fifth Wheel Bump Integrator 1 No.
- iv) Camber templates 3-lane straight run cross-section 4 Sets.

E. For Cement, Cement Concrete and other Materials

- i) Vicat needle apparatus for setting time with plungers, as per IS-269-1968 1Set
- ii) Moulds
 - a) 150 mm x 300 mm ht. Cylinder with capping component along with the capping set and compound as per IS 48 Nos.
 - b) Cube 150 mm, moulds and 100 mm (each size) as per IS 36 Nos.
 - c) Beams 750 mm x 150 mm x 150 mm moulds 18 Nos.
- iii) High frequency mortar cube vibrator for cement testing 1 No.
- iv) Concrete mixer power driven, 1 cu. ft. capacity 1 No.
- v) Variable frequency and amplitude vibrating table as per the relevant IS 1 No.
- vi) Equipment for slump test /compacting factor Apparatus complete 4 Nos.
- vii) Equipment for determination of specific gravity for fine and coarse aggregate as per IS 2386 (Part 3) 1963 4 Nos.
- viii) Flexural attachment to compression testing machine. 1 Nos.
- ix) Core cutting machine with 10cm dia diamond cutting tool 1 No.



- | | | |
|-------|--|-------|
| x) | Needle vibrator | 1 No. |
| xi) | Air entrainment meter | 1 No. |
| xii) | Le-Chatelier apparatus for Soundness testing of cement | 1 Set |
| xiii) | Blain Air Permeability apparatus | 1 No. |

All equipments shall conform to accepted National/ International standards and shall be subject to the approval of the Engineer.

Full complement of listed equipment procured from an internationally reputed manufacturer, after procurement and approval of Engineer shall be incidental to the work and no payment shall be made to the Contractor.

Clause 121.3.5

Add New Sub-Clause:

For Control of Profile and Surface Evenness

- | | | |
|------|--|-------------|
| i) | Theodolite | 2 sets |
| ii) | Total Station | 2 sets |
| iii) | Precision automatic level | 4 sets |
| iv) | Precision staff | 4 sets |
| iv) | Camber templates full width and half width | |
| | a) Crown type cross-section | 4 sets each |
| | b) Straight run cross-section | 4 sets each |
| | Invar /Steel Tape a) 3 m long | 4 sets |
| | b) 5 m | 4 sets |
| | c) 10 m | 4 sets |
| | d) 20 m | 4 sets |
| | e) 30m | 4 sets |
| | f) 50m | 4 sets |

Clause 121.3.6

Add New Sub-Clause:

In addition to clause 121.3, any equipment which is not mentioned in this clause but which is necessary for the work for complying with the provisions of the contract and Section 900 of MORTH specifications or as required by the engineer shall be provided by the contractor. No extra payment shall be made to the contractor and it will be considered as incidental to the work.

Clause 121.6

Deleted.

Clause 121.7

Substitute this Sub-Clause by the following:

“There is no separate item in the Bill of Quantities for establishing and maintenance of the laboratory and supply, erection maintenance of equipment and also running cost of testing. The rates quoted for the



items in the BOQ by the Contractor shall be deemed to cover the cost of all these items.”

Clause 122 Deleted

Clause 124 Deleted

Clause 125.2 **Replace the last but one line with :**

The contractor shall supply the digital form of the printed photographs clearly recorded in compact CD.

Clause 125.3 **Replace the first para as :**

Supply of two copies of colour record photographs mounted in the albums and the digital form of the printed photographs recorded in a CD shall be measured in number of record photographs supplied.

Clause 125.4 **Replace the 1st line of the last para**

The photographs and materials including digital version in CD shall form a part

Clause 126.1 **Replace the last line of the 1st para**

The video films in form of DVD shall be of acceptable quality and the file shall be capable of producing colour pictures.

Clause 126.2 **Replace this para with :**

The measurement shall be by number of sets of edited master DVD each with four copies thereof.

Clause 126.3 **Replace the word Cassette with DVD**

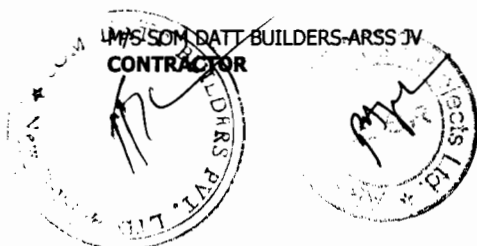
SECTION 200 SITE CLEARANCE

Clause 201 **Clearing and Grubbing**

Clause 201.1 **Scope**

Replace with following para

This work shall consist of cutting removing and disposing of all materials such as trees of girth up to 300 mm bushes shrubs stumps, roots, grass weeds etc. and top soil 150mm minimum thickness rubbish etc. which in the opinion of Engineer is unsuitable for incorporation in the work including draining out stagnant water if any from the area of road land, drain, cross drainage structure and other area as specified in the drawing by Engineer. It shall include necessary excavation by harrow discs or any other suitable equipment back filling of the pits, by suitable soil, resulting from uprooting of trees & stumps and making the surface in proper grade by suitable equipment and compacted by power roller to required compaction as per Clause 300. The work also includes handling salvaging and disposable of cleared material. Clearing ad grubbing shall be performed less than one month in advance of earthworks operation and in accordance with requirement



of these specification. Areas requiring cleaning and grubbing shall be determined by the Engineer.

Clause 201.5 Measurements for Payment

Add at the end of first para

“Cutting including removal of foundation of sign boards, hoarding boards, concrete posts, km stones etc. and back filling of pits shall be considered incidental to the clearing and grubbing operations”

Add the following paragraph:

“The removal from site and disposal of all materials obtained from clearing and grubbing operations, which in the opinion of the engineer cannot be used or auctioned shall be included in the Contract unit rate”.

Clause 201.6 Rates

Clause 201.6.1 Replace the second sentence as follows

These will also include removal of stumps of trees of any girth left after cutting of trees carried out by any agency, removal of sign boards, hoarding boards, concrete post, km stones including their foundation, excavation and back filling to required density, where necessary and handling, salvaging and piling and disposing of the cleared materials with all lifts and up to all lead.

Clause 202.1 Add at the end of this clause

Water shall be sprayed to reduce dust while dismantling work is in progress. Dismantling work shall not be carried out at night, during storms or heavy rain.

Goggles and gas masks shall be worn at the time of dismantling
Leather gloves shall be worn by the workers. Screens made of G.I. sheets shall be placed wherever necessary to prevent the flying pieces from injuring the workers.

Damage caused to any component of the bridge structure during removal operations shall be restored by the Contractor at his cost. The service lines, if any, shall be disconnected/ diverted before dismantling work commences.

Clause 202.5 Disposal of Materials

Add the following as the last para

“The material may be disposed of at the nearest tip or other approved location in accordance with all statutory requirements. The Engineer may permit the disposal of boulders, concrete fragments and other incombustible materials by burial within the road reserve, outside paved area. When buried, the tops of these materials shall not be less than 300mm below finished surface level.”

Clause 202.7 Rates

Add the following at the end of the para



“The cost of cartage of materials with no salvage value to disposal sites with all leads is deemed to be included in the rates for dismantling.”

SECTION 300 EARTH WORK, EROSION CONTROL AND DRAINAGE

Clause 301 Excavation for Roadway and Drains

Clause 301.3.7 This clause shall be read as under:

“In works involving widening of existing pavements or providing paved shoulders the existing shoulder/verge/ median shall be removed to its full width. The sub-grade material within 0.2m deep from the lowest part of the pavement for widened portion or paved shoulders shall be loosened and re-compacted as per Clause 305 to a density not less than 97% of maximum dry density determined according to IS: 2720 (Part 8). Any unsuitable material encountered in this portion of subgrade shall be removed and replaced with suitable material and compacted in accordance with Clause 305”.

Clause 301.3.11 Disposal of excavated materials

Replace the last para

Unsuitable and Surplus material which in the opinion of the Engineer cannot be used in the works, shall be removed from site by the Contractor and disposed of at the nearest pit or other approved disposal location with all lead and lifts in accordance with all statutory requirements.”

Clause 301.8 Delete item (v) of last para and replace with:

(v) Disposal of surplus material with all lead and lifts ...cum’

Clause 301.9 Rates

Clause 301.9.2 This Clause shall read as under

“The Contractor unit rate for loosening and re-compacting at sub-grade level shall include full compensation for loosening to the specified depth, removing the loosened soil outside the roadway excavation, rolling the surface below, breaking the clods, spreading the excavated soil in layers watering where necessary and compacting to the requirements.”

Clause 305 Embankment Construction

Clause 305.2 Materials and General Requirements

Clause 305.2.1 Physical requirements

Clause 305.2.1.1 The first sentence of this Clause shall be read as under

The materials used in embankments, sub-grades, earthen shoulders and miscellaneous backfills shall be soil, moorum, gravel, sand, a mixture of these or any other material as approved by the Engineer and in the embankment fly ash modified soil may also be used conforming to requirement in accordance with additional Technical Specification “A-4: EMBANKMENT CONSTRUCTION WITH FLY ASH MODIFIED



SOIL” enclosed hereof and as per IRC-SP:58-2001 as per the directions of Engineer.

Clause 305.2.1.4 Delete the second & third sentence of the clause.

Clause 305.2.1.5 Add the following at the end of first sentence

The material to be used in sub-grade should satisfy the requirement of 4 day soaked design CBR ,when tested as per IS: 2720 (Part 16) at 97% of maximum laboratory dry density (IS:2720-Part 8).

Clause 305.2.2.2 Borrow materials

The first Para graph of this clause shall be read as under

“No borrow area shall be made available by the Employer for this work and Borrow pits along the road and with in the Right of Way (ROW) is prohibited. The arrangement for the source of supply of the material for embankment meeting the prescribed specifications as well as compliance to the different environmental requirements in respect of excavation and borrow areas as stipulated from time to time by the Ministry of Environment and Forest, Government of India and the local bodies, as applicable shall be the sole responsibility of the Contractor.”

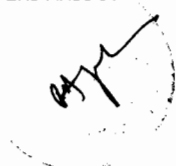
Add after the second para

The top soil of the borrow area selected by the contractor shall be removed and preserved. Care shall be taken not to create any low lying area; if any borrow pit is created, the same shall be filled up with pond/flyash/inertslag covered with 0.5m thick soil wherever technically feasible. In all cases the top soil shall be placed over the borrow area and watered for three days. No part of the borrow area shall be left uncovered to expose scar marks. The Table 300-2 shall be read as under

Table 300-2: Compaction requirements for embankment and sub-grade

Sl. No.	Type of Work/Material	Relative compaction as % of max. laboratory dry density as per Is: 2720 (Part 8)
1.	Sub-grade and earthen shoulders	Not less than 97
2.	Embankment	
	a) Up to 6m height	Not less than 95
	b) High embankment (exceeding 6m height)	Not less than 97
3.	Expansive clays (DFS <50%)	
	a)Subgrade and 500mm portion just below the subgrade	Not allowed
	b)Remaining portion of the Embankment	Not less than 90

Para 8 of this clause given below Table 300-2 shall read as under



“the contractor shall, at least 7 working days before commencement of compaction, submit the following to the Engineer for approval:

- (i) The values of maximum dry density and optimum moisture content obtained in accordance with IS: 2720 (Part 8) for each fill materials he intends to use.
- (ii) The graphs showing values of density against moisture content from which each of the values in (i) above of the maximum dry density and optimum moisture content were determined.
- (iii) The dry density –moisture content –CBR relationships for heavy compactive efforts corresponding to IS: 2720 (Part 8) for each of the fill materials he intends to use in the sub-grade,”

Clause 305.4.3 Earth work over existing road surface

Add at the end as (iv)

(iv) Where the existing bituminous layer to be scarified, the scarification shall be done by using suitable equipment as per direction of Engineer.

Dismantled materials shall be re-used in the new pavements if it conforms to the specifications requirements. The following uses of dismantled materials are suggested.

1. The surplus materials, reclaimed from the existing bituminous layer may be used in the sub-grade of service road, intersection and junctions after breaking in to pieces of less than 75mm particle size and as directed by the Engineer. If directed by the Engineer the material shall be mixed with materials brought from borrow area. Compaction shall be carried out to the requirements of clause 305.3.6.
2. The dismantled bituminous material may be used as fill in the earthen shoulder; diversion roads and intersections/ junction of feeder roads provided the material conforms to the relevant clauses of earthwork.

Clause 305.4.4 Embankment and Sub-grade around structures.

Para-3 delete the last line and substitute it with

“compacted thoroughly to 98% MDD”.

Clause 305.4.6 Embankment construction under water.


Insert the following as the second para

At locations where water table is high and the soil has potential for rapid and relatively great migration of moisture by capillarity, provision of sand blanket of 100mm thickness of approved grain size shall be provided at a level of 200 mm below bottom of subgrade by way of cut off extending across the full width of the embankment so that the same will act as an effective capillary cut off as per IRC:34

Clause 305.4.7 Earth work for High embankment
The second para shall be read as follows



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Chief Engineer
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Orissa, Bhubaneswar.

To ensure stability during construction, it is necessary to control rate of construction especially in both side approaches of ROB's and Bridges which is achieved by stage construction i.e. each period of construction activity is followed by a period of inactive period. The embankment foundation shall be prepared and a drainage layer provided. No embankment work shall proceed until the foundation have been inspected by the Engineer-in-Charge and approved. In the first month the total height of construction should be limited to maximum 6.0metre only. The balance embankment construction should be done after a rest period of two months for strength gain and consolidation. The rest period need not be given in case the construction of initial 6-metre height of embankment takes more than 4 months time. However, based on the available subsoil data the contractor may suggest his loading schedule or any other method to take care of the excessive settlement problem for approval of the engineer.

Clause 305.9.1 Add "including removal of top soil" after word "materials" appearing in first line of item (v).

Clause 306 Soil Erosion and Sedimentation Control

Clause 306.4 Measurement for payment

Substitute Clause 306.4 as follows

" All temporary sedimentation and pollution control works shall be deemed as incidental to the earthwork and other items of work and as such no separate payment shall be made for the same."

Clause 306.5 Rates

This Clause shall be deleted

SECTION 400 SUB-BASES, BASES (NON-BITUMINOUS) AND SHOULDERS

Clause 401 GRANULAR SUB-BASE

Clause 401.2 Materials

Clause 401.2.1 Replace the last line of second para as

The grading for this project to be adopted is grading I for Coarse Graded Granular Sub-Base(naturally occurring) as per Table 400-2 with minimum Soaked CBR value of 30%.

Clause 402.2.3 Replace the first line of this para as below:

Quantity of lime to be added @4% to 5% by weight of the dry soil or should be determined in accordance to IRC:51 and as approved by the Engineer. The other important governing factors to be considered for stabilization of expansive soil by lime should be determined as per IRC:51 and as approved by Engineer.

Clause 406. WET MIX MACADAM SUB-BASE/BASE

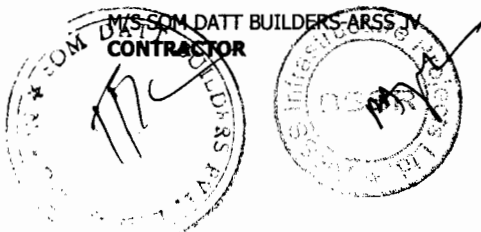
Clause 406.2. MATERIALS

Clause 406.2.1 Aggregate

Clause 406.2.1.1 Physical requirements:

Add at the end of first paragraph

The fraction of materials passing through 4.75 mm sieve shall be crusher run screening only. The river sand or quarry sand shall not be permitted either as such or mixed with crusher-run-screening in the Wet Mix Macadam.



Add the following at the end of the paragraph:

Soundness test shall be carried out in accordance with IS : 2386 (Part- 5). The average loss of weight of coarse aggregate after 5 cycles shall not exceed 12% when tested with sodium sulphate and 18% when tested with magnesium sulphate as specified in IS: 383.

Clause 406.3. CONSTRUCTION OPERATIONS

Clause 406.3.1. Preparation of base

404.3.1 shall be applicable by replacing the work "Water Bound Macadam" by "Wet Mix Macadam".

Clause 406.3.3 Replace first para with :

Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced/positive mixing arrangement like pugmill.

Add the following at end of 2nd para

Unless otherwise instructed by the Engineer , the moisture content at the time of compaction shall be between 80% and 120% of the optimum moisture content

Clause 406.3.5. Delete second sentence of first para.

Substitute para 7 of this clause as follows :

Rolling shall be continued till the density achieved over the full thickness of the material laid is at least 98% of the maximum dry density as determined by the method outlined in I.S.:2720(part 8) and satisfies the requirements of Sub Clause 903.3.

Clause 407 SHOULDERS, ISLANDS AND MEDIAN

Clause 407.2 Materials

Add after first para as follows

The hard shoulder shall consists of minimum 150mm thick granular/ moorum layer having liquid limit less than 25% and PI between 3% to 6%.

Replace second para with :

Median/Traffic islands shall be raised and kerbed at the perimeter and the enclosed area filled with agriculture soil and suitably covered with grass turf/shrubs as per clause 307 and/or paved as per clause 409.3.4 or 409.3.5.

Clause 407.4 Construction Operations

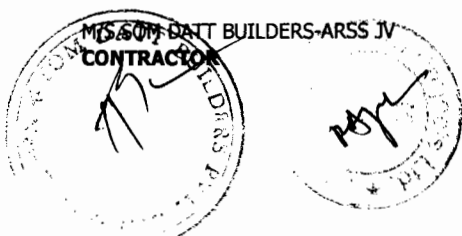
Clause 407.4.1 Shoulder

Add as follows after para 4

The hard shoulder shall be compacted not less than 98% of maximum laboratory dry density as per IS:2720 (Part-8).

Clause 502 PRIME COAT OVER GRANULAR BASE

Clause 502.1 Scope



Add the clause as follows

The work shall consist of Priming (spraying) of liquid bituminous materials on the surface of non-bituminous granular base course. Prime coat is not to be regarded as a substitute for tack coat, the objective of which is to ensure a proper bond between the surface being paved and the new bituminous course being placed over it.

CLAUSE 502.2

MATERIALS

Replace the clause as follows

The bituminous material to be used as primer should be such that it can penetrate deep into base course (about 10mm depth) to perform its intended function in environment friendly manner.

Cationic bitumen emulsion SS-1 grade conforming to IS:8887 shall be used as primer. The quantity of bitumen emulsion for WMM/WBM types of surfaces shall be 0.7-1.0 Kg/m².

The correct quantity of primer will be the maximum amount that can be absorbed by the surface without causing run-off of excessive primer (some times referred as "finger" to form at the lower edges of the primed area) and is to be decided by the supervising engineer at the site.

Clause 502.3

Weather and Seasonal limitations

Replace the clause as follows

Bitumen emulsion grade SS-1 as well as Cutback Bitumen as Primer shall not be applied on wet surface. The moisture content in the surface to be primed shall not exceed 3.5%. Primer shall not be applied during dust storm, rainy, foggy or windy weather. The ambient temperature during priming by bitumen emulsion should be above 10⁰C.

Clause 502.4

Construction

CLAUSE 502.4.1

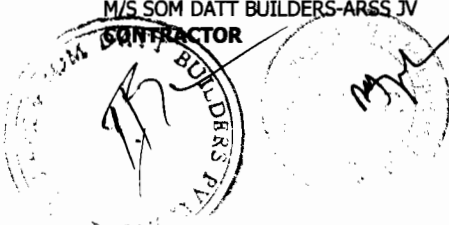
EQUIPMENT

Replace the clause as follows

All equipment required for execution of priming work shall be in good working condition at site. The primer distributor shall be a self propelled or towed bitumen pressure sprayer equipped for spraying the material uniformly at specified rates and temperature. Hand spraying of small areas using pressure hand sprayer may be permitted at specific strategic locations, where distributor is not accessible or if narrow strips of granular surface are to be primed. Pouring of Primer using perforated can should not be permitted. SS-1 grade bitumen emulsion stored at site in the tank shall have arrangement like circulation pump to ensure its proper mixing before withdrawal from tank and transfer to browser.

CLAUSE 502.4.2

PREPARATION OF ROAD SURFACE



Replace the clause as follows

The base course surface to be primed shall be swept clean and made free from dust. All loose material and other foreign material on the surface shall be removed completely. Power brooms or mechanical sweepers may be used for cleaning of surface. The surface to be primed (whether with SS-1 emulsion or cutback bitumen) should be kept dry. If Soil /Moorum binder has been used in the WBM surface, part of this should be brushed and removed up to a depth of 2mm so as to provide good bond.

The dilution of SS-1 bitumen emulsion is not permitted.

CLAUSE 502.4.3 APPLICATION OF PRIMER

Replace the clause as follows

After the base to be primed has been prepared as in section 502.4.2, the primer shall be uniformly applied using the appropriate equipment at application rate. The spraying should preferably be carried out using pressure sprayer or distributor. The quantity of primer shall be checked periodically using tray coating test. The method of application of primer will also depend on the type of equipment to be used, size of nozzles, pressure at spray bar and speed of the forward movement of vehicle. A trial section shall be laid to check the efficacy of equipment and penetration depth of the primer.

TEMPERATURE OF APPLICATION OF PRIMER

No heating of SS-1 Bitumen Emulsion is permitted at site.

In case of cutback bitumen, temperature of application of primer should be high enough to permit the prime to be sprayed effectively through the jets of the spray bar and to cover the base course surface effectively. The temperature of product at the time of application should be more than 10⁰C.

Clause 502.4.4 Curing of Primer and opening for traffic

Replace the clause as follows

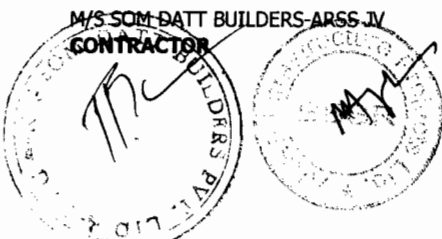
The primed surface shall be allowed to cure for at least 24 hours or such other period as is found to be necessary to allow all the volatiles to evaporate before any subsequent surface treatment or mix is laid. Excessive and unabsorbed primer if any shall be blotted with an application of sand using the minimum quantity possible. A primed surface shall not be opened for traffic other than that necessary to lay the next bituminous course.

Clause 503 Tack Coat

Clause 503.1 Scope

Replace the clause as follows

The work shall consist of a very light application of liquid bituminous material to an existing bituminous, cement concrete or primed granular



surface to ensure a bond between the surface being paved and the overlaying course. The tack coat material is not expected to penetrate into pavement and for this reason; the applications should be very light to provide adequate bond strength between two layers.

CLAUSE 503.2 MATERIALS

Replace the clause as follows

The binder used for tack coat shall be Cationic Bitumen Emulsion RS-1 conforming to IS 8887.

Clause 503.3 Weather and Seasonal Limitations

Replace the clause as follows

Bituminous material shall not be applied during a dust storm or when the weather is foggy, rainy or windy or when the ambient temperature is less than 10⁰C.

The surface should be totally dry. However, when using bitumen emulsion as tack coat, the surface should be slightly damp, but not wet.

Clause 503.4. Construction

CLAUSE 503.4.3. APPLICATION OF TACK COAT

Add the following after the end of para:

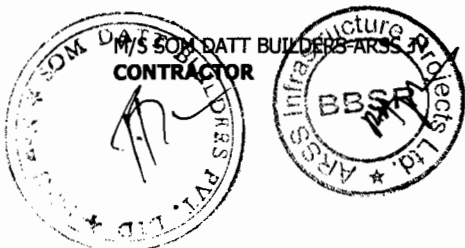
Heating and dilution of RS-1 Bitumen Emulsion is not permitted.


Table as mentioned below will replace table 500-2:

TABLE : RATE OF APPLICATION OF TACK COAT

Type of surface	Quantity of liquid bituminous material in Kg per sq. m. area
i)Normal Bituminous surfaces	0.20 to 0.30
ii)Dry and Hungry bituminous surfaces	0.25 to 0.35
iii)Granular surfaces treated with primer	0.25 to 0.35
iv)Non bituminous surfaces	0.30 to 0.40
a. Granular base (not primed)	0.30 to 0.35
b. Cement concrete pavement	

CLAUSE 503.4.4 CURING THE TACK COAT




Chief Engineer
 World Bank Projects, Orissa
 Chief Engineer
EMPLOYER
 World Bank Project
 O/o the E.P.C. (Civil)
 Orissa, Bhubaneswar.

Replace the clause as follows

After application of the Emulsion as tack coat, allow the bitumen emulsion to break i.e. turn black before placing the bituminous mixture or overlay. Traffic should be kept off of the area where tack coat is being sprayed. No Plant or vehicles shall be allowed on the tack coat other than those essential for construction.

Clause 503.8

Rate

Replace 0.2 kg /m². with 0.30 kg/m² in fourth line.

Clause 509.1

Add the following after 2nd line of this para.

Where modified bitumen is specified to be used as a binder shall have a softening point not less than 60⁰ C & specification as prescribed in IRC SP 2002 Cl.7 for CRMB or PMB as approved by the Engineer. "Modified bitumen shall be product from the refinery".

Clause 509.2.5

In **Table 500.18**, for grading 2 ,for 13mm nominal size aggregate, the cumulative % by weight of total aggregate passing against 13.2 sieve will be 90-100 instead of 79-100 .

Clause 509.3

Mixture Design

Clause 509.3.1

The requirements set out in table **500-19** will be replaced by table **500-11(A) & 500-11(B)**.

SECTION 600

CONCRETE PAVEMENTS

Clause 601

Dry Lean Cement Concrete sub-base

Clause 601.1

Scope

Clause 601.1.1

The para will be replaced as follows:

The work shall consist of construction of dry lean concrete sub base for cement concrete pavement in accordance with the requirements of these Specifications as well as of IRC:15 and in conformity with the lines, grades and cross-sections shown on the drawings or as directed by the Engineer. The work shall include furnishing of all plant and equipment, materials and labour and performing all operations, in connection with the work, as approved by the Engineer.

Clause 601.5.

Construction

Clause 601.5.2

Batching and Mixing

Add as new sub-clause

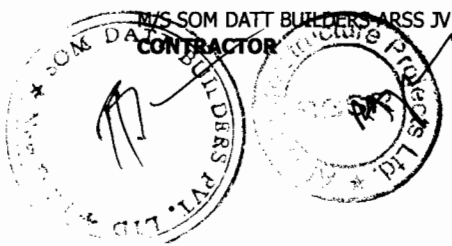
Clause 601.5.2.1

Semi-Mechanised and Labour-Oriented Construction Technique

Clause 601.5.2.1.1

General

Use of very sophisticated paving machines and high capacity concrete batch mixer is not possible in small concrete road projects and also in remote hilly terrains. But with the use of such machineries and plants the end product is always of better quality. Without these advanced equipments concrete roads can be constructed using semi-mechanized and labour-intensive constructions but the resulting quality and surface may not be the same as achieved with mechanized constructions.



Clause 601.5.2.1.2: Forms:

The fixed-forms made of steel channels or fabricated steel sections are generally made use of.

Clause 601.5.3.1 Semi-mechanized method of construction:

Clause 601.5.3.1.1 Hauling of mix (New Clause)

Transporting of concrete mix from mixer to paving site with steel pans should be avoided. The mix tends to get segregated during such handling. It is desirable to use wheel-barrows or trolleys for carrying mix to the paving site. The workability of the mix can be controlled better with the use of wheel-barrows.

Clause 601.5.3.1.2. Plants, equipments and tools:

The plants and equipments considered essential even in semi-mechanized and labour-oriented constructions are:

A couple of tilting type drums mixers of at least 0.2 cum capacity. The number of mixers to be employed in a project shall be decided on the basis of the size of the project. Vibratory or smooth wheeled roller of 8-10t capacity Fixed side forms measuring at least 100-150 m length. Stop-end and start-end made of steel or wooden sections.

Clause 602. CEMENT CONCRETE PAVEMENT

Clause 602.2.4.3

Add as last paragraph

Although IS:383 permits the fines passing 75 microns up to 15 per cent, this provision should be used only when crushed stone dust is used as fine aggregate and when the mix produced in the Laboratory and the field is satisfactory in all respects and complies with the requirement of Specification.

Clause 602.2.6

Mild Steel Bars for dowels and tie bars

Add to the end of paragraph

“The steel shall be coated with epoxy paint for protection against corrosion.”

Clause 602.2.8.

Joint sealing Compound:

Add at the end of para as follows

and IS: 11433.(Refer Appendix –C of IRC:15 for specifications of sealing compound)

Clause 602.3.4

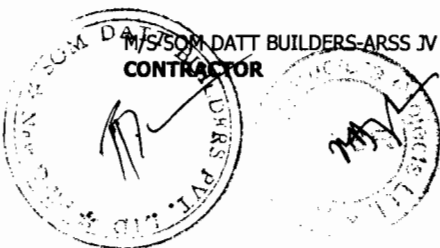
Workability

Clause 602.3.4.2

Add after fourth sentence of the clause

The slump of concrete mix for pavements compacted in manual construction using needle vibrators for compaction, the slump shall not be more than 40 mm.

Add as last paragraph



In case the concrete is to be carried for long distances, liquid plasticiser shall be used having slight retardation effect. The plasticisers conforming to IS: 9103- 1999 are generally desirable for road works. The quantity of admixtures shall be determined by trials.

Clause 602.4

Sub-base

Replace the 602.4 clause as follows

Clause 602.4.1

Sub-base provided under the concrete slabs shall be of two layers consisting of upper sub-base of dry Lean Concrete as specified under clause 601 and lower sub-base as specified under clause 401 constructed in accordance with the respective specification and the surface finished to the required lines, levels and cross-section. The Concrete pavement shall mostly be undertaken in urban area and if the sub-grade in the widening portion consists of heavy clay (L.L.>50 and/or DFS >50), such as, black cotton soil, the sub-base should be laid over a 22.5 cm thick blanket course consisting of local sand. The sub-base or blanket course, as the case may be, shall be laid over a properly compacted sub-grade to give uniform support. The blanket course of sand shall not be provided at the edges but should be replaced with suitable filter of graded granular material.

Clause 602.4.2

The sub-base shall be in a moist condition at the time the concrete is placed. There shall, however, be no pools of water or soft patches formed on the sub-base surface. In case where a sand layer is placed between the sub-base and pavement concrete, a layer of water-proof paper shall be laid over the sand layer. No moistening of the sub-base shall be done in this case.

Clause 602.4.3

If the sub-base is found damaged at some places or it has cracks wider than 10 mm, it shall be repaired with fine cement concrete or bituminous concrete before laying separation layer. Prior to laying of concrete it shall be ensured that the separation membrane as per Clause 602.5 is placed in position and the same is clean of dirt or other extraneous materials and free from any damage.

Clause 602.5

Separation Membrane

Add after the first line:

It shall be white in colour and transparent.

Clause 602.6.4.

Longitudinal Joints

Clause 602.6.4.1

Add to the clause no 602.6.4.1 in end of the clause

These joints known as warping joints shall be:

Plain butt type and shall be formed by placing the concrete against the face of the slab concreted earlier. The face of the slab concreted earlier, shall be painted with bitumen before placing of fresh concrete.

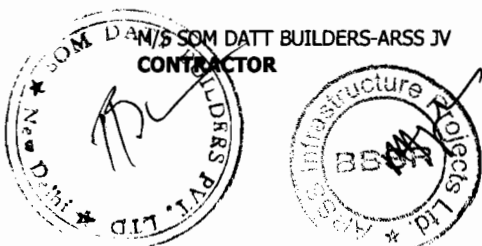
Formed by a joint cutting machine when a pavement width of more than one lane is laid and to relieve warping stresses when the pavement width exceeds 4.5 m.

Add as new sub-clause

Clause 602.6.4.3.

Longitudinal joint with shoulder:

This is one of the critical areas which are generally not given proper treatment. The joint widens after the concrete slabs have shrunk and this wide joint allows water to seep to the lower layers. Whether the



shoulder is rigid or flexible type, the joint should be treated with sealant after widening.

Clause 602.6.4.4.

Transition slabs:

At the interface of rigid and flexible pavement, at least 3 m long reinforced buried slab should be provided to give a long lasting joint at the interface. The details are shown in Fig. 3 of IRC 15: 2002.

Clause 602.6.5

Dowel bars:

Clause 602.6.5.1

Add after first sentence of the clause

Epoxy coating shall treat these or any approved anti-corrosion treatment.

Clause 602.6.5.5

The first two sentences shall read as follows

“Dowel bars shall be covered by a thin plastic sheath for at least 60 per cent of the length from one end for dowel bars in contraction. The sheath shall be tough, durable and of an average thickness not greater than 0.5 mm and shall have closed end. The sheathed bar shall comply with the following pull out test.”

Clause 602.8.

Side Forms, Rails and Guide wires:

Clause 602.8.1

Replace the first three sentence of the clause as follows:

All side forms shall be of mild steel of depth equal to the thickness of pavement minus the level tolerance stipulated for the lower layer. The forms can be placed on a series of steel packing plates or shims to take care of irregularity of sub-base. They shall be sufficiently robust with a minimum thickness of 6 mm and rigid to support the weight and pressure exerted by the paving equipment.

Clause 602.9.

Construction

Clause 602.9.1:

General

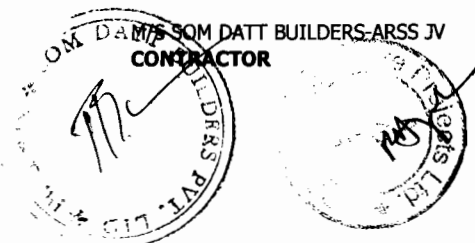
Replace the clause as follows

“A systems approach may be adopted for construction of the pavement, and the Method Statement for carrying out the work, detailing all the activities including indication of time-cycle, equipment, personnel, etc. These shall be got approved from the Engineer before the commencement of the work. The above shall include the type, capacity and make of the batching and mixing plant/ Concrete mixer with integrated weighing mechanism/portable mixing plant besides the hauling arrangement and paving equipment. The capacity of crusher, batching plant the cement storage, silos and the paver shall be matching so that the rate of paving shall not be less than 60 metre per hour and paving can progress without any stoppage. During planning stage, it should be noted that constructing multilane pavement is better than constructing single lane at a time from the point of view of riding quality. Therefore, the capacity of plants should be planned accordingly.”

Add as new clause

Clause 602.9.1.1

Existing Pavement



When concrete pavement is to be laid over an existing bituminous pavement which is known as white-topping, it shall be ensured that the existing road extends over the required width and has a minimum thickness of 150 mm. Where the general unevenness of the surface varies within 25 &, it can be provided with an overlay of dense bituminous macadam (DBM) with the help of a paver operating with electronic sensor to achieve the desired level, grade and alignment. The thickness of DBM shall be decided on basis of undulations present on the existing road. Where the width of the existing pavement falls short of the width to be concreted and the condition of the surface is sound enough for receiving the paving concrete, the extra width may be made up by placing at least 150 mm depth of lean cement concrete or lime-puzzolana concrete or lime-fly ash concrete or lean cement concrete as per clause 6.2.1(c) in trenches of required width at the sides of the existing metalling after taking care to see that the bottom of such trenches is well compacted with 100 mm WBM or WMM layer. The soil below shall be watered and well compacted before placing WBM/WMM material by suitable tampers before placing of the new sub-base material. The correction to the unevenness of the surface and for camber shall follow the same lines as in the preceding paragraph.

Clause 602.9.1.2

Work on Gradients

The progress on gradient of all operations of placing, compacting and finishing of concrete should proceed from the lower to the higher reaches. The concrete mix shall be stiffer than that used on level reaches. Therefore, slump of concrete mix in such gradients should be adjusted from field trials.

Clause 602.9.9.
Clause 602.9.9.1

Curing of Concrete

Replace the first paragraph as follows

Immediately after the surface texturing, the surface and sides of the slab shall be cured by the application of approved resin-based aluminised reflective curing compound or white pigmented curing compound which hardens into an impervious film or membrane with the help of a mechanical sprayer.

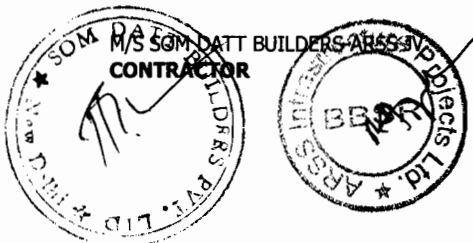
Curing can be done by one of the following two methods:

By application of curing compound followed by spreading of wet hessian and moistening it regularly. In case of arid areas where water is extremely scarce, two applications of curing compound without moist curing by wet hessian may be allowed at the discretion of the Engineer. For small works, curing can be done by manual methods using wet hessian which is kept moist during curing period. Curing shall be done for a minimum period of 7 days.

The water used for curing shall also be free from all injurious chemicals, like, chlorides and sulphate and shall meet the requirements of IS:456.

Clause 602.9.9.2.

Add as last sentence of the clause



Arrangements should be made to spray the curing compound on the sides of the slab.

Add as new clause

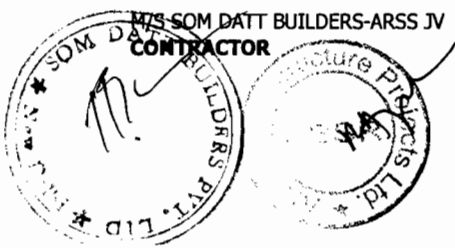
Clause 602.9.9.5.

Curing by manual methods:

After completion of the finishing operations, the surface of the pavement shall be entirely covered with wet hessian cloth (minimum of two layers), burlap or jute mats. The coverings used shall be of such length (or width) that when laid will extend at least 500 mm beyond the edges of the slab, shall be so placed that the entire surface and both the edges of the slab are completely covered. They shall be placed as soon as the concrete has set sufficiently to prevent marring of the surface. Prior to their being placed, the coverings shall be thoroughly wetted with water and placed with the wettest side down. They shall be so weighed down as to cause them to remain in intimate contact with the surface covered. They shall be maintained fully wetted and in position for 24 hours after the concrete has been placed, or until the concrete is sufficiently hard to be walked upon without suffering any damage. To maintain the coverings wet, water shall be gently sprayed so as to avoid damage to the fresh concrete. If it becomes necessary to remove the coverings for cutting the joints, the concrete slab shall not be kept exposed for a period of more than half an hour. Worn coverings or coverings with holes shall not be permitted. If the covering is furnished in strips, the strips shall be laid to overlap at least 150 mm. Covering shall be placed from suitable wooden bridges (IRC: 43). Walking on freshly laid concrete to facilitate placing coverings will not be permitted. Upon the removal of the wet covering at the end of 24 hours, the slab shall be thoroughly wetted and then cured by ponding or sprinklers. Exposed edges of the slab shall be banked with a substantial berm of earth. Upon the slab shall then be laid a system of transverse and longitudinal dykes of clay about 50 mm high, covered with a blanket of sandy soil free from stones to prevent the drying up and cracking of clay. Before constructing clay dykes, the joints formed in concrete slabs shall be temporarily sealed with jute ropes, or synthetic back-up rods so that no foreign material, like, clay or sand enters the joint. The rest of the slab shall be covered with sufficient sandy soil so as to produce a blanket of earth not less than 40 mm depths after wetting. The earth covering shall be thoroughly wetted while it is being placed on the surface and against the sides of the slab and kept thoroughly saturated with water for 7 days and thoroughly wetted down during the morning of the 8th day and shall thereafter remain in place until the concrete has attained the required strength and permission is given to open the pavement to traffic. When such permission is granted, the covering shall be removed and the pavement swept clean. If the earth covering becomes displaced during the curing period, it shall be replaced to the original depth and re-saturated.

Clause 602.10.

Trial Length



Clause 602.10.5.3. Density

Replace the clause as follows

"In-situ density shall be assessed as described in Clause 602.3.3 from at least 3 cores drilled when the concrete is not less than 7 days old. Should any of the cores show honey-combing in the concrete, the trial length shall be rejected and further use of the spreading and compacting unit shall not be permitted until further trials have shown that modification can be made which will result in adequate compaction"

Clause 602.10.5.5 Temperature Measurement (New Clause)

"The temperature development in the concrete slab during hardening shall be recorded. The temperature shall be measured in the middle of the slab (vertically) at a horizontal distance of at least 1000 mm from any free edge. The temperature shall be recorded every 3 hours after installment of the thermometer and the temperature-age relationship shall be determined. The maximum recorded temperature shall not exceed 700C. If the temperature exceeds 700C the trial length shall be condemned and the Contractor shall propose methods to reduce the temperature development and carry out a new trial length at his own expense.

Add as a new clause

Clause 602.10.5.6.

Construction of trial sections is considered obligatory on the part of the Contractor and the entire cost of construction, dismantling and transportation of debris is to be borne by the Contractor.

Clause 602.10.6. Approval and acceptance

Add as the first sentence to the clause.

Compliance for the position and alignment of tie bars shall be checked by drilling additional cores from the slab unless they can be determined from cores taken for density.

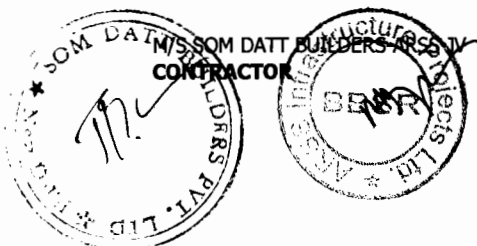
Clause 602.11. Preparation and Sealing of Joint Grooves

Clause 602.11.2.2. Replace the last two sentences as follows

If spalling occurs or the angle of the former is greater than 10 degrees, the joint sealing groove shall be sawn wider and perpendicular to the surface to encompass the defects up to a maximum width, including any chamfer, of 25 mm for transverse joints and 15 mm for longitudinal joints. If the spalling cannot be so eliminated then the same shall be repaired by an approved thin bonded repair using cementitious materials, like, epoxy or polymer concrete.

Clause 602.11.3.3. Add to the last of the paragraph

The groove configuration is different for polysulphide and silicone. Silicone, a single chemical formula, hardens by absorbing moisture from the air and hence it should be placed in a thinner layer vis-a-vis polysulphide. Accordingly, the depth width ratio of grooves should be



modified. Besides the curing time of silicone is more than that of polysulphide.

Clause 602.13.

Opening to Traffic

Replace the clause as follows

Clause 602.13

Opening to Traffic

Replace the entire Clause with:

“In general, traffic shall be excluded from the newly constructed pavement for a period of 28 days where Ordinary Portland Cement, Portland Blast Furnace Slag Cement and Portland Pozzolana Cement are used or for a period of 7 days where Rapid Hardening Cement is used. In all cases, before the pavement is opened to traffic it shall be cleaned and the joints shall be sealed as per Clause 602.11. No vehicular traffic (including the Contractor's vehicles) shall be allowed on the finished surface until a field flexural strength of minimum 4.0 MPa has been achieved. It is the responsibility of the Contractor to produce a sufficient number of series of test specimens to verify the field flexural strength. Each series of test specimens for measurement of field flexural strength shall consist of minimum 3 test specimens. The specimen shall be cured at conditions similar to the field conditions. The method for curing and storing of the test specimen in order to imitate field conditions shall be proposed by the Contractor and approved by the Engineer. The required minimum field flexural strength of 4.5 MPa is achieved when the average flexural strength of minimum 3 specimens exceeds $4.0 + 1.65 s$ where s is the standard of the group.”

SECTION 800

TRAFFIC SIGNS, MARKING & OTHER ROADS APPURTENANCES

Clause 801

Traffic Signs

Clause 801.1.2.

This Clause shall be read as under

"All road signs shall be of retro-reflectorised type as per Type 8/9 of ASTM D 4956 a super high-intensity retro-reflective sheeting..The sheeting is typically unmetallised micro-prismatic retro-reflective element material or any other type as approved by the Engineer.

Clause 803.3.2

This Sub clause is substituted to read as under :

The road marking shall be laid with appropriate road marking machinery

Clause

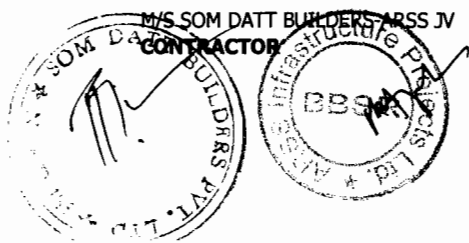
803.6.6

Add as a new clause

General

Road traffic markings shall be constructed to accuracy within the tolerances given below:

The width of lines and other markings shall not deviate from the specified width by more than 5%.



The position of lines, letters, figures, arrows and other markings shall not deviate from the true position specified by more than 20mm.

The alignment of any edge of a longitudinal line shall not deviate from the true alignment by more than 10 mm. in 15 m.

The length of segments of broken longitudinal lines shall not deviate from the specified length by more than 150 mm.

In broken lines, the length of segments and the gap between segments shall be as indicated on the Drawings. If these lengths are altered by the Engineer, the ratio of the lengths of the painted sections shall remain the same.

Line and curves, whether broken or unbroken, shall not consist of chords but shall follow the correct radius.

Faulty Workmanship or Materials

If any material not complying with the requirements is delivered at the site or used in the Works, or if any sub-standard work is carried out, such material or work shall be removed, replaced or repaired as required by the Engineer, at the Contractor's own cost. Rejected traffic markings and paint that has been splashed or has dripped onto the surfacing, kerbs, structures or other such surfaces shall be removed by the Contractor at his own cost, in such a way that the markings of split paint will not show up again later.

Clause 804.3 **The first sentence of this Clause shall be read as under :**

The hectometer/kilometer stones shall be made of concrete of M20 grade.

SECTION 900 QUALITY CONTROL FOR ROAD WORKS

Clause 903 Quality Control Tests During Construction

Clause 903.4 Tests on Bituminous Constructions

In Table 900-4, Tests mentioned at serial No.4 & 6 for Bituminous Macadam/Dense Bituminous Macadam/Semi Dense Bituminous Concrete and for Bituminous Concrete, **add the following at the end** in the frequency column:

"10% of the density tests shall be done within 300mm width from edges."

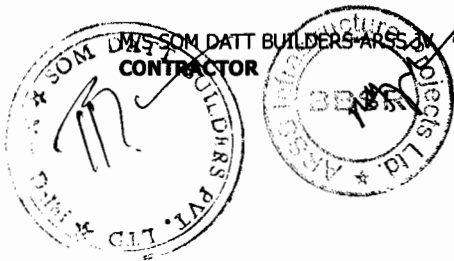
Add new sub clause as 903.4.3 as follows

Clause 903.4.3

Bituminous mix shall be spread with paver fitted with electronic sensing device and string line arrangement (supported by steel pegs @ 5 m apart) on either side of paving width for automatic levelling, surface evenness and profile control. Use of string line is compulsory to provide signal to the electronic sensing device fitted with the Paver Finisher.

Bituminous works shall be tested immediately after finishing for:

- a) Thickness (compacted) measured by extracting cores shall be dealt in accordance with MORTH Specification Section 900.
- b) Density (compaction) test as performed on the extracted cores
- c) Workmanship test by measuring roughness of the finished layer by duly calibrated Towed Fifth Wheel Bump Integrator.



Note: Contractor shall arrange the core extraction machine at his cost and shall take cores of the executed bituminous works jointly with Engineer without any extra cost.

The result of tests shall be compared with the prescribed acceptable values. The payment of all such works executed shall be based on the test results. In case test results for parameters (b) & (c) above fall below the required values in accordance with specification, deductions as specified below here under shall apply limiting to 'Nil' payment for the executed bituminous works. Separate deductions shall be made for each attribute i.e. Density Test and Workmanship test.

b) Density (Compaction Test):

Core Density	Deduction in the payable rate
- Less upto 1% of requirement	@ 5%
-Less above 1% and upto 2% of requirement	@15%
-Less above 2% and upto 3% of requirement	@30%
-Less above 3% of requirement	@ 100%. Such works shall be rejected and NIL payment shall be made

The minimum deduction in the payable rate shall be made for 250 Sqm for each failure.

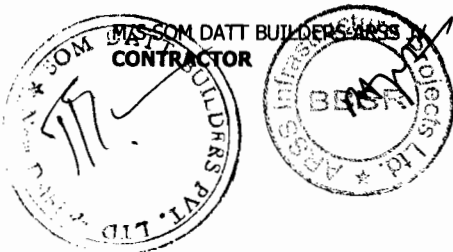
c) Workmanship Test: Roughness measured longitudinally

The finished bituminous layers shall be tested for workmanship (immediately before allowing traffic) by measuring roughness, longitudinally separately for each lane with the Calibrated Towed Fifth Wheel Bump Integrator. The measured roughness shall not exceed a value of 1500 mm/km for finished DBM and BC layers.

In case DBM is laid in two separate lifts, the roughness shall be measured on the final DBM layer. Any completed layer (DBM and BC) having roughness in excess of the value 1500 mm/km shall be paid in accordance with the Deduction Formulae as specified below:

Measured Roughness	Deduction in the payable rate
- Upto 5% more than the requirement	Nil
-More than 5% and upto 30% more than the requirement	@ (10%+1% for every 1% in excess of 5% of prescribed limit)
-More than 30% more than the requirement	Works to be rejected and to be relayed.

The area for which deduction in the payable rate shall apply shall be determined by the Engineer based on analysis of results. However,




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regardless of any other consideration, the minimum deduction shall not be less than one lane-km (3500 m²)

SECTION 1000 MATERIALS FOR STRUCTURES

Clause 1009 Steel For Pre-Stressing

Add (e) to the list of codes to which acceptable prestressing steel shall conform:

- (e) Uncoated Stress relieved low relaxation seven ply strand for prestressed concrete - IS: 14268

Clause 1009.3 Add the following note under table 1000-3

Thermo Mechanically Treated bars (TMT bars) conforming to IS: 1786 may also be used.

Clause 1010 Water

In para (c), the permissible limit for **Chloride (Cl)** shall be read as "500 mg/lit for Prestressed Concrete / Reinforced Cement Concrete Works."

The lines indicated with * shall be read as

“* In case of structures, for concrete works not containing embedded steel, the permissible limit of chlorides may be increased upto 1000mg/lit.”

Clause 1012 Concrete Admixtures

Add the following at the end of paragraph 2 of Clauses 1012.1

Admixtures shall not impair the durability of concrete; they shall not combine with the ingredients to form harmful compounds or endanger the protection of reinforcement against corrosion.

Add the following at the end of the clause.

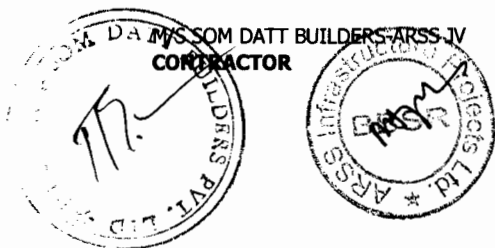
After selecting a few acceptable brands & types of admixture based on the manufacturer's data/technical literature. Independent acceptance tests should be carried out for the same using the approved combinations of cement / sand / aggregates intended for use in the Project. After establishing the basic acceptability using strength criteria (compression & tensile strengths) a number of trial mixes be designed using different proportion of admixtures / cement / water etc. to establish the data bank on the behaviour of the admixture for the project site conditions. A spectroscopic signature of accepted product should be obtained and preserved for comparison for acceptance of the production lots.

Retrials should be conducted with change in source / type of cement.

Workmanship

The dosage should be finalised on the basis of field trial and special mechanical devices should be used for dispensing the admixture in the batching / mixing plant. No addition of admixture after dosage is permitted (including addition in transit mixers).

Manufacturer's experts should be available for consultation / trouble shooting of problems associated with their product. The conditions of storage, shelf life etc. as specified by the manufacturer should be strictly observed. The manufacturer's Quality Assurance Plan during process of production should be obtained and field for reference / record.



Clause 1015 Test and Standards of Acceptance
Add following as last paragraph :

Independent testing of prestressing steel shall be carried out by the contractor for each consignment from each source in the laboratory approved by the Engineer before use. The tests shall be carried out for the properties as listed in clause 7.2.1 of BS-5896:1980. These tests are in addition to the tests carried out by the manufacturer.

SECTION 1500 FORMWORK

Clause 1502 Materials
Delete the last sentence of para one
Delete the word “or Timber” in 1st line of para 2

Clause 1503 Design of Form work

Clause 1503.2 The following shall be added to this Clause
"For distribution of load and load transfer to the ground through staging, an appropriately designed base plate must be provided which shall rest on firm sub-stratum. The loading from the form work shall be distributed to the soil or the permanent works below (e.g. pile cap) in such a manner that any total or differential settlement are within acceptable limits."

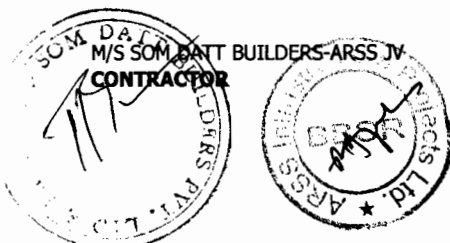
Clause 1508 Removal of Formwork
Add the following as para 5
For prestressed units, the side forms shall be released, as early as possible and the soffit forms shall permit without restraint deformation of the members, when prestress is applied. Form supports and forms for cast in situ members shall not be removed until sufficient prestress has been applied to carry the dead load and any formwork supported by the member and anticipated construction loads.

Clause 1510 Specialised Formwork
Replace the word “plywood” by “marine plywood” in the fourth paragraph of this clause.

Clause 1513 Rate
Add the following at the end of the first para
“The unit rate shall also include all cost for preparation of erection scheme, designs of false work and formwork and their approval.”

SECTION 1600 STEEL REINFORCEMENT (UNTESTED)

Clause 1605 Placing of Reinforcement
Paragraph (c) (i) of clause 1605 shall read as follows
Cover blocks shall be made of concrete or cement mortar with the same durability and strength properties as the surrounding concrete and




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with the same type of constituents. In visible surfaces, the cover blocks shall be of the same colour and texture as the surrounding concrete. The contractor's proposal for cover blocks shall be submitted to the engineer for acceptance.

Clause 1606

Bar Splices

Clause 1606.1

First sentence of Clause 1606.1 shall read as follows:

“To the extent possible, all reinforcement shall be furnished in full lengths as indicated in drawings.”

Clause 1606.2

Welding

Clause 1606.2.1

Add the following at the end of the paragraph.

In prestressed concrete members, when welding of untensioned reinforcement is permitted by the Engineer, it shall be carried out before insertion of the prestressing tendons.

SECTION 1700

STRUCTURAL CONCRETE

Add the following new clause 1704.6

Clause 1704.6

Materials for pumped concrete:

Materials for pumped concrete shall be batched consistently and uniformly. Maximum size of aggregate shall not exceed one-third of the internal diameter of the pipe.

Grading of aggregate shall be continuous and shall have sufficient ultra fine materials (materials finer than 0.25 mm). Proportion of the aggregate passing through 0.25 mm shall be between 15 and 30% and that passing through 0.125 mm sieve shall not be less than 5% of the total volume of aggregate. Admixtures to increase workability can be added. When pumping long distances and in hot weather set retarding admixtures can be use. Fluid mixes can be pumped satisfactory after adding plasticizers and super plasticizers. Suitability of concrete shall be verified by trial mixes and by performing pumping test.

Clause 1707

Equipment

Para 1 of this Clause shall read as under

“Unless specified otherwise, equipment for production, transportation and compaction of concrete shall be as under:

- a) For production of concrete: Batching and mixing of the concrete shall be done in a concrete batching and mixing plant fully automatic of a suitable capacity. The plant shall be approved by the Engineer.”

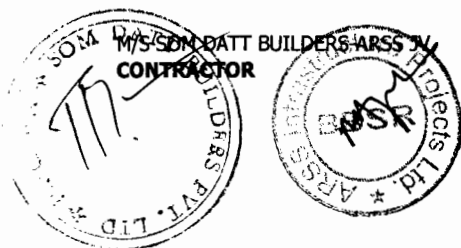
SECTION 2000

BEARINGS

Clause 2001

Description

Add the following as paragraph 2 of this clause



Within 90 days of award of work, the Contractor shall submit detailed specifications, designs and drawings including installation drawings and maintenance manual, for the approval of the Engineer. Designs shall also include review and modifications of designs and drawings of bearing pedestals and other elements required for installation. The installation of bearings shall be carried out under the supervision of the manufacturer of the bearings. The Contractor shall provide a warranty for 15 years from the manufacturers and the bearings shall be repaired or replaced free of cost by the Contractor / manufacturer, if any defects are observed during this period. The Employers decision regarding replacement/ repairs shall be final and binding.

Clause 2005 **Elastomeric Bearings**

Clause 2005.3 **Acceptance Specifications**

In para 5, substitute the words "Engineer or his authorized representative" for the word "Inspector".

Clause 2005.3.5 **Inspection Certificate**

In para 4, substitute the words "Engineer or his authorized representative" for the word "Inspector."

Clause 2009 **Measurements for Payment**

Add the following after para 2

"POT and POT-cum-PTFE/ Sliding bearings shall be measured in metric tons of vertical load capacity."

"Paper bearings shall be measured in square metres."

Clause 2011 **Add clause 2011 after the clause 2010 as under**

Paper bearing

Paper bearing shall be reinforced bitumen laminated Kraft paper conforming to the requirements of IS- 1398.

SECTION 2200 **SUB-STRUCTURE**

Clause 2204 **Piers and Abutments**

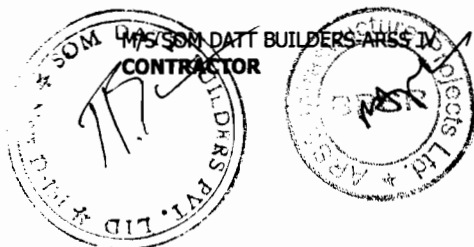
Add the following paragraph at the end of clause

"Where necessary suitable cofferdams or other means shall be provided to exclude water from the construction area. The Contractor shall provide necessary pumping equipment for dewatering in working areas".

Clause 2210 **Rate**

This clause shall be read as follows

The contract rate for masonry, concrete and reinforcement in substructure shall include all works as given in respective sections and cover the cost of incidental items like providing cofferdams,



dewatering, providing special formwork, where necessary, and all other items for furnishing and providing substructure as mentioned in this section.”

SECTION 2600 EXPANSION JOINTS

A new clause shall be added as 2611 as follows:

Clause 2611 Asphaltic Plug Joint

Asphaltic plug joint shall consist of a polymer modified bitumen binder, carefully selected single size aggregate, closure/bridging metallic plate and heat resistant foam caulking/ backer rod. The specifications for general requirement, material, handling & storage, installation, tests and standards of acceptance etc. shall be as per IRC-SP:69-2005.

SECTION 2800 REPAIR OF STRUCTURE

**Clause 2804 Epoxy Mortar for Replacement of Spalled Concrete
Add the following in Clause 2804.4 at the end as (c)**

- (c) If reinforcement is exposed the same shall also be cleaned thoroughly. Sand blasting shall be done to clean the rusting on reinforcement. The reinforcement shall be coated with PMC slurry or epoxy phenolic based / epoxy based protective coating within one hour of cleaning to prevent rusting. The PMC or epoxy based protective coating shall be brush applied on the cleaned reinforcement ensuring that full surface area is covered in accordance with the manufacturers recommendation

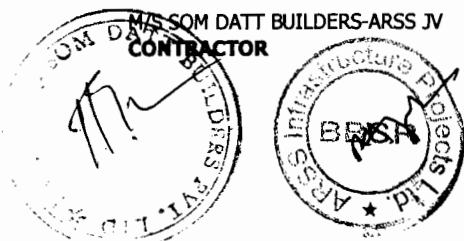
**Clause 2809 Dismantling of Concrete Wearing Coat
Clause 2809.2 This Clause shall read as follows:**

The removal operations shall be carried out mechanically using pavement breakers and compressors. Removal shall be done carefully to avoid damage to any part of the existing structure. In delicate locations for example around spouts, removal shall be done by manual methods. After removal, the concrete deck surface shall be closely inspected for identifying any distress such as cracks, pockets of loose or honeycombed concrete etc. the deck surface shall be thoroughly cleaned with special efforts to remove any loose material. Expansion joints and spouts shall be removed carefully so that deck concrete is not damaged.

Clause 2809.3 Add the following at the end of Para

Dismantled material shall not be stacked on the deck nor shall it be thrown below the bridge. It shall be neatly piled at points designated by the Engineer with all lifts and lead up to 5000m. Materials, which can be used or auctioned, shall be stored in neat piles at locations designated by Engineer with all lifts and lead up to 2000m.

FOLLOWING NEW CLAUSES SHALL BE ADDED



Clause 2814

Dismantling of damaged and existing structures

The dismantling of various components of structure like railing, kerbs, footpath, approach slab, wing walls, piers, abutments, parapet, deck slab etc. shall be carried out as specified in drawings and as per directions of Engineer. The work shall be executed in accordance with MORTH specifications section 200, clause 202.

Clause 2815

Dowel bars

Dowel bars in deck slab at locations of parapet and expansion joint and grouting with epoxy resin locations shall be provided as shown in the drawings.

Holes shall be drilled vertically using rotary drill machines. Care shall be taken that the holes are drilled vertical and the deck concrete is not damaged. It shall be ensured that buried reinforcement of the deck is not damaged due to drilling by avoiding locations above reinforcement. Rebar detector shall be used for this purpose. 16 mm dia. dowel bars shall be inserted in the hole and kept in undisturbed position with appropriate fixture. The annular space shall be filled by epoxy grouting.

Work of epoxy grouting shall be done in accordance with MORTH Specifications Section 2800 clause 2803. It shall be ensured that the inside of the hole is dry.

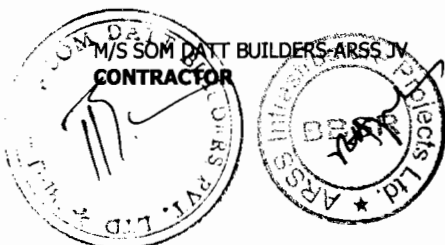
Epoxy resin shall be of following specifications:

Compressive strength	- min 35 MPa at 24 hours.
Tensile strength	- 15 - 20 MPa at 7days.
Flexural strength	- 30-40 MPa at 7 days
Viscosity @ 250C	- 900-1200 cps

Clause 2816 Railing / Parapets

Cast-in-situ railing/ parapets shall be constructed in accordance with the requirements of structural concrete section 1700. The reinforcement shall conform to section 1600. The formwork shall conform to section 1500. The work in general shall conform to section 2700 clause 2703.

The reinforcement of the railings/ parapets shall be welded with the existing reinforcement of the deck slab and with the dowel bars as shown in the drawings or as directed by the Engineer.



Clause 2817 Expansion Joint

The old expansion joint assemblies shall be removed carefully along the entire width of the carriageway as per MORTH Clause 2809.1 and recess of size shall be prepared as specified in drawing. The requirements of new expansion joint shall confirm to MORTH specifications section 2600.

Clause 2818 Drainage Spout

For existing bridge decks drainage spouts shall be replaced and new drainage spouts shall be provided as shown in the drawings. The waterproofing material shall be provided around the area of drainage spout from the top of the deck.

The work shall be executed in accordance with MORTH Specifications Section 2700 clause 2705 except to the extent modified below.

The work shall be done after the wearing coat is removed. The existing spouts shall be removed carefully with minimum damage to surrounding concrete. The pocket formed shall be sufficiently large to ensure good flow and compaction of concrete around the new spout. The area around the spout covering the pocket of new concrete adequately, approximately 500 mm x 500 mm shall be provided with a 5 mm thick polymer modified cementitious (PMC) brush topping layer.

Before commencing application of PMC brush topping the prepared concrete substrata shall be thoroughly soaked with clean water. The surface shall then be primed with PMC slurry. Before priming it should be ensured that any free surface water is removed. PMC mortar shall be applied before priming agent sets. The material shall be applied in accordance with manufacturer's recommendations.

The specifications for polymer modified cementitious (PMC) brush topping and polymer modified cementitious (PMC) mortar shall be as per clause 2822.

Clause 2819 Approach Slab

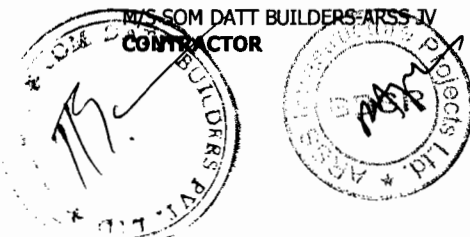
Approach slabs, which are cracked or otherwise damaged, shall be recasted after dismantling of the existing slab as specified in drawing.

The work shall be executed in accordance with MORTH specifications section 2700 clause 2704. The approach slab shall be laid over lean concrete as per drawing after compacting the base properly.

Clause 2820 Repair of Exposed Surface of Masonry Work

Exposed masonry surface of existing wing walls / returns, abutments, piers etc. shall be provided with 20mm thick plaster in 1:3 cement mortar as specified in drawings or as directed by Engineer. The work shall be executed in accordance with MORTH specifications of section 1300/1400.

Clause 2821 Gabion Walls



The Gabion walls shall be provided at locations as specified in drawing or as per direction of Engineer as slope protection / floor protection measures. The work shall be executed in accordance with MORTH Specifications Section 2500 clause 2503. Excavation and back filling shall be done in accordance with MORTH Specifications Section 300.

Clause 2822 Polymer Modified Cementitious Brush Topping

The polymer latex, which is to be used, should consist of water based acrylic polymer and copolymer dispersion and special purpose chemicals. The polymer solid contents shall be 30 ± 1 percent. The particle shall be of nearly spherical shape with a diameter of 0.35 ± 0.05 micrometer. The manufacturer shall certify the above requirements about solid content and grain size. In order to keep control over the quality, the manufacturer shall provide infra red absorption spectrum analysis for the materials (polymer latex) to be supplied by them.

Portland Cement conforming to IS:8112 shall be used for production of polymer modified cement repair mortar and polymer modified cementitious coating system, which is to be used as a bonding medium concrete substrata.

Acrylic polymer latex shall be used as the polymer for modifying and improving the properties of cement. The same product is to be used for various purposes such as in a slurry form with cement to form a bonding /priming medium and with sand to form PMC repair mortar. However, no additional water is to be added to PMC slurry or PMC repair mortar as the water which is present in the latex is sufficient for cement hydration and for this reason the latex cement ratio remain constant for all applications.

The sand which is to be used for constituting the PMC repair mortar should be Silica sand as the basic material which is categorized in two groups:

- a) Coarse Silica sand
- b) Fine Silica

The gradings of the above groups should follow the limits provided below.

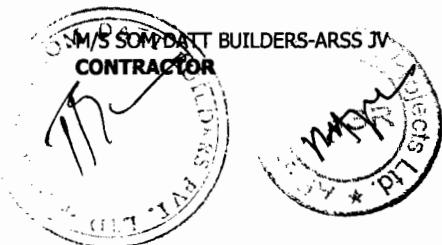
Polymer Modified Cementitious (PMC) Mortar

The specifications for polymer modified cementitious material (PMC) shall be read as under

I. Mix Formulations

<u>PMC SLURRY</u>	
COMPONENT	PARTS BY WEIGHT
Cement	100
Acrylic polymer latex	52

<u>PMC REPAIR MORTAR</u>	
COMPONENT	PARTS BY WEIGHT



Cement	100
Acrylic polymer latex	52
Coarse Silica Sand	150
Fine Silica Sand	150

Curing of PMC WORK

This specification describes the curing procedures to be followed for PMC Repair Mortar & Slurry

The curing procedures outlined apply to normal weather conditions. Under hot weather conditions take precautions to avoid drying. PMC work should be carried out at a temperature below 35°C

Under unusual weather conditions e.g. high humidity and / or high wind velocity or imposed constraints special curing procedures shall be followed for which approval shall be obtained from the Engineer.

Air-drying shall be considered to be taken place only during favourable uninterrupted weather conditions existing throughout the existing recommended drying period. Some judgement shall be made in this respect and if conditions are deemed unfavourable for drying to occur, then drying must be prolonged for the full-recommended period after weather clears.

As PMC work proceeds, precautions shall be taken to prevent rapid drying of the PMC repair mortar. This is usually accomplished by covering the filled surfaces with an impermeable sheet shortly after the work has been done.

The sheet shall be kept in place until further work is carried out over the mortar or in case where the mortar is likely to be disturbed the sheet shall be kept in place for 24 hours.

No foot traffic for further work shall be allowed over mortar until 12 hours from the time of the completion of work.

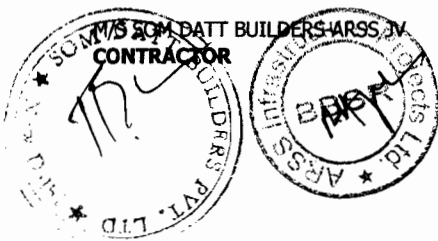
Curing compound may also be used as curing membrane. Care shall be taken to ensure complete covering particularly around the interface with the host concrete.

For the first day the repaired concrete patch shall be protected from harsh environment by laying a polythene sheet over it, taping down the edges.

Mixing PMC

To mix PMC, it is necessary to have the following items

- i. A suitable sized mixing container
- ii. A high speed drill with mixing paddles



- iii. Premark batching containers for measuring out components to be mixed

Pour all the liquid polymer latex into mixing container. After shaking the latex to disperse the solids uniformly throughout the liquid before use.

Begin mechanical mixing and while doing so, slowly add the dry components i.e. cement and sand.

Mix for about 5 minutes until solids have been well dispersed. The resulting mix should look uniform, feel creamy and be free from lumps and grits.

Precaution shall be taken not to entrap an excessive amount of air into the mix during mixing.

Since the desired consistency depends on type and brand of cement as well as weather conditions, start a trial mix with a reduced amount of cement. Once all components are mixed, add cement if necessary to achieve the desired consistency. Record the amount of cement required and uses this for subsequent mixes. Do not reduce the quantity of cement noted in the mix proportions.

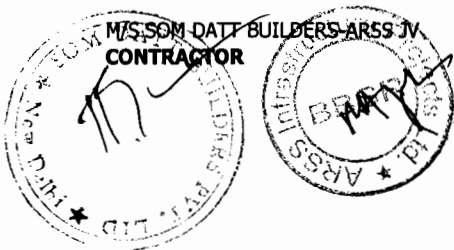
In case the slurry sets before application of mortar, a fresh coat of slurry shall be applied. Under no circumstances water shall be added in PMC repair mortar mix. Unused mortar or mortar which has partially set shall not be re-mixed and used.

I.S. Sieve No.	Percentage Passing by Weight		
	Coarse	Fine	Combined
10 mm	100	100	100
4.75 mm	95-100	100	98-100
2.36 mm	90-100	100	80-100
1.18 mm	40-60	100	70-80
600 micron	0-10	90-100	45-55
300 micron	0-4	40-60	20-30
150 micron	0-3	0-10	0-5
75 micron	3max	0-3	3max

In the event of using local sand, the sand to be used must satisfy the limits of deleterious materials and the requirements of soundness as given in Cl. 3.2.1 and Cl. 3.6 respectively of IS: 383. Confirmatory tests shall be conducted by the Contractor and sample kept for comparison by the Engineer.

II Mix Formulations

COMPONENT	PARTS BY WEIGHT
Cement	100



Acrylic polymer latex	52
Fine Silica Sand	100

Curing of PMC brush topping

This specification describes the curing procedures to be followed for various PMC systems.

The curing procedures outlined apply to normal weather conditions. Under hot weather conditions take precautions to avoid drying. PMC work should be carried out at a temperature below 35°C.

Under unusual weather conditions e.g. high humidity and/or high wind velocity or imposed constraints special curing procedures shall be followed, for which approval shall be obtained from the Engineer.

Air drying shall be considered to take place only during favourable uninterrupted weather conditions existing throughout the recommended drying period. Some judgement shall be made in this respect and if conditions are deemed unfavourable for drying to occur, then drying must be prolonged for the full-recommended period after the weather clears.

In unexposed and exposed areas the initial air drying of 4 to 6 hours shall be followed by moist curing for 24 hours by spraying or another approved curing method.

Following moist curing, the coating shall be allowed to air dry for 4 to 6 hours prior to the application of finishing coat.

Mixing PMC Slurries

To mix PMC slurries, it is necessary to have the following items:

- i) a suitable sized mixing container
- ii) A high speed drill with mixing paddles
- iii) Premark batching containers for measuring out components to be mixed.

Pour all the liquid polymer latex into the mixing container. Shake the latex to disperse the solids uniformly throughout the liquid before use.

Begin mechanical mixing and while doing so, slowly add the dry components, i.e. cement and sand for brush top coating.

Mix for about 5 minutes until all the solids have been well dispersed. The resulting mix should look uniform, feel creamy and be free from lumps and grit.

Precaution shall be taken not to entrap an excessive amount of air into the mix during mixing.

Since the desired consistency depends on type and brand of cement as well as weather conditions, start a trial mix with a reduced amount of



cement. Once all components are mixed, add cement if necessary to achieve the desired consistency. Record the amount of cement required and use this for the subsequent mixes. Do not reduce the quantity of cement noted in the mix proportions.

ADDITIONAL TECHNICAL SPECIFICATIONS

A-1 DIVERSION AND FILLING OF EXISTING WATER COURSES ALONG THE ROAD ALIGNMENT.

1. Scope

Where water courses have to be diverted from the sites of embankments or other works, the original channels shall be cleared of all vegetation and soft deposits as directed by the Engineer and carefully filled in with suitable materials deposited and compacted as specified. The new channel shall be formed as shown in the drawings or as directed by the Engineer”.

2. Measurement for Payment

The work involved in filling existing water course shall be measured as follows.

- (i) the work involved in filing existing water courses shall be measured under clearing and grubbing item on area basis.
- ii) Excavation and removal of soft deposits shall be measured in cubic metre.
- iii) Filling with suitable material shall be measured in cubic metre.
- iv) The works involved in forming the new channel shall be measured under the relevant items of work.

3. Rates

Clause 201.6.1 shall apply for clearing of vegetation growth.

Clause 301.9.3. shall apply for removal of soft deposits and filling with suitable materials . The contract unit rates for the item of new channel formation shall be payment in full for carrying out the operations required for the relevant items.”

A-2 PLANTATION OF TREES

1. Scope

The work shall consist of survey and demarcation, alignment and staking, soil working, pitting of trees ad shrubs at the rate of 100 plants, 800 shrubs per km with 5% of casualty replacement, plants to be 4 to 5 years of age of 10cm. of girth, transportation loading, unloading of plants and shrubs within all lead and lift, refilling earth after mixing oil cake, manure, watering and providing and fixing tree -guards, post planting operation with weeding , soil working, applying insecticides, replacement, pruning, watch and wards of the plant etc. all complete.

2. Materials

2.1 Dump Manure

Dump manure shall be of well decayed organic or vegetable matter obtained in the dry state from the municipal dump or other similar soruces approved by the engineer. The manure shall be free from earth, stone, brick , bats or other extraneous stuff. Manure sieved through sieve of IS designation 16mm is generally used for mixing with the excavated soil to be refilled in trenches.

2.2. Sapling of Trees

The sapling of trees shall be of good quality as directed by the Engineer.



2.3 Farm Yard Manure

It shall be well decayed free from grits and any other unwanted materials.

2.4. Good Earth

The soil shall be agricultural soil of loamy texture free from kankar, moorum, shingle, stone brick, bats, building rubbish and any other foreign matter. The earth shall be free from clods or lumps of sizes bigger than 75mm in any direction. It shall have PH value ranging between 6 to 8.5.

2.5 Oil Cake (Neam/Castor/ Groundnut)

The cake shall be free from bush, dust, grit and any other foreign matter.

3. Planting and Refilling Earth after Mixing with Oil Cake, Manure and Watering

Holes of circular shape of 60cm dia and 45 cm in depth in ordinary soil shall be excavated and the excavated soil, broken to clods of sizes not exceeding 75mm in any direction, shall be stacked outside the hole, stones, brick bats, unsuitable earth and other rubbish all roots and other undesirable growth met with during excavation, shall be separated out and unserviceable material removed from the site as directed. Useful material if any shall be stacked properly and separately. Good earth in quantities required to replace such discarded stuff shall be brought and stacked at site by the contractor.

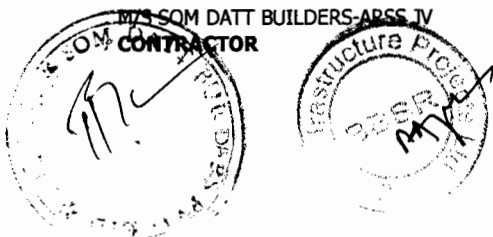
The tree hole shall manured with powdered neam/ caster oil cake at the specified rate alongwith farm yard manure dump manure/ screened through sieve IS designation 16mm, or slugged shall be uniformly mixed with the excavated soil after the manure has been broken down to powder, (size of particles not to exceed 6mm in any direction) in the specified proportion. The sapling of trees shall be placed at the center of the hole and then the mixture shall be filled into the hole upto the level of adjoining ground and then profusely watered to enable the soil to subside. The refilled soil shall then be dressed evenly with its surface about 50 to 75mm below the adjoining ground level or as directed by the Engineer.

4. Circular Iron Tree Guard with Bars

The tree guard shall be 50 cm in diameter. The tree guards shall be formed of (i) 3 Nos. 25 x 25 x 3 mm angle iron verticals 1.95m long excluding splayed outward at lower end upto an extent of 5 cms., (ii) 3 Nos. 25 x 5 mm M.S. flat rings fixed as per design (iii) 15 Nos. 1.55 metre long 6mm dia bars. Each ring shall be in two parts in the ratio of 1:2 and their ends shall be turned in radically for a length of 4 cm. at which they are bolted together with 8mm dia and 30mm long M.S. bolts and nuts.

The vertical irons shall be welded to rings along the circumference with electric plant 15 nos. bars shall be welded to rings at equal spacing along the circumference of ring. The lower end of the angle iron verticals shall be splayed outwards upto an extent of 5 cm. The lower end of the flat of lower ring shall be at the height of 70cm and upper end of the flat of top ring shall be at the height 70cm and upper end of the flat of top ring shall be in the centre of top and lower ring. The entire tree guard shall be given two coats of paint of approved brand and of required shade over a priming coat of ready mixed primer of approved brand. The design of the tree guard shall be approved by the Engineer.

5. Maintenance



Trees shall be maintained for a period of 12 (twelve) months which require watering applying insecticides, replacing, pruning, watch and ward of the plant as directed by the Engineer.

6. Measurements

Planting of trees shall be measured in number. Planting plants and shrubs in the central verge and landscaping shall be measured in linear m/km. as specified in the item.

7. Rate

The rate shall include the cost of all labour and material involved in all the operations described above including cost of trees sapling tree-guard and maintenance as mentioned above and the cost of supplying and stacking the requisite quantity of manure and oil cake.

A-3 VOID FORMER

Void formers are to be supplied with suitable end blockers to seal the void former ends.

Specialized form work shall be manufactured by use of form lining materials with ring stiffeners as per design requirements. The form lining may either be Marine Plywood, PVC/HDPE sheet or steel sheet of appropriate thickness and the ring stiffeners should preferably be of structural steel sections. Manufactured void formers shall be absolutely leak proof.

The contractor may use PVC/HDPE pipes, Galvanised corrugated light metal tubes of required sizes from market or specially manufactured for use as void formers. However, the specifications & design for such pipes/ tubes shall be submitted for approval of Engineer.

The Void Formers shall be strong enough to withstand all pressure, ramming and vibration during placing of concrete and handling / erection stresses. The void formers shall be placed and tied in position so that they are not displaced during concreting.

A-4 EMBANKMENT CONSTRUCTION WITH FLY ASH MODIFIED SOIL

Over the years Fly Ash are discharged and deposited in Ash ponds. Pond Ash with fly ash produced daily are allowed to be used for the construction of embankment mixing with the soil from borrow area in proportion of 60% of soil and 40% of Fly Ash. The mixing of the soil with Flyash should be satisfactorily demonstrated by use of mechanical mixer capable of producing homogeneous mixture of soil and flyash on an industrial scale, to the satisfaction of the engineer.

The quality of fly ash should be tested as per IRC :SP:58 to determine its suitability for embankment construction.

Density and compaction requirement of the embankment with Fly Ash modified soil in the above proportion shall conform to the Table 300-1 and 300-2 and Embankment construction is to conform to Clause 305 of the MORTH Specifications.

Fly Ash from Ash Ponds are to be transported to site of work with tarpaulin covered dump trucks to minimize the fugitive emission . It is to be ensured that pond ash is



free from unsuitable materials like peat, marsh, excessive salt which can leach, expansive clays and such material as are susceptible to spontaneous combustion.

(a) **Tests** . All tests and quality control on Fly Ash modified soil shall conform to Clause 900 of MORTH Specifications and IRC: SP: 58.

Rate for embankment construction with Fly Ash modified soil shall include all the items as prescribed under Clause 305.9 of MORTH Specifications and in addition it shall cover the full compensation for transportation of Fly Ash from Thermal power station to the site of works in tarpaulin covered dump trucks including all haulage and transportation, spreading and mixing with soil from borrowed area and all tests required. The embankment using flyash should be properly designed through slope stability analysis with suitable earth cover as per IRC: 75.


PART III

TECHNICAL SPECIFICATIONS FOR BUILDING WORKS

This part shall comprise the latest "Specifications for Building Works" Volume I to Volume IV, 1995 as published by the Central Public Works Department, Govt. of India and deemed to be bound into this document.



Volume – III - Page No. 64


Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank Project
Chief Engineer (Civil)
Orissa, State Water

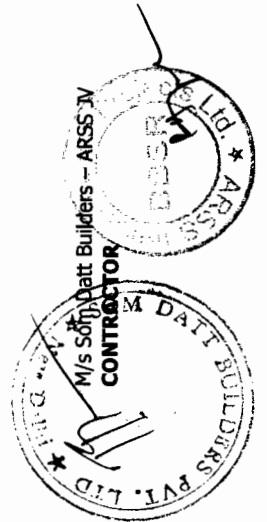
ENVIRONMENTAL MANAGEMENT PLAN

Pre-Construction Stage


S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
Pre-construction activities by Project Management Unit, Orissa Works Department					
P.1	Land Acquisition	<p>The acquisition of land and properties (govt./private) will be carried out in accordance with the Rehabilitation Action Plan and the entitlement framework for the project.</p> <p>The PIU has to ascertain that any environmental impacts resulting from additional acquisition of land shall be addressed and integrated into the EMP and other relevant contract documents.</p>	Land Acquisition Act 1984 and its Amendments; R&R Policy and RAP of OSRP.	PIU, Revenue Dept., NGOs, Collaborating Agencies	PIU /OWD /District Collectors
P.2	EMP Preparation of Resettlement Sites	<p>All R & R activities will be undertaken in accordance with the RAP document. It will be ensured that all R&R activities including preparation and implementation of environmental management plan for such site/s are completed before the construction activity starts on any section of ROW of existing/proposed road including bypasses.</p> <p>EMPs for such a Resettlement Site will be prepared in consultation with the concerned community. Plans will include specific actions in relation to basic services, health, hygiene and plantation.</p>	R&R Policy and RAP of OSRP.	PIU, Revenue Dept., NGOs, Collaborating Agencies	PIU /OWD /District Collectors
P.3	Tree Cutting	<p>Tree cutting is to proceed only after all the legal requirements including attaining of in-principle and formal clearances from the Forest Dept. /MoEF are obtained by OWD. In case of</p>	Orissa Forest Act, 1972; Orissa Timber	EMU of PIU /OWD, Forest Dept., OFDC /Tree Felling	EMU of PIU /OWD, Site Engineer



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>plantation outside forest areas, a joint enumeration of the trees to be cut shall be conducted by the PIU/OWD in association with Orissa Forest Development Corporation (OFDC) and the Forest Department, GoO.</p> <p>Subsequent approval orders shall be obtained from the concerned Divisional Forest Officers to fell the trees in compliance with the Orissa Timber and Other Forest Produce Transit Rules, 1980 and Orissa Forest Act, 1972. The tree felling operations will to be carried out by OFDC. No construction activity and tree felling can be taken up in any location of the contract package, which has not been cleared by the Regional C.C.F., Eastern Region, Bhubaneswar or the MoEF, Govt. of India.</p> <p>In all around, 6746 trees have been identified for cutting after design finalization. Details can be referred in Annexure 1. This doesn't include trees on forest land or those on private properties, which are proposed to be acquired for the project. The records shall be updated by the PIU as these figures are available upon completion of joint enumeration exercises for such sites.</p> <p>Activities pertaining to tree felling, logging, stacking of fire wood and passing of timber and removal are to be synchronized and removal of the converted materials shall be taken up by the responsible agencies as per tree cutting and removal rules as prescribed separately together with the prevailing of Orissa Timber and Other Forest produce Transit Rule 1980. or as specified by the Competent Authority.</p> <p>Trees will be removed from the Corridor of Impact before the</p>	<p>and Other Forest Produce Rules, MoRTH Framework Arrangements with the Department for OSRP</p> <p>Forest Transit 1980; 201.2;</p>	<p>Contractor</p>	<p>/Supervision Consultant</p>




S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>actual commencement of the construction work to prevent traffic problems and accidents.</p> <p>Tree cutting should not be carried out simultaneously all along the corridor as this will adversely impact the traffic movement and road safety. It should be carried out on priority basis at locations of diversions, bridge and culvert construction, and such other places where the construction work is scheduled to be started early i.e. is under priority one stretch as identified in the Contract Package.</p> <p>All workers involved in the cutting and removal of trees and demolition of structures shall wear safety helmets, gloves, and protective shoes and shall provided with a batch of first aid facility for attending to basic unforeseen and freak accidents. Emergency numbers and details of nearest hospitals shall be identified during work in each stretch of the road corridor and this information shall be with the Site Supervisor.</p> <p>On the spot records shall be maintained for all trees felled and logs, fire wood, stacks, obtained from such trees in the conversion register, which shall be available for verification by any competent supervising authority of the Forest Department, OWD/PIU and SC.</p> <p>No sooner the trees are felled, the same has to be kept under watch and ward by the felling agency and steps taken for its authentication by 'passing' carried out at stump site.</p> <p>The 'passing' by any Forest Officer not below the rank of an ACF of the Forest Department irrespective of the</p>			



 M/s Sam Datt Builders (P) Ltd.

 CONTRACTOR

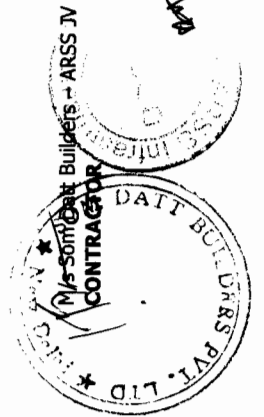
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S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.4	Relocation of Community Utilities and Common Property Resources	<p>location of the tree (either with in RoW or the acquired private land and govt. forest land) should be considered for quick removal of such trees. Uprooting of the stumps should start immediately after the logs and firewood are removed from the stump site to speed-up road construction.</p> <p>To the extent possible, felling of trees which are located beyond the hard shoulder - that is on the slopes of the embankment can be retained for reducing the loss of vegetative cover by careful selection of young and sound trees within 30cm girth and up to 1mtr girth.</p> <p>All community utilities and common property resources such as stand posts, bore wells, wells, ponds, water supply lines, toilets, sewage lines, drainage systems, optical fiber cables, electric power supply lines, transformers, irrigation pump houses, telephone and television cables shall have to be relocated and restored before the commencement of the road improvement activity. Details can be referred in Annexure 2. The fittings/pipes that can be re-utilized shall be salvaged and reused.</p> <p>While relocating these utilities and facilities, all concerned agencies including PIU shall take necessary pre-cautions and provide for barricading/delineation of such sites to prevent accidents including accidental fall into bore holes, pits, drains both during demolition and construction/ relocation of such facilities. Standard safety practices shall be adopted for all such works.</p> <p>Early completion of works for schools, colleges and health centres including shifting of gates and construction of boundary</p>	EMP Annexure 2 and RAP document of OSRP.	OWD/PIU; Concerned Agencies/Departments; Contractor	PIU/OWD, Site Engineer/Supervision Consultant



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>walls will be planned during holidays so that the risk of accidents and disturbance to day-to-day activity of such institutions is minimized.</p> <p>The schools and health centers will be constructed as per the relevant state norms. In case of govt. buildings, staff quarters, weekly and kisan markets, proper planning and extra care has to be taken to prevent unusual hardship to public on account of demolition/discontinuance of functioning of such facilities along with provision of appropriate safety measures during the construction /relocation process.</p> <p>Relocation sites for all CPRs shall be selected in consultation with concerned communities, local administrative authorities/departments and the gram sava. Environmental considerations with suitable/required actions including health and hygiene aspects will be kept in mind while relocating all community utilities and resources.</p> <p>The PIU/OWD will relocate these properties in consultation and written agreement with the agency/owner/community prior to initiation of any type of construction work/activity in such stretches. This includes construction of noise barrier walls, boundary walls, shifting of entrance gates and other protection works, specifically at school, college and health centre sites.</p> <p>Proper placement (as per codes) of passenger shelters/bus stops will be ensured to prevent distress to the commuters and passengers.</p> <p>The dismantled bore holes, wells and tap points shall be properly packed and sealed so that no external water or</p>			

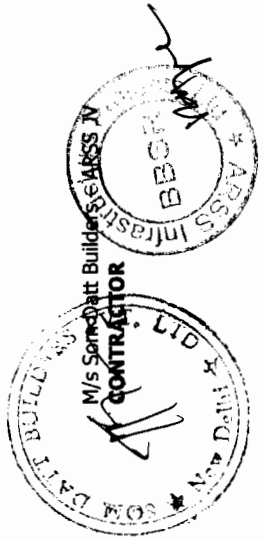


M/s Som Datt Builders - ARSS JV

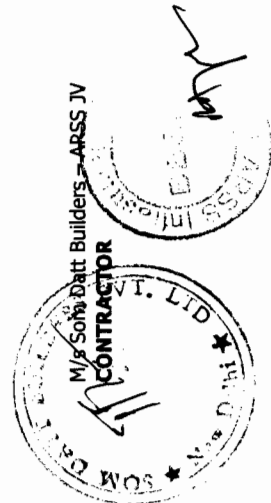
CONTRACTOR


Chief Engineer
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 Orissa, India-751005.

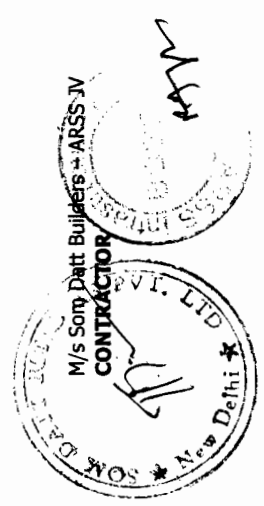
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.5	Relocation of affected Cultural and Religious Properties	<p>pollutants can enter such openings.</p> <p>All religious structures, statues (idols), mandaps and boundaries coming within the corridor of impact will be relocated after alternative sites are selected for relocation of these structures in consultation with the concerned communities, management committee/trust/endorsement authority and after disbursement of the due payments are made or construction is taken up and completed by the PIU /Contractor as per the design and specification approved by the community /endorsement.</p> <p>No cultural properties or religious structures shall be removed or relocated without the knowledge and written consent of the concerned parties or communities and local administration as the case may be.</p> <p>Sites for the relocation of these religious structures will be identified in accordance with the choice of the community. The NGO and PIU in consultation with local people will finalize design of these temples.</p> <p>As far as possible, the architectural elements of the structure should be conserved/reflected/translated into the design of new structures in accordance with wishes of the community.</p> <p>The relocation of such properties must be completed before commencement of any physical road improvement activity.</p> <p>Proper drainage and garbage disposal at such sites will be ensured to prevent unhygienic conditions, blocking of drains etc. at/near relocated structures. Garbage collection bins, soaks</p>	<p>EMP Annexure 2; RAP document of OSRP</p>	<p>EMU of PIU /OWD; NGOs; Contractor; Concerned Community</p>	<p>EMU of PIU /OWD, Site Engineer /Supervision Consultant</p>



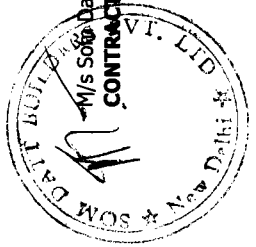
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.6	Orientation of Implementing Agencies	<p>pits or other appropriate measures will be provided apart from simple enhancement of such sites.</p> <p>The OWD/PIU shall organize orientation sessions during all stages of the project. This shall include on-site training (general as well as specific to the context of this sub-project) as well.</p> <p>These sessions shall involve concerned division-level staff of the OWD involved in this sub-project, Staff of the Site Engineer/ Supervision Consultant and the implementing agencies. Refer details in Chapter 4.</p>	Training Plan (EMP) – Chapter 4	<p>EMU OF PIU/OWD, Site Engineer/Supervision Consultant</p> <p>EMU OF PIU/OWD</p>	OF
Pre-construction activities by the Contractor/Environmental Officer of the Site Engineer/Supervision Consultant (SC)					
P.7	Field Verification and Modification of the Contract Documents				
P.7.1	Joint Field Verification	<p>The Environmental Officer of Supervision Consultant and the Contractor will carry out joint field verification to ascertain the possibility to saving trees, environmental and community resources wherever such representations or suggestions in writing have been received and forwarded by the project authority or by the site engineer in accordance with the local situations.</p> <p>In all such cases the interested organization/representatives, authority, expert (as required for a specific situation), executing and supervising agencies together with the local administrative set-up has to under take a joint field verification for assessing the pros and cons of such demands/suggestions to assess the need for any changes in the design and implementation plan for</p>		Contractor; Environmental Officer of SC	PIU/OWD



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>the activities earlier approved by the project authority.</p> <p>The complaints/suggestions together with the observations and expert opinion of the joint verification team containing the need for additional protection measures or changes in design/scale/nature of protection measures including the efficacy of enhancement measures suggested in the EMP shall be summarized in a written document containing all the details with date, time, place and signature of the individuals involved and this shall be sent to the EMU OF PIU/OWD for approval.</p> <p>The PIU shall maintain proper documentation and justifications/reasons in all such cases where deviation from the original EMP is proposed.</p>			
P.7.2	Assessment of Impacts due to Changes/Revisions in the Project Work	The Environmental Officer of SC will assess impacts and revise/modify the EMP in consultation with the PIU/OWD in accordance to the recommendation made by the field survey party in the event of changes /revisions (including addition or deletion) in the project's scope of work.	EA; Biodiversity Management Plan; EMP Document of OSRP	Contractor; Environmental Officer of SC	PIU/OWD
P.8	Crushers, Hot-mix Plants and Batching Plants Location	<p>Hot-mix and batching plants will be located 1000 mts. away from settlements, forests, wildlife movement areas and commercial establishments, preferably in the downwind direction. No plants can be set-up within 1000mts. from the following locations :</p> <ul style="list-style-type: none"> • 5.95km Ichhapur • 6.60km Berhampur • 8.19km Balibili 	MoRTH 111.1; Air Pollution Control Act; Noise Rules; EMP document of OSRP	Contractor	Environmental Officer of SC ; PIU/OWD




S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<ul style="list-style-type: none"> • 8.21km Mirjapur • 2.8km Nathasahi • 5.00km Karamil • 11.00km Alinagar • 11.4km Ranipur • 9.65km Dolasahi • 12.65km Paliabindh • 16.5km Tihidi • 12.75km Nandapur • 20.20km Kolha • 22.7km Maa Kali Temple • 24.5km Bindha • 26.00km Pirahat • 27.57km Kanpur • 29.100km Samantaraipur • 29.5km Gadibazar • 39.25km Digochia • 46.35km Gohulia • Bagudi • Randia • Barapada • Banta • Hatadihi • Banchoo • Fakirpur 			



 M/s Soma Datt Builders Pvt. Ltd.

CONTRACTOR



Chief Engineer

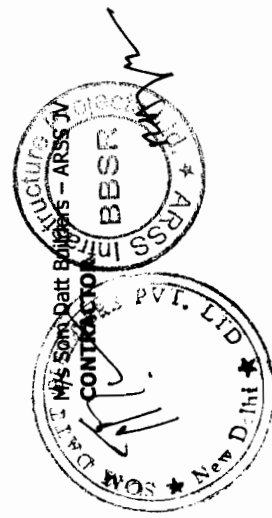
 World Bank Projects, Orissa

EMPLOYER

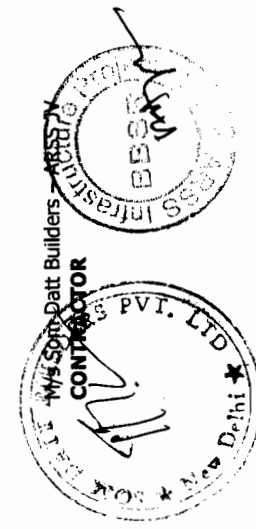
 (Government of India)

 Chief Engineer, Subansiri


S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<ul style="list-style-type: none"> Ambagadia SH-9- 26.430, 28.837, 30.154, 31.700, 35.825, 40.974 SH-53- 11.867, 13.507, 17.002, 21.024, 23.500, 34.000, 40.242 to facilitate movement of wildlife across the road by providing traffic calming measures. <p>The Contractor shall submit a detailed layout plan for all such sites and seek prior approval of Environmental Officer of SC before entering into formal agreement with a land owner for setting-up such sites. Actions by SC and PIU/OWD against any non-compliance shall be borne by the Contractor at his own cost.</p> <p>Arrangements to minimize dust pollution through provision of windscreens, mist spray units, and dust encapsulation will have to be provided at all such sites. Specifications of crushers, hot mix plants and batching plants should have to comply with the requirements of the relevant current emission control legislations and Consent / NOC for all such plants shall be submitted to the SC and PIU/OWD.</p> <p>No such installation by the Contractor shall be allowed till all the required legal clearances are obtained from the competent authority and the same is submitted to the PIU/OWD and the SC.</p>			
P.9	Other Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery to be procured for construction will confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under Environment Protection Act, 1986 will be strictly adhered to.	Air Pollution Control Act, 1981; Noise Rules; Motor Vehicle Act, 1988; EMP document of OSRP	Contractor	Environmental Officer of SC ; EMU of PIU /OWD




S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.10		<p>Efficient and environment friendly equipment confirming to the latest noise and effluent emission control measures available in the market should be used in the project.</p> <p>The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period, which shall be produced to the PIU/OWD and the Supervision Consultant for verification whenever required.</p>			
P.10.1	Borrow Areas	<p>Finalizing borrows areas for borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the Contractor. Locations finalized by the Contractor shall be reported to the Environmental Officer of SC and who will in turn report to PIU/OWD.</p> <p>SH-9- 26.430, 28.837, 30.154, 31.700, 35.825, 40.974 SH-53- 11.867, 13.507, 17.002, 21.024, 23.500, 34.000, 40.242 to facilitate movement of wildlife across the road by providing traffic calming measures.</p> <p>Format for reporting will be as per the Reporting Format for Borrow Area and will include a reference map and proposed rehabilitation plan. The Environmental Officer of the SC will be required to inspect every borrow area location and evaluate such proposals in accordance to environmental requirements prior to issuing approval for use of such sites.</p> <p>No borrow areas shall be opened within 500mts. from wildlife</p>	<p>IRC Borrow Management Framework given in the EMP of OSRP</p> <p>Guidelines; Area Contractor</p>	<p>Supervision Consultant; EMU of PIU /OWD</p>	




S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>movement zones and forest areas. The borrow areas shall be at least 300mts. from schools and village access roads.</p> <p>The Contractor will not start borrowing earth from the selected borrow area until a formal agreement is signed between land owner and Contractor and a copy of this agreement is submitted to the Environmental Officer of the SC. The Supervision Consultant shall report these facts to the PIU/OWD along with remarks in the prescribed format along with documentary proofs.</p> <p>Planning of haul roads for accessing borrow materials will be undertaken by the Contractor and these details will be provided in the format given in the EMP. The haul roads shall be routed to avoid agricultural areas as far as possible and will use the existing village roads wherever available. In case such agricultural land is disturbed, the Contractor will rehabilitate it as per Borrow Area Rehabilitation Framework given in this EMP or as approved by the Environmental Officer of SC.</p> <p>Haul roads shall be maintained throughout the operation period of the borrow areas by undertaking the required maintenance and repair works, which may include strengthening, pot hole repairing and diversions. Improvements shall be done to reduce inconvenience to users of these roads, residents living along the haul roads and minimize air and water pollution.</p> <p>Such measures will include, but not limited to, frequent sprinkling of water, repairing of the road, road safety provisions (warning and informatory signage, flagmen etc.), and ensuring covering of loaded vehicles by waterproof tarpaulin and</p>			



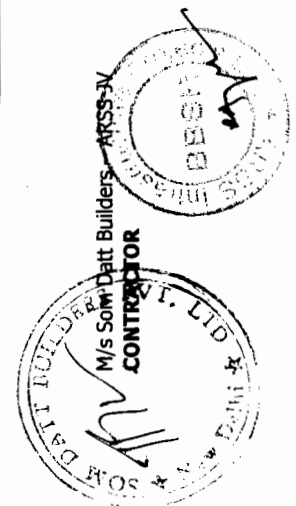
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CONTRACTOR
Delhi



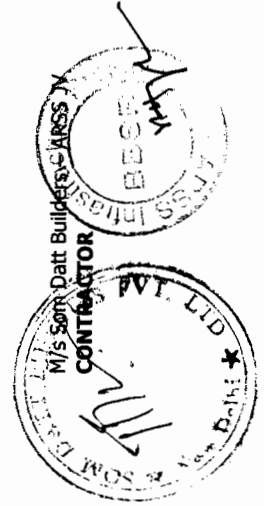
ARSS INFRASTRUCTURE
Bhubaneswar



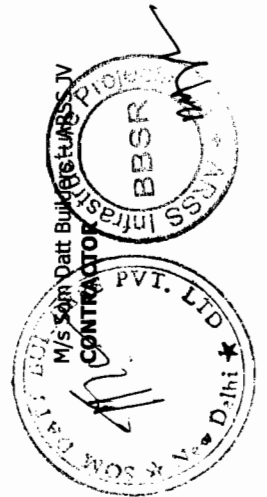
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.10.2	Quarry	<p>consultation with public and special precautions required near schools, health centers and settlement areas.</p> <p>All borrow areas whether in private, community or govt. land shall be restored either to the original condition or as per the approved rehabilitation plan immediately upon completion of the use of such a source. The Contractor shall plan and ensure rehabilitation work in such a manner that it is completed prior to the rainy season.</p> <p>Action against non-compliance in this regard shall be the sole responsibility of the Contractor and shall be made good at his own cost. Substantial completion or completion certificates for the civil work shall not be issued unless restoration and rehabilitation works are completed and the same has been approved by the SC and the PIU/OWD in writing.</p> <p>Contractor will finalize the quarry for procurement of construction materials after assessment of the availability of sufficient materials and other logistical arrangements.</p> <p>The Contractor will procure necessary legal permission for quarry opening and operation from Directorate of Mines, GoO; District Administration; SPCB and will obtain written approval from the local Tahasildar. A copy of such approval along with the rehabilitation plan shall be submitted to the PIU/OWD and Environmental Officer of Supervision Consultant.</p> <p>Format on quarry/ crushers along with the required maps showing site details and haul road network shall be submitted to PIU/OWD through the Environmental Officer of SC prior to initiating and operation of quarry sites for the project.</p>	<p>MoRTH 111.3; Quarry Management Framework given in the EMP of OSRP</p>	<p>Contractor</p>	<p>Supervision Consultant; PIU/OWD</p>



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>No quarry and/or crusher units shall be selected or used, which is within 1000mtrs. from a forest boundary, wildlife movement path, breeding and nesting habitats and national parks/sanctuaries. No quarries or crusher units for this contract package shall be established within 1000mtrs. from the following locations:</p> <p>SH-9</p> <ul style="list-style-type: none"> • 5.95km Ichhapur • 6.60km Berhampur • 8.19km Balibili • 8.21km Mirjapur • 2.8km Nathasahi • 5.00km Karamil • 11.00km Alinagar • 11.4km Ranipur • 9.65km Dolasahi • 12.65km Paliabindh • 16.5km Tihidi • 12.75km Nandapur • 20.20km Kolha • 22.7km Maa Kali Temple • 24.5km Bindha • 26.00km Pirahat • 27.57km Kanpur • 29.100km Samantaraipur • 29.5km Gadibazar 			



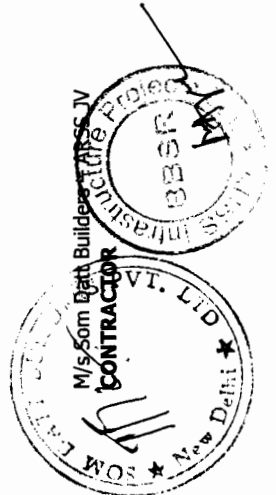
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P. 10.3	Sand (all river and	<ul style="list-style-type: none"> • 39.25km Digachhia • 46.35km Mahulia SH-53 • 2.0km Bagudi • 3.1km Randia • 7.0km Barapada • 19.4km Banta • 18.0km Tillo • 30.0km Hatadihi • 32.8km Banchoo • 41.5km Fakirpur • 34.0km Ambagadia • SH-9- 26.430, 28.837, 30.154, 31.700, 35.825, 40.974 • SH-53- 11.867, 13.507, 17.002, 21.024, 23.500, 34.000, 40.242 to facilitate movement of wildlife across the road by providing traffic calming measures. • Contractor will also work out haulage road network and report to Environmental Officer of Supervision Consultant who shall inspect and in turn report to PIU/OWD on the suitability of such haul roads from safety of residents, biodiversity and other environment point of views. All precautions for preventing accidents, spillage of materials and pollution, as mentioned in P.11.1 shall be adhered to by the Contractor. 	MoRTH 111.3;	Contractor	Supervision Consultant;



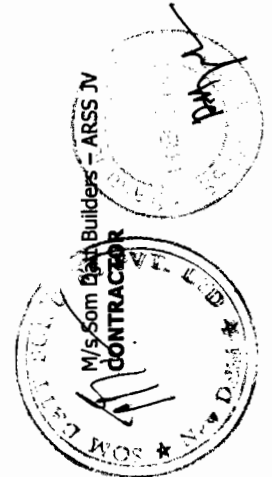
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
	stream beds used directly or indirectly for the project)	<p>impurities as per the locations indicated above. This procurement shall be made only after declaration of sand quarry sites by the local Tahasildar Anandpur, and Jajpur, K with the concurrence of the concerned District Collector with due regard to Orissa Miner Mineral Concession Rules, 2004 and regulation regarding protection of river basins by Irrigation department.</p> <p>In case of selection of new sites for sand quarrying, the Contractor shall obtain prior approval and concurrence from Competent District Authority and the Environment Officer of the SC keeping in view the objections and convenience of the local population, who may restrain such activities for their own security and safety.</p> <p>Where the supplier of sand is another party, the authentic copy of lease agreement that has been executed between the local Tahasildar and the supplier has to be submitted to SC and PIU/OWD Executive Engineer of the project before any procurement is made from such a site.</p> <p>To avoid accidents and caving in of sand banks at quarry sites, sand shall be removed layer by layer. Digging deeper than the permissible limit has to be completely avoided by the Contractor. Such quarry should be barricaded 10 mtr away from the periphery on all sides except the entry point, so as to prevent accidental fall of domestic cattle, wildlife and human beings.</p> <p>The flood embankment on either side of the river shall not be used for movement of tippers and loaders, which are likely to be damage and destroy such structures. Instead alternative haul</p>	Miner Concession Rules, 2004 Mineral Rules,		EMU of PIU /OWD



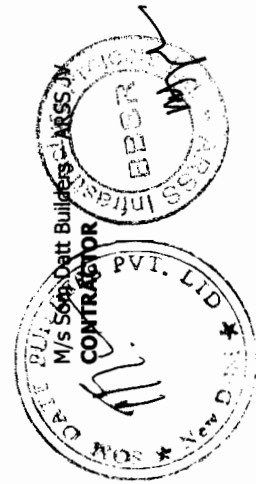
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.10.4	Arrangement for Construction Water	<p>roads will be constructed, avoiding the embankment for safety and security of the vehicles, road users and the habitations along the banks of the river.</p> <p>To avoid disruption/disturbance to other water users, the Contractor will extract water from fixed locations and consult the Environmental Officer of SC before finalizing the locations. The Contractor will provide a list of locations and type of sources from where water for construction will be used to the SC and the PIU/OWD.</p> <p>All efforts shall be made to ensure avoidance of competitive use of a single water source, which may be depleted on account of the stress caused by drawing of water for road construction activity by the Contractor.</p> <p>The Contractor should use surface water depending on the availability and quality by developing its own water storage units in a river bed during sand quarrying or by developing ponds during borrowing earth from where water can be lifted using diesel or electric pump sets.</p> <p>In case of nalas and water scarcity areas, the possibility/permission for sinking of bore wells adjacent to nalas and streams may be examined, such that while the water requirement for the road construction activity is met, these structures when abandoned will serve as a ground water recharge after suitable modification.</p> <p>Use of ground water facility shall be subject to the local legislation; ground water availability in the area and the granting of necessary permission by the Competent Authority</p>	State Norms and Water Policy	Contractor	Environmental Officer of SC ; PIU/OWD



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>as declared by the State Govt. The Contractor shall pay the royalty for use of such water as decided by the State Govt. under relevant norms. A copy of the permission obtained from the Competent Authority shall be submitted to Supervision Consultant and OWD prior to initiation of construction activity.</p> <p>Use of any other water source such as irrigation canals, ponds, water harvesting structures and river/stream, which is likely to strain and deplete availability for surrounding and downstream inhabitants will not be allowed. Contractor can use ponds, which are not in use by the community/wildlife or have been identified for filling-in for the proposed works, but in such a case, he will obtain a written consent from the owner and submit this to the SC.</p>			
P.11	Labor Requirements	The Contractor preferably will use unskilled labor drawn from local areas to provide maximum benefit to the local community especially to the SC and ST population along the corridor.	General Conditions of the Contract Document	Contractor	Supervision Consultant; PIU/OWD
P.12	Construction Camp Locations - Selection, Design and Lay-out	<p>Construction camps will not be proposed within 500mtrs. from the nearest settlement and 1000mtrs. from the nearest reserved or protected forest to avoid conflicts and stress on the local infrastructure facilities resources.</p> <p>Stock piling of construction materials and go downs shall be at least 500mtrs. from the nearest water source. These are to be located on higher ground to avoid impact during floods due to pollution or due to any accidental spillage of stored /stockpiled materials.</p> <p>All location and lay-out plans of such sites will be</p>	<p>Framework for Construction Camps; General Conditions of Contract Document</p>	Contractor	Supervision Consultant; PIU/OWD



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.13	Arrangements for Temporary Land Requirement	<p>submitted by the Contractor prior to their establishment and will be approved by the Environmental Officer of SC and OWD/PIU. Other conditions laid out in the Framework for Construction Camps (part of this EMP) shall apply.</p> <p>The waste disposal and sewage treatment shall be such that the environment is not polluted with the waste material and foul order including the effluents and wastewater generated at the campsite. The designing and setting up of these structures should be as per the approved site plan. This should include soak pits, septic tanks and arrangements for carriage of extra sewage by sealed mechanized containers for disposal at designated sites, as available in the locality, with due written permission from the Competent Local Authority.</p> <p>In case of non-receipt of any such permission from the competent authority as stated above, the provision of wider safety tanks and storage facility for garbage has to be made at the camp site as additional measures.</p> <p>The Contractor will carry out negotiations with the landowners for obtaining their consent for temporary use of their lands for haulage roads, approach roads, temporary diversions; stockpiling of bulk construction materials; establishment of camps, hot-mix plants, batching plants and crusher units with proper agreement, detailing the terms and conditions agreed between both the parties. This needs to include conditions governing activities to be ensured during the construction stage and at the time of decommissioning of the project.</p> <p>The agreement must contain the details of the land involved with relevant records of ownership. A copy of such agreement/s</p>	Contract Document	Contractor	Supervision Consultant; PIU/OWD



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.14	Orientation of Implementing Agencies	<p>(use and clean-up operations) shall have to be submitted to the Supervision Consultant and PIU/OWD.</p> <p>The OWD/PIU shall organize orientation sessions during all stages of the Project. This shall include on-site training (general as well as specific to the context of this sub-project) as well. These sessions shall involve staff of the Site Engineer/Supervision Consultant and the contractor/s. Refer details in Chapter 4.</p>	Training Plan (EMP) – Chapter 4	PIU/OWD, Site Engineer/Supervision Consultant	PIU/OWD

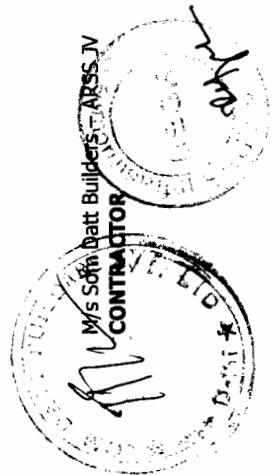
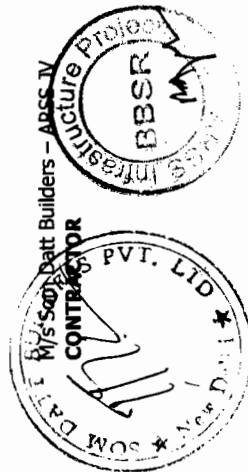


Table 3.2

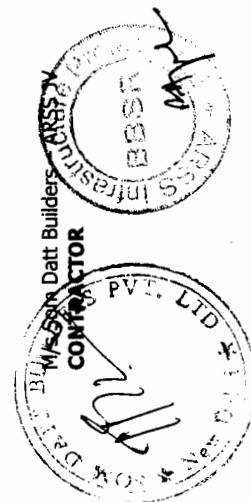
ENVIRONMENTAL MANAGEMENT PLAN

Construction Stage

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
Activities to be Carried Out by the Contractor					
C.1	Site Clearance				
C.1.1	Clearing and Grubbing	<p>Site clearance including clearance of marked trees for felling and removal has to be carried out much before the actual road construction takes place.</p> <p>Structures and utilities (cabins, commercial properties, hoardings, overhead power transmission lines, cable connections, telephone lines, bore wells, stand posts, wells, statues, temples etc.) should have been compensated/relocated as per RAP and EMP provisions before tree felling work and clearing or grubbing activities are undertaken since such activities may damage structures (private and govt.) and essential facilities/utilities of public use.</p> <p>All works shall be carried out in a manner such that the damage or disruption to flora is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary</p>	MoRTH 201.2	Contractor	Supervision Consultant; PIU/OWD

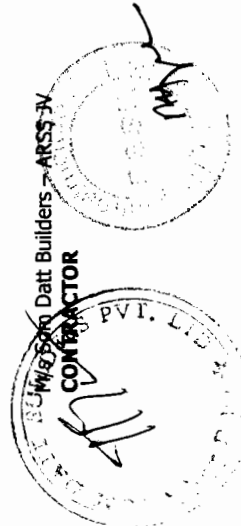


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>works will be removed with prior approval from Environmental Officer of SC.</p> <p>Any tree up to 30cm girth at breast height shall be uprooted mechanically with ball of earth intact for relocation and transplantation at various degraded sites, embankment of water body, ponds, temples, market places, schools and along road corridors for preventing complete loss of such vegetative cover.</p> <p>The Contractor, under any circumstances will not cut or damage trees. Vegetation above 30 cm girth will be considered as trees and can be compensated, in the event of OWD/PIU's written instruction to undertake tree cutting.</p>			
C.1.2	Generation of Debris from dismantling structures and road surface	<p>Debris generated due to the dismantling of the existing road will be suitably reused in the proposed construction as follows:</p> <p>➤ Eighty percent (60%) of the sub-grade excavated from the existing road surface, excluding the scarified layer of bitumen, shall be reused in the civil works after improving the soil below the sub-grade through addition of sand and suitable cementing material for qualitative up-gradation. The balance shall be used to raise the diversions and haulage roads to</p>	<p>Framework for Waste Management (EMP);</p> <p>Guidelines of Orissa State Pollution Control Board.</p>	Contractor	Supervision Consultant; PIU/OWD

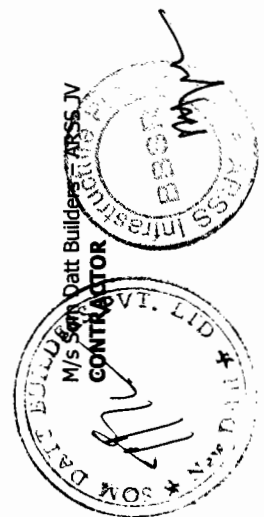


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>desired level, raise the embankments of drainage systems those are to reconstructed on account of expansion of the road, repair of pot holes, filling up of ditches and depressions along the corridor to prevent water logging, raising the earthen mounds at each 5th km nearer to habitations to serve as flood and cyclone shelters as well as recreations areas through plantations of medicinal and religious trees and development of utility centers on abandoned roads to make it more pliable and wide.</p> <ul style="list-style-type: none"> ➤ The dismantled scraps of bitumen will be utilized for the paving of cross roads, access roads and paving works in construction sites and campus, temporary traffic diversions, haulage routes, parking areas along the corridor or in any other manner approved by the Environmental Officer of SC. ➤ At locations identified for disposal of residual bituminous wastes, the disposal will be carried out over a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. ➤ The Contractor will suitably dispose off unutilized non-toxic debris either through filling up of borrows areas located in wasteland 			

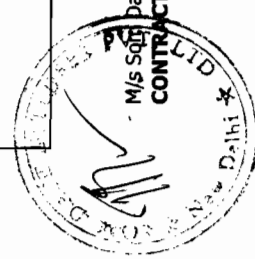
Shri. Datt Builders - ARSS JV
CONTRACTOR




Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>or at pre-designated disposal sites, subject to the approval of the Environmental Officer of SC.</p> <p>➤ Debris generated from pile driving or other construction activities along the rivers and streams drainage channels shall be carefully disposed in such a manner that it does not flow into the surface water bodies or form puddles in the area.</p> <p>The pre-designated disposal locations will be a part of Comprehensive Solid Waste Management Plan to be prepared by Contractor in consultation and with approval of Environmental Officer of SC and approval local competent authority.</p> <p>All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, considered incidental to the work, will be planned and implemented by the Contractor as approved and directed by the Environmental Officer of SC and OWD/PIU.</p> <p>All disposal sites shall be identified by the Contractor and a rehabilitation plan (including details about pollution prevention and safety measures) for each such site shall be submitted in the approved format. These shall be verified and</p>			



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>approved by the Environment Officer of SC in consultation with the Local Competent Authority after joint site visits, prior to disposal of any debris or waste materials.</p> <p>The Contractor shall then enter into an agreement with the concerned land owner/s and a copy of this document shall be submitted to OWD/PIU through Environment Officer of SC.</p>			
C.1.3	Other Construction Wastes Disposal including Fly Ash	<p>The pre-identified disposal locations will be a part of Comprehensive Waste Disposal & Solid Waste Management Plan to be prepared by the Contractor, which needs to be approved by the Environmental Officer of SC (as per the process described in C.1.2). Disposal sites will be finalized prior to initiation of any work on a particular section of the road.</p> <p>Contractor will ensure that any spoils/materials unsuitable for embankment fill shall not be disposed off near any water course; water body; agricultural land; natural habitats like grass lands, wet lands, flood plains, forests etc.; pastures; eroded slopes; and in ditches, which may pollute the surrounding including water sources.</p> <p>Such spoils from excavation can be used to reclaim borrow pits and filling-up of depressions</p>	<p>Framework for Waste Management (EMP);</p> <p>Guidelines of Orissa State Pollution Control Board.</p>	Contractor	Supervision Consultant; PIU/OWD



M/s SSGP Datt Builders
CONSTRUCTION PRIVATE LIMITED
New Delhi

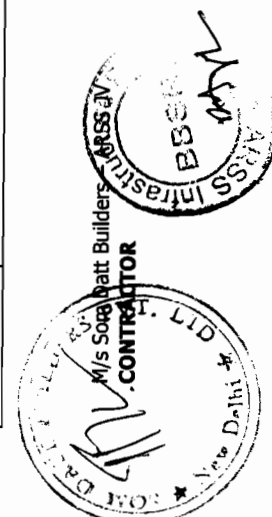


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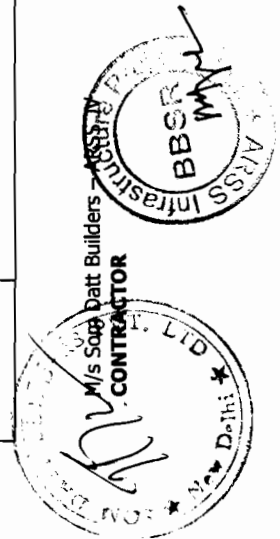
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>which are not connected to any water source in the locality nor under use by the local people.</p> <p>Surplus fly ash, bottom ash and lime, if any transported for use on this corridor shall not be left open and dumped at any disposal site. Contractor shall take care of such residual materials for use at any other location/s of new embankment construction work with proper protection measures.</p> <p>The re-use and disposal of debris from diversions shall be the responsibility of the Contractor, which includes rehabilitation and restoration of such sites. These quantities also need to be reflected in the Solid Waste Disposal Plan.</p> <p>Non-bituminous wastes other than fly ash may be dumped in borrow pits (preferably located in barren lands) where such borrow pits are not suitable to develop as an economic source like pisciculture or a source of irrigation. Such borrow pits can be filled up with non-bituminous wastes and then covered with a minimum 30cm layer of the soil, where plantation of trees and shrubs will be taken-up by the Contractor as a part of site rehabilitation. The species suitable for such rehabilitation work shall be at least one-year-old saplings of Alstonia, Ziziphus, Bel, Peepal, Banyan, Babool, Arjuna, Karanja, Samania, Siris,</p>			



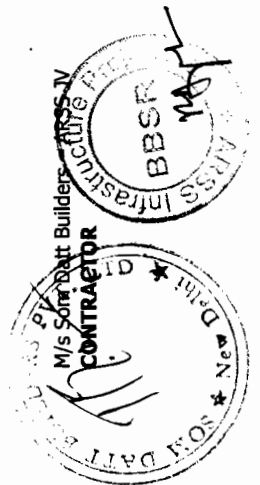
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>Neem, Maha Neem, Tamrind, Fasi, etc.</p> <p>No disposal site shall be created as part of the project, without prior approval of the Environmental Officer of SC, OWD/PIU and Local Competent Authority. SC will keep strict vigil on this aspect and ensure that work is not permitted without appropriate Solid Waste Disposal Plan in place.</p> <p>The Contractor at his own cost shall resolve any claim, arising out of waste disposal or any non-compliance that may arise on account of lack of action on his part.</p>			
C.1.4	Stripping, stacking and preservation of top soil	<p>The top soil from all sites including road side widening and working area, cutting areas, quarry sites, borrows areas, construction camps, haul roads in agricultural fields (if any) and areas to be permanently covered shall be stripped to a specified depth of 150mm and stored in stockpiles for reuse.</p> <p>A portion of the temporarily acquired area and/or RoW edges will be earmarked for storing top soil. The locations for stacking will be pre-identified in consultation and with approval of Environmental Officer of SC. The following precautionary measures will be taken by the Contractor to</p>	<p>MoRTH: 301.3.2; MoRTH: 301.7; MoRTH: 301.3.3; MoRTH: 305.3; Framework for Borrow Areas</p>	Contractor	Supervision Consultant; PIU/OWD



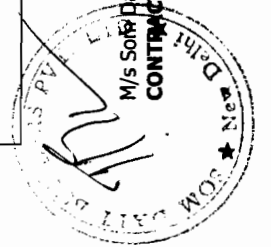
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>preserve the stockpiles till they are re-used:</p> <p>(a) Stockpile will be such that the slope does not exceed 1:2 (vertical to horizontal), and height is restricted to 2 m.</p> <p>(b) To retain soil and to allow percolation of water, the edges of the pile will be protected by silt fencing.</p> <p>(c) Multiple handling kept to a minimum to ensure that no compaction occurs.</p> <p>(d) Such stockpiles shall be covered with empty gunny bags or will be planted with grasses to prevent loss during rains.</p> <p>Such stockpiled topsoil will be utilized for -</p> <ul style="list-style-type: none"> ➤ Covering reclamation sites or other disturbed areas including borrow areas (not those in barren areas) ➤ Top dressing of road embankment and fill slopes ➤ Filling up of tree pits and ➤ In the agricultural fields of farmers, acquired temporarily that need to be restored. <p>Residual topsoil, if there is any, will be utilized for the plantation works along the road corridor.</p>			



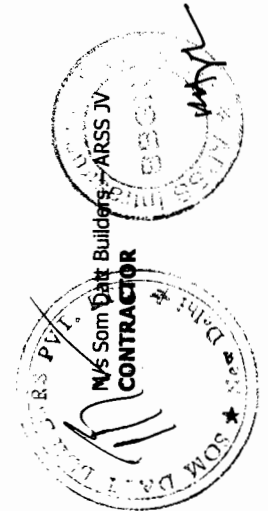
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>The utilization as far as possible shall be in the same area/close to the same area from where the top soil was removed.</p> <p>The stripping, preservation and reuse shall be carefully inspected, closely supervised and properly recorded by the SC.</p>			
C.1.5	Accessibility	<p>The Contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road by providing temporary connecting road, as necessary.</p> <p>Construction activities that shall affect the use of side roads and existing accesses to individual properties, whether public or private, shall not be undertaken without providing adequate provision approved by the SC.</p> <p>The Contractor will take care that the cross roads are constructed in such a sequence that construction work over the adjacent cross roads are taken up in a manner that traffic movement in any given area does not get affected.</p>	MoRTH specifications and IRC guidelines	Contractor	Supervision Consultant; PIU/OWD
C.1.6	Planning for Traffic Diversions and Detours	Detailed traffic control plans will be prepared and submitted to the Resident Engineer of SC for approval, minimum seven days prior to	MoRTH: 112; IRC SP:55	Contractor	Supervision Consultant; PIU/OWD




Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>commencement of works on any section of road.</p> <p>The traffic control plans shall contain details of temporary diversions, traffic safety arrangements including night time safety measures, details of traffic arrangement after cessation of work each day, safety measures undertaken for transport of hazardous materials and arrangement of flagmen etc. to regulate traffic congestion.</p> <p>The Contractor will provide specific measures for safety of pedestrians and workers as a part of traffic control plans.</p> <p>Temporary diversions will be constructed with the approval of the Resident Engineer and Environmental Officer of Supervision Consultant. The temporary traffic detours will be kept free of dust by sprinkling of water three times a day or as required under specific conditions and directed by the SC (depending on weather conditions, construction in the settlement areas and volume of traffic). The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow.</p> <p>The Contractor will also inform local community of changes in traffic routes and pedestrian access</p>			



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.2	Construction Material	arrangements with assistance from SC and OWD.			
C.2.1	Earth from Borrow Areas for Construction	<p>No borrow area will be opened without permission of the Environmental Expert of Supervision Consultant. The location, shape and size of the designated borrow areas will be as approved by the Environmental Expert of Supervision Consultant and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961).</p> <p>The borrowing operations will be carried out as specified in the guidelines for setting and operation of borrow areas.</p> <p>The unpaved surfaces used for the haulage of borrow materials, if passing through the settlement areas or habitations; will be maintained dust free by the Contractor. Sprinkling of water will be carried out thrice a day to control dust along such roads during their period of use.</p> <p>During dry seasons (winter and summer) frequency of water sprinkling will have to be increased according to the site and climatic conditions in the settlement areas and Environmental Officer of SC will decide the</p>	MoRTH: 305.2; Framework for Borrow Area Management	Contractor	Supervision Consultant; PIU/OWD

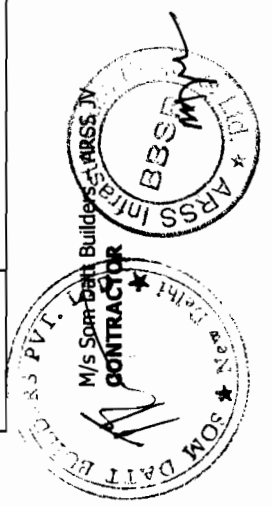


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>numbers of sprinkling depending on the local requirements.</p> <p>Contractor will rehabilitate the borrow areas as soon as borrowing is over from a particular borrow area in accordance with the Framework for Borrow Area Management (refer Framework – 4) or as suggested by Environmental Expert of Supervision Consultant.</p>			
C.2.2	Quarry Operations	<p>The Contractor shall obtain materials for quarries only after the approval of Department of Mines, Govt. of Orissa and the District Administration. A copy of this consent must be submitted to OWD/PIU through Environment Expert of SC.</p> <p>The Contractor will develop a Comprehensive Quarry Redevelopment Plan, as per the Mining Rules of the State and submit a copy to OWD and SC prior to opening of the quarry site.</p> <p>The quarry operations will be undertaken within the rules and regulations in vogue.</p>	MoRTH:111.3	Contractor	Supervision Consultant; PIU/OWD
C.2.3	Transporting Construction Materials and Haul Road Management	Contractor shall maintain properly (as directed by SC) all roads (existing or constructed for the project), which are used for transporting construction materials, equipment and	MoRTH specifications	Contractor	Supervision Consultant; PIU/OWD

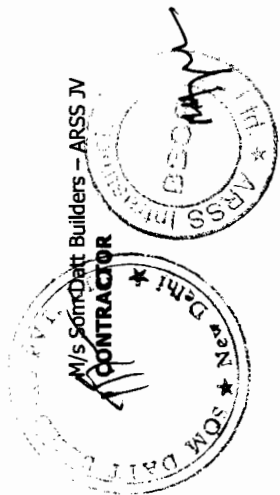


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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
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		<p>machineries.</p> <p>All vehicles delivering goods to the site shall be covered to avoid spillage of materials and air pollution.</p> <p>It shall be the responsibility of the Contractor to ensure that highways and other roads used for transportation of construction materials are clear from any dust, sand, soil, aggregates etc., fallen from the transporting vehicles used for the project. Contractor will arrange for regular water sprinkling for dust suppression of all such roads and surfaces, as directed by Environmental Officer of SC.</p> <p>The unloading of all materials at construction sites will be limited to day time only to avoid accidents. Screens of hessian cloth, agro-net and such other barricading material like geo-synthetic fabrics are to be erected along all dumping and stockpiling sites, so that generation of the dust in the vicinity of such locations can be minimized to a great extent.</p>			
C.2.4	Construction Water	<p>Contractor will arrange adequate supply and storage of water for the whole construction period at his own cost.</p> <p>The Contractor will take all precaution to</p>	State Water Policy; Water Act and	Contractor	Supervision Consultant; PIU/OWD



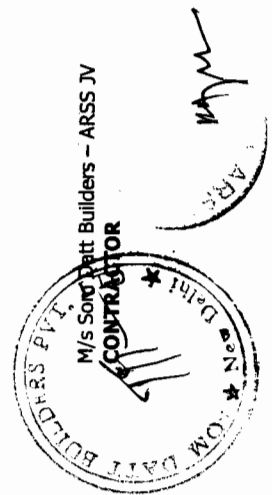
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.3	Construction Work	minimize the wastage of water in the construction process and related operations.	Rules		
C.3.1	Disruption to Other Users of Water	<p>While working across or close to any perennial water bodies, Contractor will not obstruct/ prevent the flow of water.</p> <p>Construction over and close to the non-perennial streams shall be undertaken in dry season and if such activity is likely to disrupt, constrain or impact the community use of the water body, adequate prior information (at least two weeks in advance) will be provided to such community. Such water body may be ponds, water harvesting structures (WHS), feeder channels to pond, irrigation sources etc.</p> <p>If the supply of water or access to a source is being completely cut off, then the Contractor shall make necessary arrangements to provide water in the interim period. Water quality test shall be done prior to providing / supplying the water.</p> <p>In all such cases specific provision of lessening the impact of construction has been elaborated in the design plan of retaining walls, spillways and ghats in Drawing No. OSRP/CEG/SH /ENV/03</p>	MoRTH:304.3.2 ; Water Rules and Policy of the State	Contractor	Supervision Consultant; PIU/OWD



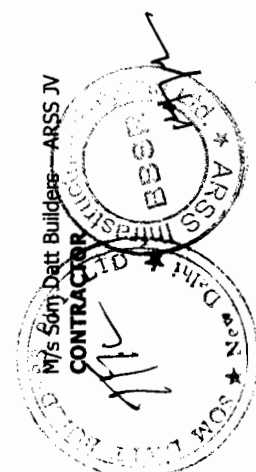
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>Wherever excavation for diverting water flow will be required as per the engineering designs, the Contractor will ensure that such diversion channels have no steeper slopes than 1:2 (V to H). Proper slope protection measures have to be taken as approved by the Environmental Officer of SC and OWD/PIU.</p> <p>The Contractor will take prior approval of the River Authority or Irrigation Department and SC for any such activity. The OWD/PIU will ensure that Contractor has served the notice to the downstream users of water well in advance where such diversion of the flow is likely to affect the down stream population subject to the condition that under no circumstances the down stream flow shall be stopped putting the wildlife, the aquatic fauna and the shore line settlement under distress.</p> <p>Minimum eco-flow shall be maintained even during the construction stage by ensuring downstream connection to the main channel.</p>			
C.3.2	Drainage and Flood Control	<p>Contractor will ensure that no construction materials like earth, stone, ash or appendage disposed off so as not to block the flow of water of any water course and cross drainage channels.</p> <p>Where necessary adequate mechanical devices to</p>	MoRTH:305.3.7 ; MoRTH:306	Contractor	Supervision Consultant; PIU/OWD


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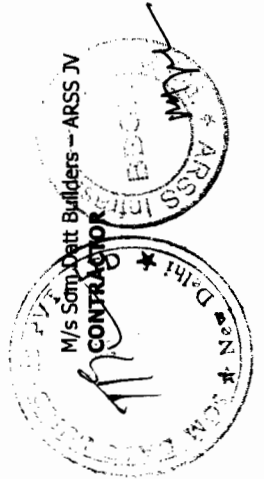
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>bail out accumulated water from construction sites, camp sites, storage yard, excavation areas are to be pre-settled and arranged well in advance of the rainy season besides providing temporary cross drainage systems.</p> <p>The contractor will take all adequate precautions to ensure that construction materials and excavated materials are enclosed in such a manner that erosion or run-off of sediments is controlled. Silt fencing shall be installed prior to the onset of the monsoon at all the required locations, as directed by Environmental Officer of SC and OWD/PIU.</p> <p>The contractor will also ensure that no material blocks the natural flow of water in any water course or cross drainage channel.</p> <p>Prior to monsoon, the contractor will provide either permanent or temporary drains to prevent water accumulation in surrounding residential, commercial and agricultural areas. Additionally, all structure construction sites shall be cleared/cleaned-up.</p> <p>A pre-monsoon joint inspection (in May first week) by SC and/or PIU/OWD will be conducted to identify all such areas which need to be cleared</p>			



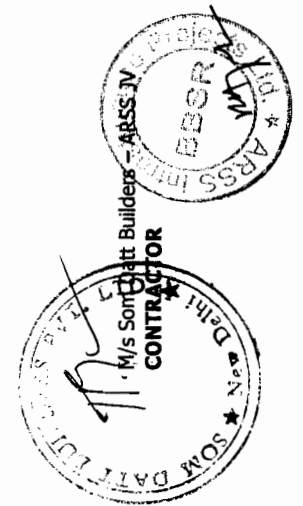
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				Execution / Civil Work	Supervision/ Monitoring
		and restored before the onset of rains.			
C.3.3	Siltation of Water Bodies and Degradation of Water Quality	<p>Contractor will construct silt fencing at the base of the embankment construction near all water bodies (including wells) and around the stockpiles at the construction sites.</p> <p>Silt fencing will be provided prior to the commencement of earthwork and continue till the stabilization of the embankment slopes is complete on the particular sub-section of the road.</p> <p>The contractor will also put up sedimentation cum grease traps at the outer mouth of the drains located in truck lay byes and bus bays which are ultimately entering into any surface water bodies / water channels with a fall exceeding 1.5 m.</p> <p>Contractor will ensure that construction materials containing fine particles are stored in an enclosure such that sediment-laden water does not drain into nearby water bodies.</p>	MoRTH: 306; Silt Fencing Details in Annexure 4	Contractor	Supervision Consultant; PIU/OWD
C.3.4	Slope Protection and Control of Soil Erosion	<p>➤ The contractor will construct slope protection works as per design, or as directed by the Environmental Officer of SC to control soil erosion and sedimentation through use of dykes, sedimentation chambers, basins, fiber</p>	MoRTH: 305.2.2.2; MoRTH: 306.2; Framework for	Contractor	Supervision Consultant; PIU/OWD



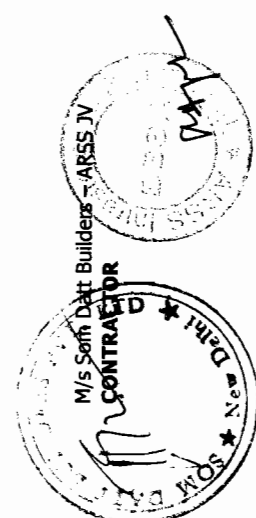
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>mats, mulches, grasses, slope drains and other devices as required under specific local conditions.</p> <p>➤ All temporary sedimentation, pollution control works and maintenance thereof will be deemed as incidental to the earth work or other items of work and as such no separate payment will be made for them.</p> <p>Contractor will ensure the following:</p> <p>➤ After construction of road embankment, the side slopes of all cut and fill areas will be graded and covered with stone pitching, grass and shrub as per design specifications.</p> <p>➤ Terfing works will be taken up as soon as possible provided the season is favorable for the establishment of grass sods.</p> <p>➤ Other measures of slope stabilization will include mulching netting and seeding of batters and drains immediately on completion of earthworks with sowing of seeds of grass, shrub and bushes 30cm interval from line to line across the slope and sprinkling of water on such slopes after completion of the earth work.</p> <p>➤ Regular watering shall be provided at such</p>	Soil Erosion and Sedimentation Control		



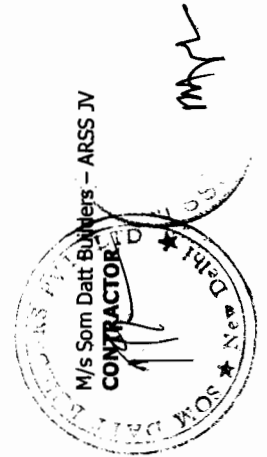
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>locations as required. In all these cases, seeds of Banachakunda (Cassia tora), Banakolthi (Tephrosia), Bala (Sida species), Vetiver grass, Pamarosa grass, Croton bonplandianus (Gandha tulasi), Jatropha gossypifolia etc. will be used.</p> <ul style="list-style-type: none"> ➤ In borrow pits, the depth shall be regulated so that the sides of the excavation should not be steeper than 1 vertical to 2 horizontal, from the edge of the final section of the bank. ➤ Along sections abutting water bodies, stone pitching as per design specification will be provided to protect slopes. All such stone pitching should have a filter layer to prevent scouring and settlement of the pitched surface when the water level recedes. ➤ Stabilization of the embankment with appropriate technique/s shall commence soon after the embankment formation. ➤ Any existing drainage channel or body shall not be obstructed during filling operations. ➤ The embankment slope shall be maintained as per IRC specifications. 			



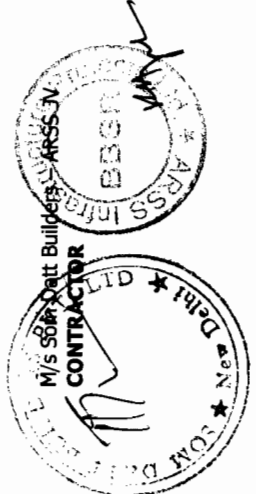
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.4	Pollution				
C.4.1	Water Pollution				
C.4.1.1	Water Pollution from Construction Wastes	<p>The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system by providing safe wastewater soak pits away from any aquifers or water body.</p> <p>The Contractor will avoid continuation of construction activity close to the streams or water bodies during monsoon. Stream courses and drains will be kept free from dumping of solid wastes, excavated earth, sludge and discharge of waste water from construction camps and sites. Liquid wastes arising from construction sites are to be impounded into collection pits.</p> <p>Construction materials containing fine particles like lime stone, lime, cement, fine aggregates etc. shall be stored in enclosures away from water bodies on high land to ensure that any run off from such locations does not drain into nearby water courses.</p> <p>No garbage, sludge, lubricants, fuel, sewerage or contaminated waste water is to be released in the settlement areas, water bodies, forests and wildlife</p>	<p>MoRTH: 111.4; MoRTH: 111.1; Water Act, 1974</p>	Contractor	Supervision Consultant; PIU/OWD, SPCB



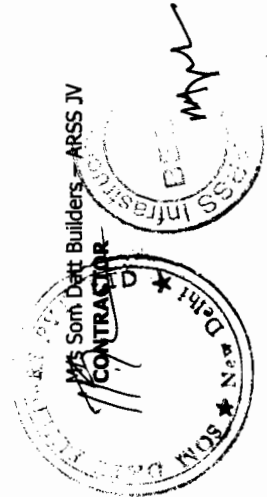
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>habitats or grazing areas. All waste arising from the project is to be disposed off in the manner that is acceptable to the State Pollution Control Board or as directed by Environmental Expert of Supervision Consultant.</p> <p>The Environmental Expert of SC will specify in the progress reports on whether the all liquid wastes disposed off from the various sites meets the discharge standards as specified by the CPCB Govt. of India. If case of non-compliance actions taken by SC shall also be specified.</p> <p>This shall be done on the basis of pollution monitoring results received from the Contractor and that from the Independent Agency hired by OWD/PIU.</p>			
C.4.1.2	Water Pollution from Fuel, Lubricants and Chemicals	<p>The Contractor will ensure that location of parking lots; garage; fuel/lubricants storage sites; POL waste collection sites; vehicle, machinery and equipment maintenance and refueling sites (other than those located inside construction camps, for which the relevant clause is applicable); are located on high ground at least 500 m from rivers, streams, canals, ponds, wildlife movement areas, forests and ground water sources.</p> <p>If such areas are located on agricultural land, top</p>	<p>MoRTH: 111.4; MoRTH: 111.1; Petroleum Act and Rules; MoEF/CPCB Notifications; Framework for Construction</p>	Contractor	Supervision Consultant; PIU/OWD, SPCB



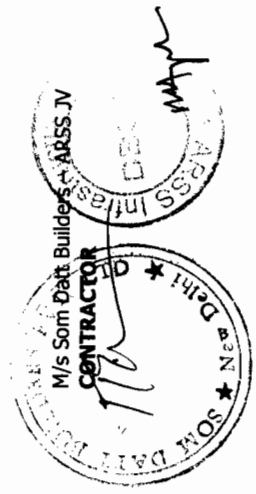
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>soil will be stripped, stockpiled and returned after cessation of such use.</p> <p>Garage, service stations, refueling stations and equipment maintenance yards shall be so located at least 100mts. away from kitchen, mess and drinking water facilities within the camp site.</p> <p>The Contractor will ensure that all vehicle/machinery and equipments operation, maintenance and refueling will be carried out in such a fashion that any spillage (while working or accidental) of fuel and lubricants does not contaminate the land and water resources.</p> <p>There shall be lined drains and service ramps with oil and grease traps/oil interceptors (as per the design provided) in such areas to prevent liquid wastes from entering into any aquifer, local water source, abandoned well, bore well, pond and other water bodies.</p> <p>Storage of drums (both filled and empty) and refueling shall be done on concrete platforms (impervious surface). Additionally, roofing (of any type) shall be provided to prevent contamination of land and water due to run-off from such sites during rains. Oil interceptors are also to be provided at vehicle parking areas.</p> <p>The contractor will arrange for collection, storage,</p>	Camps		



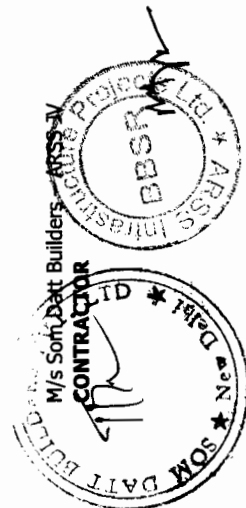
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>reuse/disposal of spent oil, lubricants, grease, sludge, slurry, bitumen, chemicals, paints etc. Covered bins/drums (marked specifically regarding the contents) shall be kept separately at maintenance and refueling areas.</p> <p>Disposal shall be at pre-identified sites (list to be submitted to SC and OWD/PIU) as approved by the Environmental Officer of SC. All spills and collected petroleum products will be disposed off in accordance with the prevailing MoEF and SPCB guidelines issued for such purpose. Environmental Officer of SC will certify that all arrangements comply with the guidelines of SPCB/ MoEF or any other relevant laws such as the Central Excise and Explosive Substances Act.</p>			
C.4.2	Air Pollution				
C.4.2.1	Dust Pollution	<p>The contractor will take every precaution to reduce the level of dust (SPM and RSPM) from crushers, material storage yards, haul roads and construction sites (including earthwork, dismantling, scarification and material mixing sites) by sprinkling of water, mist spray, encapsulation of dust source and erection of screen /barriers.</p> <p>Hot mix plant and batch mix plant will be fitted with dust extraction units and mist spray to keep</p>	<p>MoRTH:111.1; MoRTH:111.5; MoRTH:111.9; MoRTH:111.10; Air Act; SPCB Rules and Guidelines</p>	Contractor	Supervision Consultant; PIU/OWD, SPCB



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>down the dust emission levels. The suspended particulate matter value at a distance of 40m from a unit located in such a cluster should be less than 500 µg/m³.</p> <p>Dust screening vegetation such as Dwarf bamboo, Justiacea, Vitex negundo, Lawsonia inermis will be planted around the crusher sites besides provision of dust screens.</p> <p>The contractor will provide necessary certificates to confirm that all crushers used in the project conform to relevant dust emission control legislation. Air pollution monitoring will be conducted as per the Pollution Monitoring Plan and results shall be used to strengthen/rectify problematic areas. If other existing crushers are used, such units need to have valid license from the SPCB.</p> <p>Copies of the required certificates and consents of the operator owner shall be procured by the Contractor and submitted to OWD/PIU through Environment Officer of SC prior to the procurement of material from such units. The Resident Engineer will ensure that the necessary documents have been submitted by the contractor before material procurement permission is issued by the Materials Engineer of SC.</p>			



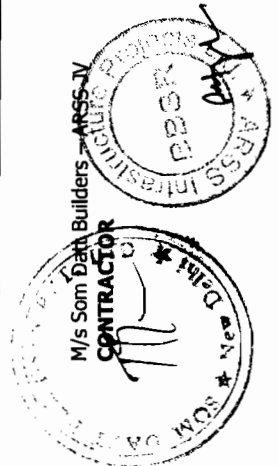
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.4.2.2	Emission from Construction Vehicles, Equipment and Machineries	Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and conform to the emission standards specified by the CPCB. Certification issued for such contrivances obtained from designated/approved authority shall be submitted along with the specified reporting format. The contractor will maintain a separate file and submit PUC certificates for all vehicles/equipment/machinery used for the project. Monitoring results will also be submitted to SC and OWD/PIU as per the Pollution Monitoring Plan in the specified format.	Motor Vehicles Act	Contractor	Supervision Consultant; PIU/OWD, SPCB
C.4.3	Noise Pollution				
C.4.3.1	Noise Pollution: Noise from Vehicles, Plants and Equipment	The Contractor will ensure the following: ➤ All plants and equipment used in construction (including those of sub-Contractors and/or suppliers such as aggregate crushing plants) shall strictly conform to the MoEF/CPCB noise standards and shall have latest noise suppression mountings. ➤ All vehicles and equipment used in construction will be fitted with exhaust	Noise Rules, 2002	Contractor	Supervision Consultant; PIU/OWD; SPCB, Affected Communities



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
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		<p>silencers.</p> <ul style="list-style-type: none"> ➤ Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective, these shall be replaced. ➤ Limits for construction equipment used in the project such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) Rules, 1986. ➤ Maintenance of equipment, machinery and vehicles (including proper lubrication, tuning, checks for muffler effectiveness) shall be regular and up to the satisfaction of the Environmental Officer of SC to keep noise levels under control . ➤ Construction activity at sites within 100m habitations and hospitals shall not be carried out during night (10:00 pm to 06:00 am). ➤ Construction activity at sites within 500m from wildlife movement zones, reserved and protected forest areas shall not be carried out 			<p>; PRIs; NGOs; Staff at Schools and Health Centres</p>



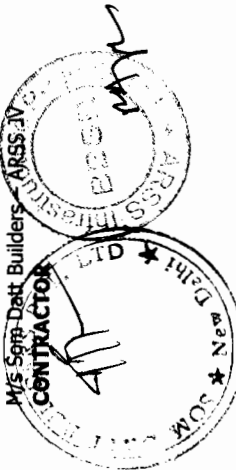
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>between 06:00 pm to 06:00 am.</p> <p>➤ The Contractor will not take any construction activity around educational institutes within a distance of 100 m between the working hours of these sensitive receptors.</p> <p>➤ Contractor will provide noise barriers at all sensitive receptors mentioned in Tabular statement under Chapter -2 of EMP, which includes masonry walls and vegetative screens (creepers) as per the design drawing no. OSRP/CEG/SH/ENV/04B.</p> <p>These locations include 34 temples (SH-9-0.915,11.362,11.928,11.932,13.167,13.280,14.583,18.413,19.376,21.975,23.640,24.584,26.023,27.500,27.746,29.400,33.010,30.960,31.347,39.810,40.000,42.577,42.927,43.317 SH-53 3.480,</p> <p>3.790,3.837,20.000,24.250,25.870,29.710,40.580,41.640,42.300) Chandbali to Bhadrak and Bhadrak to Anandpur on SH-9 and SH-53 respectively, 8 schools and 1 college (SH-9- 21.000,27.780,36.200,40.720,31.300 SH-53-</p> <p>5.750,8.320,17.590,20.250,33.960,35.150,44.600) on the above roads, 2 Hospitals at (13.300km on SH-9 and 29.250kms on SH-53), 8 govt. buildings (SH-9-</p>			



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>4.525,16.355,17.100,39.662,32.885,31.300 and SH-53- 0.980, 20.050,20.220,31.710,41.300km, Blasting operations, if any shall be carried out with full safety precautions and in compliance with measures as specified in the legal provisions.</p> <p>➤ Monitoring shall be carried out at the construction sites as per the noise monitoring plan and results will be submitted to SC and OWD/PIU.</p> <p>Environmental Officer of SC will be required to regularly inspect all above mentioned sites to ensure proper compliance of the said measures.</p>			
C.5	Safety				
C.5.1	Personal Safety Measures for Labour	<p>Contractor shall provide (including enforcement with zero tolerance):</p> <p>➤ Protective footwear and protective goggles to all workers employed on mixing asphalt materials, cement, mortars, concrete, welding sites, blasting, crusher and stockpiling locations etc. as per the Factory Act, 1948.</p> <p>➤ Welder's protective eye-shields to workers engaged in welding works.</p>	<p>Factories Act, 1948;</p> <p>Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act,</p>	Contractor	Supervision Consultant; PIU/OWD

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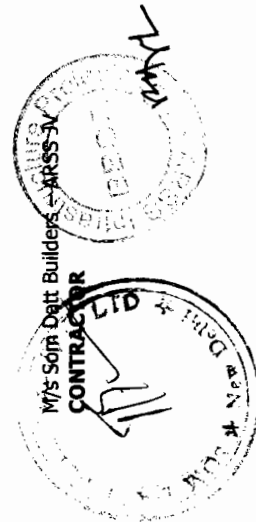
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>➤ Earplugs to workers exposed to high noise levels (above 65db) at quarries, crushers, compaction sites, concrete mixing, batch mixing, drilling and hot mixing plants, fabricating and heavy machinery operations.</p> <p>➤ Hard hat or helmets to all workers, supervising staff and inspecting officials entering a construction site, plant area, quarry, loading and unloading site.</p> <p>➤ Protective goggles and clothing to workers engaged in stone breaking activities.</p> <p>➤ Earplugs to workers exposed to noise in crushing, compaction, blasting, dismantling or concrete mixing operations.</p> <p>➤ Adequate safety measures for workers during handling of materials at site.</p> <p>➤ Nettings and platforms below and on the sides of overhead construction and excavation work to prevent mishaps due to accidental fall of workmen and debris.</p> <p>The Contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.</p>	1996		



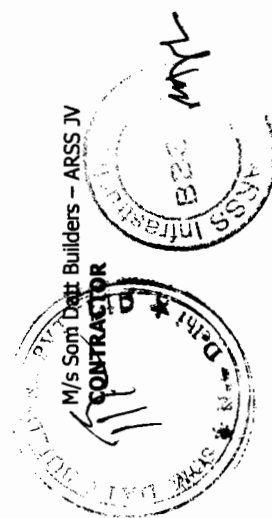
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>The Contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and Other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 are adhered to.</p> <p>The Contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</p> <p>The Contractor will not employ any person below the age of 18 years for any work and no woman of productive age will be engaged in the work of painting containing lead in any form. The Contractor will also ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint.</p> <p>Contractor will provide facemasks to the workers engaged in spray painting or manual painting when lead based compound is one of the constituents of such surface to be scrubbed, cleaned and painted. These masks shall also be provided to workers to minimize risks from inhaling toxic fumes and dust.</p> <p>'No smoking' and other 'high risk' areas are to be</p>			



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>provided with warning signage besides strict enforcement of PPE with zero tolerance limits.</p> <p>These arrangements need to be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilization, which shall be approved by SC and OWD/PIU after proper scrutiny.</p>			
C.5.2	Traffic Safety	<p>The Contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signage, markings, flags, lights, reflectors and flagmen as proposed in the Traffic Control Plan/Drawings and as required by the Environmental Officer of SC for the information and protection of road users approaching or passing through the section of any construction site of activity or diversion.</p> <p>The Contractor will ensure that all signs, barricades, pavement markings are provided as per the MoRTH/ IRC specifications.</p> <p>Before taking up construction on any section of the existing lanes of the highway, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Officer of SC</p>	MoRTH specifications and IRC guidelines	Contractor	Resident Engineer; Bridge Engineers PIU/OWD



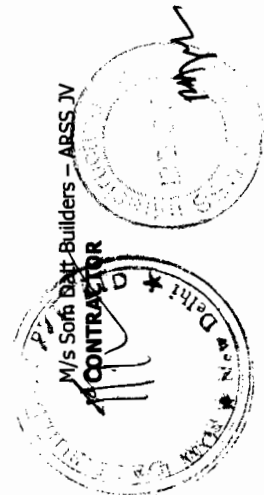
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.5.3	Risk from Electrical Equipment(s)	<p>and local administrative authorities including traffic police.</p> <p>All power transmission lines whether clamped or sufficiently covered are potential hazards at construction sites. The Contractor will take all required precautions to prevent danger from electrical cables, wires and equipment and ensure that –</p> <ul style="list-style-type: none"> ➤ No material will be stacked or placed below/near power transmission lines, wires and equipment, which can be a potential danger to any road user, workman or public. ➤ All such electrical installations and wirings shall be barricaded in manner that ensures safety of the road users, wildlife and operating vehicles/equipment such as cranes, excavators, loaders, fabricating units etc. ➤ Necessary fencing, illumination and proper insulation of the electrical lines shall be ensured by the contractor for safety and security of the public, road users, workers and the wildlife. ➤ The contractor shall ensure proper maintenance of electrical supply lines/points. 	-	Contractor	Supervision Consultant; PIU/OWD



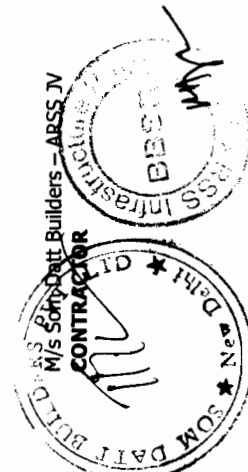
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<ul style="list-style-type: none"> ➤ All such electrical operating units shall be switched off before operations are closed every day or night as the case may be. ➤ All electrical equipment/cables/wires to be used in the construction shall have to conform to the relevant BIS specifications/codes. ➤ The contractor will ensure that such equipment/cables/wires are free from patent defect, and under good working conditions and maintained in good working order (as per the owner manual supplied by the manufacturer) through regular supervision, monitoring, maintenance and repair/ replacement from time to time. 			
C.5.4	Risk Force Measure	<p>The contractor will take all reasonable precautions to prevent danger of destruction to life and property of the public as well as the workers on account of flood, fire, explosion, accidents involving vehicles carrying hazardous materials etc. in an around work sites, camps, maintenance units, borrow areas, quarries, haul roads and in any other place associated with the project activity.</p> <p>The contractor will make the required arrangements so that in case of any mishap all necessary steps can be taken for prompt on-the-</p>	-	Contractor	Supervision Consultant; PIU/OWD



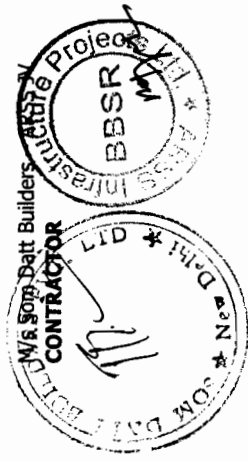
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>spot first aid treatment. Arrangements shall be made for quick rescue operation including shifting of the injured to the nearest hospital</p> <p>Fire extinguishers/fire fighting equipment and salvaging equipment for the recovery of hazardous chemicals on account of accidents or spillage are to be kept ready at camping sites or major construction sites to attend to such eventualities.</p> <p>Construction Safety Plan to be prepared by the contractor shall identify all necessary actions in the event of an emergency. The actions shall include description of stand-by arrangements, rescue of workers/people and salvage of hazardous chemicals/ materials in case of such eventualities. This plan shall be approved by the Supervisor Consultant and the Environmental Officer of the OWD/PIU as per the standard practice adopted under labour welfare activities and Factories Act.</p>			
C.5.5	First Aid	<p>The Contractor shall arrange for -</p> <ul style="list-style-type: none"> ➤ A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone with life saving first aid kits. ➤ Availability of suitable transport at all times to 	Building and the other Construction Workers (Regulation of Employment and Conditions	Contractor	Supervision Consultant; PIU/OWD



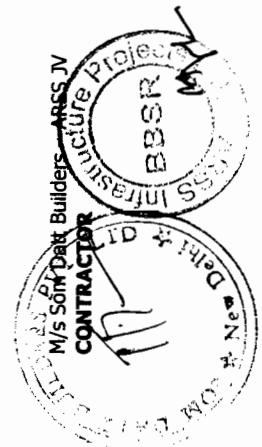
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>take injured or sick person(s) to the nearest hospital.</p> <ul style="list-style-type: none"> ➤ Equipment and trained nursing /paramedical staff at construction camps. ➤ Periodic health checks for workers 	of Service) Act, 1996		
C.6	Cultural Property				
C.6	Chance Archaeological Property	<p>All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</p> <p>The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or property. He will, immediately upon discovery thereof intimate the Environmental Officer of SC, local police and administration of such discovery and carry out the given instructions for dealing with the same.</p> <p>The SC will seek direction from the State Archaeological Department before instructing the contractor to recommence the work in the site.</p> <p>Till such time, the site and the findings shall be under strict watch and ward of the contractor, SC</p>	Central and State Laws	Contractor	Supervision Consultant; PIU/OWD, State Archeological Department



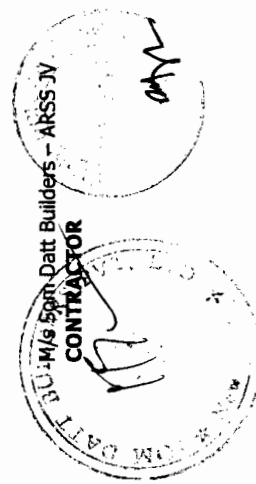
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.7 Labor Camp Management					
C.7.1	Accommodation	<p>and local administration to prevent any pilferage, alteration of the findings by the workmen or locals as the case may be.</p> <p>Contractor will follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp.</p> <p>The location, layout and basic provision of facilities at each labour camp site will be submitted to SC. The construction or hiring of such facilities shall commence only after the written approval from the SC.</p> <p>The Contractor will maintain necessary living accommodation and ancillary facilities (including provision of clean fuel to prevent damage to forests and to prevent fuel wood cutting and burning by labour) in functional and hygienic manner. Any non-compliance or damage shall be made good by the contractor at his own cost.</p>	<p>Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996</p>	Contractor	Supervision Consultant; PIU/OWD
C.7.2	Potable Water	The contractor will also provide availability of potable water within the precincts of every workplace in a cool and shaded area, which is	Building and Other Construction	Contractor	Supervision Consultant; PIU/OWD



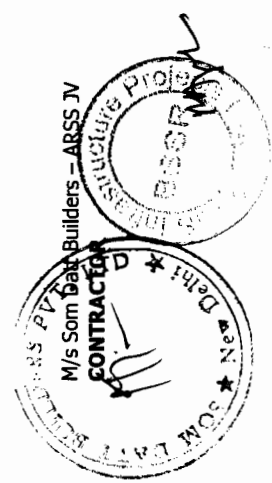
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>easily accessible as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.</p> <p>The contractor will ensure the fulfillment of the following conditions at all work places for the benefit of workers:</p> <p>a) Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places shall be made. Such facilities shall be regularly maintained from health and hygiene point of view.</p> <p>b) All potable water storage facilities will be on a safely raised platform that is at least 1m above the surrounding ground level.</p> <p>c) In the camp sites, water purifier units shall be installed for providing potable water.</p> <p>d) As far as possible shallow well will not be used as potable source of water. However, if water is drawn from any existing well, irrespective of its location from any polluting sources, regular disinfection of the water source (which may include application of lime, bleaching powder and potassium permanganate</p>	Workers (Regulation of Employment and Conditions of Service) Act, 1996		



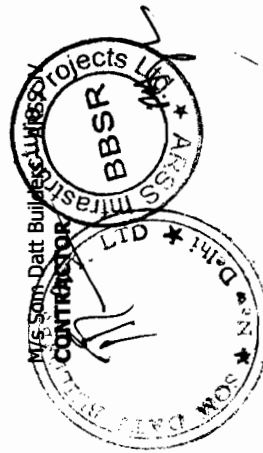
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>solution) has to be ensured at weekly/fort nightly interval.</p> <p>e) All open wells will be entirely covered and will be provided with a trap door to prevent accidental fall and contamination from dust, litter etc. A reliable pump will be fitted to each covered well.</p> <p>f) A drain shall be constructed around the well to prevent flow of contaminated water into the well from road, camp or other sources.</p> <p>g) The trap door will be kept locked and opened only for cleaning or inspection, which will be done at least once in a month.</p> <p>h) Water quality testing of all potable water sources will be done every month as per parameters prescribed in IS 10500:1991.</p> <p>Environmental Officer of SC will be required to inspect the labour camp once in a week to ensure compliance to these health and hygienic standards prescribed in the EMP. The camp-in-charge will be responsible for day-to-day monitoring.</p>			
C.7.3	Sanitation and Sewage System	<p>The contractor will ensure that -</p> <p>➤ The sewage system for the camp are designed,</p>	Building and the other Construction	Contractor	Supervision Consultant;



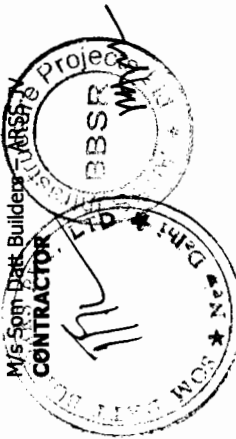
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses takes place.</p> <ul style="list-style-type: none"> ➤ Separate toilets and bathrooms for women workers wherever required, screened from those of men, are provided with markings in vernacular language. ➤ All such facilities must have adequate water supply with proper drainage and disposal facility. ➤ All toilets in workplaces are with dry earth systems which are to be maintained, cleaned and disinfected daily using proper disinfectants. The location of such provisions should not affect the air, surface water and ground water of the locality or the agricultural fields located near-by. ➤ Portable toilets may be brought to use and the night soil from such units has to be disposed through designated septic tanks so as to prevent pollution of the surrounding areas. ➤ In the main camp, no night soil or sewerage shall be disposed of at any place other than the septic tanks constructed at the site. 	Workers (Regulation of Employment and Conditions of Service) Act, 1996		PIU/OWD




Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.7.4	Waste Disposal	<p>All these facilities shall be inspected on a weekly basis to check the hygiene standards.</p> <p>The Contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in a hygienic manner as per the Comprehensive Solid Waste Management Plan approved by the Environmental Officer of SC.</p> <p>No incineration or burning of wastes shall be carried out by the Contractor. The disposal of kitchen waste and other biodegradable matter shall be carried out in pits covered with a layer of earth within the camp site. The contractor may use the compost from such wastes as manure in the plantation sites.</p> <p>Discarded plastic bags, paper and paper products, bottles, packaging material, gunny bags, hessian, metal containers, strips and scraps of metal, PVC pipes, rubber and poly urethane foam, auto mobile spares, tubes, tires, belts, filters, waste oil, drums and other such materials shall be either reused or will be sold / given out for recycling.</p>	Environment Protection Act, 1986 and Rules	Contractor	Supervision Consultant; PIU/OWD, SPCB, Local Authorities
C.8	Contractor's Demobilization and Decommissioning of Established Setup				
C.8.1	Clean-up Operations,	Contractor will prepare site restoration plan, which	-	Contractor;	OWD/PIU

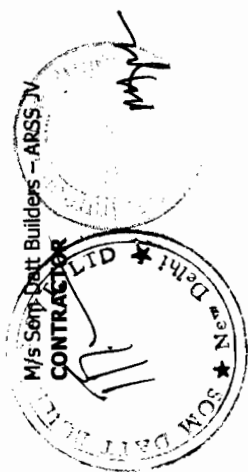


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
	Restoration and Rehabilitation	<p>will be submitted for approval to the Resident Engineer of SC. The Resident Engineer and the Environmental Officer of SC will be jointly responsible for approving and monitoring these plans.</p> <p>The contractor needs to submit his plan at least 60 days prior to 'substantial handing over of the site.'</p> <p>All clean-up and restoration operations shall be completed by the contractor prior to demobilization.</p> <p>The contractor will clear all temporary structures; dispose all garbage, night soils and POL waste as per the approved Comprehensive Waste Management Plan. All disposal pits or trenches will be filled in disinfected and effectively sealed off. Residual topsoil, if any will be distributed or spread evenly at plantation sites, on adjoining/near-by barren land or affected agricultural land adjacent to the RoW that has been impacted on account of accidental spillage.</p> <p>All construction zones including river-beds, drainage channels, culverts, road-side areas, camps, hot mix plant sites, crushers, batching plant sites and any other area used/affected by the project will be left clean and tidy, at the Contractor's expense, to the entire satisfaction of</p>		Resident Engineer of SC; Environment Officer of SC	



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>Environmental Officer of SC and OWD/PIU.</p> <p>The Resident Engineer shall ensure that all clean-up and restoration operations are completed satisfactorily and written approval is given to the contractor before the 'works completion' is issued/recommended. The OWD/PIU shall ensure through site inspection that the Contractor and SC have complied with all these provisions.</p>			


Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 (For the OWD/PIU)
 Cuttack, Bhubaneswar.



M/s Srip Datt Builders - ARSS JV
 CONTRACTOR
 SOA DATT BLDG. ANE DATT LID.

Table 3.3

ENVIRONMENTAL MANAGEMENT PLAN

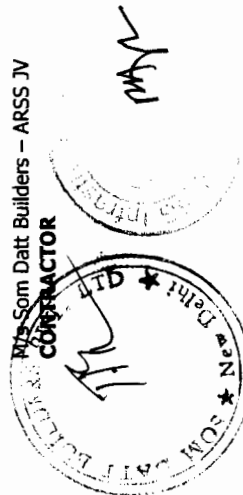
Operation Stage

SL No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
OPERATION STAGE					
Activities to be Carried Out by the OWD					
O.1	Monitoring and Evaluation of Operational Performance of Environmental Mitigation Measures provided in the Project	<p>The OWD/PIU will monitor the operational performance of the various mitigation/enhancement measures carried out as a part of the project. Monitoring and performance indicators have been indicated in Chapter 4. These include –</p> <ul style="list-style-type: none"> ➤ Tree preservation and plantation ➤ Biodiversity Works ➤ Construction Camp Management ➤ Top Soil Preservation ➤ Borrow and Quarry Area Management ➤ Traffic Safety and Management ➤ Pollution Control and Waste Management ➤ Site enhancements etc. <p>Also, the rehabilitation works at degraded sites along nalas, streams and gullies after soil and water conservation measures has to be inspected, recorded and damages timely repaired for</p>	-	OWD Field Divisions; OWD/PIU	OWD/PIU; Concerned Departments/Agencies

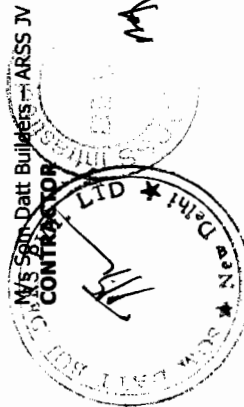
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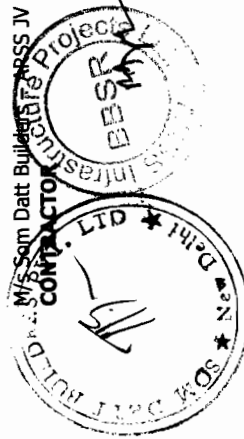
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank
Country Office, Bhubaneswar.



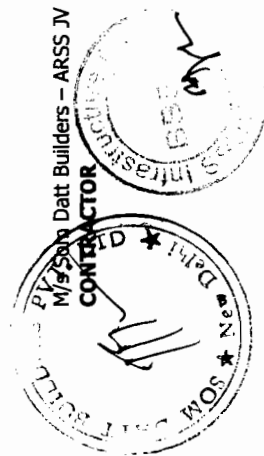
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		<p>effective functioning and maintenance of such efforts in the field.</p> <p>All observations and data shall be added /updated in the Database/Information Management System developed for the project. This also covers other points given in this table.</p>			
O.2	Maintenance of Drainage	<p>OWD/ PIU will ensure that all drains (side drains and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater and avoid flooding without damaging the spurs and check dams erected to stabilize the course and flow of all such drainage channels.</p> <p>OWD/PIU will ensure that all the sediment/oil and grease traps set up at the truck and bus lay bye are cleared once in every three months.</p>	MoRTH specifications; IRC guidelines	OWD Field Divisions	OWD/PIU
O.3	Pollution Monitoring	<p>The periodic monitoring of the ambient air quality, noise level, water (both ground and surface water) quality, soil pollution/contamination are to be continued at pre-designated locations as identified in the Pollution Monitoring Plan and if necessary, at additional locations for comparative study of pre and post operation data in order to ensure further improvement/modification in similar future</p>	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PIU	OWD/PIU



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		works. OWD/PIU will appoint specific pollution monitoring agency for this purpose.			
O.3.1	Atmospheric Pollution	<p>Ambient air concentrations of various pollutants shall be monitored as envisaged in the pollution-monitoring plan at pre designated locations to compare the levels with the pre construction data.</p> <p>Additional data at other location may be collected as per any site specific requirement.</p>	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PIU	OWD/PIU
O.3.2	Noise Pollution	<p>Noise pollution will be monitored as per monitoring plan at sensitive locations where pre-construction noise data was collected.</p> <p>The survival rate and functioning of the noise control plantations and noise control walls has to be specifically supervised and monitored for further improvement/replication at other affected points if necessary. The survival rate of dwarf bamboo plantation at such locations along the road avenue in this cyclone ravaged corridor needs to be specifically monitored.</p> <p>Signage indicating 'no horn zones' near sensitive locations shall be maintained and kept clean.</p> <p>Monitoring the effectiveness of the pollution attenuation barriers will be taken up thrice in the operation period.</p>	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PIU	OWD/PIU



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
0.4.	Soil Erosion and Monitoring of Borrow Areas	Visual monitoring and inspection of soil erosion at borrow areas, quarries (if closed and rehabilitated), embankments and other places expected to be affected, will be carried out before monsoon, during monsoon and after winter rains to record and monitor the effectiveness of such structures for five years after the completion of project, so as to evaluate the beneficial effects of each type of activity together with the cost involved.	Frameworks on Prevention of Soil Erosion and Borrow Area Management (EMP)	OWD Field Divisions; OWD/PIU	OWD/PIU
0.5	Changes in Land Use Pattern	OWD shall take initiative and act as a facilitator in preparing an action plan to encourage balanced, congestion free, safe, hygienic, environment friendly activity on either side of the developed highway during and after completion of the project. This to avoid irregular, ugly, unhygienic and destructive ribbon development, close to the road corridor which adversely affects agricultural and water harvesting capabilities and drainage system of the area. The OWD may consider effective promulgation through some legislation and guidelines controlling such unbridled activity, which are self destructive and distressful for the poor farmers and a drain on the state's economic resources.	Legal Provisions under Prevention and Control of Ribbon Development Act	OWD/PIU, Local Authorities, Revenue Department and Local Civic Bodies, District Administration	OWD/PIU; Govt. of Orissa



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		<p>A state-wide anti-encroachment policy to ensure safety (of the residents and the road users), highway aesthetics and future possibilities for expansion of highway facilities should be considered by OWD. This could include notification and legal recourse against local authorities, which supply power, water, sanitary connections and register commercial activities to encroachers, squatters and illegal settlers on the OWD land. This policy should also cover religious structures, mandaps and puja pandals etc.</p> <p>A land use-zoning map may be developed, under which up to a particular distance from the RoW of the alignment especially in new bypass stretches, no development will be allowed.</p> <p>Necessary hoardings along the corridor will be provided to warn encroachers against any such activity (including punitive action such as forfeiture of the structures and belongings without prior notice, legal action in the court of law barring any stay over such action by the state from any court of law). Budgetary provisions may be made to control the ribbon development along project road.</p>			

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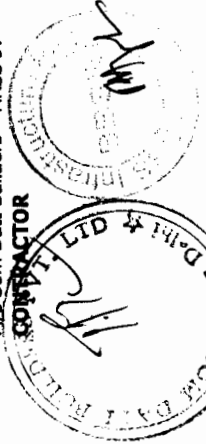
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Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
0.6	Road Safety and Maintenance of Assets	No advertisement/hoardings shall be allowed within the Right of Way limits of the project road. Regular maintenance and cleaning of assets such as sign boards, bus stops, drains etc. shall be undertaken.	-	OWD Divisions (and its contractors, if any), District Administration/ Local Authorities, Local Police	OWD/PIU; Govt. of Orissa

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CHIEF ENGINEER
EMPLOYER
World Bank Project
Orissa, Bhubaneswar.

Table 3.4

BIODIVERSITY MANAGEMENT PLAN

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
PRE-CONSTRUCTION STAGE				
Activities to be Carried Out by the OWD/Forest Department, GoO/Contractor				
B.1	Preservation of road side trees	<p>Cutting of trees along the avenue and those in the strips of land to be diverted from the forest area for road widening and strengthening, construction of bridges/culverts and for creating temporary diversions is required for the project. A total of (3581 on SH-9 and 2893 on SH-53) 6474 trees will be cut along Chandbali – Bhadrak 0 to 45 km of SH-9 and 0 to 50 km of SH-53 respectively for the project road for the purpose of the project.</p> <p>Attempts to minimize tree cutting particularly of green tunnels, giant healthy trees and young avenue plantation have been done to reduce the impact of cyclones, which are common to this belt of the state. A total of 1002 trees shall be preserved in this contract package(480nos on SH-9 and 522nos on SH-53). The location, no. and side to be saved as per the fringe benefit of retention given to all sound and healthy plants above 30 cm girth at BH coming on the toe margin as per the horizontal drawing. The details of above trees km wise may be referred under Table 2.11 of Chapter 2.</p> <p>Saving or retaining at least one side of the green tunnels, avenue plantation giant trees and young plantation has not been done for facilitating nesting, parching, hunting and vintage observation points of aviary fauna, which also provides resting and breeding habitat for rodents, reptiles and amphibians. Besides this, protection of fruit</p>	<p>PIU/OWD; DPR consultants; Tree Felling Contractor; Supervision Consultant</p>	<p>Project Director, PIU/OWD</p>

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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<p>bearing trees used by human beings and wildlife offers additional economic and ecological benefits, which is not projected here. In the event of design changes during the course of the project, additional assessments including the possibility to save trees shall be made by the PIU/OWD and the SC. Documentation of such exercises shall be maintained by the EMU of PIU /OWD. This includes evaluation of on-the-spot minor design adjustments (as applicable) to save trees. In the instant case trees which are located within or on the toe line of the embankments have been retained.</p> <p>Specific attention will be given for protecting giant trees, green tunnels and locally important trees (religiously important etc.). However, if necessary removal of hollow, rotten and dismembered giant old trees from the corridor of impact may be allowed after site verification by the Forestry Expert of OWD/PIU.</p> <p>As necessary, separate proposals for felling of such trees will be submitted to the concerned Divisional Forest Officer Bhadrak wild life Division and Keonjhar wild life Division after joint enumeration exercises are completed.</p> <p>Systematic corridor level documentation for the trees to be cut and those retained shall be maintained by PIU. A separate list will be maintained by the PIU/OWD in a bound register for each contract package duly signed by the site-in-charge from OWD, the tree cutting Contractor and designed officer of the OFDC Ltd., so that no unmarked trees are cut or removed from the corridor.</p>		

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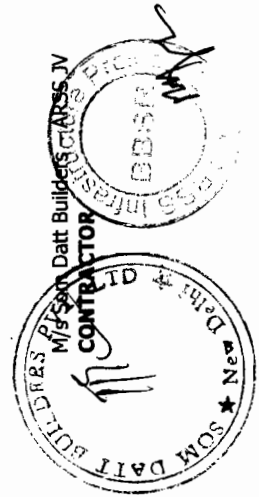
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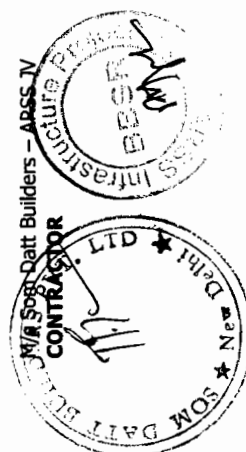
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 World Bank Projects, Orissa
EMPLOYER
 World Bank Project
 Chief Engineer (Civil)
 Chief Engineer


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.2	Transplantation	Wherever possible, all trees up to 30cm girth at breast height and naturally occurring medicinal shrubs/bushes/grass clumps within the ROW shall be uprooted mechanically with ball of earth intact for relocation and transplantation at various pre-identified locations such as degraded sites, embankments of road-side water bodies, temples, near-by market places, religious properties, schools and along road corridors for preventing loss of diverse vegetative cover and for reducing growth period subject to the choice of species, which are hardy and vigorous coppicers to withstand the shock of uprooting and relocation.	PIU/OWD; Forest Dept., GoO; OFDC; Tree Felling Contractor	Project Director, PIU/OWD
B.3	Tree Cutting	Trees with bird nestings shall not be felled between August to mid-April to facilitate the young birds/new generations to fly out. Additionally, all provisions stated under clause P.3 of Table 3.1 shall be adhered to.	PIU/OWD; Forest Dept., GoO; OFDC; Tree Felling Contractor	PIU/OWD
B.4	Nursery Creation	A nursery (preferably close to the road) will be created/raised for bud grafting, cleft grafting, rooting of off-sets of lesser found indigenous/exotic species available along the corridor so that these can be replicated and planted along the corridor for preserving biodiversity. Apart from this, saplings for plantation along the road or at various enhancement sites shall be raised to meet the plantation targets in a time bound manner.	PIU/OWD; Forest Dept., GoO	PIU/OWD; Forest Dept., GoO Supervision Consultant

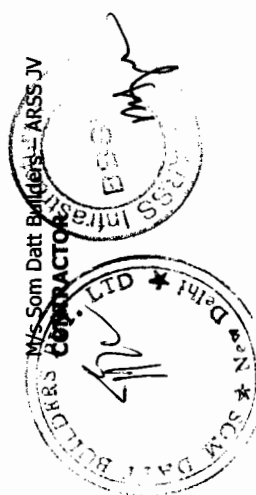


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.5	Compensatory Afforestation	No forest land involved in acquisition.	District Administration, DFO, Executive Engineer, Forest Department Govt. of Orissa, MoEF, PIU of OWD	PIU/OWD, Forest Department, GoO
B.6	Drainage	Adequate number of drainage structures as per the list of culverts and bridges indicated with treatment to be carried out against each location in Chapter – 1 - Table 1.3, 1.4 and 1.5 . Sufficient vantage to enable smooth flow of storm water and flood water have been provided together with specific measures for controlling velocity and scour protection masonry walls to ensure safety and security of the agricultural land on the up stream and down stream. Construction of drains where necessary along the road to facilitate quick drainage as per design drawing for different section of the road. If additional requirements for drainage emerge during the construction period, these will be properly assessed. Water flow modifications and drainage alterations resulting from such exercises shall not affect the forest and water ecosystems of the region.	PIU/OWD; Supervision Consultant	PIU/OWD
B.7	Water holes for wildlife and birds	The existing water holes located scattered within the agricultural areas and drainage basins of river Baitarani and Salandi areas on either side of the package beside the irrigation canals and intertidal zones and ponds, which are the perennial sources of water for the wildlife and domesticated live stock . These are not going to be disturbed on account of development activity, except during storms and summer rains, when the water sources are likely to be affected due to surface	PIU/OWD; Forest Dept., GoO	PIU/OWD; Forest Dept., GoO



Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		erosions to which wildlife and domestic cattle are well acquainted in this zone. Since the forest department is taking up development of water holes and pasture within the forest areas under FDA activity, further repetition of the same from this road project has not been suggested.		
CONSTRUCTION STAGE				
Activities to be Carried Out by the OWD/Forest Department, GoO/Contractor				
B.8	Construction management and related aspects	The contractor shall adhere to all clauses /specifications covered under the contract including EMP requirements mentioned in Tables 3.1 and 3.2 (and the related frameworks) . Any non-compliance in this regard may lead to suspension/withholding of works and stoppage/deduction of payments or any other action as deemed appropriate within the contractual framework.	Contractor	PIU/OWD; Supervision Consultant
B.9	Preservation of Trees and Vegetation	All existing trees within the RoW but beyond the corridor of impact shall be protected /preserved during the construction of the road as per the enumeration list of trees to be retained. The contractor shall ensure that damages resulting from operation of machinery, dumping and stacking of materials etc. do not occur. Trees within the construction camps, borrow areas and those close to haul roads shall not be cut. These shall be integrated into the lay-out plan for such operations.	Contractor	PIU/OWD; Supervision Consultant

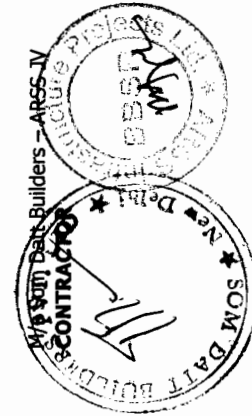

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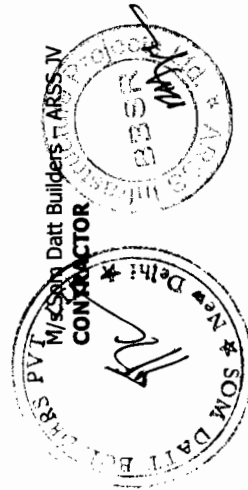
Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.10	Underpasses or crossing sites for wildlife	<p>Provision for construction of the embankment at the following locations shall be so made that the slide slopes are gentle with natural grass turving to give it a natural look, so that the wildlife movement is continue after the construction activities are over. . Development of approaches to under mentioned corridors shall be by camouflage plantations within the forest either side, up to the base of the road, which will be taken up during construction activity in the area for an additional length of 20X50 mtr on such sites at 2.5mtr spacing from plant to plant with the help of forest department by use of indigenous species of plants preferred by wildlife. This work should be taken up by the EMU wing of the PIU for implementation by Forest department.</p> <ul style="list-style-type: none"> • SH-9-26.430,28.837,30.154,31.700,35.825,40.974kms. • SH-53-11.867,13.507,17.002,21.024,23.500,34.000,40.242kms. <p>The sequencing of construction activity for wildlife underpasses will be such that no two structures are opened for construction at the same point of time. Also, the construction timing and duration shall be closely monitored to reduce the distress period for wildlife.</p> <p>Advice and assistance will be sought from the Forest Department for undertaking plantation near wildlife underpasses and for the various soil and water conservation measures that will be required in the wildlife habitat/movement zones.</p>	Contractor	PIU/OWD; Forest Dept., GoO ; Supervision Consultant
B.11	Material Stacking and Debris	<p>No materials or debris or silt (including excavated earth and waste materials) shall be stacked/dumped at the following locations at any point of time along Bhawanipatna - Khariar road:</p> <p>SH-9</p> <ul style="list-style-type: none"> • 5.95km Ichhapur 	Contractor	PIU/OWD; Forest Dept., GoO ; Supervision Consultant



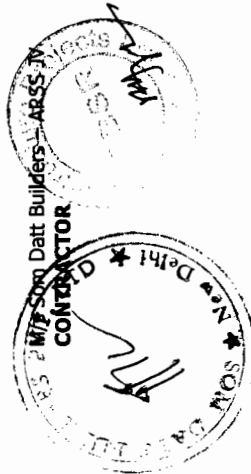
Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
	Management	<ul style="list-style-type: none"> • 6.60km Berhampur • 8.19km Balibili • 8.21km Mirjapur • 2.8km Nathasahi • 5.00km Karamil • 11.00km Alinagar • 11.4km Ranipur • 9.65km Dolasahi • 12.65km Paliabindh • 16.5km Tihidi • 12.75km Nandapur • 20.20km Kolha • 22.7km Maa Kali Temple • 24.5km Bindha • 26.00km Pirahat • 27.57km Kanpur • 29.100km Samantaraipur • 29.5km Gadibazar • 39.25km Digachhia • 46.35km Mahulia • SH-53 • 2.0km Bagudi • 3.1km Randia • 7.0km Barapada 		



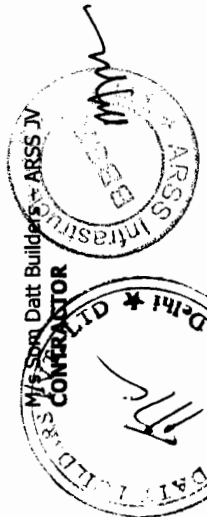
Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<ul style="list-style-type: none"> • 19.4km Banta • 18.0km Tillo • 30.0km Hatadihi • 32.8km Banchoo • 41.5km Fakirpur • 34.0km Ambagadia • SH-9- 26.430, 28.837, 30.154, 31.700, 35.825, 40.974 • SH-53- 11.867, 13.507, 17.002, 21.024, 23.500, 34.000, 40.242 to facilitate movement of wildlife across the road by providing traffic calming measures. <p>Debris shall be directly loaded into dumpers/tractors and disposed at the pre-identified location/s. Construction management shall be such that operations are completed during the day and materials stacks are not left behind.</p> <p>All excavated boulders and rocks which are not fit for use in road construction should be used near streams, water bodies or wildlife underpasses to prevent scouring and to provide camouflage cover to animals.</p> <p>Uprooted stumps, discarded logs etc. can also be used at such locations without affecting the natural drainage or without causing pools of water by such activity, where accumulation of water is likely to induce slip circle and land slides. These stones and logs can also be placed at selected enhancement locations including abandoned roads to function as resting platforms.</p>		



Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B. 12	Water Pollution	Release of wastes (non-toxic and toxic) by the contractor into water bodies and drainage systems that may adversely impact the aquatic life both locally and in the downstream stretches shall be viewed as serious non-compliance of EMP since these may affect the eco-flow, aquatic life and livelihoods of people dependent on such resources.	Contractor	PIU/OWD; Supervision Consultant
B. 13	Damage to aquatic life in ponds	The construction of retaining walls in the ponds, bathing ghats, spillways, minor bridges etc., shall be in manner that causes minimal disturbance/damage to users and the aquatic life (like fish on which local people use for sustenance/livelihood).	Contractor	PIU/OWD; Supervision Consultant
B. 14	Fire Safety	No lighting of fire or setting-up of labour camps within one kilometer of the forest areas and wildlife movement zones shall be permitted.	Contractor	PIU/OWD; Forest Dept.; Supervision Consultant
B. 15	Strengthening Forest Check Gates	The two existing forest check gates at the under-mentioned locations will be reconstructed along with provision of lay bye to enable proper checking of vehicles and prevent congestion on the highway : > 32.885km (SH-9) > 33.900km (SH-53)	Plantation near underpasses and/or crossing sites	
B. 16	Informatory and Warning Signage	Signage (229nos.) regarding speed limits and protecting wildlife/environment shall be put-up along the road. This may include information/warnings about for preventing forest fires, hunting, snaring, encroaching, smuggling, obstruction of natural water courses, confrontation with wildlife etc. The content of such signage (samples provided in Biodiversity Assessment Report and in this report as subject	Contractor	PIU/OWD; Forest Dept.; Supervision Consultant



Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.17	Avenue or side Road Plantation Strategy	<p>to any addition or alteration that may be effected by the forest department, while issuing the release order for non forest use of forest land.</p> <p>Avenue plantation at the edge of the RoW shall be undertaken to improve highway side aesthetics, reduce micro-climatic impacts of loss of roadside vegetation and provide for some livelihood benefits to the local communities. Additionally, some species that provide shelter and food to birds and small organisms shall also be planted to reduce ecological stress on such species in the medium and long run.</p> <p>The tree planting along the corridor within the RoW (but outside Forest Areas) shall be taken up by the Contractor assigned with the job of planting, which may be local Self help groups (SHG) or any other independent party. This works shall be undertaken in a phased manner and tied-up with the civil works schedule.</p> <p>A total of 6474 trees are going to be removed from the avenue to be replaced by 3 times the number 19422 plants. Planting along the avenue over 20km, will cover 14000 plants only as per the Table -2.12 using poly pot seedling (1.5 year old) including 674 plants to be up rooted and re-planted. 10% additional planting stock shall be raised in the nursery for casualty replacement along the Right of Way. The balance 5422 plants shall be planted as site enhancement activity along the abandoned roads, ponds and other water bodies, camouflage corridor, toll plaza, bus stops, spur junctions and for the purpose of beautification and environmental up gradation along the corridor as per details in the CPR s enhancement budget under Chapter - 5. A minimum of 75 percent survival rate of the saplings shall be required</p>	Contractor	Supervision Consultant; PIU/OWD

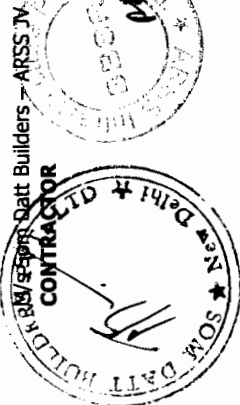


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<p>for the clearance of payments at the end of the 3rd year of maintenance. Any damage beyond this threshold shall be made good by the contractor at his own cost. The contractor will maintain the plantation for a minimum of three years beyond which it shall be handed over to the OWD for maintenance.</p> <p>The plantation shall be taken up in areas beyond the ROW inside degraded forest land by Forest Department, through a memo of understanding (MoU) between OWD and Forest Department as site enhancement for wildlife and environment. In case of Govt. waste land this will be taken up by local SHG, after signing MoU with OSRP of OWD.</p> <p>The species, spacing, age and height of the plant together with condition of seedlings at the time of plantation, shall be as per the Tree Plantation Framework provided in Framework - 1. All other conditions as mentioned in this framework including those of transportation, plantation, and maintenance shall be strictly adhered to.</p> <p>The Environmental Officer of SC and Forestry Expert of OWD/PIU(EMU Unit) will inspect and monitor regularly the plantation works, survival rate of all such plantations and record their observations in the plantation register at the time of inspection, besides making official correspondence on deficiencies or improvements or changes, as warranted in specific situations.</p>		
B.18	Site Enhancement	Plantation of trees such as Banyan, Pipal, Mango, Samania, Champa, Karanja, Anla, Harida, Bahada, Kadamba, Gulmohar, Bengal almond, Arjuna, and Tamarind along with medicinal plants and shrubs such as Adhatoda, Cassia fistula, Harasingar, Dhatuki, Ganiary (Premna),	Contractor; PRIs; Local Communities/S	PIU/OWD; Supervision Consultant

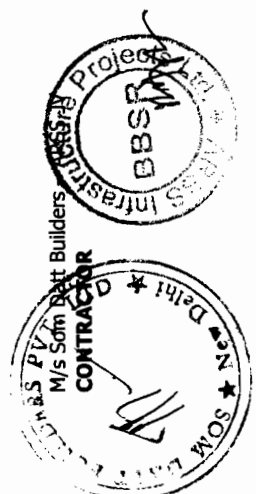


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Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work HGs/ Individuals	Supervision /Monitoring
	Plantation	Barakoli etc. shall be undertaken near ponds and community gathering areas. The final plantation number will depend upon the interest and involvement of local communities /groups / individuals. Plantations shall also be taken up by the contractor at demolition waste dumping mounds to erected at every 5 th km on SH -9 and SH-53 to function as cyclone cum flood escape centers over Govt. land as has been discussed with the district Collectors Bhadrak and Keonjhar during public disclosure of the EMP document as a safe guard to prevent soil erosion and silting up of drainage systems.		
B.19	Flora and Chance found Fauna	<p>The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal whether in forest or non-forest land along the corridor. Only permissive activities like fishing may be allowed in the local non-forest areas with prior written consent of the local authorities and villagers. Copies of such permission shall be submitted to the Supervision Consultant.</p> <p>Collection of specimens, hunting, snaring, shooting, mining, fishing and burning fire in an around wildlife movement zones and, protected or reserved forest areas is strictly prohibited under law. Any such action by the contractor (and his staff) or the Supervision Consultant (and his staff) shall be reported to Forest Department, GoO and the local police/administration.</p> <p>If any wild animal is found near the construction site at any point of time, the contractor or his representative will immediately upon discovery thereof inform the Environmental Officer of SC, the Resident</p>	Contractor; Supervision Consultant	PIU/OWD; Supervision Consultant; Forest Dept., GoO

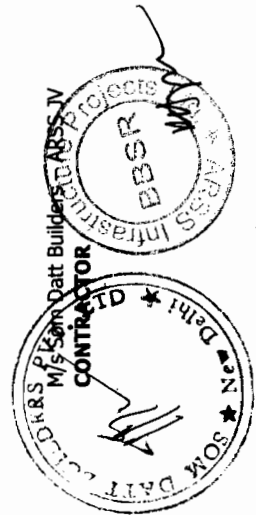


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<p>Engineer and the local forest authority and will abide by the necessary action/s as suggested by these officials.</p> <p>The Environmental Officer of SC will report to the near by DFO, Bhadrak wild life Division and Keonjhar wild life Division respectively of all such activities, along with the local Forest Range Officer or Wildlife Warden and as per their advice will take appropriate steps/measures, if required in consultation with the Forest Officials – this could include rescue, first-aid or sending back the animal towards the forest as would be decided.</p>		
B.20	Involvement of Local Communities	As far as possible, employment to local people/communities/SHGs should be provided for the plantation (including raising of saplings in the nurseries and maintenance), enhancement and other environmental works along the corridor.	Contractor; Supervision Consultant	PIU/OWD; Supervision Consultant
B.21	Awareness Generation	Leaflets and/or booklets for generating awareness among the public including road users on do's and 'don'ts' during the various stages of the project shall be prepared and distributed.	PIU/OWD; Supervision Consultant	PIU/OWD
OPERATION STAGE				
Activities to be Carried Out by the OWD/Forest Department, GoO				
B.22	Immunization of Cattle	Mass immunization of cattle in villages within 5 km aerial distance on either side of the corridor, adjoining the forest and wildlife movement zones may be taken-up by the Forest Department, GoO in association with the local animal husbandry wing to prevent spread of	Forest Department, GoO (District Level); Animal Husbandry	Forest Department, GoO



Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work Wing	Supervision /Monitoring
B.23	Monitoring and Evaluation of Operational Performance of Biodiversity Protection Measures provided under the Project	<p>communicable diseases.</p> <ul style="list-style-type: none"> o The completion of wildlife passage routes as per design and specifications with signage and development of camouflage plantation with its rates of success to be monitored together with placement of discarded near the approach into a wildlife corridor shall be closely monitored and evaluated. o Monitoring of the wildlife movement (type, frequency and season) along the identified wildlife corridors shall be undertaken at fixed intervals. o The function and stability of water holes provided to remove distress to the wildlife shall be monitored for five years. o The avenue plantation and site enhancement plantation raised under the project and the old avenue trees retained /saved are to be checked every year with respect to the details in the plantation register for evaluating their survival and benefits to the local community. <p>All these observations and data (including number, condition/status and utility/benefits) shall be systematically recorded for assessment and evaluation.</p>	PIU/OWD; Forest Department, GoO	EMU of PIU/OWD; Forest Department, GoO

Note: The complete EMP Document may be read alongwith the above stipulations which is available on our official website at <http://osrrp.gov.in>



AGREEMENT No- 4 of 2008 - 09



GOVERNMENT OF ORISSA
WORKS DEPARTMENT

CIVIL WORKS CONTRACT

[PACKAGE No. OSRP-CW-ICB-Y1-P02]

For

*Widening & Strengthening of existing carriageway to 2-lane road for
Chandabali-Bhadrak-Anandapur road
(Km. 0/0 to Km. 45/0 of SH – 9 & Km. 0/0 to Km. 50/0 of SH-53)*

*under
Orissa State Roads Project*

between

Chief Engineer, World Bank Projects, Orissa
on behalf of
Orissa Works Department, Government of Orissa

and

SOM DATT BUILDERS – ARSS JV
Plot No. 38, SECTOR – A, Zone – D
Mancheswar Industrial Estate, Mancheswar, Bhubaneswar – 751010 [INDIA]

[VOLUME – IV: DRAWINGS]
Agreement Value: Rs. 216,23,17,622.00

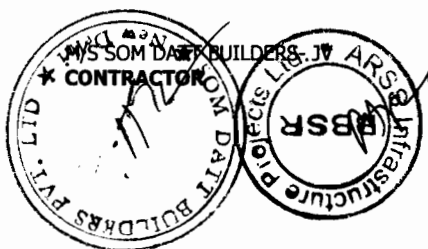
*Project Management Unit, Orissa State Roads Project
Office of the Engineer-in-Chief (Civil), Orissa,
Nirman Soudha, Keshari Nagar, Unit – V, Bhubaneswar – 751 001
Dated: 3rd November, 2008*


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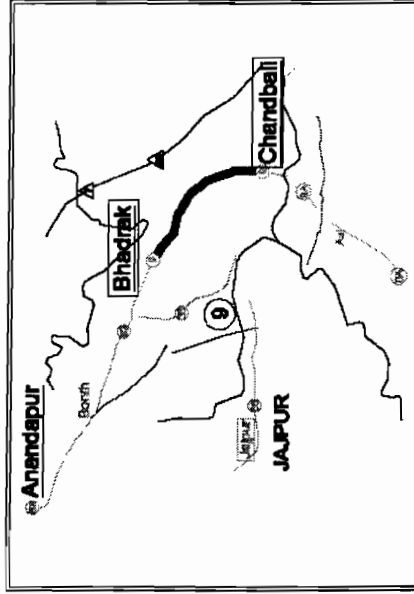
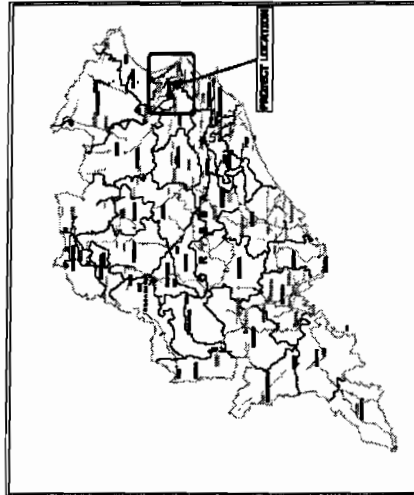
WORKS DEPARTMENT ORISSA STATE ROAD PROJECT

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

FOR
BHADRAK TO CHANDBALI
(SH - 9) FROM KM 0 / 000 TO 45 / 000
PLAN AND PROFILE

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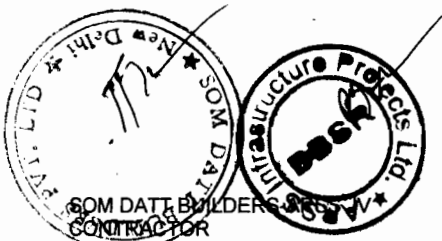
- (1) - COVER SHEET
- (2) - INDEX OF DRAWINGS
- (3) - LIST OF STRUCTURES
- (4) - CURVE DETAILS
- (5) - PLAN AND PROFILE SHEETS
- (6) - SCHEDULING



LEGEND

	EXISTING CARRIAGE WAY
	PRO. CARRIAGE WAY EDGES
	PROPOSED CENTER LINE
	EXISTING CENTER LINE
	PRO. SHOULDER EDGES
	ELECTRIC POLE
	TRANSFORMER
	TELEPHONE POLE
	TELEPHONE LINE
	H.T. TOWER
	H.T. LINE
	PIPE LINE
	HOUSE/BUILDING/STRUCTURE
	EXISTING ROW BOUNDARY
	PROPOSED ROW BOUNDARY
	EDGE/CULVERT
	TANK
	WELL
	HAND PUMP
	TAP
	EMBANKMENT
	CUT
	CULVERT
	NAME BOARD

**C O N S U L T I N G
ENGINEERS GROUP LTD.**
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Fax: 2521348, E-mail: csg@cegroupindia.com



INDEX

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E	Horizontal Curve Details (2 of 2)	OSRP/CEG/SH-09/H/C/02
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22	Plan & Profile Km 21/000 to Km 22/000	OSRP/CEG/SH-09/P&P/22
23	Plan & Profile Km 22/000 to Km 23/000	OSRP/CEG/SH-09/P&P/23
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27	Plan & Profile Km 26/000 to Km 27/000	OSRP/CEG/SH-09/P&P/27
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30	Plan & Profile Km 29/000 to Km 30/000	OSRP/CEG/SH-09/P&P/30
31	Plan & Profile Km 30/000 to Km 31/000	OSRP/CEG/SH-09/P&P/31
32	Plan & Profile Km 31/000 to Km 32/000	OSRP/CEG/SH-09/P&P/32
33	Plan & Profile Km 32/000 to Km 33/000	OSRP/CEG/SH-09/P&P/33
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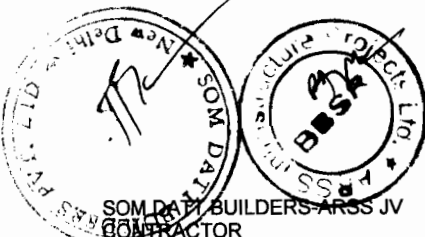
NOTE: FOR DETAILED SCHEDULE OF SL.NO. 61 TO 77, "ENVIRONMENTAL MANAGEMENT PLAN OF BHADRAK-CHANDBALI AND BHADRAK - ANANDPUR" MAY BE REFERRED

SL.No.	Description	Drawing No.
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DATE	SCALE	DATE	SCALE
SH. NO.	B	DATE	REV
DESIGNED (A)	DESIGNED (A)	DESIGNED (A)	DESIGNED (A)
DRAWN (A)	DRAWN (A)	DRAWN (A)	DRAWN (A)
CHECKED (C)	CHECKED (C)	CHECKED (C)	CHECKED (C)
APPROVED (P)	APPROVED (P)	APPROVED (P)	APPROVED (P)
B.M.	J.P.	R.R.D.K	S.G
NTS			

PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

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LIST OF STRUCTURE

S.I. No.	Existing Chainage	Proposed Chainage	Type of Structure	Span Arrangement	Remarks
36	20100	20144	New Single Box	1/22/0	Additional
37	20200	20365	To be widened	-	
38	20700	20681	To be widened	-	
39	21050	21074	New Single Box	1/23/0	
40	21150	21236	New Single Box	1/23/0	
41	21400	21490	New Single Box	1/43/0	Additional
42	21700	21829	New Single Box	1/44/0	Additional
43	22700	22570	New Single Box	1/22/0	
44	23150	23240	New Single Box	1/22/0	
45	24050	24098	New Single Box	1/64/0	
46	24350	24478	New Single Box	1/23/0	
47	24500	24770	New Single Box	1/22/0	
48	25200	25249	New Single Box	1/23/0	
49	26400	26430	New Single Box	1/22/0	
50	-	26225	New Single Box	1/43/0	Additional
51	-	30075	New Single Box	1/44/0	Additional
52	30600	30821	New Single Box	1/22/0	
53	-	31700	New Single Box	1/43/0	Additional
54	-	31700	New Single Box	1/43/0	Additional
55	-	36775	New Single Box	1/43/0	Additional
56	-	36850	New Single Box	1/44/0	Additional
57	-	37850	New Single Box	1/43/0	Additional
58	38300	38387	New Single Box	1/22/0	
59	39800	39837	New Single Box	1/22/0	
60	40350	40310	New Single Box	1/22/0	
61	40950	40974	New Single Box	1/23/0	
62	-	41125	New Single Box	1/43/0	Additional
63	-	41275	New Single Box	1/43/0	Additional
64	-	41375	New Single Box	1/43/0	Additional
65	-	41550	New Single Box	1/43/0	Additional
66	41890	41986	New Single Box	1/34/0	
67	-	42225	New Single Box	1/44/0	Additional
68	-	42400	New Single Box	1/44/0	Additional
69	43050	43061	New Single Box	1/22/0	
70	43600	43771	New Single Box	1/43/0	

S.I. No.	Existing Chainage	Proposed Chainage	Type of Structure	Span Arrangement	Remarks
36	20100	20144	New Single Box	1/22/0	
37	20200	20365	New Single Box	1/22/0	
38	20700	20681	New Single Box	1/22/0	
39	21050	21074	New Single Box	1/22/0	
40	21150	21236	New Single Box	1/22/0	
41	21400	21490	New Single Box	1/22/0	
42	21700	21829	New Single Box	1/22/0	
43	22700	22570	New Single Box	1/22/0	
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48	25200	25249	New Single Box	1/22/0	
49	26400	26430	New Single Box	1/22/0	
50	-	26225	New Single Box	1/43/0	Additional
51	-	30075	New Single Box	1/44/0	Additional
52	30600	30821	New Single Box	1/22/0	
53	-	31700	New Single Box	1/43/0	Additional
54	-	31700	New Single Box	1/43/0	Additional
55	-	36775	New Single Box	1/43/0	Additional
56	-	36850	New Single Box	1/44/0	Additional
57	-	37850	New Single Box	1/43/0	Additional
58	38300	38387	New Single Box	1/22/0	
59	39800	39837	New Single Box	1/22/0	
60	40350	40310	New Single Box	1/22/0	
61	40950	40974	New Single Box	1/23/0	
62	-	41125	New Single Box	1/43/0	Additional
63	-	41275	New Single Box	1/43/0	Additional
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66	41890	41986	New Single Box	1/34/0	
67	-	42225	New Single Box	1/44/0	Additional
68	-	42400	New Single Box	1/44/0	Additional
69	43050	43061	New Single Box	1/22/0	
70	43600	43771	New Single Box	1/43/0	

NOTE :

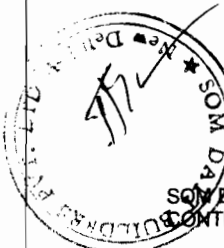
1) FOR DETAILS REFER STRUCTURAL DRAWINGS.

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

LIST OF STRUCTURE
BHADRAK TO ANANDPUR (SH-09, KM 0/00 TO 50/00)

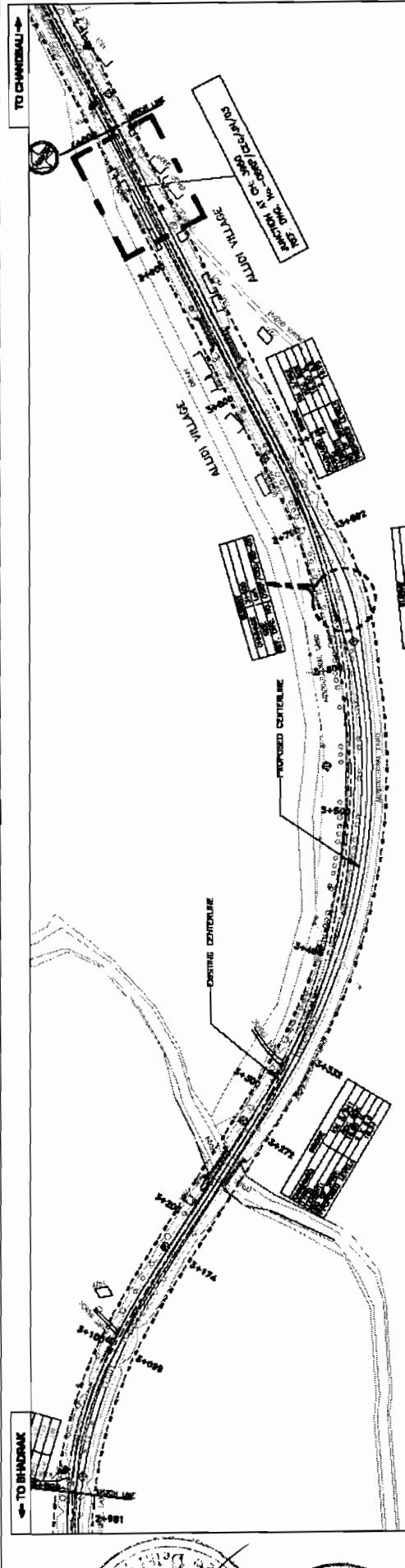
DATE REC'D	DATE PREP'D	DATE SH-09/08/01	DATE	REV	RD	APPROVED (P)
SRL. NO.	C					
SCALE						B.M.
NTS						J.P.
						R.R.D.K
						S.G



SONY DATT BUILDERS PVT. LTD.
CONTRACTOR

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Chief Engineer
World Bank Projects
EMP



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHANGE
18.898	17.424	R=300.000m L=18.135m	G=0.601 L=1.918690m G=-0.674	D=2.000	
18.498	17.879	L=75.000m			
18.978	18.198	L=1.00.000m			
18.753	18.240	L=60.000m			
18.799	18.048	L=60.000m			
18.809	17.800				
18.548	17.732				
18.800	17.600				
18.900	17.389				
18.900	17.227				
18.780	17.058				
18.810	16.880				
18.500	16.721				
18.021	16.553				
18.300	16.402				
18.800	16.217				
18.598	16.048				
18.734	15.900				
18.905	15.734				
18.878	15.568				
18.878	15.402				
18.978	15.234				
18.895	15.068				
18.228	14.902				
18.197	14.734				
18.163	14.568				
18.129	14.402				
18.099	14.234				

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHANGE
24.00	17.394				
22.00	17.300				
20.00	17.206				
18.00	17.112				
16.00	17.018				
14.00	16.924				
12.00	16.830				
10.00	16.736				
8.00	16.642				
6.00	16.548				
4.00	16.454				
2.00	16.360				

LEGEND

UNDESIGNED ROAD

DESIGNED ROAD

WIDENING AND STRENGTHENING TO TWO LANE

PROPOSED ROAD

EXISTING ROAD

PROPOSED CENTRELINE

EXISTING CENTRELINE

PROPOSED GRADE

EXISTING GRADE

PROPOSED BANKING

EXISTING BANKING

PROPOSED DRAINAGE

EXISTING DRAINAGE

PROPOSED FENCE

EXISTING FENCE

PROPOSED SIGN

EXISTING SIGN

PROPOSED LIGHTING

EXISTING LIGHTING

PROPOSED LANDSCAPING

EXISTING LANDSCAPING

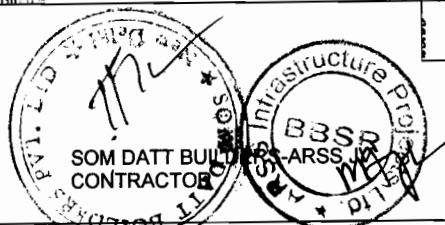
CONSULTING ENGINEERS GROUP LTD.
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Tel: +91-141-2520959, 2521981, 2520555
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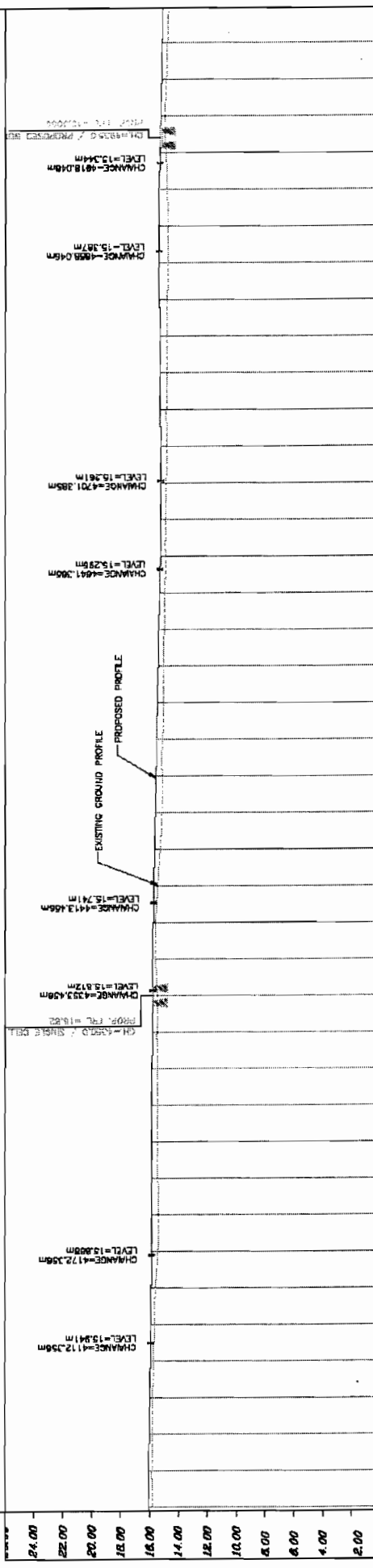
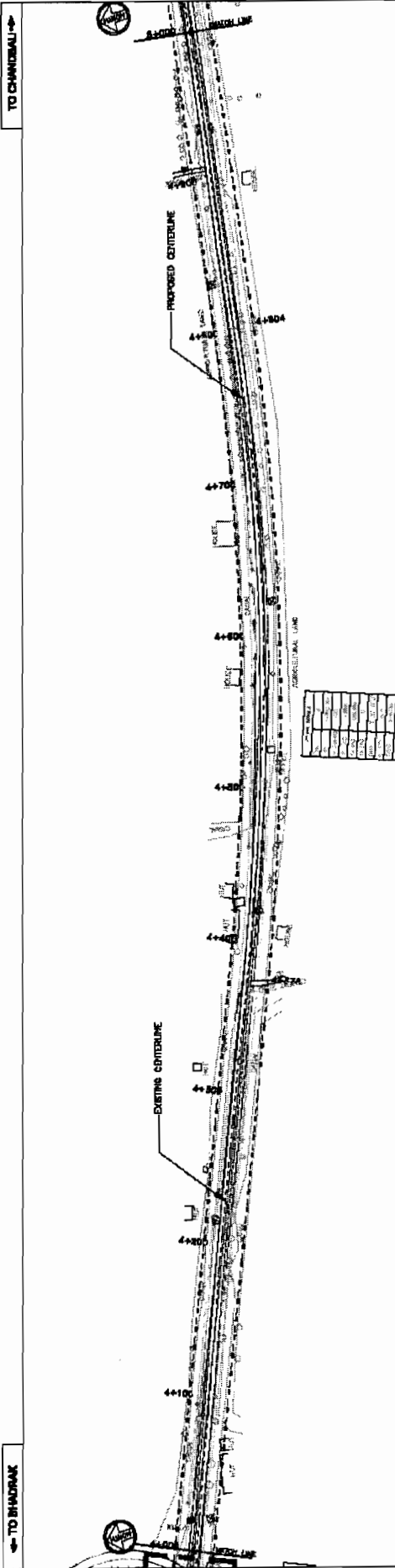
PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BIHADRAK TO CHANDBAL (SH-9) KM 3/000 TO KM 4/000

DATE: 12/01/2014
SCALE: HORIZONTAL: 1:5000
VERTICAL: 1:1000

DESIGNER: J.P.
CHECKER: D.M.
APPROVER: N.B.M.
SCALE: N.B.M.
SCALE: S.C.





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGELINE
18.85	18.081					
19.72	18.028					
19.721	18.028					
19.722	19.958					
19.925	19.886					
19.927	19.876					
19.928	19.876					
19.930	19.814					
19.931	19.814					
19.932	19.814					
19.936	19.835					
19.940	19.835					
19.943	19.835					
19.947	19.835					
19.949	19.876					
19.952	19.876					
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19.957	19.876					
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19.995	19.876					
19.996	19.876					
19.997	19.876					
19.998	19.876					
19.999	19.876					
20.000	19.876					

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

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 Fax : 2521348, e-mail : ceg@cegroup.com

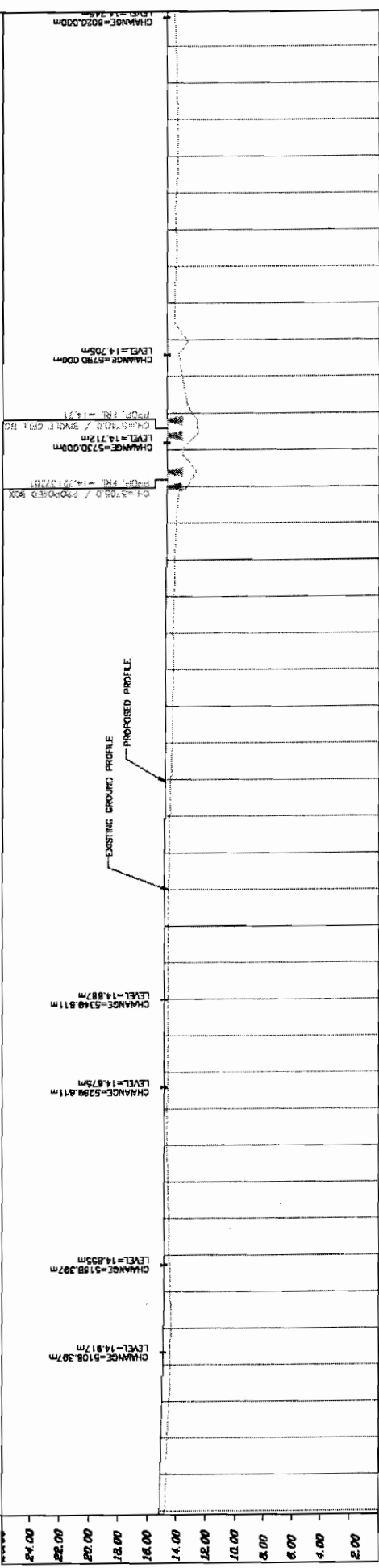
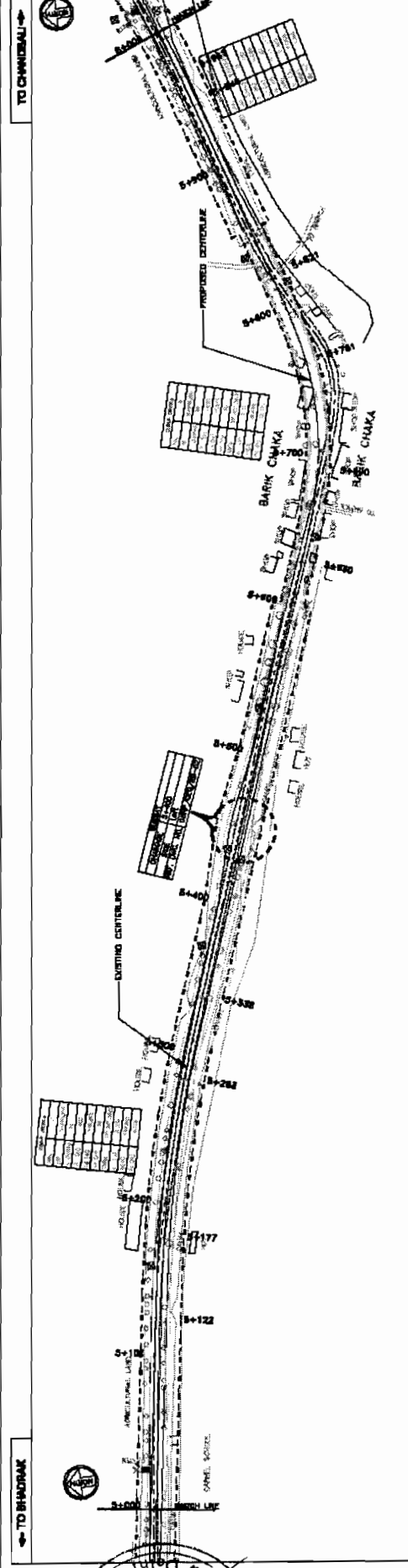
DATE	25/07/2011
SCALE	1:1000
PROJECT NO.	ORISSA STATE ROAD PROJECT
DATE OF PREP.	25/07/2011
DATE OF REV.	
BY	
CHKD BY	
APPD BY	
DATE	

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDBALI (SH-9) KM 4/000 TO KM 5/000

JOB NO. / DATE / SCALE / PROJECT NO. / DATE OF PREP. / DATE OF REV. / BY / CHKD BY / APPD BY

N.B.M. S.D.





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	DRAINAGE	ROAD WIDTH		TOTAL WIDTH	
							LANE WIDTH	PAVEMENT WIDTH	LANE WIDTH	PAVEMENT WIDTH
15180	14.799	R=700.0 L=94.950m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15190	14.827	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15200	14.804	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15210	14.816	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15220	14.827	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15230	14.837	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15240	14.847	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15250	14.857	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15260	14.867	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15270	14.876	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	
15280	14.887	R=200.000m L=71.515m	Q=0.017 L=230.000m	Q=2.500	Q=2.86	1.00	2.00	3.00	5.00	

PROJECT: WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDBALI (SH-9) KM 5/000 TO KM 6/000
PREPARATION OF PHASE-(I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 L-12, 1st Floor, Colaba Station Road, Mumbai-400 006
 Tel: 4351-441-2520599/2520598/888/3202558
 Fax: 2521346, e-mail: ceg@cegroup.com

LEGEND

DATE: 20/11/2005

DRAWN BY: ...

CHECKED BY: ...

DATE: ...

SCALE: HORIZONTAL 1:1000, VERTICAL 1:500

PROJECT NO.: ...

SCALE: HORIZONTAL 1:1000, VERTICAL 1:500

SHEET NO.: ...

DATE: ...

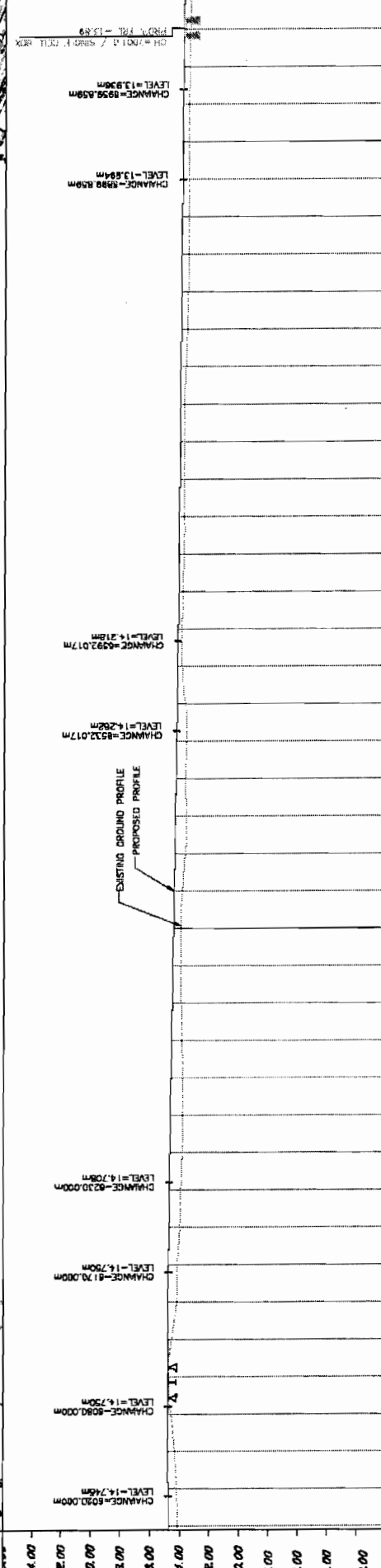
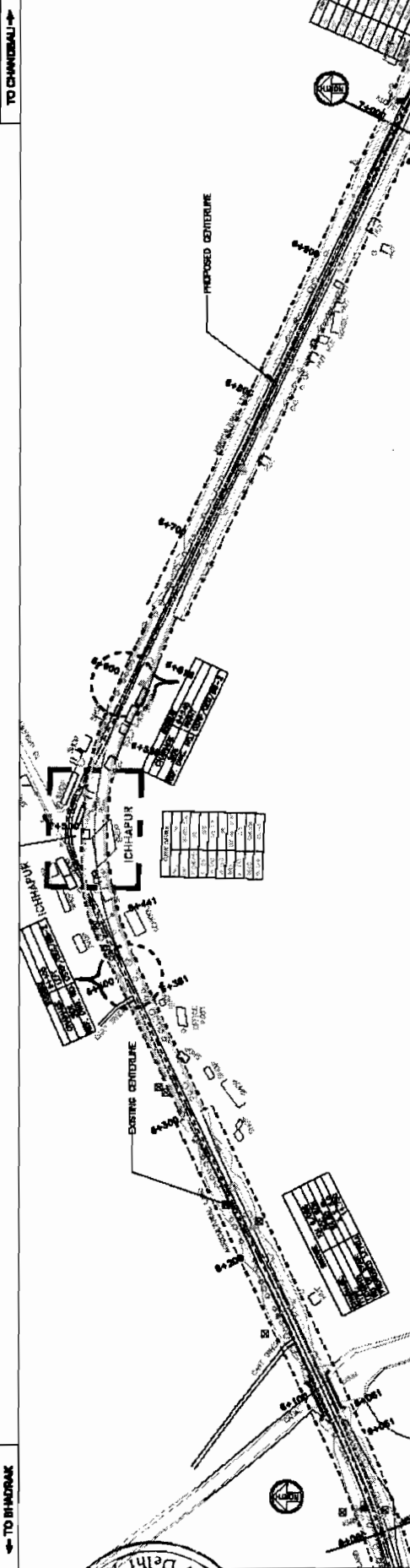
REV.: ...

BY: ...

SCALE: HORIZONTAL 1:1000, VERTICAL 1:500

SOM DATT BUILDERS JV-1 CONTRACTOR

ARSS Infrastructure



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHANCE	STATIONING	ELEVATION	SECTION
14.746	14.156	L=60.00m G=-4.950m	L=60.00m	0-2.880	14.746	14.746	6025.000	13.086
14.748	14.538	L=60.00m	L=60.00m		14.748	14.750	6075.000	13.916
14.750	14.743	L=60.00m G=-0.000	L=60.00m		14.750	14.750	6125.000	13.973
14.750	14.531	L=60.00m	L=60.00m		14.750	14.750	6175.000	13.984
14.750	14.183	L=60.00m	L=60.00m		14.750	14.750	6225.000	14.012
14.758	14.012	L=60.00m	L=60.00m		14.758	14.758	6275.000	14.030
14.758	13.849	L=398.805m G=2.500	L=60.00m		14.758	14.758	6325.000	14.046
14.808	13.828	L=302.017m G=-3.141	L=60.00m		14.808	14.808	6375.000	14.087
14.808	13.972	L=60.00m	L=60.00m		14.808	14.808	6425.000	14.085
14.838	13.841	L=60.00m	L=60.00m		14.838	14.838	6475.000	14.095
14.838	13.617	L=60.00m	L=60.00m		14.838	14.838	6525.000	14.096
14.838	13.654	L=60.00m	L=60.00m		14.838	14.838	6575.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6625.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6675.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6725.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6775.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6825.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6875.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6925.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	6975.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7025.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7075.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7125.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7175.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7225.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7275.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7325.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7375.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7425.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7475.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7525.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7575.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7625.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7675.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7725.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7775.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7825.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7875.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7925.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	7975.000	14.096
14.838	13.899	L=60.00m	L=60.00m		14.838	14.838	8025.000	14.096

SOM DATT BUILDERS PVT. LTD.
CONTRACTOR

ARSS Infrastructure Projects

22/11

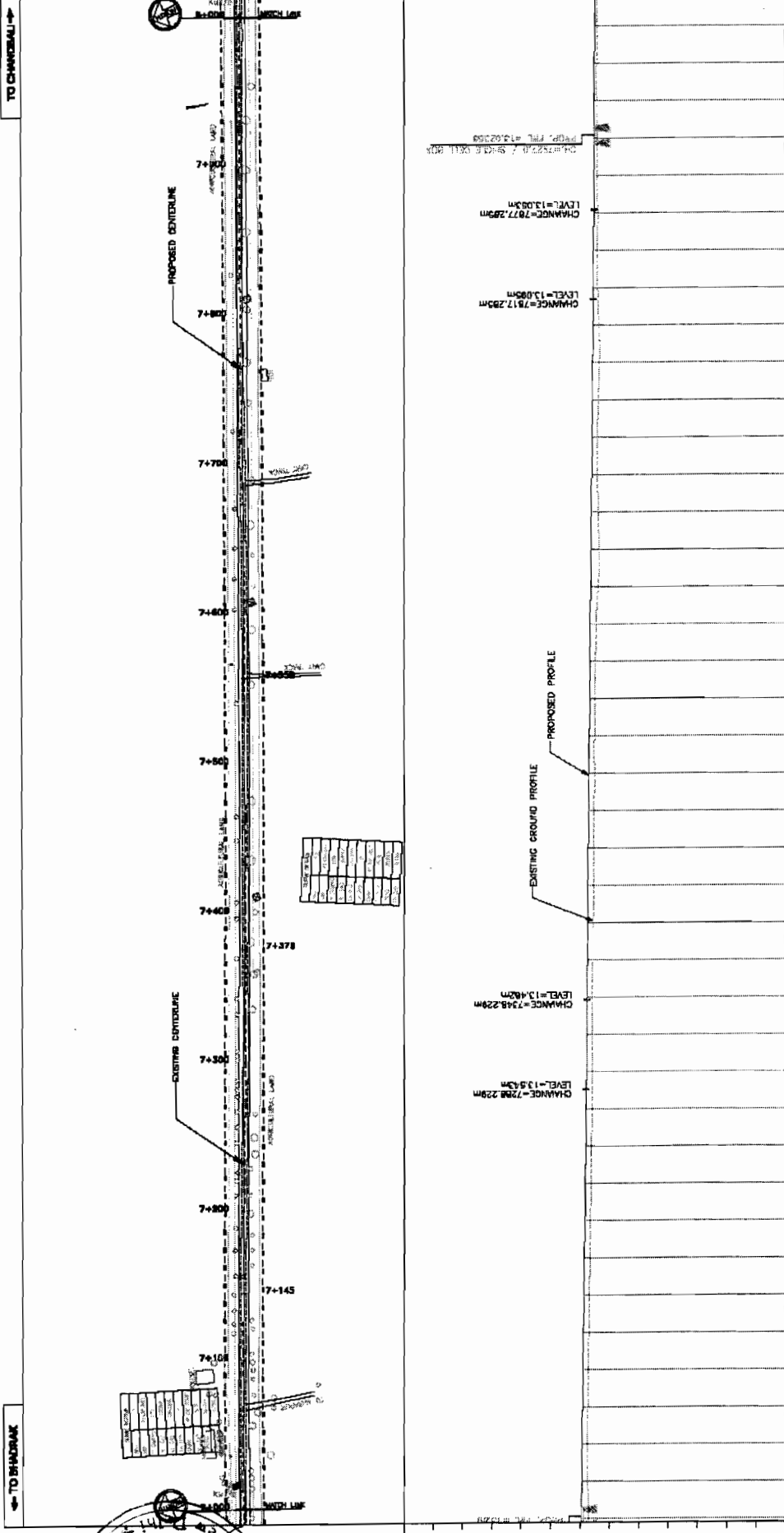
CONSULTING ENGINEERS GROUP LTD.
 E-12, Neel Colony, Malviya Nagar, Jaipur-302017
 Tel: 0141-2520889, 2521841, 2520658
 Fax: 2521946, E-mail: ceg@cegroupindia.com

PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE,
 BHADRAK TO CHANDBAL (SH-9) KM 6/000 TO KM 7/000
 PREPARATION OF PHASE-I) ROADS FOR CRISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

LEGEND

DATE: 22/11/2011
SCALE: HORIZONTAL: 1"=50.00m, VERTICAL: 1"=5.00m

DESIGNED BY: J.P.
CHECKED BY: B.M.
APPROVED BY: N.B.M.
DATE: 13.08.08



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
12.982	13.858	$R=1000.000m$ $L=100.000m$	$R=3200.000m$ $L=100.000m$		
12.981	13.798				
12.980	13.738				
12.979	13.678				
12.978	13.618				
12.977	13.558				
12.976	13.498				
12.975	13.438				
12.974	13.378				
12.973	13.318				
12.972	13.258				
12.971	13.198				
12.970	13.138				
12.969	13.078				
12.968	13.018				
12.967	12.958				
12.966	12.898				
12.965	12.838				
12.964	12.778				
12.963	12.718				
12.962	12.658				

PROJECT:
CONSULTING SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, May Colony, Kalyani Nagar, Jaipur-302017
 Tel: 0141-2520889, 2521881, 2520558
 Fax: 2521348, E-mail: ceg@cegroup.co.in

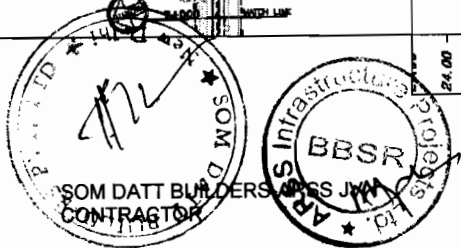
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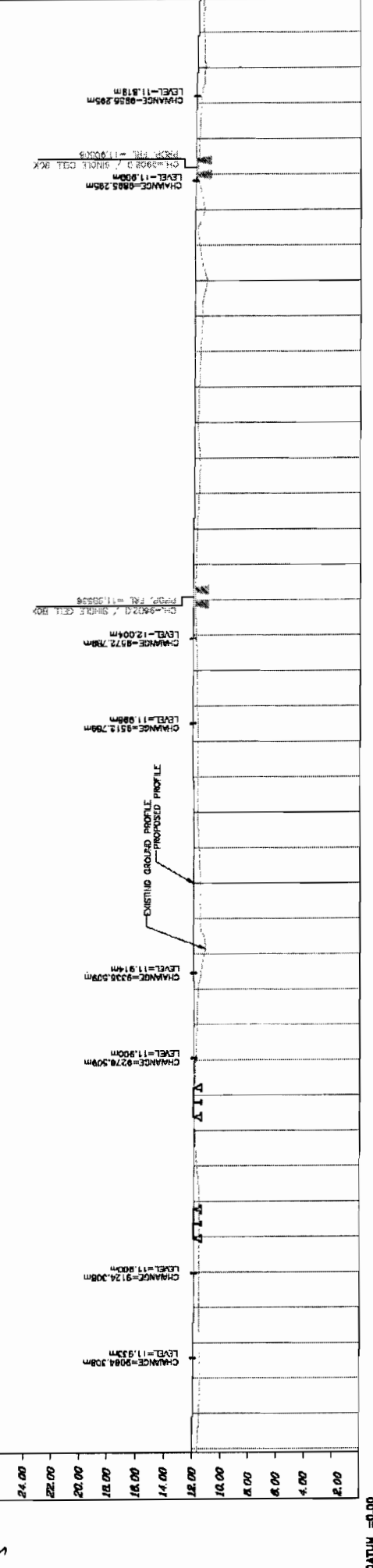
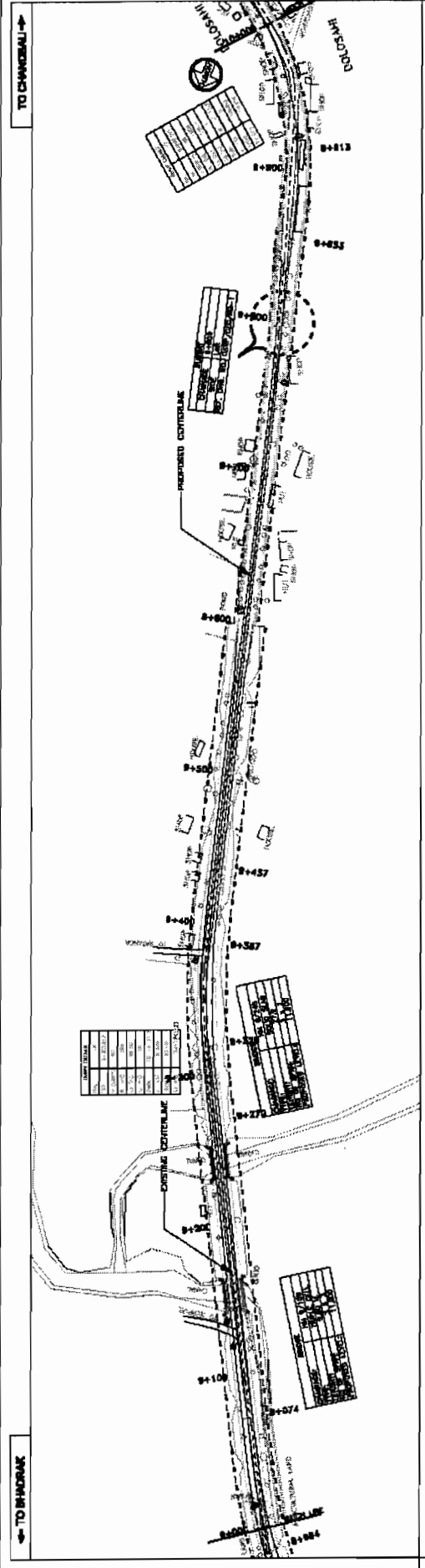
PROPOSED ROAD	EXISTING ROAD
PROPOSED CENTERLINE	EXISTING CENTERLINE
PROPOSED PROFILE	EXISTING PROFILE
PROPOSED SUPERELEVATION	EXISTING SUPERELEVATION
PROPOSED CROSSFALL	EXISTING CROSSFALL

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM 7/000 TO KM 8/000

DATE: 12/01/2011 **DRAWN BY:** J.P. **CHECKED BY:** J.P. **SCALE:** HORIZONTAL: 1:500 VERTICAL: 1:100

DATE: 12/01/2011 **DRAWN BY:** J.P. **CHECKED BY:** J.P. **SCALE:** HORIZONTAL: 1:500 VERTICAL: 1:100





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHAINAGE
11.85	11.85	L=90.00m		D=2.600	780.00
11.87	11.87				790.00
11.88	11.88				800.00
11.90	11.90				810.00
11.92	11.92				820.00
11.94	11.94				830.00
11.95	11.95				840.00
11.96	11.96				850.00
11.97	11.97				860.00
11.98	11.98				870.00
11.99	11.99				880.00
12.00	12.00				890.00
12.03	12.03	L=50.00m			900.00
12.07	12.07				910.00
12.09	12.09				920.00
12.09	12.09				930.00
12.07	12.07				940.00
12.03	12.03	L=50.00m			950.00
11.96	11.96				960.00
11.92	11.92				970.00
11.82	11.82				980.00
11.69	11.69				990.00
11.64	11.64				1000.00
11.56	11.56				1010.00
11.45	11.45	L=50.00m			1020.00
11.35	11.35				1030.00
11.21	11.21	L=65.287m			1040.00
11.08	11.08	R=500.000m			1050.00
10.93	10.93				1060.00
10.82	10.82				1070.00
10.74	10.74				1080.00
10.60	10.60				1090.00
10.48	10.48				1100.00
10.32	10.32				1110.00
10.19	10.19				1120.00
10.03	10.03				1130.00
9.85	9.85				1140.00
9.65	9.65				1150.00
9.41	9.41				1160.00
9.13	9.13				1170.00
8.83	8.83				1180.00
8.50	8.50				1190.00
8.14	8.14				1200.00
7.75	7.75				1210.00
7.34	7.34				1220.00
6.90	6.90				1230.00
6.44	6.44				1240.00
5.96	5.96				1250.00
5.45	5.45				1260.00
4.92	4.92				1270.00
4.37	4.37				1280.00
3.81	3.81				1290.00
3.23	3.23				1300.00
2.63	2.63				1310.00
2.01	2.01				1320.00
1.38	1.38				1330.00
0.73	0.73				1340.00
0.00	0.00				1350.00

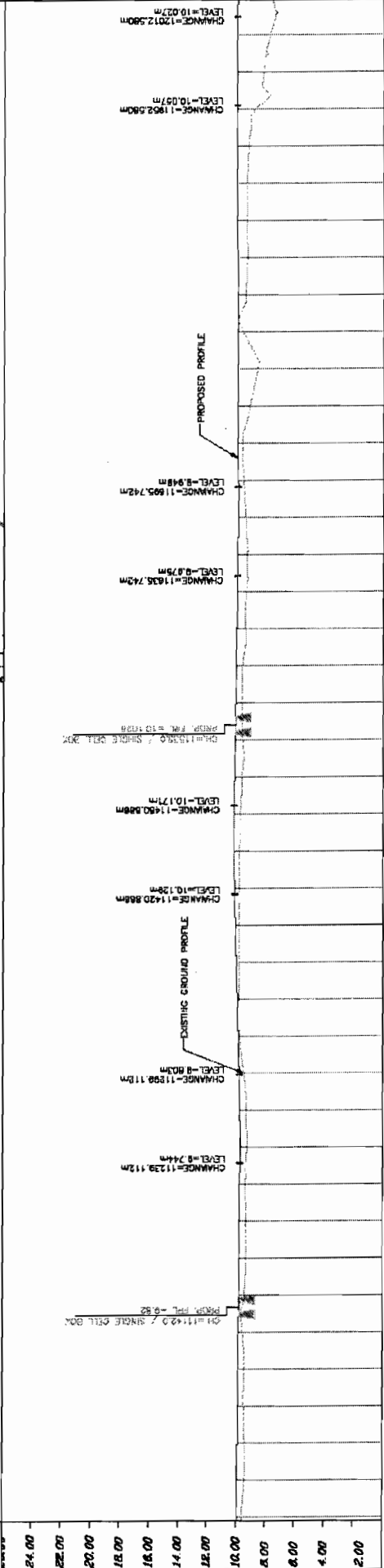
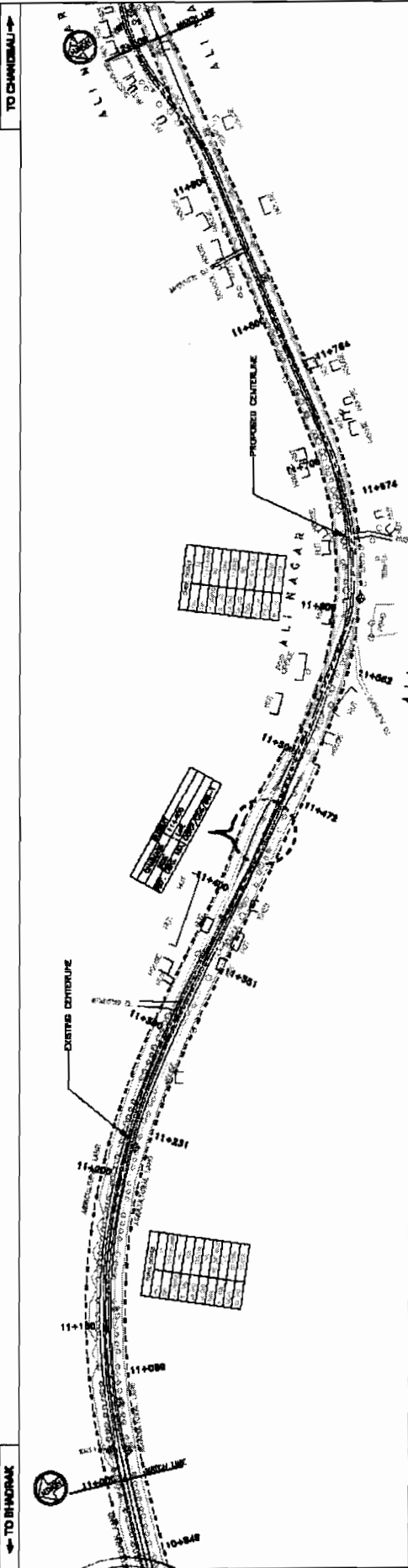
PROJECT:
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDBALI (SH-B) KM 9/000 TO KM 10/000
PREPARATION OF PHASE- (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
E-12, 1st Floor, Colony/Market, Jajpur, Bhubaneswar - 751 008, Orissa, India.
Tel: 674-141-252/0689-252/8811-252/0650
Fax: 252/1410, E-mail: cogdesign@vsnl.com

LEGEND

PREPARED BY	APPROVED BY
CHECKED BY	DATE
DATE	SCALE
HORIZONTAL	VERTICAL

DISTRICT ENGINEER, Bhubaneswar



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHANGING
10.042	7.769				
10.058	8.293				
10.078	8.837				
10.048	8.239				
10.039	8.379				
10.025	9.074				
10.014	9.027				
10.004	8.411				
9.993	8.812				
9.982	8.829				
9.972	8.180				
9.981	8.839				
9.951	8.367				
9.948	8.429				
9.959	8.398				
9.888	8.331				
10.020	9.399				
10.052	8.814				
10.084	8.822				
10.115	8.804				
10.147	8.825				
10.178	8.709				
10.178	8.829				
10.140	8.820				
10.073	8.839				
10.008	8.881				
9.939	8.816				
9.872	8.754				
9.805	8.407				
9.736	8.125				
9.740	8.230				
9.794	8.321				
9.772	8.369				
9.790	8.300				
9.808	8.438				
9.827	8.854				
9.846	8.441				
9.846	8.029				
9.881	8.408				
9.898	8.415				
9.917	8.373				
10.000	10.000				
10.025	10.025				
10.050	10.050				
10.075	10.075				
10.100	10.100				
10.125	10.125				
10.150	10.150				
10.175	10.175				
10.200	10.200				
10.225	10.225				
10.250	10.250				
10.275	10.275				
10.300	10.300				
10.325	10.325				
10.350	10.350				
10.375	10.375				
10.400	10.400				
10.425	10.425				
10.450	10.450				
10.475	10.475				
10.500	10.500				
10.525	10.525				
10.550	10.550				
10.575	10.575				
10.600	10.600				
10.625	10.625				
10.650	10.650				
10.675	10.675				
10.700	10.700				
10.725	10.725				
10.750	10.750				
10.775	10.775				
10.800	10.800				
10.825	10.825				
10.850	10.850				
10.875	10.875				
10.900	10.900				
10.925	10.925				
10.950	10.950				
10.975	10.975				
11.000	11.000				
11.025	11.025				
11.050	11.050				
11.075	11.075				
11.100	11.100				
11.125	11.125				
11.150	11.150				
11.175	11.175				
11.200	11.200				
11.225	11.225				
11.250	11.250				
11.275	11.275				
11.300	11.300				
11.325	11.325				
11.350	11.350				
11.375	11.375				
11.400	11.400				
11.425	11.425				
11.450	11.450				
11.475	11.475				
11.500	11.500				
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11.550	11.550				
11.575	11.575				
11.600	11.600				
11.625	11.625				
11.650	11.650				
11.675	11.675				
11.700	11.700				
11.725	11.725				
11.750	11.750				
11.775	11.775				
11.800	11.800				
11.825	11.825				
11.850	11.850				
11.875	11.875				
11.900	11.900				
11.925	11.925				
11.950	11.950				
11.975	11.975				
12.000	12.000				

SOM DATI BUILDERS ARCHITECTS CONTRACTOR

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM 11/000 TO KM 12/000

PROJECT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.

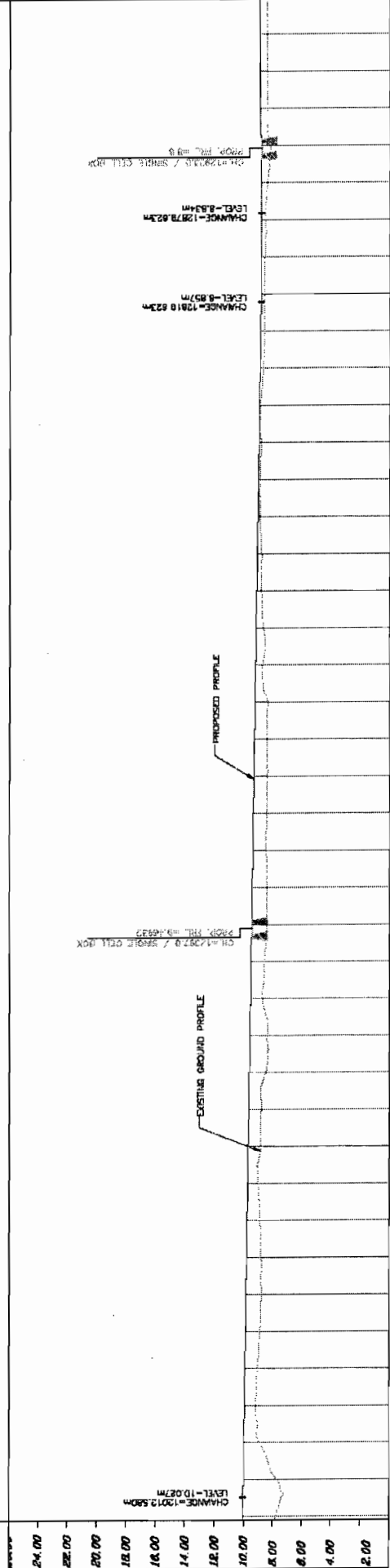
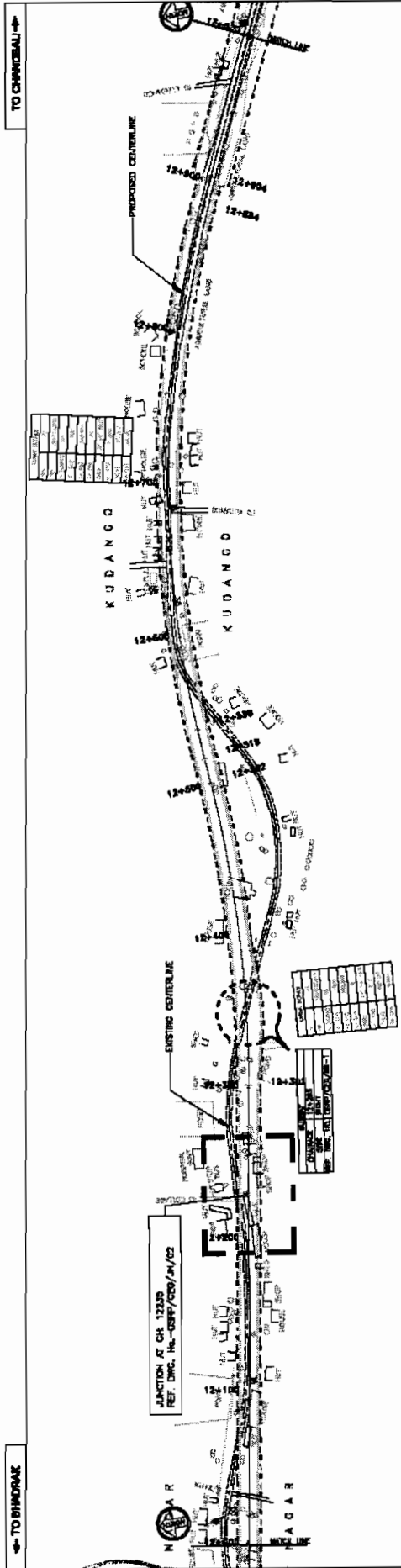
E-12, 1st Floor, Colony, Bhubaneswar-751005, Orissa, India
 Tel: 0674-2520889, 2520887, 2520558
 Fax: 0674-2520543, E-mail: ceg@cegroupindia.com

LEGEND

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

DATE	REV	BY	CHKD	APPD

SCALE: HORIZONTAL: _____ VERTICAL: _____



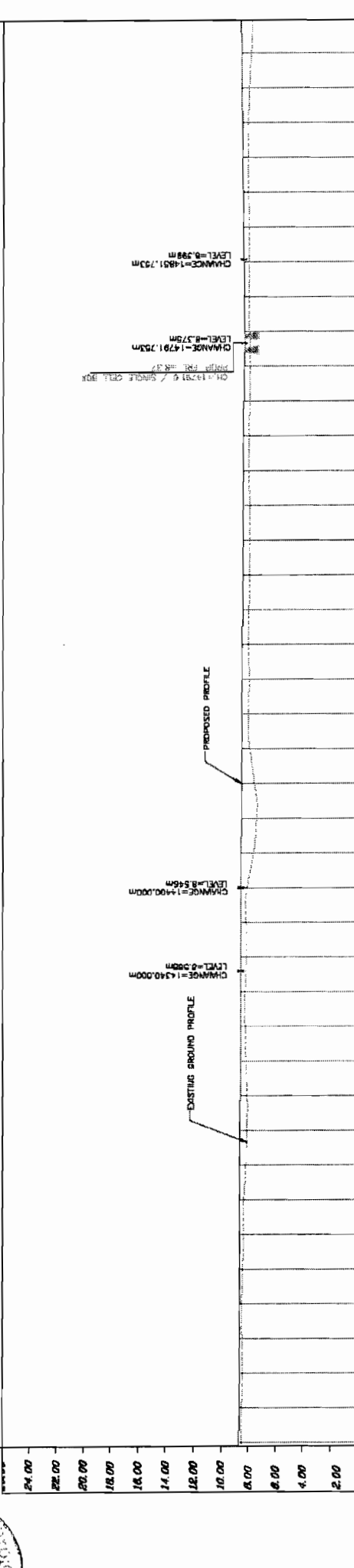
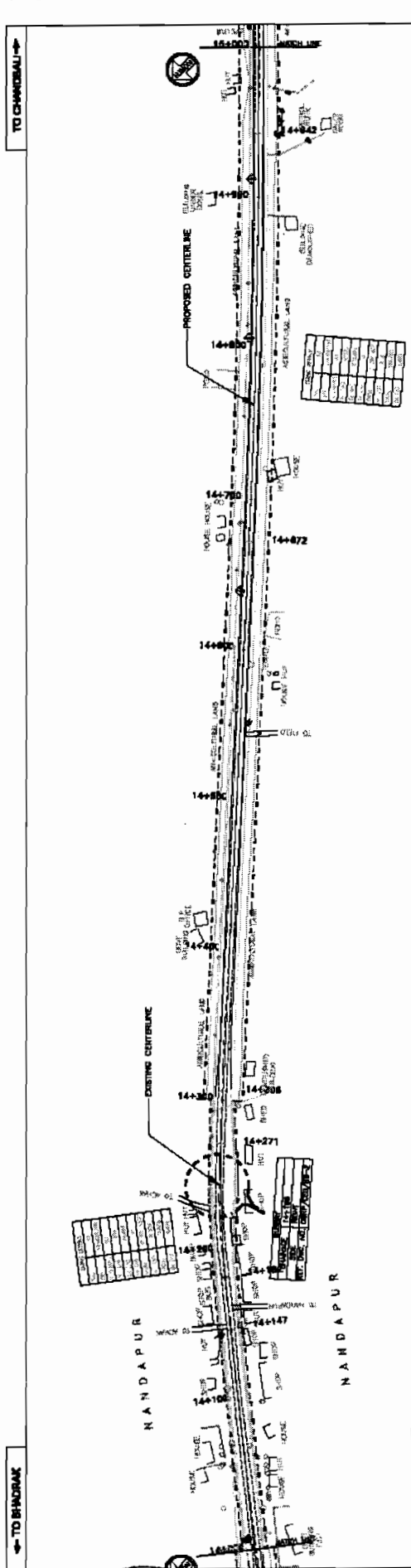
PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	MANAGE	CHIEF ENGINEER
10.00	10.00	L=537.317m	Q=0.000	0-2.500			
12.00	12.00	R=200.000m L=345.801m	Q=0.000	0-2.800			
14.00	14.00	R=200.000m L=345.801m	Q=0.000	0-2.800			
16.00	16.00	R=200.000m L=345.801m	Q=0.000	0-2.800			
18.00	18.00	R=200.000m L=345.801m	Q=0.000	0-2.800			
20.00	20.00	R=200.000m L=345.801m	Q=0.000	0-2.800			
22.00	22.00	R=200.000m L=345.801m	Q=0.000	0-2.800			
24.00	24.00	R=200.000m L=345.801m	Q=0.000	0-2.800			

SOM DATT BUILDERS ARCHITECTS & ENGINEERS PVT. LTD.
 CONTRACTOR

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDBAU (SH-9) KM 12/000 TO KM 13/000
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Colony, Kalyan Nagar, Jaipur-302017
 TEL: 261-141-2520899, 2521681, 2520550
 FAX: 2521440, E-MAIL: ceg@cegroupindia.com

CEG CONSULTING ENGINEERS GROUP LTD.
 LEGEND
 1. ROAD MARKINGS
 2. SURVEY STATIONS
 3. ...
 14. ...
 15. ...



Station	Existing Level (m)	Proposed Level (m)	Change (m)	Vertical	Horizontal
14+730	8.528	8.528	0.000		
14+729	8.528	8.528	0.000		
14+728	8.528	8.528	0.000		
14+727	8.528	8.528	0.000		
14+726	8.528	8.528	0.000		
14+725	8.528	8.528	0.000		
14+724	8.528	8.528	0.000		
14+723	8.528	8.528	0.000		
14+722	8.528	8.528	0.000		
14+721	8.528	8.528	0.000		
14+720	8.528	8.528	0.000		
14+719	8.528	8.528	0.000		
14+718	8.528	8.528	0.000		
14+717	8.528	8.528	0.000		
14+716	8.528	8.528	0.000		
14+715	8.528	8.528	0.000		
14+714	8.528	8.528	0.000		
14+713	8.528	8.528	0.000		
14+712	8.528	8.528	0.000		
14+711	8.528	8.528	0.000		
14+710	8.528	8.528	0.000		
14+709	8.528	8.528	0.000		
14+708	8.528	8.528	0.000		
14+707	8.528	8.528	0.000		
14+706	8.528	8.528	0.000		
14+705	8.528	8.528	0.000		
14+704	8.528	8.528	0.000		
14+703	8.528	8.528	0.000		
14+702	8.528	8.528	0.000		
14+701	8.528	8.528	0.000		
14+700	8.528	8.528	0.000		

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Concha Vinayagaraj Nagar, Sector-17
 Gurgaon, Haryana - 122002, INDIA
 Tel: 2821943, 2821944, 2821945 Fax: 2821946, 2821947, 2821948

PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO CHANDBALI (SH-9) KM 14+000 TO KM 15/000

PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SCALE	DATE	REV.	NO.	DESCRIPTION
HORIZONTAL	15		1	REVISED
VERTICAL	15		1	REVISED

LEGEND:
 BOUNDARY LINE
 C.A. LINE
 FENCE
 HOUSE
 OPEN AREA
 T.C. LINE
 T.P. MARK
 WATER MARK
 CROSSING
 DRAINAGE
 BRIDGE
 ROAD
 OTHER

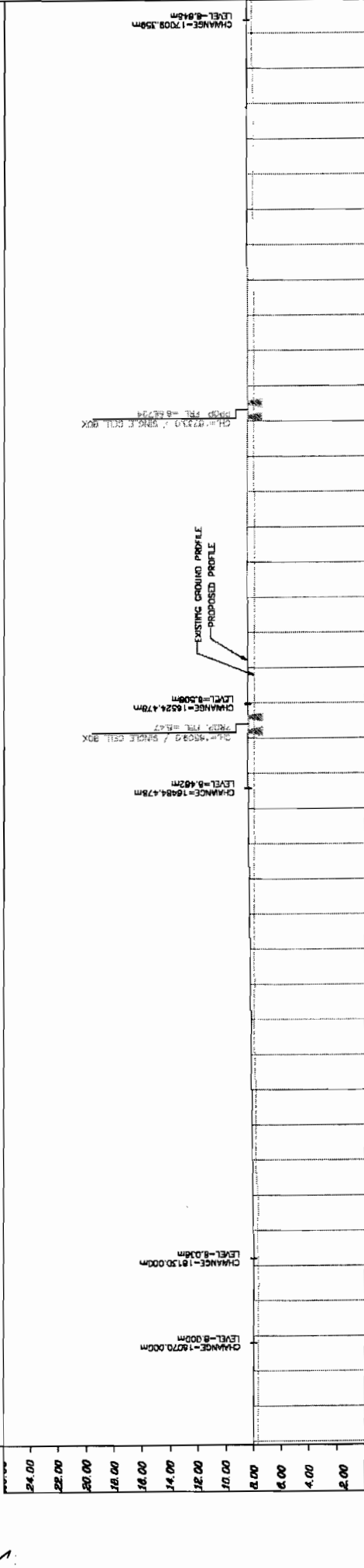
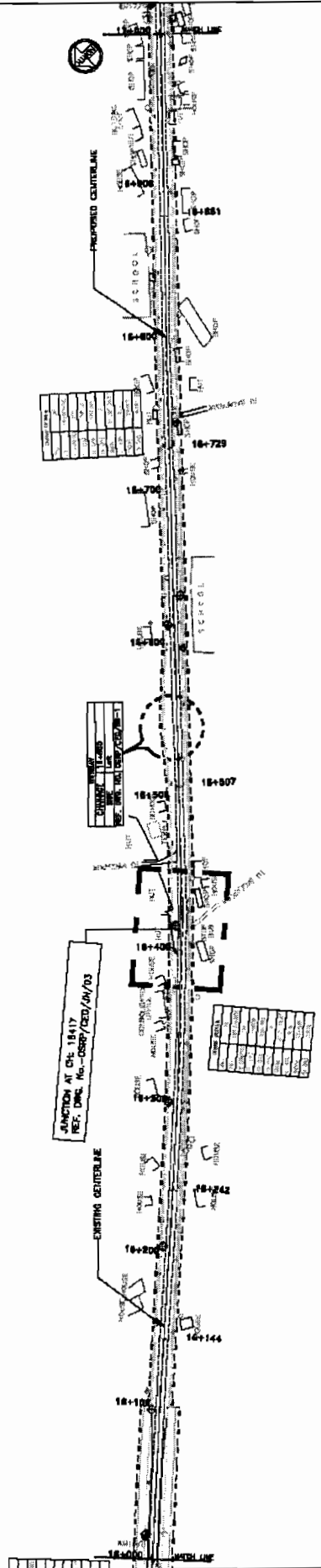
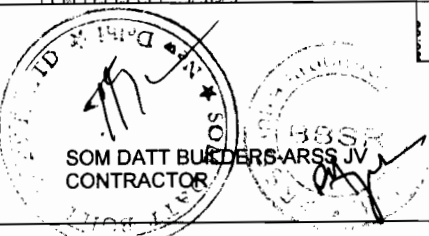
EMPLOYER:
 Orissa State Road Project
 Road Section
 Chief Engineer
 Civil Engineering
 Bhubaneswar

SOM DATT BUILDERS & CONTRACTORS
 NEW DELHI

ARIES INFRASTRUCTURE PROJECTS PVT. LTD.

TO CHANDIBALI

TO BHADRAK



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHAINAGE
24.00	8.000				17000.000
22.00	8.000				18025.000
20.00	8.000				18075.000
18.00	8.000				18100.000
16.00	8.000				18125.000
14.00	8.000				18150.000
12.00	8.000				18175.000
10.00	8.000				18200.000
8.00	8.000				18225.000
6.00	8.000				18250.000
4.00	8.000				18275.000
2.00	8.000				18300.000
0.00	8.000				18325.000
	8.000				18350.000
	8.000				18375.000
	8.000				18400.000
	8.000				18425.000
	8.000				18450.000
	8.000				18475.000
	8.000				18500.000
	8.000				18525.000
	8.000				18550.000
	8.000				18575.000
	8.000				18600.000
	8.000				18625.000
	8.000				18650.000
	8.000				18675.000
	8.000				18700.000
	8.000				18725.000
	8.000				18750.000
	8.000				18775.000
	8.000				18800.000
	8.000				18825.000
	8.000				18850.000
	8.000				18875.000
	8.000				18900.000
	8.000				18925.000
	8.000				18950.000
	8.000				18975.000
	8.000				19000.000
	8.000				19025.000
	8.000				19050.000
	8.000				19075.000
	8.000				19100.000
	8.000				19125.000
	8.000				19150.000
	8.000				19175.000
	8.000				19200.000
	8.000				19225.000
	8.000				19250.000
	8.000				19275.000
	8.000				19300.000
	8.000				19325.000
	8.000				19350.000
	8.000				19375.000
	8.000				19400.000
	8.000				19425.000
	8.000				19450.000
	8.000				19475.000
	8.000				19500.000
	8.000				19525.000
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	8.000				19850.000
	8.000				19875.000
	8.000				19900.000
	8.000				19925.000
	8.000				19950.000
	8.000				19975.000
	8.000				20000.000

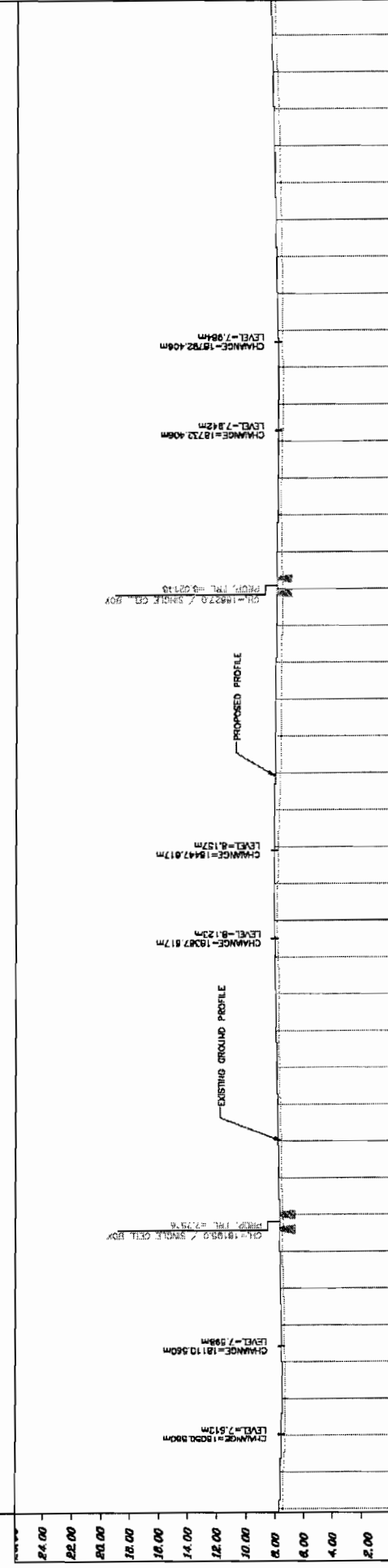
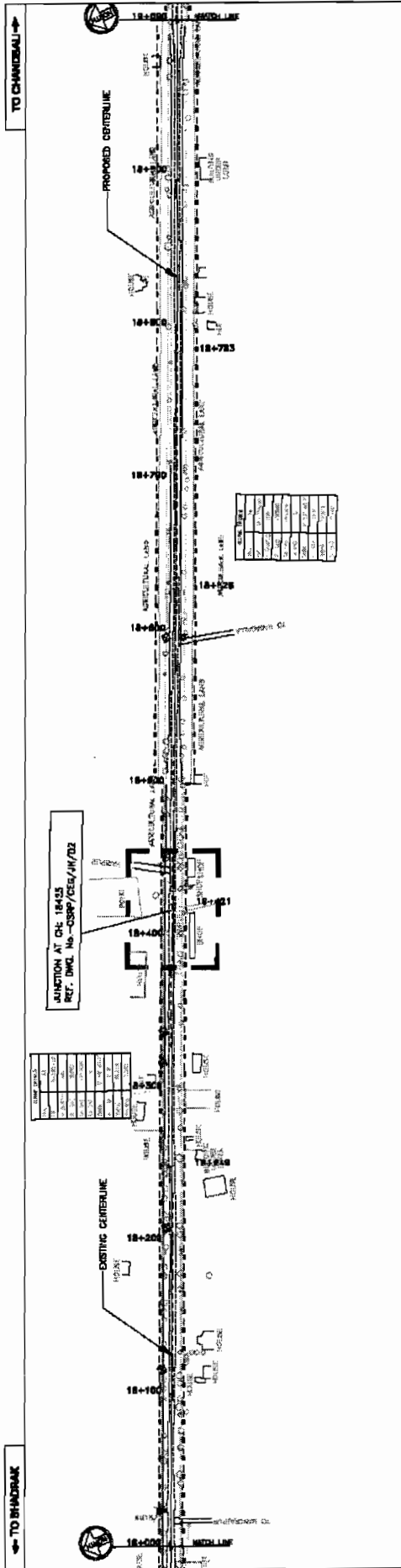
PROJECT:
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR CRISRA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Cross, Malviya Nagar, Jaipur-17
 Tel: 0141-2520699, 2521041, 2520558
 Fax: 2521041, e-mail: ceg@cegroup.com

LEGEND

EXISTING ROAD	PROPOSED ROAD
EXISTING CENTERLINE	PROPOSED CENTERLINE
EXISTING SURFACE	PROPOSED SURFACE
EXISTING GRADE	PROPOSED GRADE
EXISTING ELEVATION	PROPOSED ELEVATION
EXISTING CHAINAGE	PROPOSED CHAINAGE
EXISTING ROAD WIDTH	PROPOSED ROAD WIDTH
EXISTING ROAD TYPE	PROPOSED ROAD TYPE
EXISTING ROAD CLASSIFICATION	PROPOSED ROAD CLASSIFICATION
EXISTING ROAD CONDITION	PROPOSED ROAD CONDITION
EXISTING ROAD MATERIAL	PROPOSED ROAD MATERIAL
EXISTING ROAD DRAINAGE	PROPOSED ROAD DRAINAGE
EXISTING ROAD UTILITIES	PROPOSED ROAD UTILITIES
EXISTING ROAD OBSTACLES	PROPOSED ROAD OBSTACLES
EXISTING ROAD INTERSECTIONS	PROPOSED ROAD INTERSECTIONS
EXISTING ROAD JUNCTIONS	PROPOSED ROAD JUNCTIONS
EXISTING ROAD BRIDGES	PROPOSED ROAD BRIDGES
EXISTING ROAD TUNNELS	PROPOSED ROAD TUNNELS
EXISTING ROAD CUTS	PROPOSED ROAD CUTS
EXISTING ROAD EMBANKMENTS	PROPOSED ROAD EMBANKMENTS
EXISTING ROAD DITCHES	PROPOSED ROAD DITCHES
EXISTING ROAD FENCES	PROPOSED ROAD FENCES
EXISTING ROAD SIGNAGE	PROPOSED ROAD SIGNAGE
EXISTING ROAD LIGHTING	PROPOSED ROAD LIGHTING
EXISTING ROAD SAFETY	PROPOSED ROAD SAFETY
EXISTING ROAD ENVIRONMENT	PROPOSED ROAD ENVIRONMENT
EXISTING ROAD SOCIAL	PROPOSED ROAD SOCIAL
EXISTING ROAD ECONOMIC	PROPOSED ROAD ECONOMIC
EXISTING ROAD POLITICAL	PROPOSED ROAD POLITICAL
EXISTING ROAD CULTURAL	PROPOSED ROAD CULTURAL
EXISTING ROAD HISTORICAL	PROPOSED ROAD HISTORICAL
EXISTING ROAD LEGAL	PROPOSED ROAD LEGAL
EXISTING ROAD REGULATORY	PROPOSED ROAD REGULATORY
EXISTING ROAD STANDARDS	PROPOSED ROAD STANDARDS
EXISTING ROAD BEST PRACTICES	PROPOSED ROAD BEST PRACTICES
EXISTING ROAD INNOVATIONS	PROPOSED ROAD INNOVATIONS
EXISTING ROAD RESEARCH	PROPOSED ROAD RESEARCH
EXISTING ROAD DEVELOPMENTS	PROPOSED ROAD DEVELOPMENTS
EXISTING ROAD TRENDS	PROPOSED ROAD TRENDS
EXISTING ROAD FUTURE	PROPOSED ROAD FUTURE

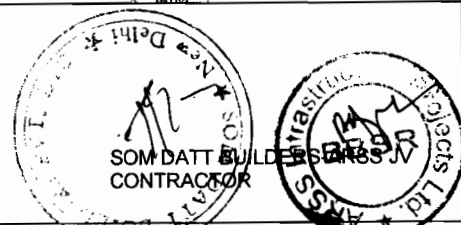
World Bank Projects, Onssa
 Chief Engineer, EMPLOYER



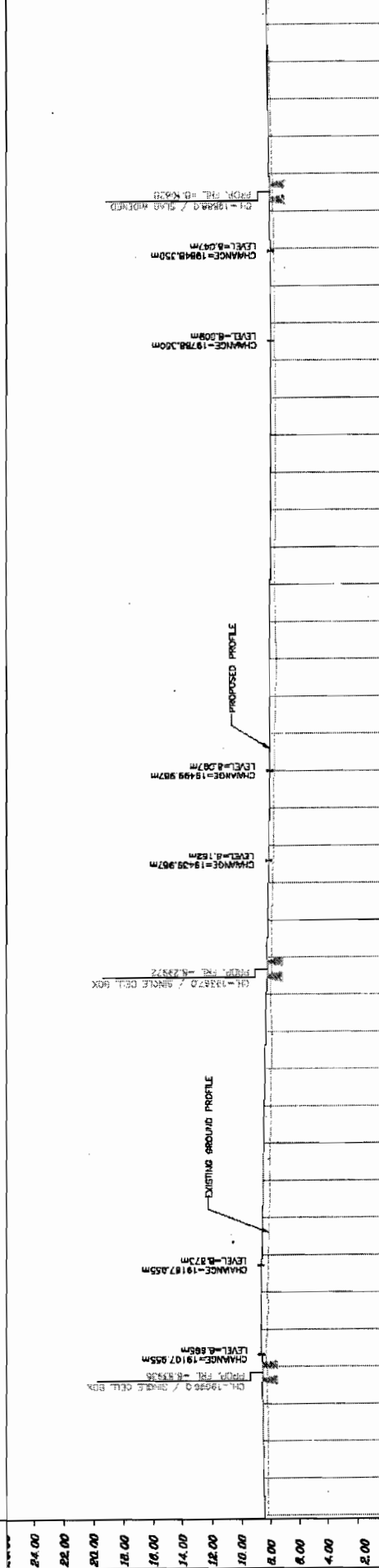
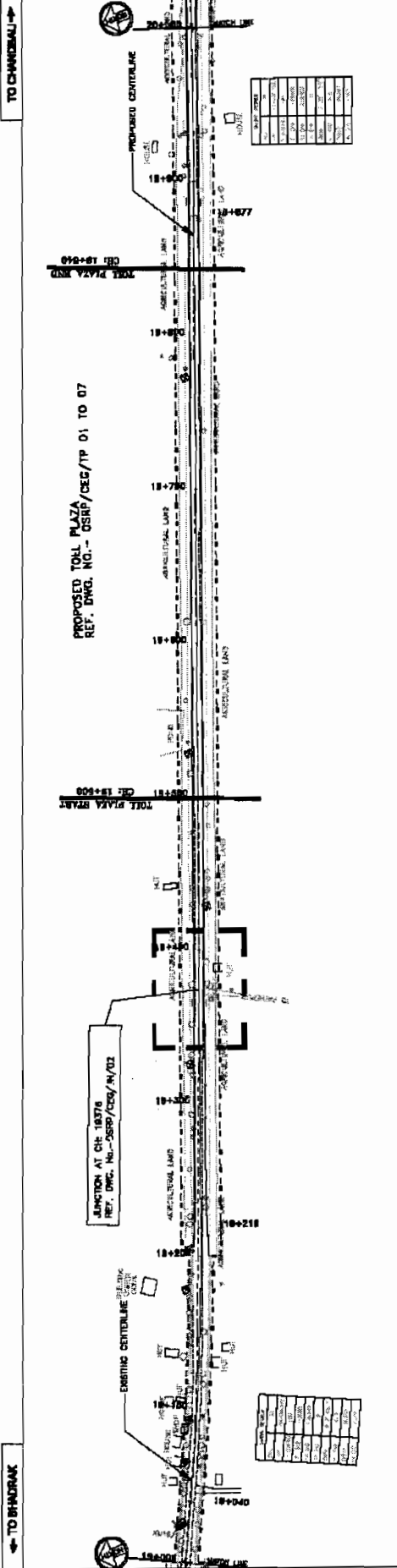
PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL	VERTICAL PROFILE	SUPERELEVATION	DRAINAGE
24.00	23.93				
22.00	23.84				
20.00	23.75				
18.00	23.66				
16.00	23.57				
14.00	23.48				
12.00	23.39				
10.00	23.30				
8.00	23.21				
6.00	23.12				
4.00	23.03				
2.00	22.94				
7.572	7.489				
7.813	7.334				
7.575	7.307				
7.582	7.320				
7.625	7.425				
7.873	7.483				
7.720	7.497				
7.787	7.514				
7.815	7.804				
7.882	7.653				
7.910	7.707				
7.937	7.839				
8.004	7.829				
8.052	7.783				
8.098	7.858				
8.143	7.971				
8.183	7.923				
8.195	7.893				
8.137	7.812				
8.118	7.724				
8.098	7.636				
8.080	7.594				
8.081	7.709				
8.042	7.853				
8.023	7.928				
8.004	7.998				
8.004	7.725				
8.004	7.718				
7.947	7.673				
7.928	7.608				
7.954	7.825				
8.000	7.898				
8.094	7.703				
8.102	7.729				
8.216	7.814				
8.270	7.997				
8.324	7.959				
8.378	8.048				
8.432	8.193				

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM 18/000 TO KM 19/000

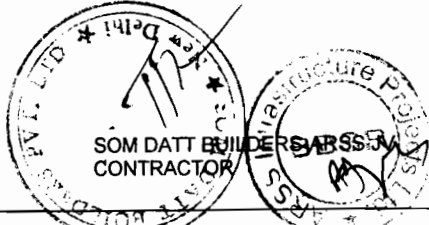
CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Convent Road, Indraprastha, New Delhi-110 021
 Tel: 2611441, 2611442, 2611443, 2611444, 2611445, 2611446, 2611447, 2611448, 2611449, 2611450, 2611451, 2611452, 2611453, 2611454, 2611455, 2611456, 2611457, 2611458, 2611459, 2611460, 2611461, 2611462, 2611463, 2611464, 2611465, 2611466, 2611467, 2611468, 2611469, 2611470, 2611471, 2611472, 2611473, 2611474, 2611475, 2611476, 2611477, 2611478, 2611479, 2611480, 2611481, 2611482, 2611483, 2611484, 2611485, 2611486, 2611487, 2611488, 2611489, 2611490, 2611491, 2611492, 2611493, 2611494, 2611495, 2611496, 2611497, 2611498, 2611499, 2611500, 2611501, 2611502, 2611503, 2611504, 2611505, 2611506, 2611507, 2611508, 2611509, 2611510, 2611511, 2611512, 2611513, 2611514, 2611515, 2611516, 2611517, 2611518, 2611519, 2611520, 2611521, 2611522, 2611523, 2611524, 2611525, 2611526, 2611527, 2611528, 2611529, 2611530, 2611531, 2611532, 2611533, 2611534, 2611535, 2611536, 2611537, 2611538, 2611539, 2611540, 2611541, 2611542, 2611543, 2611544, 2611545, 2611546, 2611547, 2611548, 2611549, 2611550, 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2611995, 2611996, 2611997, 2611998, 2611999, 2612000



World Bank Projects, Orissa EMPLOYER



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	MANAGE
8.182	8.182	R=2000.000m L=178.642m	L=60.000m			
8.182	8.182					
8.191	8.191					
8.199	8.199					
8.208	8.208					
8.216	8.216					
8.224	8.224					
8.232	8.232					
8.240	8.240					
8.248	8.248					
8.256	8.256					
8.264	8.264					
8.272	8.272					
8.280	8.280					
8.288	8.288					
8.296	8.296					
8.304	8.304					
8.312	8.312					
8.320	8.320					
8.328	8.328					
8.336	8.336					
8.344	8.344					
8.352	8.352					
8.360	8.360					
8.368	8.368					
8.376	8.376					
8.384	8.384					
8.392	8.392					
8.400	8.400					
8.408	8.408					
8.416	8.416					
8.424	8.424					
8.432	8.432					
8.440	8.440					
8.448	8.448					
8.456	8.456					
8.464	8.464					
8.472	8.472					
8.480	8.480					
8.488	8.488					
8.496	8.496					
8.504	8.504					
8.512	8.512					
8.520	8.520					
8.528	8.528					
8.536	8.536					
8.544	8.544					
8.552	8.552					
8.560	8.560					
8.568	8.568					
8.576	8.576					
8.584	8.584					
8.592	8.592					
8.600	8.600					
8.608	8.608					
8.616	8.616					
8.624	8.624					
8.632	8.632					
8.640	8.640					
8.648	8.648					
8.656	8.656					
8.664	8.664					
8.672	8.672					
8.680	8.680					
8.688	8.688					
8.696	8.696					
8.704	8.704					
8.712	8.712					
8.720	8.720					
8.728	8.728					
8.736	8.736					
8.744	8.744					
8.752	8.752					
8.760	8.760					
8.768	8.768					
8.776	8.776					
8.784	8.784					
8.792	8.792					
8.800	8.800					
8.808	8.808					
8.816	8.816					
8.824	8.824					
8.832	8.832					
8.840	8.840					
8.848	8.848					
8.856	8.856					
8.864	8.864					
8.872	8.872					
8.880	8.880					
8.888	8.888					
8.896	8.896					
8.904	8.904					
8.912	8.912					
8.920	8.920					
8.928	8.928					
8.936	8.936					
8.944	8.944					
8.952	8.952					
8.960	8.960					
8.968	8.968					
8.976	8.976					
8.984	8.984					
8.992	8.992					
8.999	8.999					
9.000	9.000					

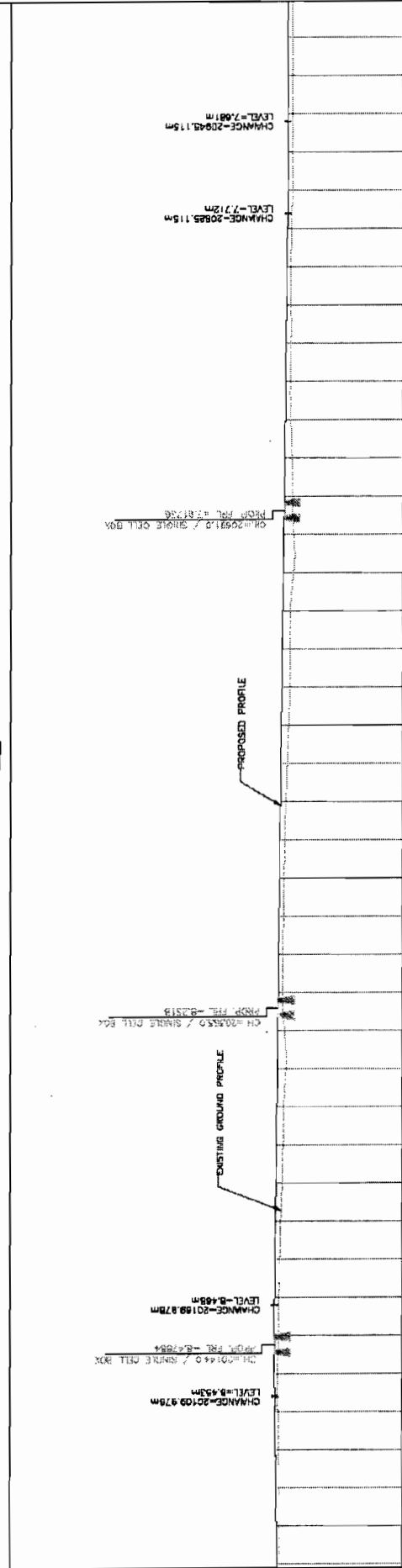
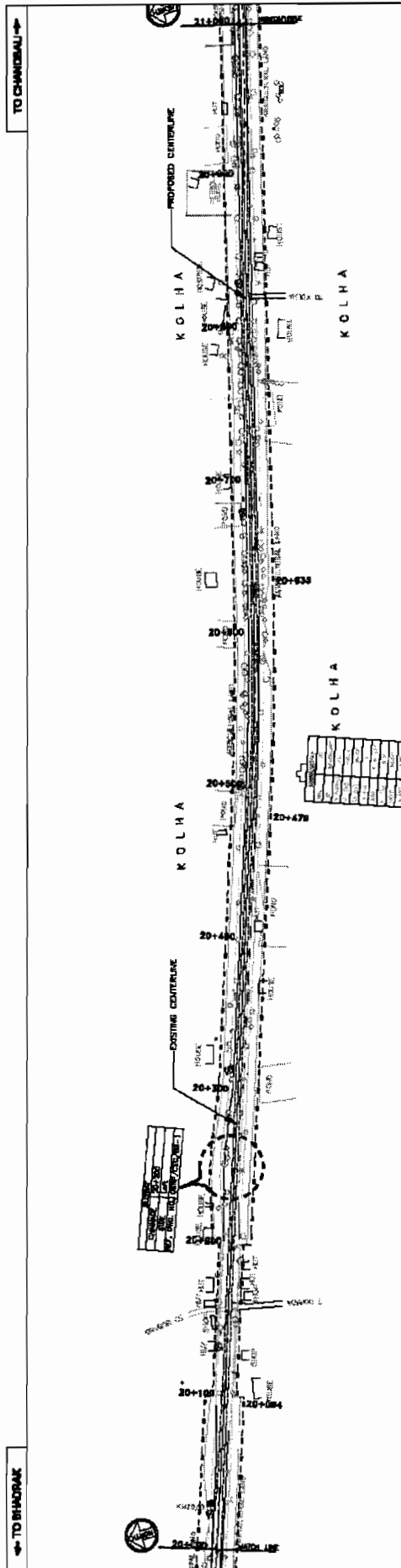


WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM 19/000 TO KM 20/000

PROJECT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Noida Colony, Malviya Nagar, Jaipur-17
 Tel: 491-141-255, 438-252, 888-250, 555
 Fax: 252-1348, e-mail: ceg@engineersgroup.com

NO.	DESCRIPTION	DATE
1	ISSUED FOR TENDER	10/11/2007
2	REVISED FOR TENDER	10/11/2007
3	ISSUED FOR TENDER	10/11/2007
4	REVISED FOR TENDER	10/11/2007
5	ISSUED FOR TENDER	10/11/2007
6	REVISED FOR TENDER	10/11/2007
7	ISSUED FOR TENDER	10/11/2007
8	REVISED FOR TENDER	10/11/2007
9	ISSUED FOR TENDER	10/11/2007
10	REVISED FOR TENDER	10/11/2007
11	ISSUED FOR TENDER	10/11/2007
12	REVISED FOR TENDER	10/11/2007
13	ISSUED FOR TENDER	10/11/2007
14	REVISED FOR TENDER	10/11/2007
15	ISSUED FOR TENDER	10/11/2007
16	REVISED FOR TENDER	10/11/2007
17	ISSUED FOR TENDER	10/11/2007
18	REVISED FOR TENDER	10/11/2007
19	ISSUED FOR TENDER	10/11/2007
20	REVISED FOR TENDER	10/11/2007



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	MANAGE
8.282	8.282					
8.291	8.291					
8.290	8.290					
8.288	8.288					
8.294	8.294					
8.297	8.297					
8.272	8.272					
8.244	8.244					
8.208	8.208					
8.124	8.124					
8.437	8.437					
8.410	8.410					
8.384	8.384					
8.357	8.357					
8.331	8.331					
8.304	8.304					
8.278	8.278					
8.251	8.251					
8.198	8.198					
8.172	8.172					
8.146	8.146					
8.119	8.119					
8.093	8.093					
8.068	8.068					
8.040	8.040					
8.013	8.013					
7.987	7.987					
7.961	7.961					
7.934	7.934					
7.908	7.908					
7.881	7.881					
7.855	7.855					
7.829	7.829					
7.802	7.802					
7.776	7.776					
7.749	7.749					
7.723	7.723					
7.696	7.696					
7.670	7.670					
7.643	7.643					
7.617	7.617					
7.590	7.590					
7.564	7.564					

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 C-12, 1st Colony, Nalanda Nagar, Jaipur-302017
 Tel: +91-141-2520899, 2521648, 3320558
 Fax: 2521346, E-mail: ceg@ceggroup.com

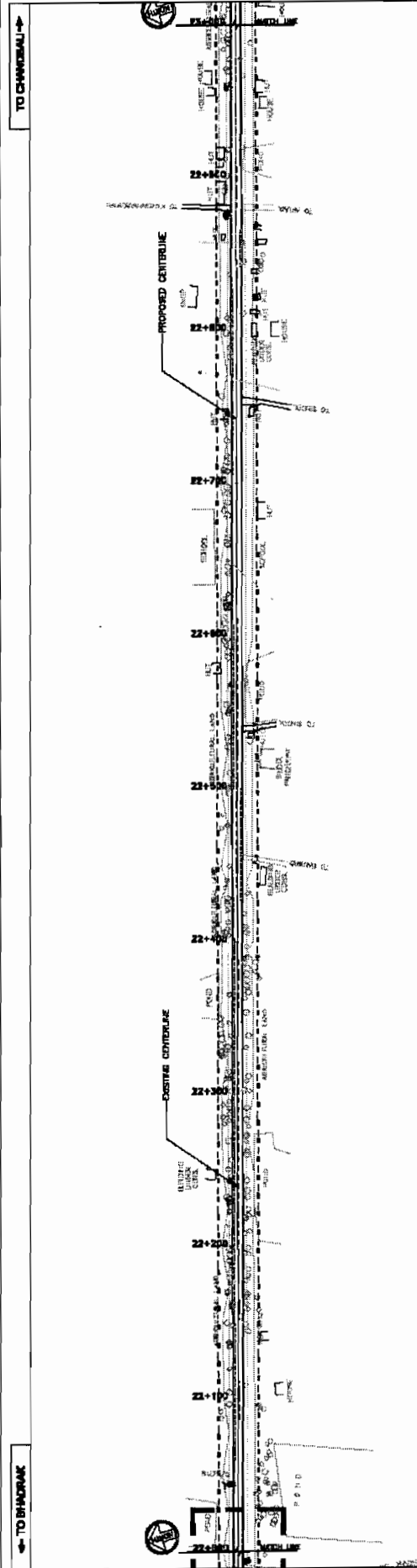
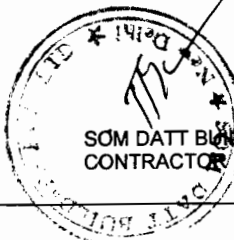
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DATE: 15/03/2011
SCALE: HORIZONTAL: 1:5000, VERTICAL: 1:1000

DATE: 15/03/2011
SCALE: HORIZONTAL: 1:5000, VERTICAL: 1:1000

SOM DATTA BUILDERS ARSSAV CONTRACTOR

World Bank Projects, Orissa EMPLOYER



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	DRAINAGE
2.00	1.00					
4.00	3.00					
6.00	5.00					
8.00	7.00					
10.00	9.00					
12.00	11.00					
14.00	13.00					
16.00	15.00					
18.00	17.00					
20.00	19.00					
22.00	21.00					
24.00	23.00					

DATUM = 0.00	PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)
25000.000	21.17	21.18
25050.000	21.18	21.19
25100.000	21.20	21.21
25150.000	21.21	21.22
25200.000	21.22	21.23
25250.000	21.24	21.25
25300.000	21.25	21.26
25350.000	21.27	21.28
25400.000	21.28	21.29
25450.000	21.30	21.31
25500.000	21.31	21.32
25550.000	21.32	21.33
25600.000	21.34	21.35
25650.000	21.35	21.36
25700.000	21.36	21.37
25750.000	21.37	21.38
25800.000	21.39	21.40
25850.000	21.40	21.41
25900.000	21.42	21.43
25950.000	21.43	21.44
26000.000	21.45	21.46
26050.000	21.46	21.47
26100.000	21.48	21.49
26150.000	21.49	21.50
26200.000	21.51	21.52
26250.000	21.52	21.53
26300.000	21.54	21.55
26350.000	21.55	21.56
26400.000	21.57	21.58
26450.000	21.58	21.59
26500.000	21.60	21.61
26550.000	21.61	21.62
26600.000	21.63	21.64
26650.000	21.64	21.65
26700.000	21.66	21.67
26750.000	21.67	21.68
26800.000	21.69	21.70
26850.000	21.70	21.71
26900.000	21.72	21.73
26950.000	21.73	21.74
27000.000	21.75	21.76
27050.000	21.76	21.77
27100.000	21.78	21.79
27150.000	21.79	21.80
27200.000	21.81	21.82
27250.000	21.82	21.83
27300.000	21.84	21.85
27350.000	21.85	21.86
27400.000	21.87	21.88
27450.000	21.88	21.89
27500.000	21.90	21.91
27550.000	21.91	21.92
27600.000	21.93	21.94
27650.000	21.94	21.95
27700.000	21.96	21.97
27750.000	21.97	21.98
27800.000	21.99	22.00
27850.000	22.00	22.01
27900.000	22.02	22.03
27950.000	22.03	22.04
28000.000	22.05	22.06
28050.000	22.06	22.07
28100.000	22.08	22.09
28150.000	22.09	22.10
28200.000	22.11	22.12
28250.000	22.12	22.13
28300.000	22.14	22.15
28350.000	22.15	22.16
28400.000	22.17	22.18
28450.000	22.18	22.19
28500.000	22.20	22.21
28550.000	22.21	22.22
28600.000	22.23	22.24
28650.000	22.24	22.25
28700.000	22.26	22.27
28750.000	22.27	22.28
28800.000	22.29	22.30
28850.000	22.30	22.31
28900.000	22.32	22.33
28950.000	22.33	22.34
29000.000	22.35	22.36
29050.000	22.36	22.37
29100.000	22.38	22.39
29150.000	22.39	22.40
29200.000	22.41	22.42
29250.000	22.42	22.43
29300.000	22.44	22.45
29350.000	22.45	22.46
29400.000	22.47	22.48
29450.000	22.48	22.49
29500.000	22.50	22.51
29550.000	22.51	22.52
29600.000	22.53	22.54
29650.000	22.54	22.55
29700.000	22.56	22.57
29750.000	22.57	22.58
29800.000	22.59	22.60
29850.000	22.60	22.61
29900.000	22.62	22.63
29950.000	22.63	22.64
30000.000	22.65	22.66

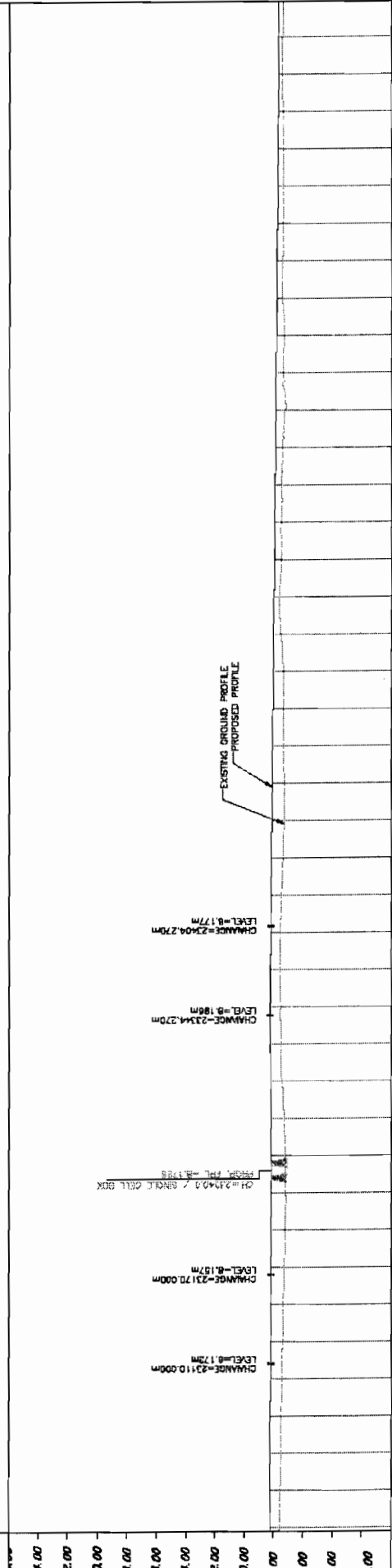
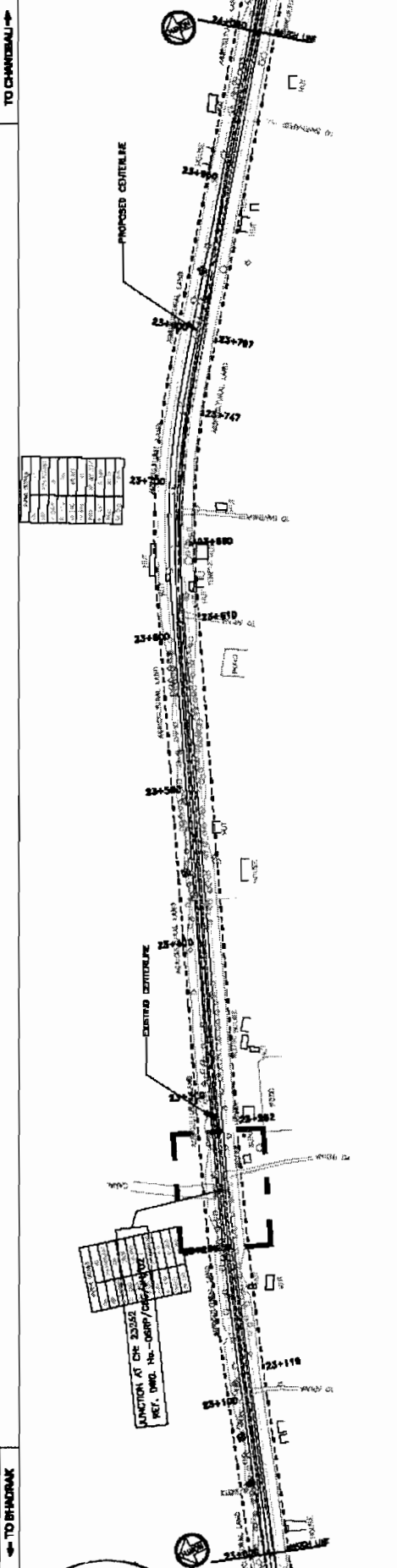
PROJECT: **WIDENING AND STRENGTHENING TO TWO LANE**
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDIBALI (SH-9) KM 22/000 TO KM 23/000
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Nofl Colony, Kalyani Nagar, Jaipur-302005
 Tel: 491-441-2520899, 2521888, 2520658
 Fax: 2521346, E-mail: ceg@cegindia.com

LEGEND

UNITS AND WEIGHTS	<input type="checkbox"/>	SI	UNITS OF AREA	<input type="checkbox"/>	SI
COLOURS	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF VOLUME	<input type="checkbox"/>	SI
PROFILES	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF LENGTH	<input type="checkbox"/>	SI
ALIGNMENTS	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF MASS	<input type="checkbox"/>	SI
STATIONING	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF FORCE	<input type="checkbox"/>	SI
TEMPERATURES	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF PRESSURE	<input type="checkbox"/>	SI
HEIGHTS	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF ENERGY	<input type="checkbox"/>	SI
ACCELERATIONS	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF POWER	<input type="checkbox"/>	SI
VELOCITIES	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF FORCE PER UNIT AREA	<input type="checkbox"/>	SI
STRESS	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF FORCE PER UNIT LENGTH	<input type="checkbox"/>	SI
MODULI	<input type="checkbox"/>	AS PER SPECIFICATION	UNITS OF FORCE PER UNIT CIRCUMFERENCE	<input type="checkbox"/>	SI
PERCENTAGES	<input type="checkbox"/>	AS PER SPECIFICATION			

World Bank Projects, Orissa
 EMPLOYER
 (Signature)



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	GRADE
23.981	7.874	L=50.000m	L=40.4		
23.973	7.899				
23.965	7.718				
23.957	7.737				
23.949	7.798				
23.941	7.779				
23.933	7.800				
23.925	7.822				
23.917	7.843				
23.909	7.864				
23.901	7.884				
23.893	7.889				
23.885	7.895				
23.877	7.908				
23.869	7.927				
23.861	7.848				
23.853	7.898				
23.845	7.891				
23.837	8.012				
23.829	8.033				
23.821	8.054				
23.813	8.075				
23.805	8.096				
23.797	8.117				
23.789	8.138				
23.781	8.159				
23.773	8.180				
23.765	8.181				
23.757	8.194				
23.749	8.197				
23.741	8.191				
23.733	8.186				
23.725	8.180				
23.717	8.175				
23.709	8.170				
23.701	8.165				
23.693	8.160				
23.685	8.155				
23.677	8.150				
23.669	8.145				
23.661	8.140				
23.653	8.135				
23.645	8.130				
23.637	8.125				
23.629	8.120				
23.621	8.115				
23.613	8.110				
23.605	8.105				
23.597	8.100				
23.589	8.095				
23.581	8.090				
23.573	8.085				
23.565	8.080				
23.557	8.075				
23.549	8.070				
23.541	8.065				
23.533	8.060				
23.525	8.055				
23.517	8.050				
23.509	8.045				
23.501	8.040				
23.493	8.035				
23.485	8.030				
23.477	8.025				
23.469	8.020				
23.461	8.015				
23.453	8.010				
23.445	8.005				
23.437	8.000				
23.429	7.995				
23.421	7.990				
23.413	7.985				
23.405	7.980				
23.397	7.975				
23.389	7.970				
23.381	7.965				
23.373	7.960				
23.365	7.955				
23.357	7.950				
23.349	7.945				
23.341	7.940				
23.333	7.935				
23.325	7.930				
23.317	7.925				
23.309	7.920				
23.301	7.915				
23.293	7.910				
23.285	7.905				
23.277	7.900				
23.269	7.895				
23.261	7.890				
23.253	7.885				
23.245	7.880				
23.237	7.875				
23.229	7.870				
23.221	7.865				
23.213	7.860				
23.205	7.855				
23.197	7.850				
23.189	7.845				
23.181	7.840				
23.173	7.835				
23.165	7.830				
23.157	7.825				
23.149	7.820				
23.141	7.815				
23.133	7.810				
23.125	7.805				
23.117	7.800				
23.109	7.795				
23.101	7.790				
23.093	7.785				
23.085	7.780				
23.077	7.775				
23.069	7.770				
23.061	7.765				
23.053	7.760				
23.045	7.755				
23.037	7.750				
23.029	7.745				
23.021	7.740				
23.013	7.735				
23.005	7.730				
23.000	7.725				

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM 23/000 TO KM 24/000

CONSULTING PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

ENGINEERS GROUP LTD.
 E-12, Net Colony, Kalyan Nagar, Jaipur-302017
 Tel: 051-41-2520889, 2521681, 2520650
 Fax: 2521346, E-mail: enggsgroup.com

LEGEND

PROPOSED ROAD LEVEL (m)

EXISTING LEVEL (m)

HORIZONTAL ALIGNMENT

VERTICAL PROFILE

SUPERELEVATION / CROSSFALL

GRADE

SCALE
 HORIZONTAL: 1:1000
 VERTICAL: 1:100

DATE _____ **REV** _____ **NO** _____

DESIGNED BY _____ **CHECKED BY** _____

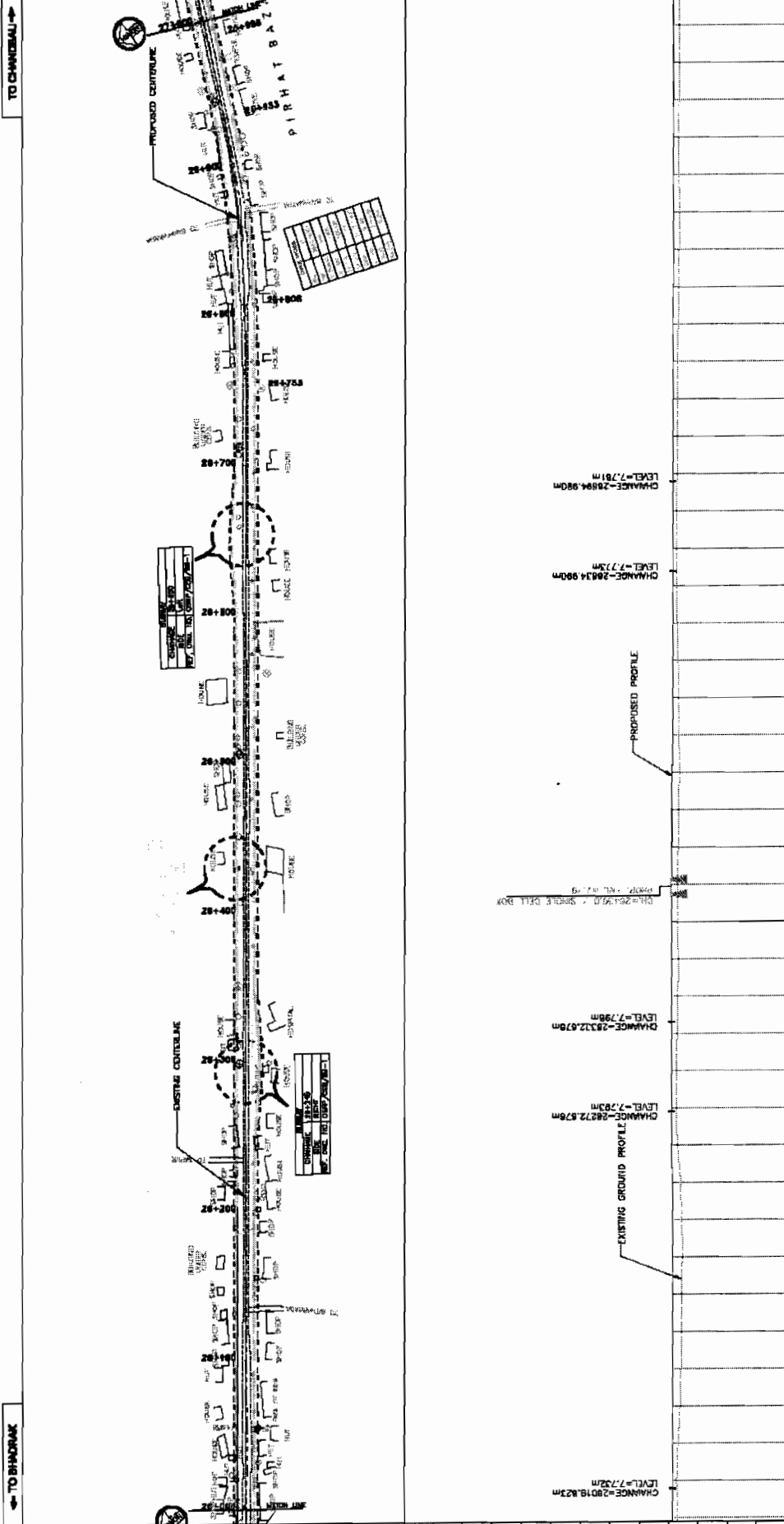
DATE _____ **REV** _____ **NO** _____

DESIGNED BY _____ **CHECKED BY** _____

SOM DAY BUILDERS ASSOCIATION
CONTRACTOR

INSURANCE PROVIDER

World Bank Projects, Orissa
EMPLOYER



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHANCE	DRAINAGE
27.82	27.82	L=55.000m				
27.87	27.87	R=800.000m L=125.136m				
27.93	27.93	L=55.000m				
27.98	27.98		L=302.51m G=-0.008			
28.04	28.04					
28.10	28.10					
28.16	28.16					
28.22	28.22					
28.28	28.28					
28.34	28.34					
28.40	28.40					
28.46	28.46					
28.52	28.52					
28.58	28.58					
28.64	28.64					
28.70	28.70					
28.76	28.76					
28.82	28.82					
28.88	28.88					
28.94	28.94					
29.00	29.00					
29.06	29.06					
29.12	29.12					
29.18	29.18					
29.24	29.24					
29.30	29.30					
29.36	29.36					
29.42	29.42					
29.48	29.48					
29.54	29.54					
29.60	29.60					
29.66	29.66					
29.72	29.72					
29.78	29.78					
29.84	29.84					
29.90	29.90					
29.96	29.96					
30.02	30.02					
30.08	30.08					
30.14	30.14					
30.20	30.20					
30.26	30.26					
30.32	30.32					
30.38	30.38					
30.44	30.44					
30.50	30.50					
30.56	30.56					
30.62	30.62					
30.68	30.68					
30.74	30.74					
30.80	30.80					
30.86	30.86					
30.92	30.92					
30.98	30.98					
31.04	31.04					
31.10	31.10					
31.16	31.16					
31.22	31.22					
31.28	31.28					
31.34	31.34					
31.40	31.40					
31.46	31.46					
31.52	31.52					
31.58	31.58					
31.64	31.64					
31.70	31.70					
31.76	31.76					
31.82	31.82					
31.88	31.88					
31.94	31.94					
32.00	32.00					

SOM DATT BUILDERS & CONTRACTORS
SOM DATT BUILDERS & CONTRACTORS
SOM DATT BUILDERS & CONTRACTORS

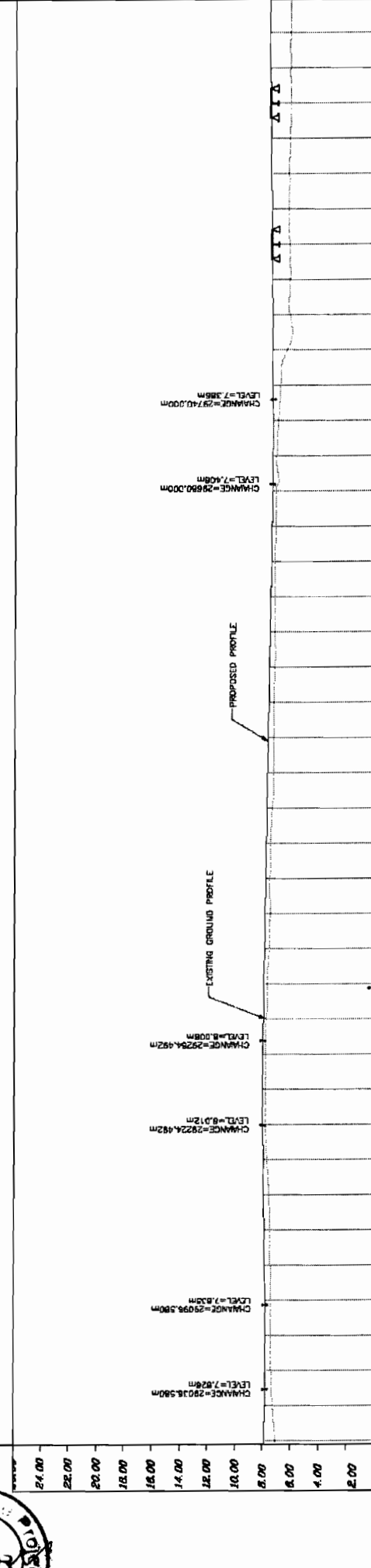
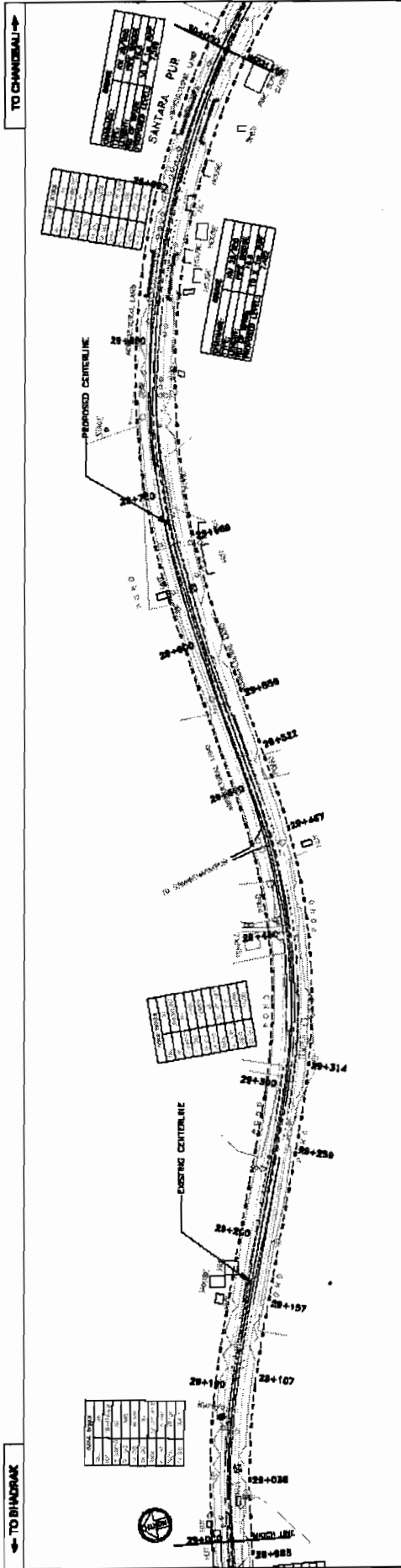
CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Cross, Malviya Nagar, Jaipur-302017
 Tel: +91-141-2520669/2521881/2520558
 Fax: 2521048, E-mail: ceg@cegltd.com

PROJECT:
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

LEGEND

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDIBALI (SH-9) KM 25/000 TO KM 27/000

DATE: 10/10/2017
 SHEET NO: 10/10/2017-01
 SCALE: 1:500
 DRAWN BY: J.P.
 CHECKED BY: M.B.M.
 APPROVED BY: S.C.



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL	VERTICAL	SUPERELEVATION	CROSSFALL	CHANGING
24.00	23.887					
22.00	23.831					
20.00	23.777					
18.00	23.723					
16.00	23.669					
14.00	23.615					
12.00	23.561					
10.00	23.507					
8.00	23.453					
6.00	23.399					
4.00	23.345					
2.00	23.291					
	23.237					
	23.183					
	23.129					
	23.075					
	23.021					
	22.967					
	22.913					
	22.859					
	22.805					
	22.751					
	22.697					
	22.643					
	22.589					
	22.535					
	22.481					
	22.427					
	22.373					
	22.319					
	22.265					
	22.211					
	22.157					
	22.103					
	22.049					
	21.995					
	21.941					
	21.887					
	21.833					
	21.779					
	21.725					
	21.671					
	21.617					
	21.563					
	21.509					
	21.455					
	21.401					
	21.347					
	21.293					
	21.239					
	21.185					
	21.131					
	21.077					
	21.023					
	20.969					
	20.915					
	20.861					
	20.807					
	20.753					
	20.699					
	20.645					
	20.591					
	20.537					
	20.483					
	20.429					
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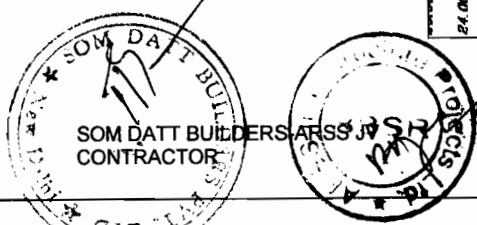
WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDIBALI (SH-9) KM 29/000 TO KM 30/000

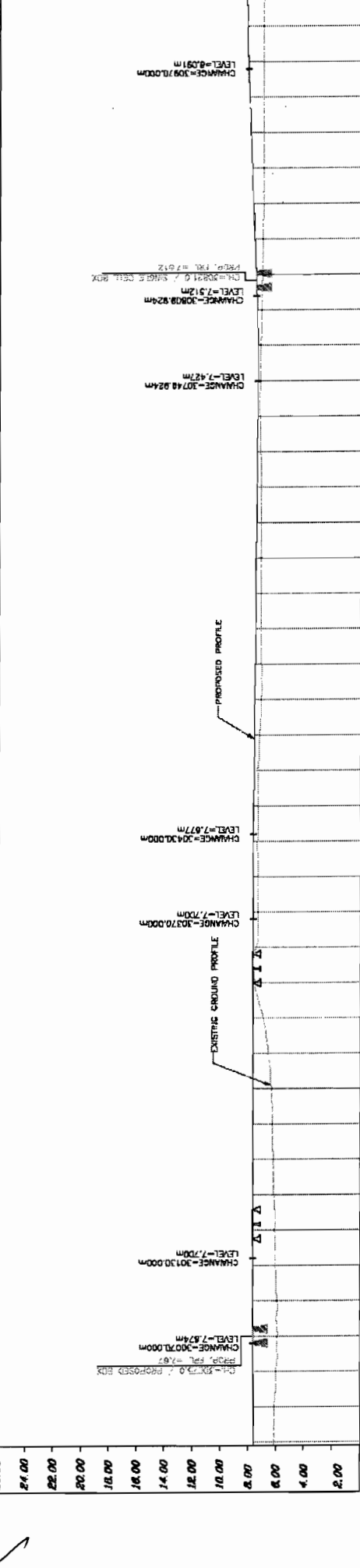
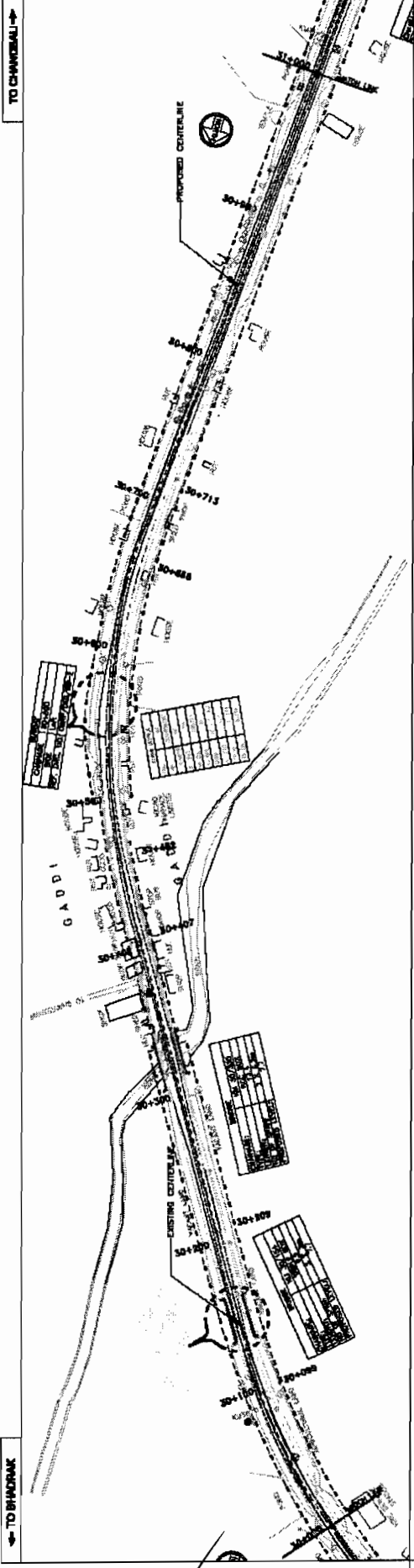
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 L-12, Naraj Colony, Cuttack, Orissa - 753002, India
 Tel: 2521443, 2521444, 2521445, 2521446, 2521447, 2521448, 2521449
 Fax: 2521443, 2521444, 2521445, 2521446, 2521447, 2521448, 2521449
 E-mail: ceg@cegroup.com

LEGEND

DATE: 15/08/2011
SCALE: HORIZONTAL: 1:5000, VERTICAL: 1:1000
PROJECT NO.: ORISSA/SH-9/2011/01
SECTION NO.: 01
DATE OF ISSUE: 15/08/2011
DATE OF REVISION: 15/08/2011
REVISION: 15/08/2011
SCALE: HORIZONTAL: 1:5000, VERTICAL: 1:1000
PROJECT NO.: ORISSA/SH-9/2011/01
SECTION NO.: 01
DATE OF ISSUE: 15/08/2011
DATE OF REVISION: 15/08/2011
REVISION: 15/08/2011





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHANGING
8.173	8.123				
8.108	8.058				
8.019	7.969				
7.929	7.879				
7.839	7.789				
7.747	7.697				
7.657	7.607				
7.566	7.516				
7.478	7.428				
7.389	7.339				
7.297	7.247				
7.208	7.158				
7.118	7.068				
7.028	6.978				
6.883	6.833				
6.794	6.744				
6.704	6.654				
6.614	6.564				
6.524	6.474				
6.434	6.384				
6.344	6.294				
6.254	6.204				
6.164	6.114				
6.074	6.024				
5.984	5.934				
5.894	5.844				
5.804	5.754				
5.714	5.664				
5.624	5.574				
5.534	5.484				
5.444	5.394				
5.354	5.304				
5.264	5.214				
5.174	5.124				
5.084	5.034				
4.994	4.944				
4.904	4.854				
4.814	4.764				
4.724	4.674				
4.634	4.584				
4.544	4.494				
4.454	4.404				
4.364	4.314				
4.274	4.224				
4.184	4.134				
4.094	4.044				
4.004	3.954				
3.914	3.864				
3.824	3.774				
3.734	3.684				
3.644	3.594				
3.554	3.504				
3.464	3.414				
3.374	3.324				
3.284	3.234				
3.194	3.144				
3.104	3.054				
3.014	2.964				
2.924	2.874				
2.834	2.784				
2.744	2.694				
2.654	2.604				
2.564	2.514				
2.474	2.424				
2.384	2.334				
2.294	2.244				
2.204	2.154				
2.114	2.064				
2.024	1.974				
1.934	1.884				
1.844	1.794				
1.754	1.704				
1.664	1.614				
1.574	1.524				
1.484	1.434				
1.394	1.344				
1.304	1.254				
1.214	1.164				
1.124	1.074				
1.034	0.984				
0.944	0.894				
0.854	0.804				
0.764	0.714				
0.674	0.624				
0.584	0.534				
0.494	0.444				
0.404	0.354				
0.314	0.264				
0.224	0.174				
0.134	0.084				
0.044	0.034				
0.000	0.000				

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM. 30/000 TO KM. 31/000

PROJECT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

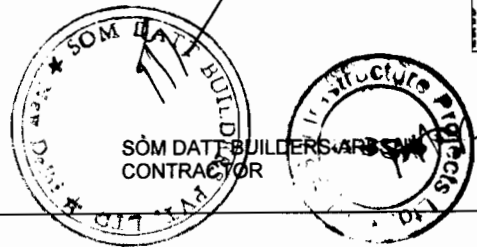
CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Colony, New Delhi, India - 110 028
 Tel: +91-11-2520889, 2520890, 2520891, 2520892, 2520893, 2520894, 2520895, 2520896, 2520897, 2520898, 2520899
 Fax: 2521346, E-mail: ceg@cegroup.com

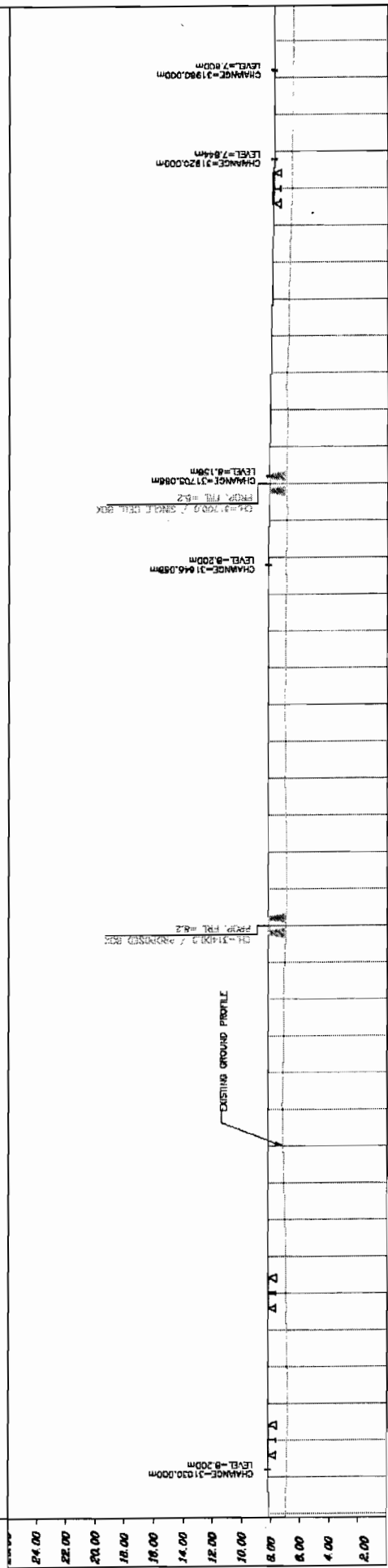
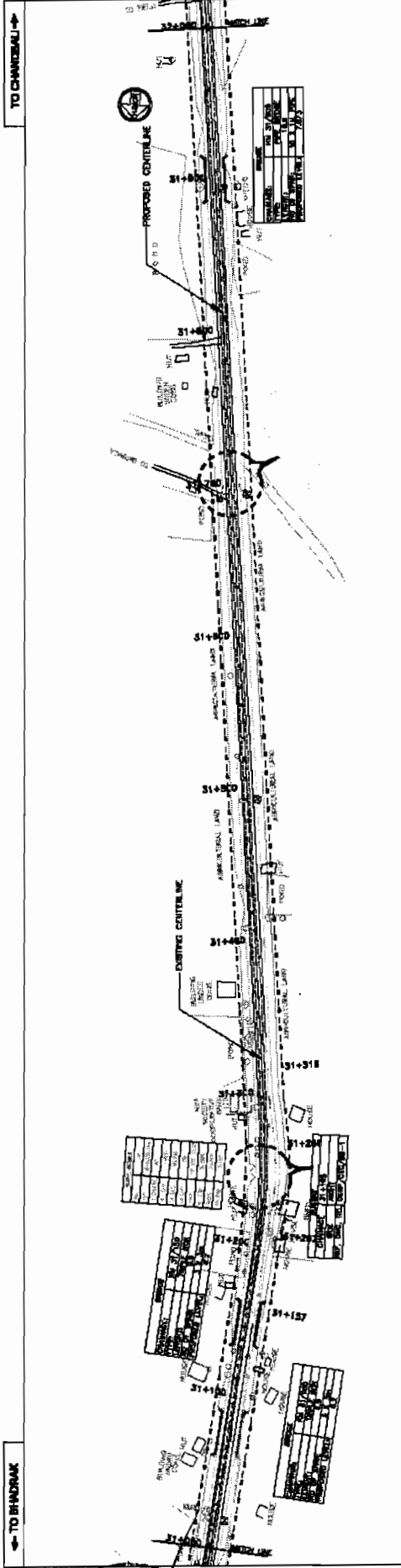
LEGEND

DATE: 11/11/2011
 SCALE: HORIZONTAL: 1:1000, VERTICAL: 1:1000
 DRAWN BY: S.D.
 CHECKED BY: S.D.
 APPROVED BY: S.D.

EMPLOYER

World Bank Projects - Orissa





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL
8.190	8.190	0+000	0+000	
8.099	8.099	0+200	0+200	
8.915	8.915	0+400	0+400	
8.995	8.995	0+600	0+600	
9.100	9.100	0+800	0+800	
9.225	9.225	1+000	1+000	
9.228	9.228	1+200	1+200	
9.250	9.250	1+400	1+400	
9.207	9.207	1+600	1+600	
9.206	9.206	1+800	1+800	
9.205	9.205	2+000	2+000	
9.139	9.139	2+200	2+200	
9.131	9.131	2+400	2+400	
9.102	9.102	2+600	2+600	
9.090	9.090	2+800	2+800	
9.200	9.200	3+000	3+000	
9.340	9.340	3+200	3+200	
9.458	9.458	3+400	3+400	
9.300	9.300	3+600	3+600	
9.200	9.200	3+800	3+800	
9.200	9.200	4+000	4+000	
9.200	9.200	4+200	4+200	
9.200	9.200	4+400	4+400	
9.200	9.200	4+600	4+600	
9.200	9.200	4+800	4+800	
9.200	9.200	5+000	5+000	
9.200	9.200	5+200	5+200	
9.200	9.200	5+400	5+400	
9.200	9.200	5+600	5+600	
9.200	9.200	5+800	5+800	
9.200	9.200	6+000	6+000	
9.200	9.200	6+200	6+200	
9.200	9.200	6+400	6+400	
9.200	9.200	6+600	6+600	
9.200	9.200	6+800	6+800	
9.200	9.200	7+000	7+000	
9.200	9.200	7+200	7+200	
9.200	9.200	7+400	7+400	
9.200	9.200	7+600	7+600	
9.200	9.200	7+800	7+800	
9.200	9.200	8+000	8+000	
9.200	9.200	8+200	8+200	
9.200	9.200	8+400	8+400	
9.200	9.200	8+600	8+600	
9.200	9.200	8+800	8+800	
9.200	9.200	9+000	9+000	
9.200	9.200	9+200	9+200	
9.200	9.200	9+400	9+400	
9.200	9.200	9+600	9+600	
9.200	9.200	9+800	9+800	
9.200	9.200	10+000	10+000	
9.200	9.200	10+200	10+200	
9.200	9.200	10+400	10+400	
9.200	9.200	10+600	10+600	
9.200	9.200	10+800	10+800	
9.200	9.200	11+000	11+000	
9.200	9.200	11+200	11+200	
9.200	9.200	11+400	11+400	
9.200	9.200	11+600	11+600	
9.200	9.200	11+800	11+800	
9.200	9.200	12+000	12+000	
9.200	9.200	12+200	12+200	
9.200	9.200	12+400	12+400	
9.200	9.200	12+600	12+600	
9.200	9.200	12+800	12+800	
9.200	9.200	13+000	13+000	
9.200	9.200	13+200	13+200	
9.200	9.200	13+400	13+400	
9.200	9.200	13+600	13+600	
9.200	9.200	13+800	13+800	
9.200	9.200	14+000	14+000	
9.200	9.200	14+200	14+200	
9.200	9.200	14+400	14+400	
9.200	9.200	14+600	14+600	
9.200	9.200	14+800	14+800	
9.200	9.200	15+000	15+000	
9.200	9.200	15+200	15+200	
9.200	9.200	15+400	15+400	
9.200	9.200	15+600	15+600	
9.200	9.200	15+800	15+800	
9.200	9.200	16+000	16+000	
9.200	9.200	16+200	16+200	
9.200	9.200	16+400	16+400	
9.200	9.200	16+600	16+600	
9.200	9.200	16+800	16+800	
9.200	9.200	17+000	17+000	
9.200	9.200	17+200	17+200	
9.200	9.200	17+400	17+400	
9.200	9.200	17+600	17+600	
9.200	9.200	17+800	17+800	
9.200	9.200	18+000	18+000	
9.200	9.200	18+200	18+200	
9.200	9.200	18+400	18+400	
9.200	9.200	18+600	18+600	
9.200	9.200	18+800	18+800	
9.200	9.200	19+000	19+000	
9.200	9.200	19+200	19+200	
9.200	9.200	19+400	19+400	
9.200	9.200	19+600	19+600	
9.200	9.200	19+800	19+800	
9.200	9.200	20+000	20+000	
9.200	9.200	20+200	20+200	
9.200	9.200	20+400	20+400	
9.200	9.200	20+600	20+600	
9.200	9.200	20+800	20+800	
9.200	9.200	21+000	21+000	
9.200	9.200	21+200	21+200	
9.200	9.200	21+400	21+400	
9.200	9.200	21+600	21+600	
9.200	9.200	21+800	21+800	
9.200	9.200	22+000	22+000	
9.200	9.200	22+200	22+200	
9.200	9.200	22+400	22+400	
9.200	9.200	22+600	22+600	
9.200	9.200	22+800	22+800	
9.200	9.200	23+000	23+000	
9.200	9.200	23+200	23+200	
9.200	9.200	23+400	23+400	
9.200	9.200	23+600	23+600	
9.200	9.200	23+800	23+800	
9.200	9.200	24+000	24+000	

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO CHANDBALI (SH-9) KM 31/000 TO KM 32/000

PROJECT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Jodhpur Colony, Kalinga Nagar, Bhubaneswar-751017
 Tel: 91-674-2520899, 2521818, 2520558
 Fax: 91-674-2521548, E-mail: ceg@engineersgroup.com

LEGEND

PROPOSED ROAD	EXISTING ROAD
PROPOSED CENTERLINE	EXISTING CENTERLINE
PROPOSED RIGHT OF WAY	EXISTING RIGHT OF WAY
PROPOSED DRAINAGE	EXISTING DRAINAGE
PROPOSED CROSSFALL	EXISTING CROSSFALL
PROPOSED SUPERELEVATION	EXISTING SUPERELEVATION
PROPOSED GRADE	EXISTING GRADE
PROPOSED ELEVATION	EXISTING ELEVATION
PROPOSED DISTANCE	EXISTING DISTANCE
PROPOSED AREA	EXISTING AREA
PROPOSED VOLUME	EXISTING VOLUME
PROPOSED WEIGHT	EXISTING WEIGHT
PROPOSED LENGTH	EXISTING LENGTH
PROPOSED PERIMETER	EXISTING PERIMETER
PROPOSED SURFACE AREA	EXISTING SURFACE AREA
PROPOSED VOLUME	EXISTING VOLUME
PROPOSED WEIGHT	EXISTING WEIGHT
PROPOSED LENGTH	EXISTING LENGTH
PROPOSED PERIMETER	EXISTING PERIMETER
PROPOSED SURFACE AREA	EXISTING SURFACE AREA

SCALE

DATE

BY

CHKD

APPD

REV

NO

DATE

SCALE

HORIZONTAL

VERTICAL

DATE

BY

CHKD

APPD

REV

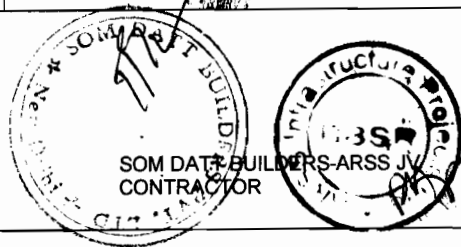
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DATE

SCALE

HORIZONTAL

VERTICAL

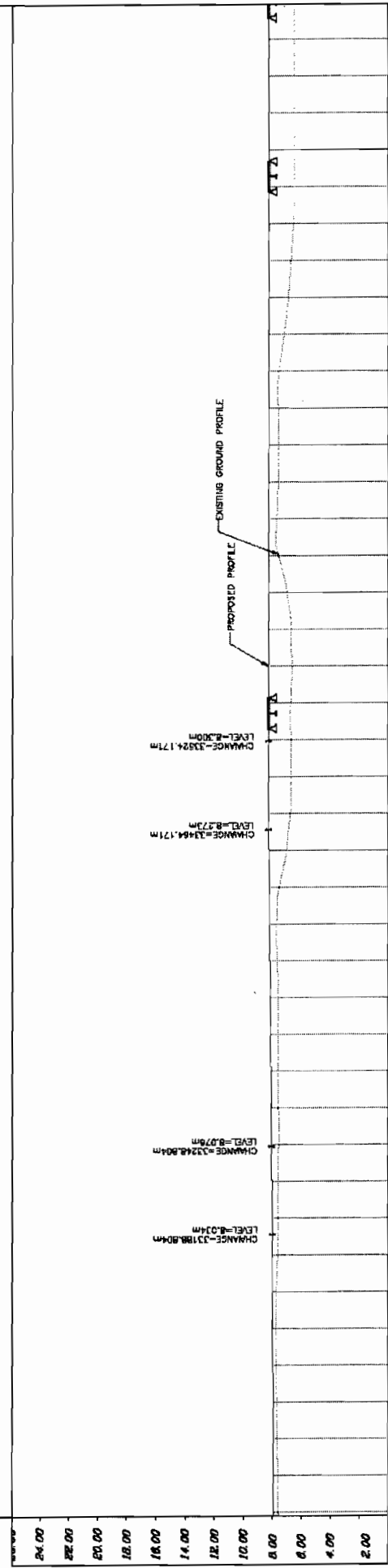
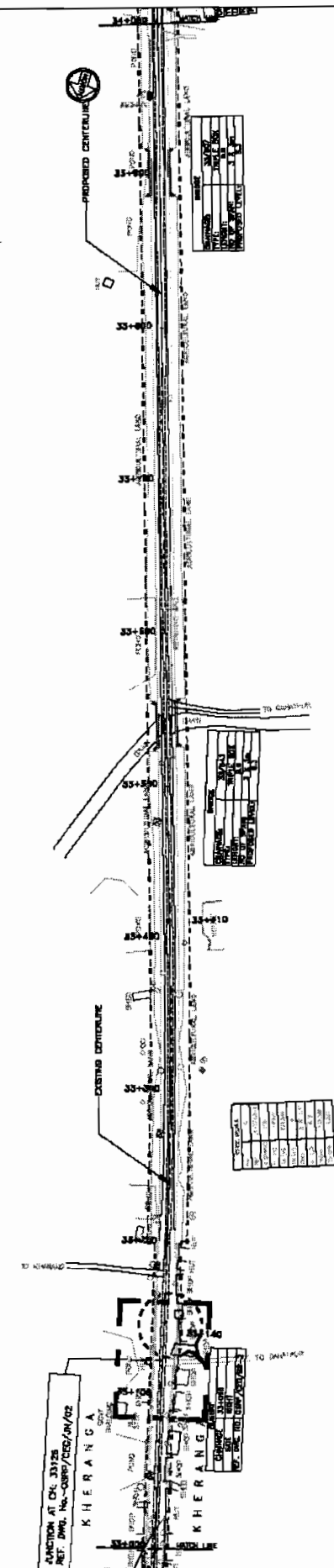


← TO BHADRAK

→ TO CHANDBAL

SOM DATTA BUILDERS-ARRS
CONTRACTOR

(Circular Stamp: SOM DATTA BUILDERS-ARRS)



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANG	STATION (km)	CHANG	STATION (km)
24.00	24.00						0.000		0.000
23.00	23.00						0.000		0.000
22.00	22.00						0.000		0.000
21.00	21.00						0.000		0.000
20.00	20.00						0.000		0.000
19.00	19.00						0.000		0.000
18.00	18.00						0.000		0.000
17.00	17.00						0.000		0.000
16.00	16.00						0.000		0.000
15.00	15.00						0.000		0.000
14.00	14.00						0.000		0.000
13.00	13.00						0.000		0.000
12.00	12.00						0.000		0.000
11.00	11.00						0.000		0.000
10.00	10.00						0.000		0.000
9.00	9.00						0.000		0.000
8.00	8.00						0.000		0.000
7.00	7.00						0.000		0.000
6.00	6.00						0.000		0.000
5.00	5.00						0.000		0.000
4.00	4.00						0.000		0.000
3.00	3.00						0.000		0.000
2.00	2.00						0.000		0.000

DATUM = 0.00

PROPOSED ROAD LEVEL (m)

EXISTING LEVEL (m)

HORIZONTAL ALIGNMENT

VERTICAL PROFILE

SUPERELEVATION

CROSSFALL

CHANG

STATION (km)

CHANG

STATION (km)

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDBAL (SH-9) KM 33/000 TO KM 34/000

CONSULTING ENGINEERS GROUP LTD.
E-12 Jeeb Colony, Madhya Nagar, Jaipur-17
Tel: +91-141-2520099, 2521041, 2520558
Fax: 2521346, E-mail: ceg@cegroupindia.com

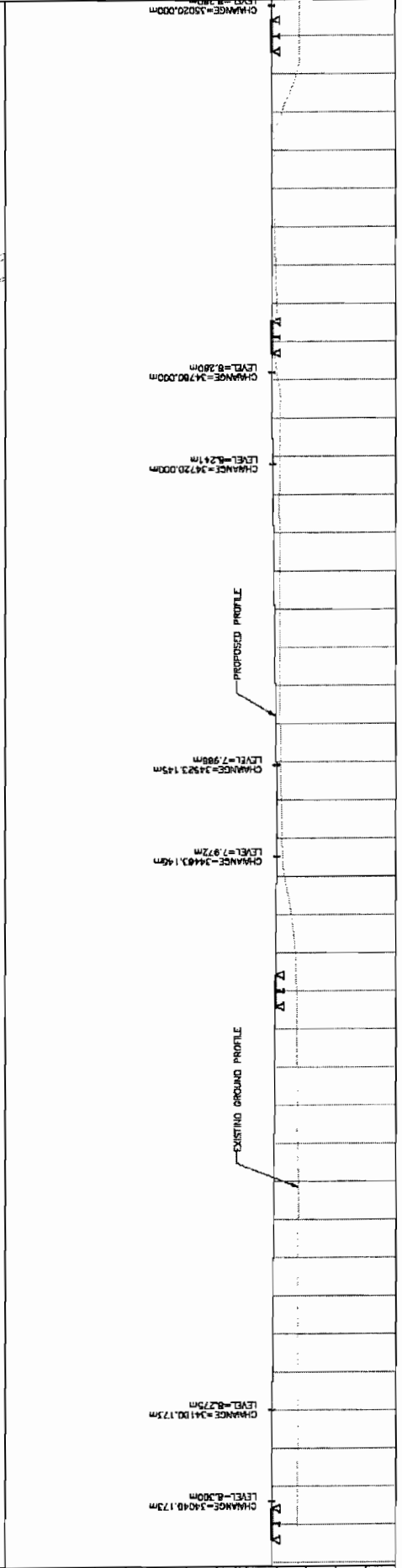
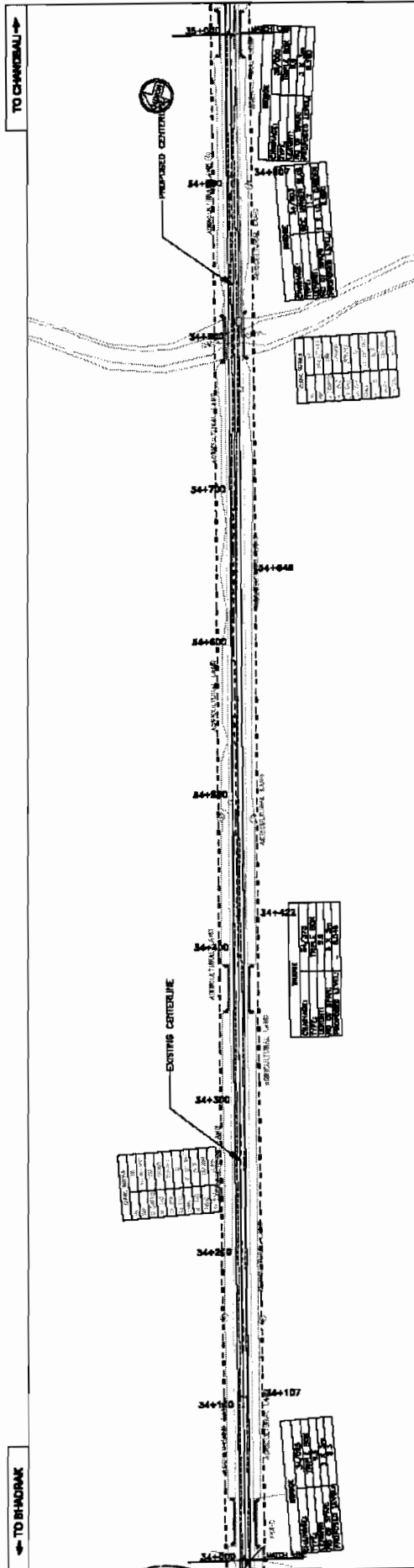
LEGEND

REVISIONS

SCALE

HORIZONTAL: 1:2000
VERTICAL: 1:500

DATE: / /
DRAWN BY: /
CHECKED BY: /
APPROVED BY: /



DATUM = 0.00

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHAINAGE
8.290	8.278	R=2000.000m L=60.00m	G=-0.30 L=190.853m		34+00.000
8.289	8.279				34+05.000
8.288	8.278				34+10.000
8.287	8.277				34+15.000
8.286	8.276				34+20.000
8.285	8.275				34+25.000
8.284	8.274				34+30.000
8.283	8.273				34+35.000
8.282	8.272				34+40.000
8.281	8.271				34+45.000
8.280	8.270				34+50.000
8.279	8.269				34+55.000
8.278	8.268				34+60.000
8.277	8.267				34+65.000
8.276	8.266				34+70.000
8.275	8.265				34+75.000
8.274	8.264				34+80.000
8.273	8.263				34+85.000
8.272	8.262				34+90.000
8.271	8.261				34+95.000
8.270	8.260				35+00.000

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO CHANDIBALI (SH-9) KM 34/000 TO KM 35/000

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR CRISSA STATE ROAD ASSISTANCE UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Majid Colony, Kalyani Nagar, Jaipur-17
 Tel: +91-441-2520999, 2521881, 2520558
 Fax: 2521461, 8-mob: 9999989160

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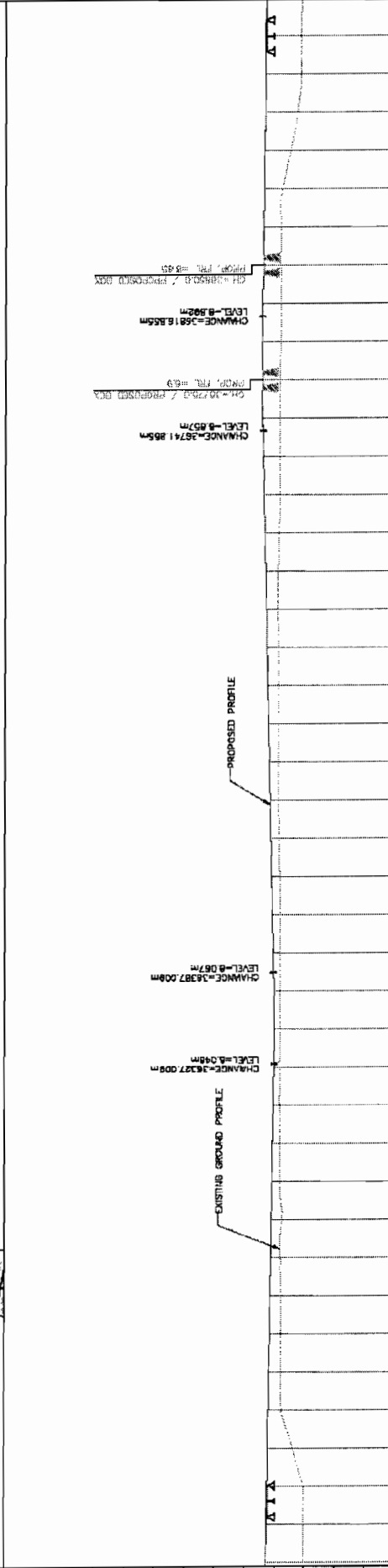
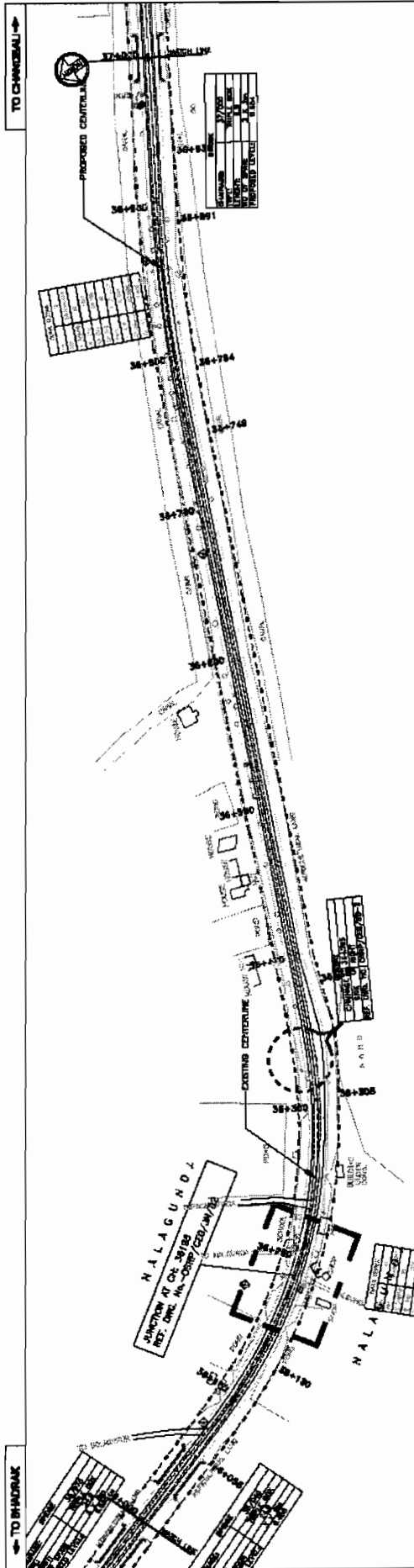
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SCALE: HORIZONTAL: 1:1000, VERTICAL: 1:2000

DESIGNED BY: J.P.
CHECKED BY: M.B.M.
DATE: 10/08/2011

DATE PREPARED: 10/08/2011
 DATE CHECKED: 10/08/2011
 DATE APPROVED: 10/08/2011
 DATE ISSUED: 10/08/2011

SOM DATT BUILDERS-ARSS JV CONTRACTOR

DATE: 10/08/2011
 TIME: 11:30 AM

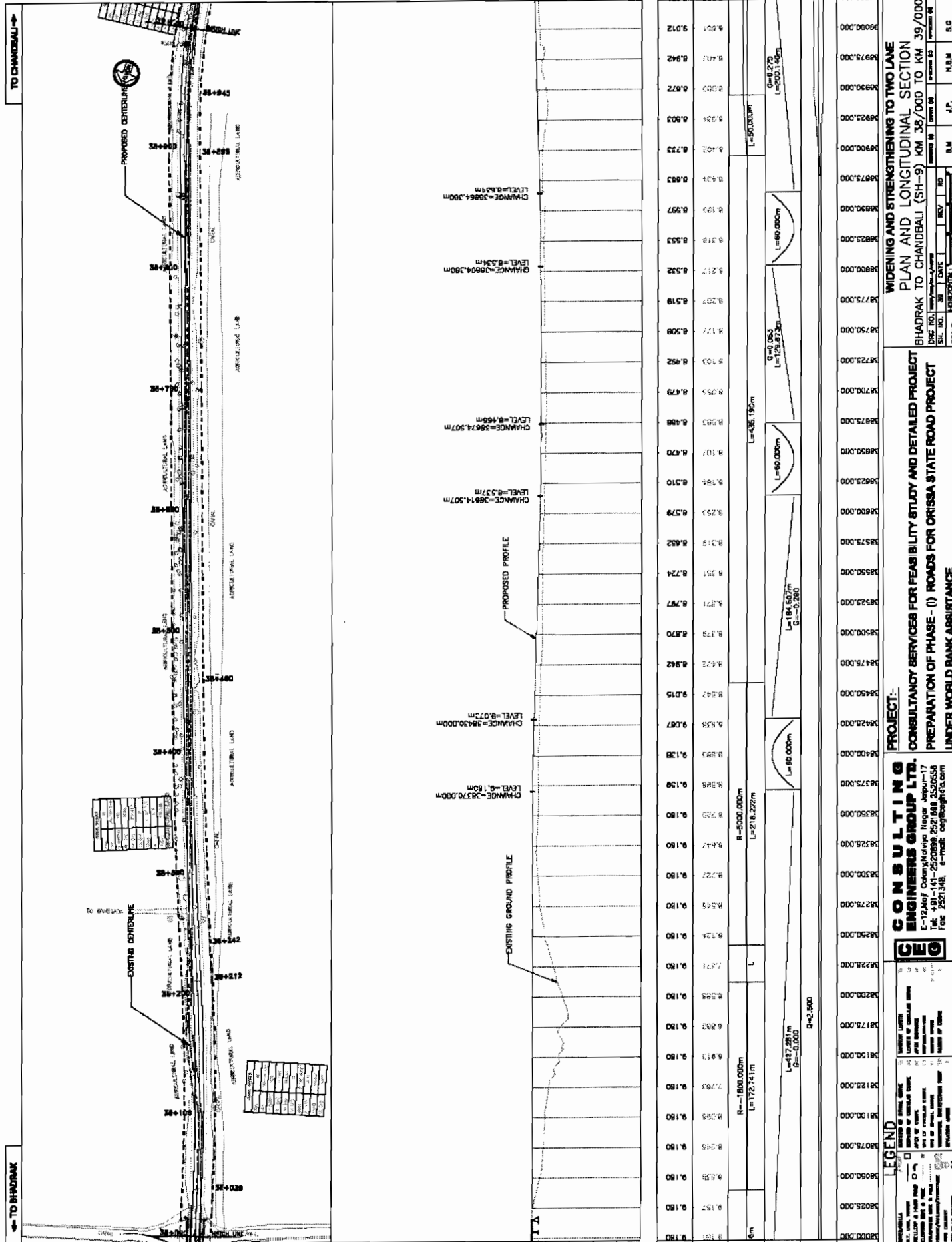


PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHINA	MANAGE	STATION	BLM	J.P.	N.B.M	S.C
24.00	23.85							0+00				
22.00	21.90							0+10				
20.00	19.85							0+20				
18.00	17.80							0+30				
16.00	15.75							0+40				
14.00	13.70							0+50				
12.00	11.65							0+60				
10.00	9.60							0+70				
8.00	7.55							0+80				
6.00	5.50							0+90				
4.00	3.45							1+00				
2.00	1.40							1+10				
								1+20				
								1+30				
								1+40				
								1+50				
								1+60				
								1+70				
								1+80				
								1+90				
								2+00				
								2+10				
								2+20				
								2+30				
								2+40				
								2+50				
								2+60				
								2+70				
								2+80				
								2+90				
								3+00				

SOM DATT BUILDERS & CONTRACTORS
 PVT. LTD. ENGINEERS & ARCHITECTS
 VOL-IV/Page 44

CONSULTING ENGINEERS GROUP LTD.
 PROJECT: WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO CHANDBALI (SH-9) KM 35/000 TO KM 37/000
 PREPARATION OF PHASE - (I) ROADS FOR CRISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

World Bank Projects, Crissa
 EMPLOYER



SOM DATT BUILDERS PVT. LTD.
 SOM DATT BUILDERS PVT. LTD.
 CONTRACTOR

ANAND P. SINGH
 PROJECT MANAGER

PROPOSED ROAD LEVEL (m)			EXISTING LEVEL (m)			HORIZONTAL ALIGNMENT			VERTICAL PROFILE			SUPERELEVATION / CROSSFALL			CHAINAGE		
9.101	9.107	9.113	9.119	9.125	9.131	9.137	9.143	9.149	9.155	9.161	9.167	9.173	9.179	9.185	9.191	9.197	
L=50.000m			L=435.190m			L=184.507m			L=50.000m			L=216.227m			L=50.000m		
G=0.278 L=20.014m			G=0.053 L=70.873m			G=-0.280 L=184.507m						R=500.000m L=216.227m			R=1800.000m L=217.241m		
L=50.000m			L=435.190m			L=184.507m			L=50.000m			L=216.227m			L=50.000m		
9.197	9.185	9.173	9.161	9.149	9.137	9.125	9.113	9.101	9.089	9.077	9.065	9.053	9.041	9.029	9.017	9.005	
9.005	9.017	9.029	9.041	9.053	9.065	9.077	9.089	9.101	9.113	9.125	9.137	9.149	9.161	9.173	9.185	9.197	
L=50.000m			L=435.190m			L=184.507m			L=50.000m			L=216.227m			L=50.000m		
G=0.278 L=20.014m			G=0.053 L=70.873m			G=-0.280 L=184.507m						R=500.000m L=216.227m			R=1800.000m L=217.241m		
L=50.000m			L=435.190m			L=184.507m			L=50.000m			L=216.227m			L=50.000m		
9.212	9.224	9.236	9.248	9.260	9.272	9.284	9.296	9.308	9.320	9.332	9.344	9.356	9.368	9.380	9.392	9.404	
9.392	9.404	9.416	9.428	9.440	9.452	9.464	9.476	9.488	9.500	9.512	9.524	9.536	9.548	9.560	9.572	9.584	
L=50.000m			L=435.190m			L=184.507m			L=50.000m			L=216.227m			L=50.000m		
G=0.278 L=20.014m			G=0.053 L=70.873m			G=-0.280 L=184.507m						R=500.000m L=216.227m			R=1800.000m L=217.241m		
L=50.000m			L=435.190m			L=184.507m			L=50.000m			L=216.227m			L=50.000m		

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION
 BHADRAK TO CHANDBALI (SH-9) KM. 38/000 TO KM. 39/000
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Colony, Kalinga Nagar, Jaipur-17
 Tel: +91-141-2520998-2521048, 2520658
 Fax: 2521346, e-mail: ceg@cegroup.com

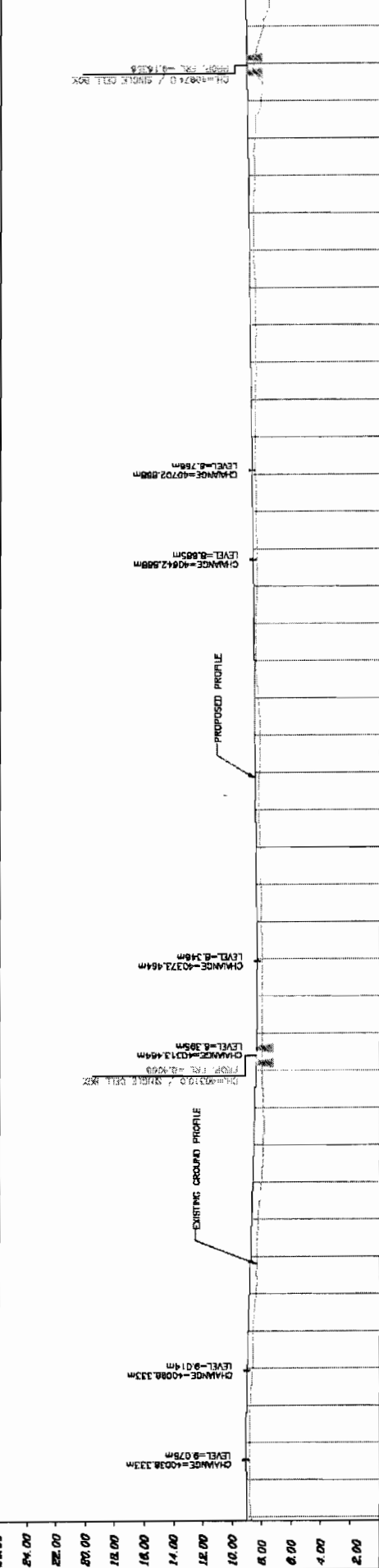
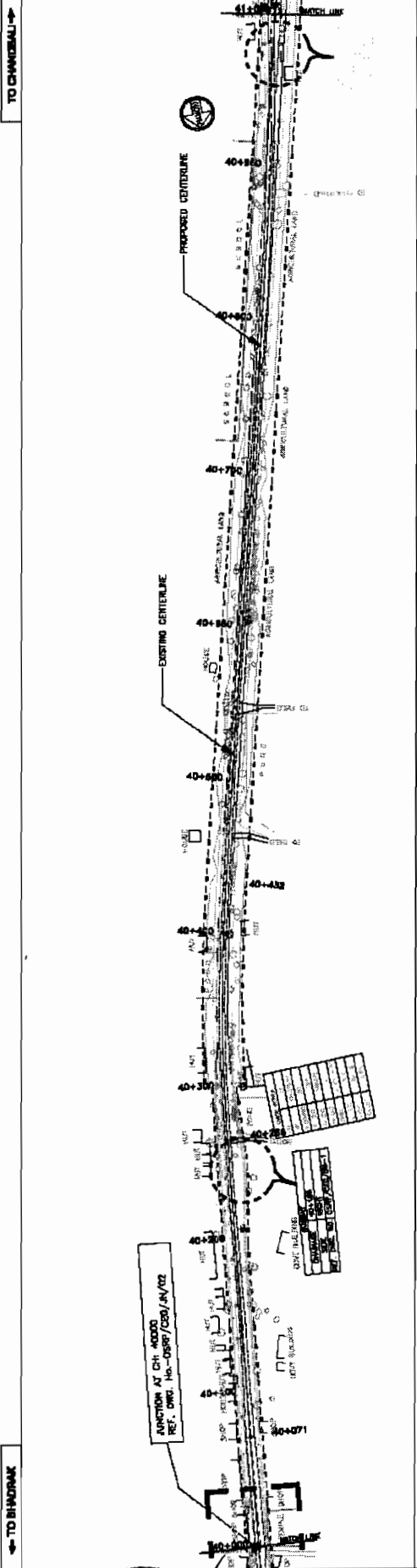
PROJECT:

LEGEND

DATE: 10/10/2023
 SCALE: HORIZONTAL: 1:10000, VERTICAL: 1:1000
 REVISIONS: 1. AS PER PLAN, 2. AS PER PLAN, 3. AS PER PLAN, 4. AS PER PLAN, 5. AS PER PLAN

PREPARED BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]

World Bank Projects, Orissa
 EMPLOYER



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION /GROSSFALL	CHAINAGE
9.202	9.110				10000.000
9.178	9.118				10075.000
9.129	9.129				10090.000
9.092	9.018				10095.000
9.093	9.093				10100.000
9.019	9.082				10105.000
9.002	9.002				10110.000
8.945	8.962				10115.000
8.923	8.923				10120.000
8.872	8.899				10125.000
8.838	8.838				10130.000
8.799	8.594				10135.000
8.702	8.538				10140.000
8.727	8.501				10145.000
8.694	8.448				10150.000
8.662	8.441				10155.000
8.631	8.477				10160.000
8.600	8.409				10165.000
8.598	8.332				10170.000
8.571	8.248				10175.000
8.505	8.258				10180.000
8.474	8.118				10185.000
8.442	8.189				10190.000
8.411	8.124				10195.000
8.380	8.070				10200.000
8.348	8.040				10205.000
8.338	8.019				10210.000
8.358	8.009				10215.000
8.424	8.028				10220.000
8.508	7.947				10225.000
8.577	7.942				10230.000
8.648	8.061				10235.000
8.721	8.088				10240.000
8.783	8.087				10245.000
8.805	8.411				10250.000
8.837	8.630				10255.000
8.908	8.807				10260.000
8.994	8.813				10265.000
9.082	8.819				10270.000
9.088	8.831				10275.000
9.050	8.752				10280.000

PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO CHARDIBALI (SH-9) KM 40/000 TO KM 41/000
 PREPARATION OF PHASE - (I) ROADS FOR CRISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

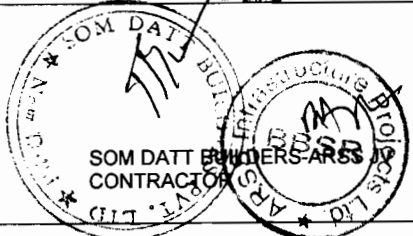
CONSULTING ENGINEERS GROUP LTD.
 E-17, Mof. Colony, Kalyan Nagar, Jabpur-17
 Tel. 191-441-2520/2521/481, 2520/551
 Fax 2521/481, E-mail: ceg@ceginb.com

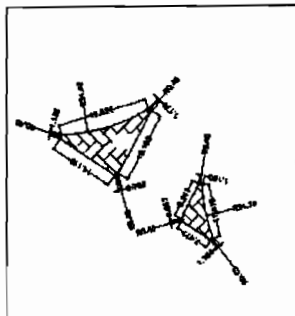
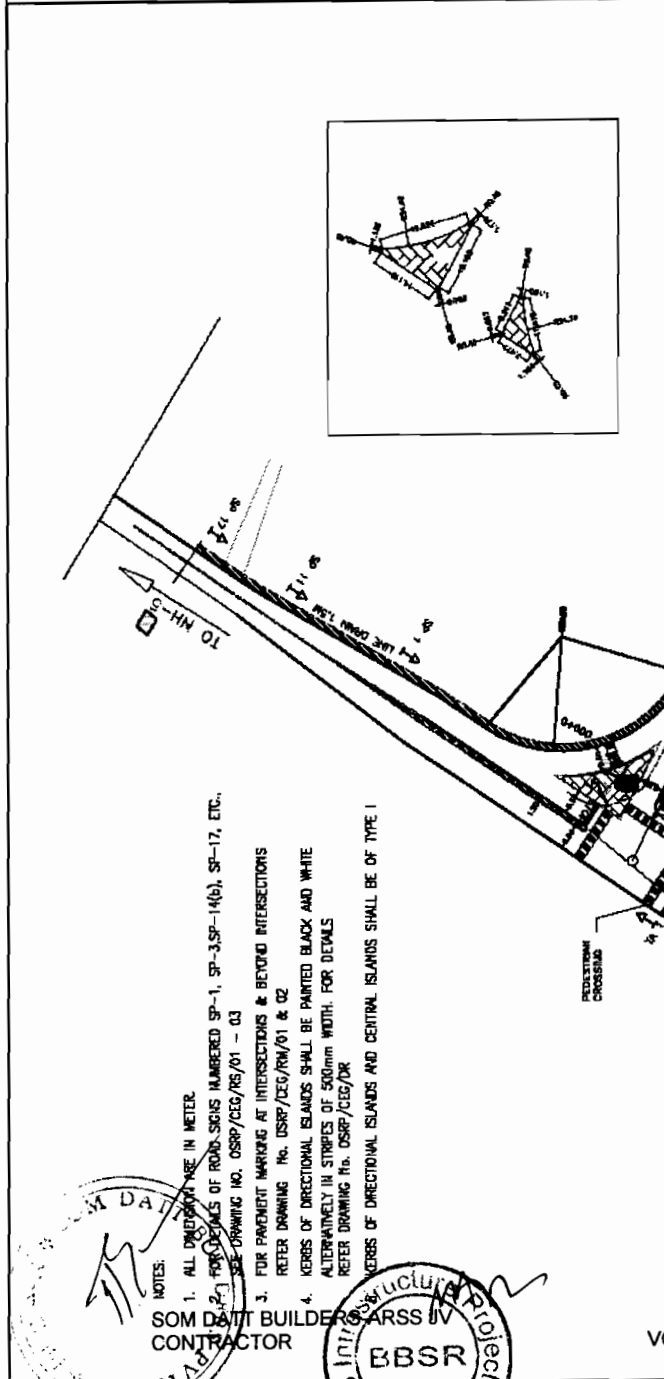
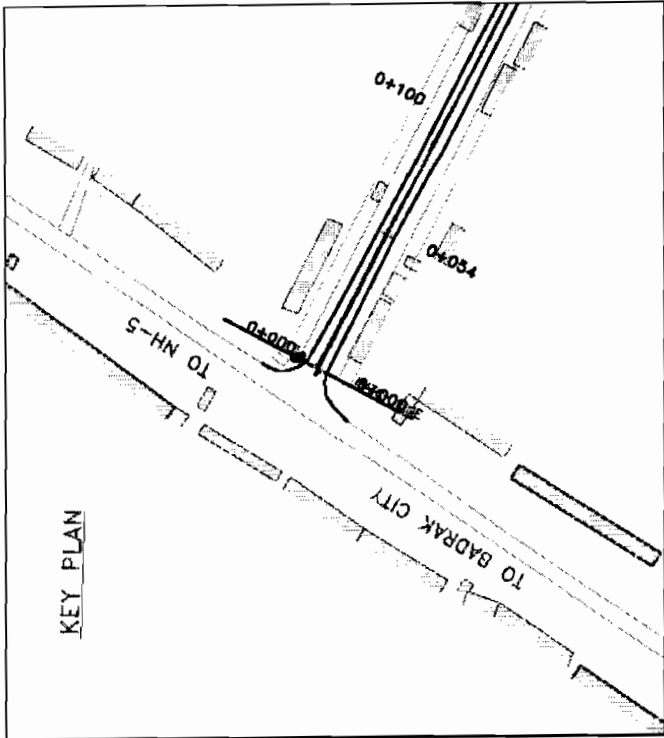
LEGEND

DATE: 10/01/2011
SCALE: HORIZONTAL: 1:1000, VERTICAL: 1:200

APPROVED FOR: [Signature]
DATE: 10/01/2011

APPROVED FOR: [Signature]
DATE: 10/01/2011





NOTES:
 1. ALL DIMENSIONS ARE IN METERS.
 2. FOR SYMBOLS OF ROAD SIGNS NUMBERED SP-1, SP-3, SP-14(b), SP-17, ETC., REFER DRAWING NO. OSRP/CEG/RIS/01 - 03
 3. FOR PAINTING MARKING AT INTERSECTIONS & BEYOND INTERSECTIONS REFER DRAWING NO. OSRP/CEG/RM/01 & 02
 4. KERBS OF DIRECTIONAL ISLANDS SHALL BE PAINTED BLACK AND WHITE ALTERNATIVELY IN STRIPES OF 500mm WIDTH. FOR DETAILS REFER DRAWING NO. OSRP/CEG/DR
 5. KERBS OF DIRECTIONAL ISLANDS AND CENTRAL ISLANDS SHALL BE OF TYPE I

CONSULTING ENGINEERS GROUP LTD.
 E-12, 16/1 Colony, Mathura Nagar, Jaipur-302017
 Ph: +91-141-2620595, 2621897, 2620598
 Fax: 26217174, e-mail: ceg@ceginfoc.com

CEG

LEGEND

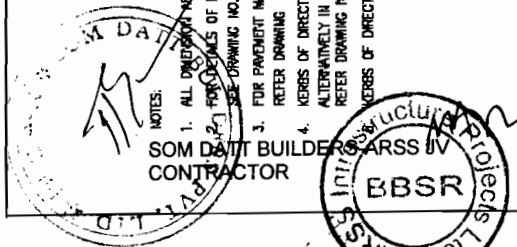
Symbol	Description
(Symbol)	Center of Right Lane
(Symbol)	Center of Left Lane
(Symbol)	Center of Road
(Symbol)	Center of Median
(Symbol)	Center of Footpath
(Symbol)	Center of Utility Line
(Symbol)	Center of Sewer Line
(Symbol)	Center of Water Line
(Symbol)	Center of Gas Line
(Symbol)	Center of Telephone Line
(Symbol)	Center of Fire Line
(Symbol)	Center of Power Line
(Symbol)	Center of Cable Line
(Symbol)	Center of Drain Line
(Symbol)	Center of Storm Water Line
(Symbol)	Center of Irrigation Line
(Symbol)	Center of Canal Line
(Symbol)	Center of Dam Line
(Symbol)	Center of Bridge Line
(Symbol)	Center of Tunnel Line
(Symbol)	Center of Viaduct Line
(Symbol)	Center of Overpass Line
(Symbol)	Center of Underpass Line
(Symbol)	Center of Culvert Line
(Symbol)	Center of Slab Bridge Line
(Symbol)	Center of Arch Bridge Line
(Symbol)	Center of Beam Bridge Line
(Symbol)	Center of Girder Bridge Line
(Symbol)	Center of Suspension Bridge Line
(Symbol)	Center of Cable Bridge Line
(Symbol)	Center of Truss Bridge Line
(Symbol)	Center of Pier and Abutment Line
(Symbol)	Center of Retaining Wall Line
(Symbol)	Center of Gravity Wall Line
(Symbol)	Center of Counterfort Wall Line
(Symbol)	Center of Cantilever Wall Line
(Symbol)	Center of Gravity Retaining Wall Line
(Symbol)	Center of Counterfort Retaining Wall Line
(Symbol)	Center of Cantilever Retaining Wall Line
(Symbol)	Center of Gravity Retaining Wall Line
(Symbol)	Center of Counterfort Retaining Wall Line
(Symbol)	Center of Cantilever Retaining Wall Line

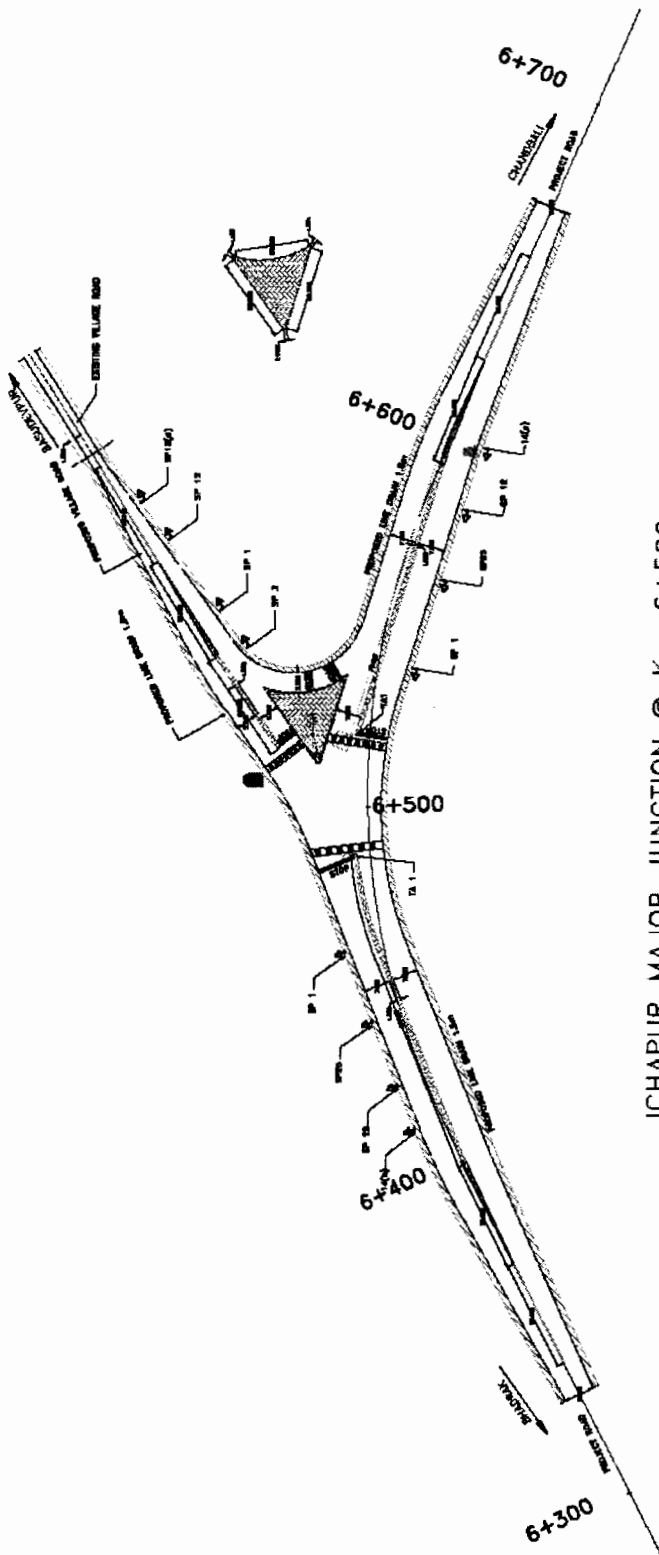
PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN FOR MAJOR JUNCTION
 BHADRAK TO CHANDBALI : DSRP/CEG/SH-8/MJ/KM.04-000

ORG. NO. 2004/2004-2005
DATE 27/11/04
SCALE HORIZONTAL: 1 : 200
 VERTICAL: 1 : 200

PROJ. NO. 2004/2004-2005
REV. NO.
DATE
SCALE
DATE
SCALE

WORLD BANK PROJECTS
 Chief Engineer
 World Bank Projects, Orissa
 EMPLOY

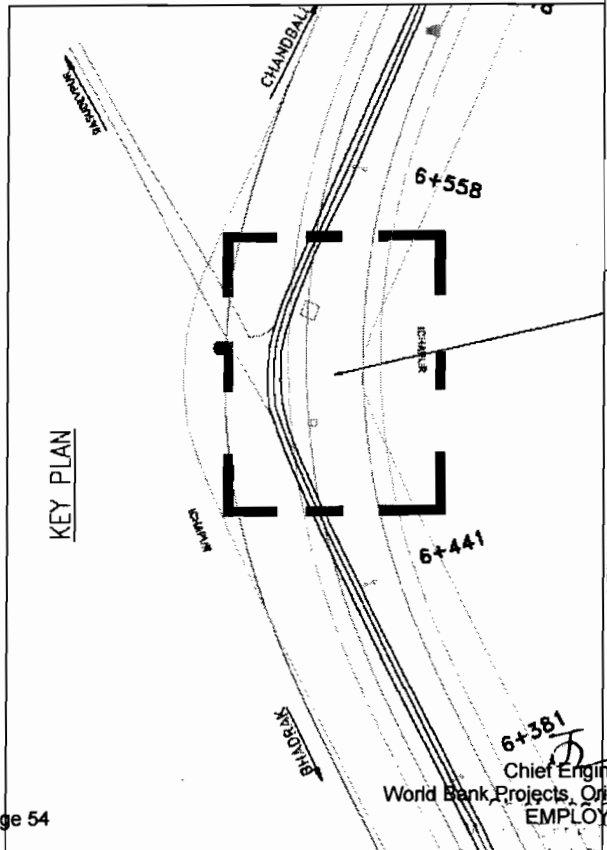




ICHAPUR MAJOR JUNCTION @ Km 6+500

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. CSR/CEG/MS/01 - 03
3. FOR PAVEMENT MARKING AT INTERSECTIONS & BEYOND INTERSECTIONS REFER DRAWING No. CSR/CEG/RM/01 & 02
4. KERBS OF DIRECTIONAL ISLANDS SHALL BE PAINTED BLACK AND WHITE ALTERNATIVELY IN STRIPES OF 500mm WIDTH. FOR DETAILS REFER DRAWING No. CSR/CEG/DR
5. KERBS OF DIRECTIONAL ISLANDS AND CENTRAL ISLANDS SHALL BE OF TYPE I



KEY PLAN



PROJECT:-

WIDENING AND STRENGTHENING TO TWO LANE
 PLAN FOR MAJOR JUNCTION
 BHADRAK TO CHANDBALL : CSR/CEG/SH-9/1A/KM.5+500
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Midy Colony, Midyke Nagar, Cuttack-751017
 Tel: +91-674-2532888, 2532899, 2532899, 2532899
 Fax: 2532848, E-mail: cegindia@rediffmail.com



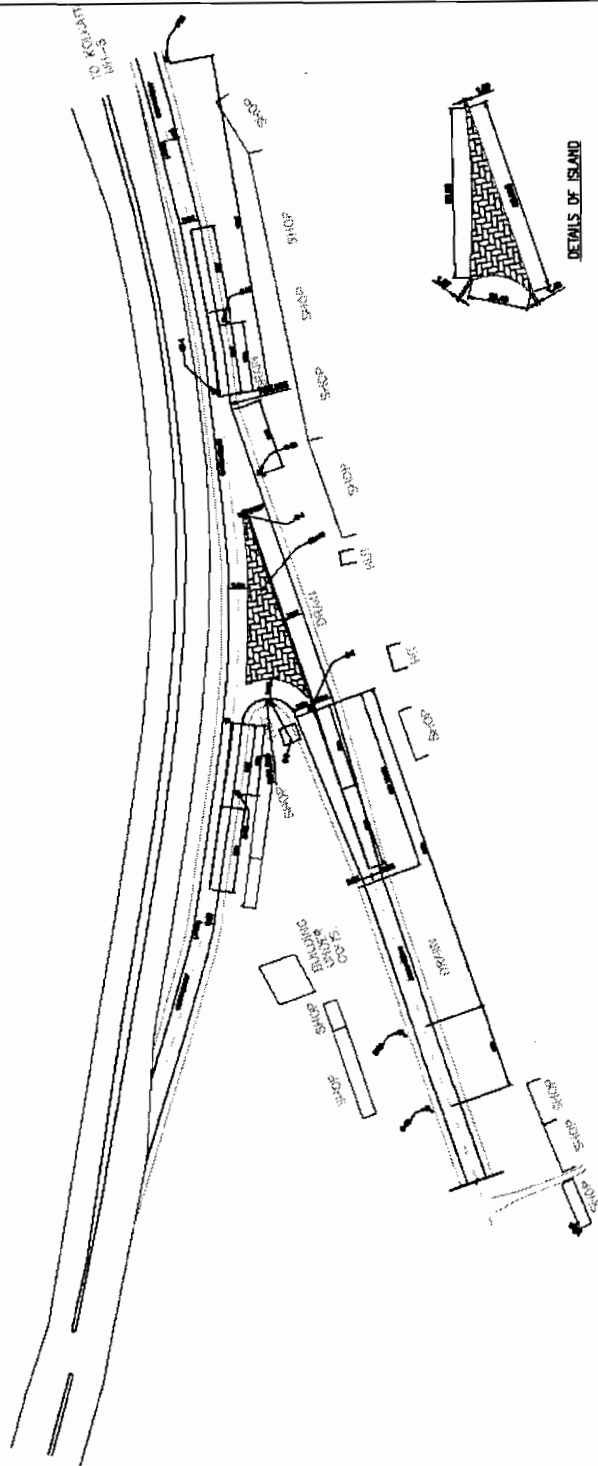
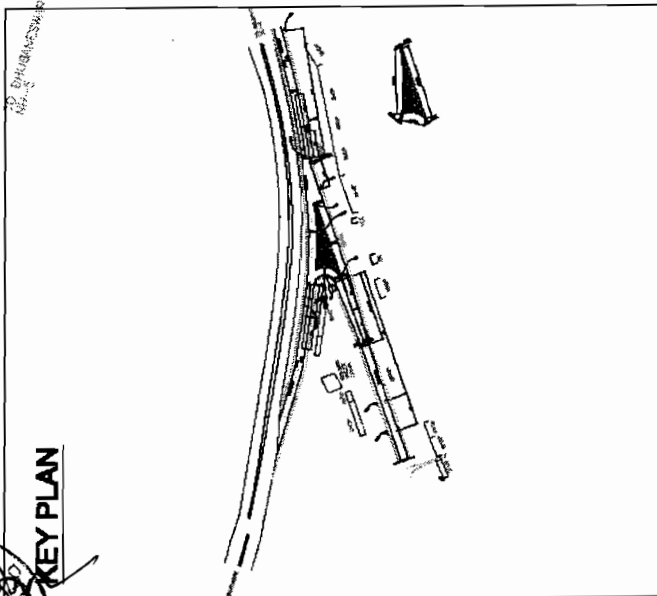
LEGEND	
1	PROPOSED ROAD
2	EXISTING ROAD
3	PROPOSED KERBS
4	EXISTING KERBS
5	PROPOSED DIRECTIONAL ISLANDS
6	EXISTING DIRECTIONAL ISLANDS
7	PROPOSED CENTRAL ISLANDS
8	EXISTING CENTRAL ISLANDS
9	PROPOSED PAVEMENT MARKING
10	EXISTING PAVEMENT MARKING
11	PROPOSED SIGN POSTS
12	EXISTING SIGN POSTS
13	PROPOSED ROAD SIGNS
14	EXISTING ROAD SIGNS
15	PROPOSED ROAD CROSSINGS
16	EXISTING ROAD CROSSINGS
17	PROPOSED ROAD CUTS
18	EXISTING ROAD CUTS
19	PROPOSED ROAD ELEVATIONS
20	EXISTING ROAD ELEVATIONS
21	PROPOSED ROAD WIDTHS
22	EXISTING ROAD WIDTHS
23	PROPOSED ROAD GRADIENTS
24	EXISTING ROAD GRADIENTS
25	PROPOSED ROAD SLOPES
26	EXISTING ROAD SLOPES
27	PROPOSED ROAD CURVES
28	EXISTING ROAD CURVES
29	PROPOSED ROAD ALIGNMENT
30	EXISTING ROAD ALIGNMENT
31	PROPOSED ROAD RIGHT OF WAY
32	EXISTING ROAD RIGHT OF WAY
33	PROPOSED ROAD CENTERLINE
34	EXISTING ROAD CENTERLINE
35	PROPOSED ROAD BOUNDARIES
36	EXISTING ROAD BOUNDARIES
37	PROPOSED ROAD ADJACENT AREAS
38	EXISTING ROAD ADJACENT AREAS
39	PROPOSED ROAD INTERSECTIONS
40	EXISTING ROAD INTERSECTIONS
41	PROPOSED ROAD JUNCTIONS
42	EXISTING ROAD JUNCTIONS
43	PROPOSED ROAD BRIDGES
44	EXISTING ROAD BRIDGES
45	PROPOSED ROAD TUNNELS
46	EXISTING ROAD TUNNELS
47	PROPOSED ROAD UNDERPASS
48	EXISTING ROAD UNDERPASS
49	PROPOSED ROAD OVERPASS
50	EXISTING ROAD OVERPASS
51	PROPOSED ROAD CULVERTS
52	EXISTING ROAD CULVERTS
53	PROPOSED ROAD DRAINAGE
54	EXISTING ROAD DRAINAGE
55	PROPOSED ROAD EROSION CONTROL
56	EXISTING ROAD EROSION CONTROL
57	PROPOSED ROAD LANDSCAPING
58	EXISTING ROAD LANDSCAPING
59	PROPOSED ROAD LIGHTING
60	EXISTING ROAD LIGHTING
61	PROPOSED ROAD SAFETY
62	EXISTING ROAD SAFETY
63	PROPOSED ROAD MAINTENANCE
64	EXISTING ROAD MAINTENANCE
65	PROPOSED ROAD UTILITIES
66	EXISTING ROAD UTILITIES
67	PROPOSED ROAD FENCES
68	EXISTING ROAD FENCES
69	PROPOSED ROAD SIGNAGE
70	EXISTING ROAD SIGNAGE
71	PROPOSED ROAD MARKINGS
72	EXISTING ROAD MARKINGS
73	PROPOSED ROAD SURFING
74	EXISTING ROAD SURFING
75	PROPOSED ROAD PAVEMENT
76	EXISTING ROAD PAVEMENT
77	PROPOSED ROAD DRAINAGE
78	EXISTING ROAD DRAINAGE
79	PROPOSED ROAD EROSION CONTROL
80	EXISTING ROAD EROSION CONTROL
81	PROPOSED ROAD LANDSCAPING
82	EXISTING ROAD LANDSCAPING
83	PROPOSED ROAD LIGHTING
84	EXISTING ROAD LIGHTING
85	PROPOSED ROAD SAFETY
86	EXISTING ROAD SAFETY
87	PROPOSED ROAD MAINTENANCE
88	EXISTING ROAD MAINTENANCE
89	PROPOSED ROAD UTILITIES
90	EXISTING ROAD UTILITIES
91	PROPOSED ROAD FENCES
92	EXISTING ROAD FENCES
93	PROPOSED ROAD SIGNAGE
94	EXISTING ROAD SIGNAGE
95	PROPOSED ROAD MARKINGS
96	EXISTING ROAD MARKINGS
97	PROPOSED ROAD SURFING
98	EXISTING ROAD SURFING
99	PROPOSED ROAD PAVEMENT
100	EXISTING ROAD PAVEMENT

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYED

- NOTES:
- ALL DIMENSION ARE IN METER.
 - FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, SP-3, SP-14(b), SP-17, ETC., SEE DRAWING NO. OSRP/CEG/RS/01 - 03
 - FOR PAVEMENT MARKING AT INTERSECTIONS & BEYOND INTERSECTIONS REFER DRAWING No. OSRP/CEG/RM/01 & 02
 - KERBS OF DIRECTIONAL ISLANDS SHALL BE PAINTED BLACK AND WHITE ALTERNATELY IN STRIPES OF 500mm WIDTH. FOR DETAILS REFER DRAWING No. OSRP/CEG/OR
 - KERBS OF DIRECTIONAL ISLANDS AND CENTRAL ISLANDS SHALL BE OF TYPE I

SOM DATT BUILDERS AND CONTRACTORS

KEY PLAN



LEGEND

SYMBOL	DESCRIPTION
[Symbol]	EXISTING ROAD
[Symbol]	PROPOSED ROAD
[Symbol]	PAVEMENT MARKING
[Symbol]	KERBS
[Symbol]	ISLANDS
[Symbol]	UTILITIES
[Symbol]	OBSTACLES
[Symbol]	EXISTING BUILDINGS
[Symbol]	PROPOSED BUILDINGS

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

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E-12, 1st Floor, Colaba, Mumbai - 400017
Tel: 2371345, 2371348
Fax: 2371348, 2371349
e-mail: ceg@cegidc.com

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

WIDENING AND STRENGTHENING TO TWO LANE PLAN FOR MAJOR JUNCTION BHADRAK TO CHANDIBALI Jn. No. OSRP/CEG/RS/01

NO.	DATE	REV.	BY	CHK.	APPROVED
01					
02					
03					
04					
05					

SCALE: HORIZONTAL: 1:500
VERTICAL: 1:500

SCHEDULE OF SIGN POSTS

SIGN POST ID	DESCRIPTION OF SIGN BOARD	CHAMBER	LOCATION			REMARKS
			LL	LR	CR (L) CR (R)	
SP-1	STOP	0	✓			
		3950		✓		
		6500		✓		
		12235		✓		
		18417		✓		
		17688		✓		
		18425		✓		
		13378		✓		
		21450		✓		
		21990		✓		
		23252		✓		
		24600		✓		
		33128		✓		
		36195		✓		
		37235		✓		
		40000		✓		
		50020		✓		
SP-4 D	SPEED 65	50448		✓		
		5674		✓		
		5768		✓		
		8433		✓		
		8590		✓		
		8885		✓		
		10067		✓		
		12278		✓		
		12948		✓		
		49676		✓		
		50063		✓		
		50380		✓		
		50440		✓		
		50531		✓		
		50749		✓		
		51096		✓		
		51252		✓		
		51469		✓		
		51628		✓		
		51787		✓		
		52024		✓		
SP-6	SCHOOL ZONE	460		✓		
		560		✓		
		6410		✓		
		8510		✓		
		12780		✓		
		12800		✓		
		16850		✓		
		16850		✓		
		25210		✓		
		25310		✓		
		26650		✓		
		26730		✓		
		27780		✓		
		27840		✓		
		36210		✓		
		36310		✓		
		40880		✓		
		40980		✓		
		47850		✓		
		47850		✓		

NOTE:

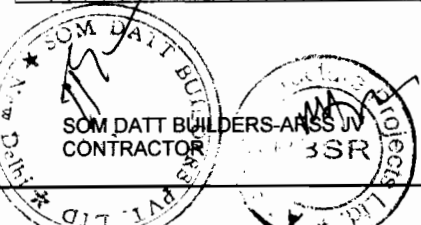
1. LL = LEFT LANE
2. RL = RIGHT LANE
3. CR(L) = CROSS ROAD LEFT

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

CONSULTING ENGINEERS GROUP LTD.
 E-12, Meji Colony, Malviya Nagar, Jaipur-17
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 Fax: 2521348, e-mail: ceg@cegindia.com

World Bank Projects EMP



SIGN POST ID	DESCRIPTION OF SIGN BOARD	CHAMBER	LOCATION			REMARKS
			LL	LR	CR (L) CR (R)	
SP-6	CROSS ROAD	24500	✓			
		24700		✓		
		12115		✓		
SP-9 A	RIGHT SIDE ROAD	21300		✓		
		21870		✓		
		23132		✓		
		37135		✓		
SP-9 B	LEFT SIDE ROAD	17778		✓		
		18535		✓		
		19408		✓		
		33236		✓		
		36305		✓		
		40110		✓		
		50589		✓		
SP-10 A	RIGHT HAND CURVE	20881		✓		
		21991		✓		
		26336		✓		
		6630		✓		
		8822		✓		
		8815		✓		
		11464		✓		
		30381		✓		
		38410		✓		
		42224		✓		
		42251		✓		
		48808		✓		
		50510		✓		
		51322		✓		
		51369		✓		
SP-10 B	LEFT HAND CURVE	2981		✓		
		5604		✓		
		6363		✓		
		38632		✓		
		41850		✓		
		56290		✓		
		51028		✓		
		3198		✓		
		8086		✓		
		10157		✓		
		11777		✓		
		30742		✓		
		42508		✓		
		50133		✓		
		51688		✓		
SP-10 F	LEFT REVERSE BEND	12270		✓		
SP-11	T-INTERSECTION	12850		✓		
SP-12	PEDESTRIAN CROSSING	410		✓		
		510		✓		
		978		✓		
		1078		✓		
		1242		✓		
		1342		✓		
		8360		✓		
		8460		✓		
		8742		✓		
		9642		✓		
		10058		✓		
		10158		✓		
		1342		✓		
		11442		✓		
		12258		✓		
		12358		✓		

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

SCHEDULE OF SIGN POSTS
 BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 45/00)

SCALE: _____ NTS

DESIGNED BY: _____ DRAWN BY: _____ CHECKED BY: _____ APPROVED BY: _____

SH. NO. 50 DATE: _____ REV. RD

B.M. R.J. R.R.D.K. S.G.

SCHEDULE OF SIGN POSTS

SIGN POST ID	DESCRIPTION OF SIGN BOARD	CHARGE	LOCATION			REMARKS
			LL	LR	CR (L) CR (R)	
SP-12	PEDESTRIAN CROSSING	12730	✓	✓	✓	
		12830	✓	✓	✓	
		13170	✓	✓	✓	
		13270	✓	✓	✓	
		16442	✓	✓	✓	
		16542	✓	✓	✓	
		16600	✓	✓	✓	
		19600	✓	✓	✓	
		17658	✓	✓	✓	
		17958	✓	✓	✓	
		20142	✓	✓	✓	
		20242	✓	✓	✓	
		21358	✓	✓	✓	
		21458	✓	✓	✓	
		24182	✓	✓	✓	
		24282	✓	✓	✓	
		24508	✓	✓	✓	
		24608	✓	✓	✓	
		23180	✓	✓	✓	
		25080	✓	✓	✓	
		26208	✓	✓	✓	
		26308	✓	✓	✓	
		26542	✓	✓	✓	
		26642	✓	✓	✓	
		27730	✓	✓	✓	
		27830	✓	✓	✓	
		31158	✓	✓	✓	
		31258	✓	✓	✓	
		34442	✓	✓	✓	
		36542	✓	✓	✓	
		40198	✓	✓	✓	
		40258	✓	✓	✓	
		40830	✓	✓	✓	
		40930	✓	✓	✓	
		41842	✓	✓	✓	
		41942	✓	✓	✓	
		44442	✓	✓	✓	
		44542	✓	✓	✓	
		46138	✓	✓	✓	
		48238	✓	✓	✓	
		48842	✓	✓	✓	
		49542	✓	✓	✓	
		49618	✓	✓	✓	
		49718	✓	✓	✓	
		63300	✓	✓	✓	
		69500	✓	✓	✓	
SP-14 B	Y-INTERSECTION	40180	✓	✓	✓	
SP-14 C	Y-INTERSECTION	16327	✓	✓	✓	
SP-13 D	MAJOR ROAD AHEAD	120	✓	✓	✓	
SP-16 A	HUMP OR ROUGH ROAD	6500	✓	✓	✓	
		12235	✓	✓	✓	
		21420	✓	✓	✓	
		21980	✓	✓	✓	
		63622	✓	✓	✓	
		37255	✓	✓	✓	
		50020	✓	✓	✓	

NOTE:-

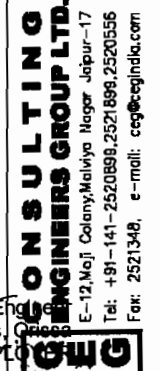
1. LL = LEFT LANE
2. RL = RIGHT LANE
3. CR(L) = CROSS ROAD LEFT
4. CR(R) = CROSS ROAD RIGHT
5. SIGN POST SHALL BE INSTALLED AT AN OFFSET DISTANCE OF 2M FROM THE EDGE OF CARRIAGE WAY
6. FOR DETAILS OF ROAD SIGNS REFER DWG. IN STANDARD DRAWINGS



World Bank Projects, Chief Engineer, C&E EMPLOYMENT

PROJECT:-

CONSULTING ENGINEERS GROUP LTD.
 E-12, Meji Colony, Malviya Nagar Jaipur-17
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SCHEDULE OF SIGN POSTS
BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 45/00)

DIRC NO. / DSRP / DSD / SH-9 / RCH / 02
 SH. NO. 51 DATE: / / REV: / RO: / NTS: /
 SCALE: /

B.M. / R.J. / R.R.D.K / S.G

SCHEDULE OF EXTRA WIDENING

Table with 14 columns: SL NO, CURVE START, CURVE END, RADIUS, CURVE LENGTH, TRANSITION, EXTRA WIDENING. It details curve data for 14 different sections.

NOTE:

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

SCHEDULE OF BUS BAYS

Table with 4 columns: START, END, TYPE, Ref. Drawing. It lists bus bay locations on the right side of the road.

SCHEDULE OF BUS BAYS

Table with 4 columns: ENO, TYPE, Ref. Drawing. It lists bus bay locations on the left side of the road.

NOTE: 1. FOR DETAILS OF BUS BAYS REFER DWG NO. OSRP/CEG/BB/01 AND 02
2. LOCATIONS OF THE BUS BAYS MAY BE CHANGED AT SITE AS PER THE REQUIREMENTS AND CONDITIONS DURING THE TIME OF CONSTRUCTION
3. LOWER BUS BAYS STANDARDS SHALL BE ADOPTED AS PER THE REQUIREMENTS AND CONDITIONS DURING THE TIME OF CONSTRUCTION
(TYPE-2 STANDARDS SHALL BE ADOPTED WHEREVER TYPE-1 STANDARDS ARE NOT FEASIBLE FROM ECONOMIC POINT OF VIEW)

PROJECT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

SCHEDULE OF BUS BAYS & EXTRA WIDENING BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 45/00)

Table with 6 columns: DWG NO., SHEET NO., DATE, REV, IRO, SCALE. It contains project identification information.

Logo for CEG CONSULTING ENGINEERS GROUP LTD. with contact details: Tel: +91-141-2520899, 2521899, 2520556; Fax: 2521348, e-mail: ceg@egindia.com.

Chief Engineer World Bank Projects, EMP



BBBR

VOL/WP/08/58

SCHEDULE OF LINED DRAIN AND FOOTPATH BARRICADES

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
30300	30500	200
32900	33200	300
37100	37400	300
39100	40300	1200
44600	45000	400

NOTE:

1. FOR DETAILS OF LINED DRAINS REFER DWG NO. OSRP/CEG/DR
2. THE PROVISION AND LENGTH OF THE LINED DRAIN SHALL BE REASSESSED DURING THE TIME OF CONSTRUCTION
3. FOOTPATH BARRIERS SHALL BE PROVIDED AS PER DWG. NO OSRP/CEG/FB
4. FOR BARRICADES OPENING SHALL BE PROVIDED WHEREVER CROSS ROAD/ GATES
5. BARRICADES SHALL BE PROVIDED WHEREVER REQUIRED AS PER THE ENGINEER IN CHARGE

SCHEDULE OF PEDESTRIAN CROSSING

SCHEDULE OF PEDESTRIAN CROSSING		
SCHOOL ZOZE	HOSPITAL ZONE	BUS BAYS
CHAINAGE		
510	13270	1342
6460	-	9842
12830	-	11442
16900	-	16542
25260	-	20242
27830	-	24292
40930	-	26642
-	-	39542
-	-	41942
-	-	44542
-	-	48942
-	-	49718

NOTE:-

1. FOR DETAILS OF PEDESTRAIN CROSSING REFER ROAD MARKINGS
2. FOR DETAILS OF RPMs AT PEDESTRAIN CROSSING REFER STANDARD DRAWINGS



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PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

SCHEDULE OF LINED DRAIN AND PEDESTRIAN CROSSING

BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 45/00)

DIR. NO.	DESIGNED BY	CHECKED BY	DATE	REV.	NO.	N.B.M.	J.P.	R.R.D.K	S.G
SH. NO.	5.3	DATE							
SCALE	NTS								

SCHEDULE OF MINOR JUNCTIONS TO BE IMPROVED

Chainage	Type of Junction	LHS/RHS	Name of the Village	Ref. Drawing
3850	Y-Type	RHS	-	DRSP/CEG/JN/03
6500	Y-Type	LHS	Beasdevpur	DRSP/CEG/JN/03
12235	T-Type	LHS	To College	DRSP/CEG/JN/02
18417	Y-Type	RHS	Boulipolia	DRSP/CEG/JN/03
17668	T-Type	RHS	Gangpoda	DRSP/CEG/JN/02
18425	T-Type	RHS	-	DRSP/CEG/JN/02
19376	T-Type	RHS	Pathapur	DRSP/CEG/JN/02
21420	T-Type	LHS	Mangolpur	DRSP/CEG/JN/02
21980	T-Type	LHS	Patana	DRSP/CEG/JN/02
23252	T-Type	LHS	Indra	DRSP/CEG/JN/02
24500	Cross Jun	Bath	Kankemara	DRSP/CEG/JN/01
33126	T-Type	RHS	Gohajpur	DRSP/CEG/JN/02
36185	T-Type	RHS	Halgunda	DRSP/CEG/JN/02
37255	T-Type	LHS	Bonteguda	DRSP/CEG/JN/02
40020	T-Type	RHS	-	DRSP/CEG/JN/02
50020	Y-Type	LHS	-	DRSP/CEG/JN/03
50448	T-Type	RHS	-	DRSP/CEG/JN/02

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	6482.92	6530.241	155	271.01	70	137
3	51826.688	51994.414	155	99.115	70	80

SCHEDULE OF ROAD HUMPS

SL NO	CHAINAGE	TYPE OF JUNCTION	LHS/RHS	CHAINAGE	REMARKS
1	3650	Y-Type	RHS	480	SCHOOL ZONE
2	6500	Y-Type	LHS	510	SCHOOL ZONE
3	12235	T-Type	LHS	16800	SCHOOL ZONE
4	18417	Y-Type	RHS	16900	SCHOOL ZONE
5	17668	T-Type	RHS	25200	SCHOOL ZONE
6	18425	T-Type	RHS	25200	SCHOOL ZONE
7	19376	T-Type	RHS	25200	SCHOOL ZONE
8	21420	T-Type	LHS	2770	SCHOOL ZONE
9	21980	T-Type	LHS	27830	SCHOOL ZONE
10	23252	T-Type	LHS	36175	SCHOOL ZONE
11	24500	Cross Jun	Bath	36260	SCHOOL ZONE
12	33126	T-Type	RHS	47770	SCHOOL ZONE
13	36185	T-Type	RHS	47770	SCHOOL ZONE
14	37255	T-Type	LHS	47900	SCHOOL ZONE
15	40000	T-Type	RHS	13270	HOSPITAL ZONE
16	50020	Y-Type	LHS	13330	HOSPITAL ZONE
17	50448	T-Type	RHS		

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

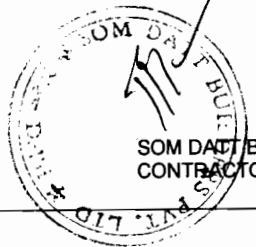
PROJECT:-

SCHEDULE OF JUNCTIONS, ROAD HUMPS & RUMBLE STRIP
BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 4.5/00)

DRG NO. DRSP/CEG/JN-9/ACH/05	DATE	REV	RD	DESIGNED (V)	DRAWN (M)	CHECKED (C)	APPROVED (D)
SH. NO. 54				N.B.M.	J.P.	R.R.D.K	S.G
SCALE	NTS						

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Chief Eng
World Bank Projects, EMPD



SCHEDULE FOR PAVEMENT DESIGN AND TYPE OF CONSTRUCTION FOR BHADRAK TO CHANDBALI (SH-09)

Sl. No	Length in KM	Prop chainage From To	Thickness Design (IRC-37) - FLEXIBLE PAVEMENT Check Details for Wearing										Type of Construction	Remarks		
			Surface Course		Sub-base		Sub-grade		Base		Sub-base				Total Thickness	
			BC	DSE	WBST	WBSZ	GSB 1	GSB 2	Sub-grade	BC	DSE	WBSZ				GSB 1	GSB 2
1	4.0	0.000 4.000	40	75	100	150	110	150	500	500	1625	110	150	500	NEW CONSTRUCTION	DFS
2	5.0	4.000 9.000	40	75	100	150	250	500	500	1625	110	150	500	RECONSTRUCTION	DFS	
3	0.6	9.000 9.600	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
4	5.8	10.250 16.100	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
5	2.8	18.500 21.250	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
6	4.2	21.800 25.800	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
7	3.9	27.100 31.000	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
8	2.0	31.000 33.000	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
9	6.1	33.000 39.100	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
10	2.3	40.300 42.550	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
11	2.1	42.500 44.500	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	
12	0.91	0.000 0.910	40	75	100	150	110	150	500	1625	110	150	500	NEW CONSTRUCTION	DFS	

For Connecting Road Between SH-9 and NH-9

RIGID PAVEMENT DESIGN FOR BHADRAK TO CHANDBALI (SH-09)

Sl. No	Chainage		Length	PCC Slab, mm	Thickness Design (IRC: 61-2002) - RIGID PAVEMENT		Remarks
	From	To			Sub-base (DLC) mm	Subgrade mm	
1	9.600	10.250	0.650	200	150	500	DFS
2	16.100	18.600	2.400	200	150	600	DFS
3	21.250	21.800	0.550	300	150	600	DFS
4	26.800	27.100	0.300	300	150	600	DFS
5	36.100	40.300	4.200	300	150	600	DFS
6	44.600	45.000	0.400	300	150	600	DFS

Note: Separation layer is in between DLC Sub base and PCC Slab

- Note:
- The pavement design has been based on IRC : 37 - 2001 & IRC 81 - 197
 - The Borrowed OR (not less than 10) shall be used for new construction Section
 - Existing subgrade shall be used where the recommendations are proposed
 - The Typical Cross Sections applicable for different sections are given in STANDARD DRAWINGS SET
 - Under drain with 10 m (7m Carriageway + 1.5m Pavd Shoulder) shall be Provided
- Refer Dig No. TCS-4, TCS-5 & TCS-6

PROJECT:-

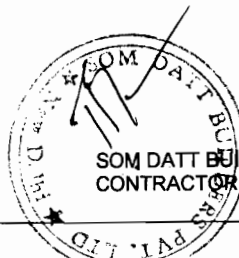
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

SCHEDULE OF PAVEMENT DESIGN & BUILT UP AREAS
BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 45/00)

DRG NO. / DATE	REV	RD	APPROVED (D)
SH. NO. / DATE	REV	RD	APPROVED (C)
SCALE	NTS	J.P.	R.R.D.K
		N.B.M.	S.G

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World Bank Projects, Chief Engineer
Chief Engineer



DETAILED PAVEMENT SCHEDULE FOR BHADRAK TO CHANDBALI (SH-09)

Sl.No.	Chainage		Distance In mts	Type of Construction	Type of Area	TCS
	From	To				
1	0	1015	1015	New Construction	Built	TCS - 18
2	1015	2000	985	New Construction	Open	TCS - 9 (With Treated material fill - 500mm)
3	2000	4050	2050	New Construction	Open	TCS - 18
4	4050	5600	1550	Reconstruction	Open	TCS - 02
5	5600	5850	250	Reconstruction	Built	TCS - 05
7	5850	6300	450	Reconstruction	Open	TCS - 02
8	6300	6650	350	Reconstruction	Built	TCS - 05
9	6650	9000	2350	Reconstruction	Open	TCS - 02
10	9000	9600	600	New Construction	Open	TCS - 18
11	9600	10000	400	Rigid Pavement	Built	TCS - 21
12	10000	10250	250	Rigid Pavement	Built	TCS - 21
13	10250	11500	1250	New Construction	Open	TCS - 18
14	11500	12900	1400	New Construction	Built	TCS - 18
15	12900	14000	1100	New Construction	Open	TCS - 18
16	14000	14900	900	New Construction	Built	TCS - 18
17	14300	16100	1800	New Construction	Open	TCS - 18
18	16100	18500	2400	Rigid Pavement	Built	TCS - 21
19	18500	19000	500	New Construction	Open	TCS - 18
20	19000	19200	200	New Construction	Built	TCS - 18
21	19200	20100	900	New Construction	Open	TCS - 18
22	20100	20200	100	New Construction	Built	TCS - 19
23	20200	21200	1000	New Construction	Open	TCS - 18
24	21200	21600	400	Rigid Pavement	Built	TCS - 21
25	21600	24450	2850	New Construction	Open	TCS - 18
26	24450	24800	350	New Construction	Built	TCS - 19
27	24800	25800	1000	New Construction	Open	TCS - 18
28	25800	27100	1300	Rigid Pavement	Built	TCS - 21
29	27100	30300	3200	New Construction	Open	TCS - 18
30	30300	30500	200	New Construction	Built	TCS - 19
31	30500	31000	500	New Construction	Open	TCS - 18
32	31000	32800	1800	New Construction	Open	TCS - 03
33	32800	33000	200	New Construction	Built	TCS - 06
34	33000	33200	200	New Construction	Built	TCS - 19
35	33200	37100	3900	New Construction	Open	TCS - 18
36	37100	37400	300	New Construction	Built	TCS - 19
37	37400	39100	1700	New Construction	Open	TCS - 18
38	39100	40300	1200	Rigid Pavement	Built	TCS - 21
39	40300	41750	1450	New Construction	Open	TCS - 03
40	41750	42000	250	New Construction	Built	TCS - 06
41	42000	42500	500	New Construction	Open	TCS - 03
42	42500	44600	2100	Reconstruction	Open	TCS - 02
43	44600	44660	60	Rigid Pavement	Built	TCS - 16
44	0	910	910	New Construction	Open	TCS - 03

FOR CONNECTING ROAD BETWEEN SH-9 AND NH-8

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION
OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE.

DETAILED PAVEMENT SCHEDULE & CROSS-SECTION TYPE
BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 4.5/00)

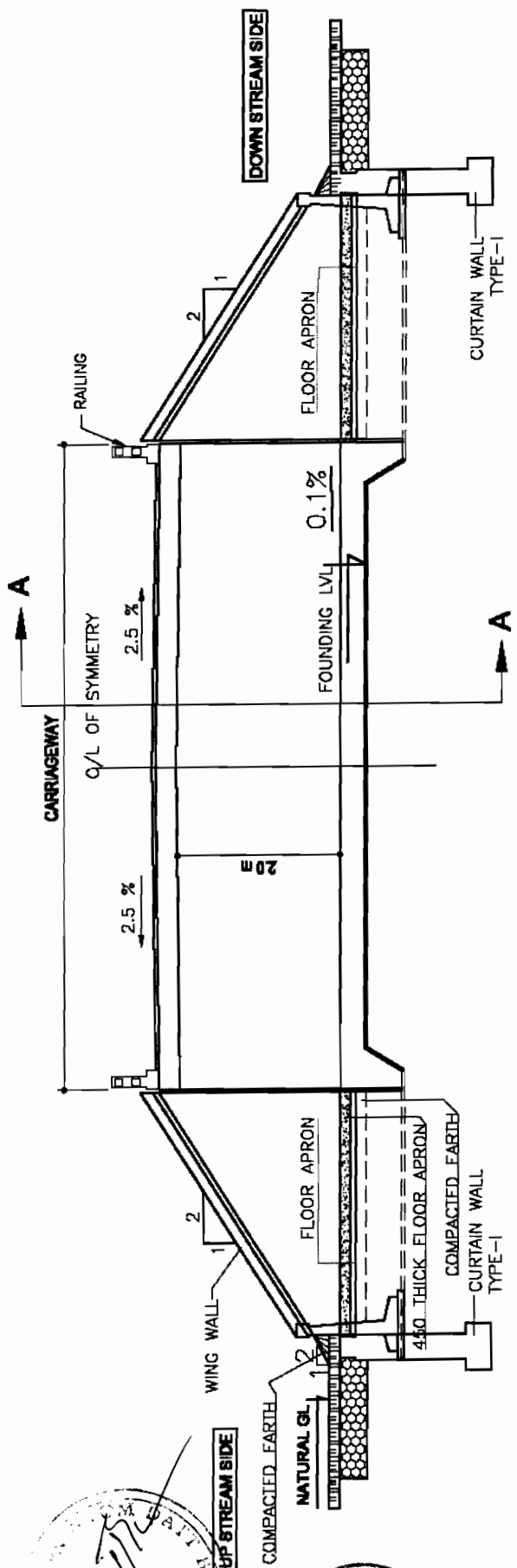
DRG NO. 088P/2020/SH-9/2SCH/08
SHEET NO. 57 DATE _____ REV _____ RD _____
SCALE _____ NTS _____

DESIGNED (A) DRAWN (B) CHECKED (C) APPROVED (D)
N.B.M. J.P. R.R.D.K. S.G.

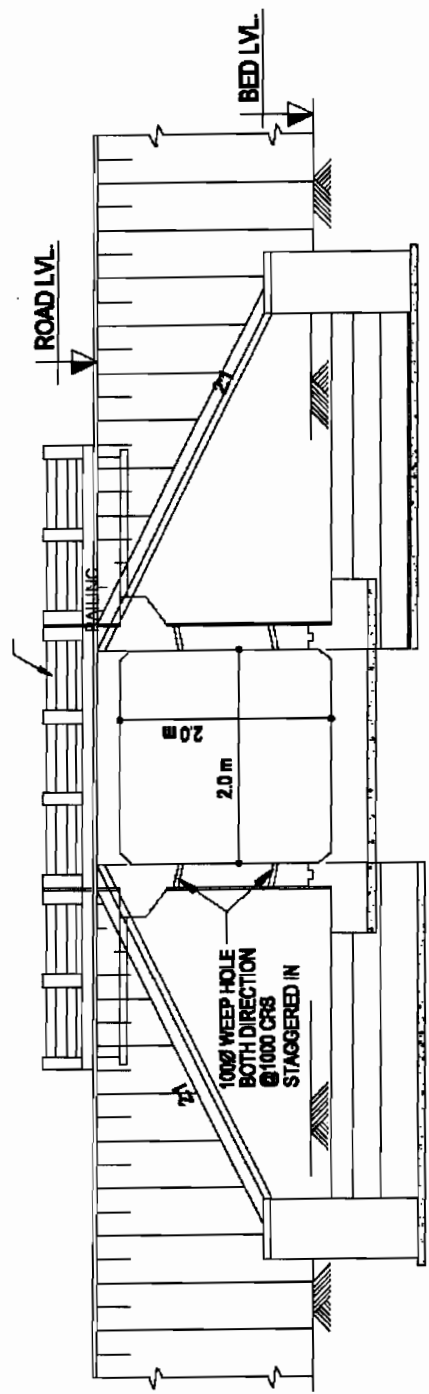


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Fax: 2521348, e-mail: ces@ceindia.com

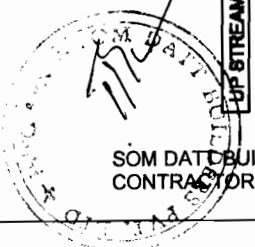
CONSULTING ENGINEERS GROUP LTD.
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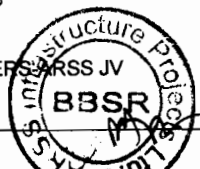
LONGITUDINAL SECTION



SECTION A-A



SOM DATTA BUILDERS & ARCHITECTS PRIVATE LIMITED
CONTRACTOR

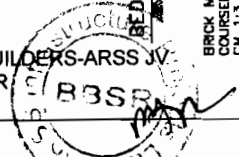
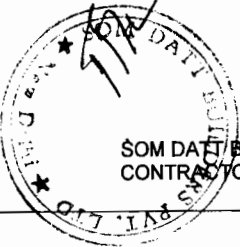
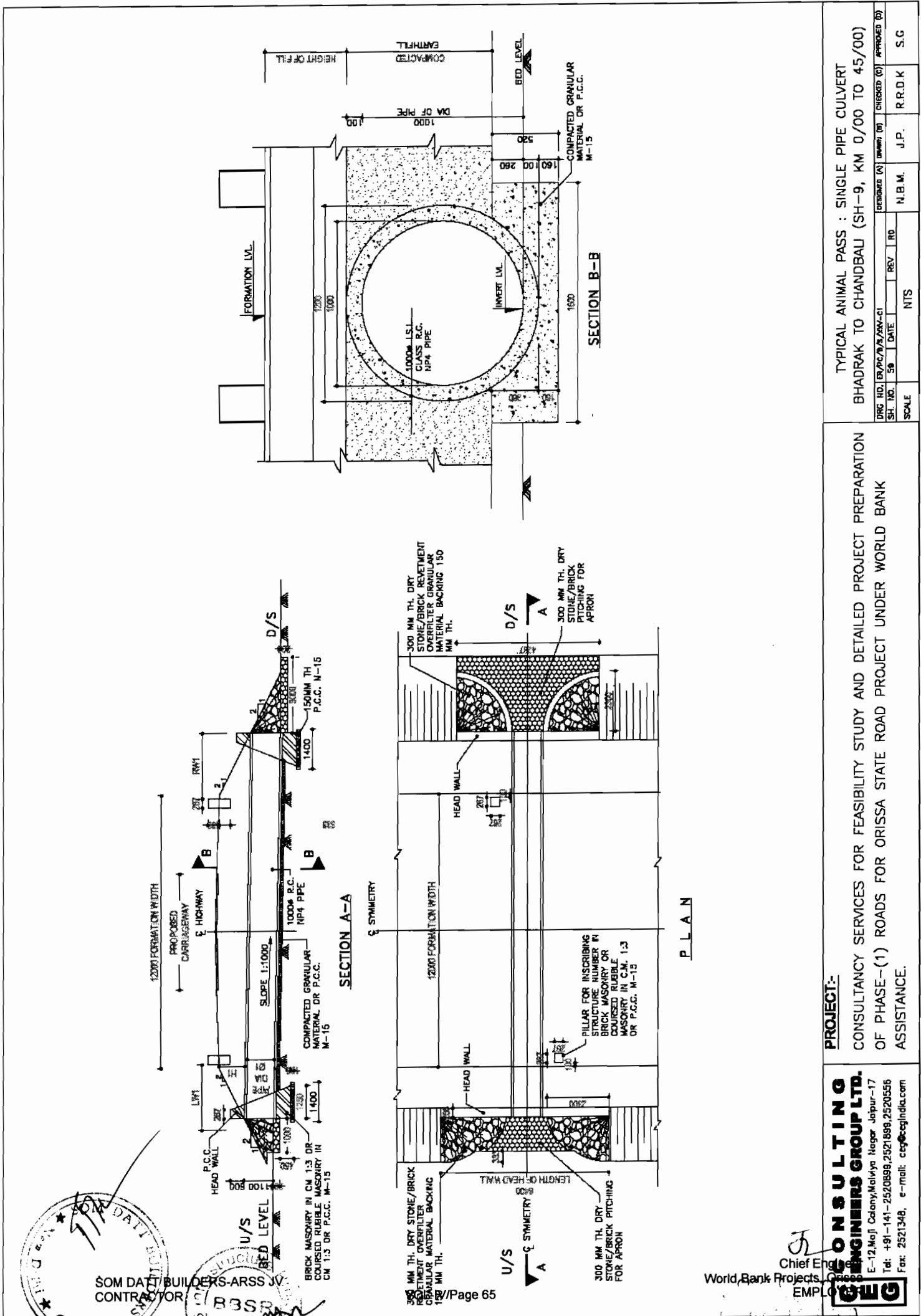


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PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

DRG. NO.	REV.	DATE	BY	CHKD.	APPD.
SH. NO.	58				
SCALE			NTS		
DESIGNED (D)			DRAWN (D)		
CHECKED (C)			APPROVED (P)		
N.B.M.			J.P.		
R.R.D.K			S.C		

TYPICAL ANIMAL PASS : BOX CULVERT (WITH OUT CUSHION)
 BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 4.5/00)



SOM DATI BUILDERS-ARSS JV
CONTRACTOR

P L A N

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

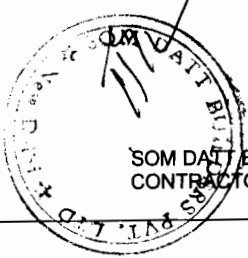
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Fax: 2521348, e-mail: ceg@cegindia.com

Chief Engineer
World Bank Projects, Office
EMPLOYED

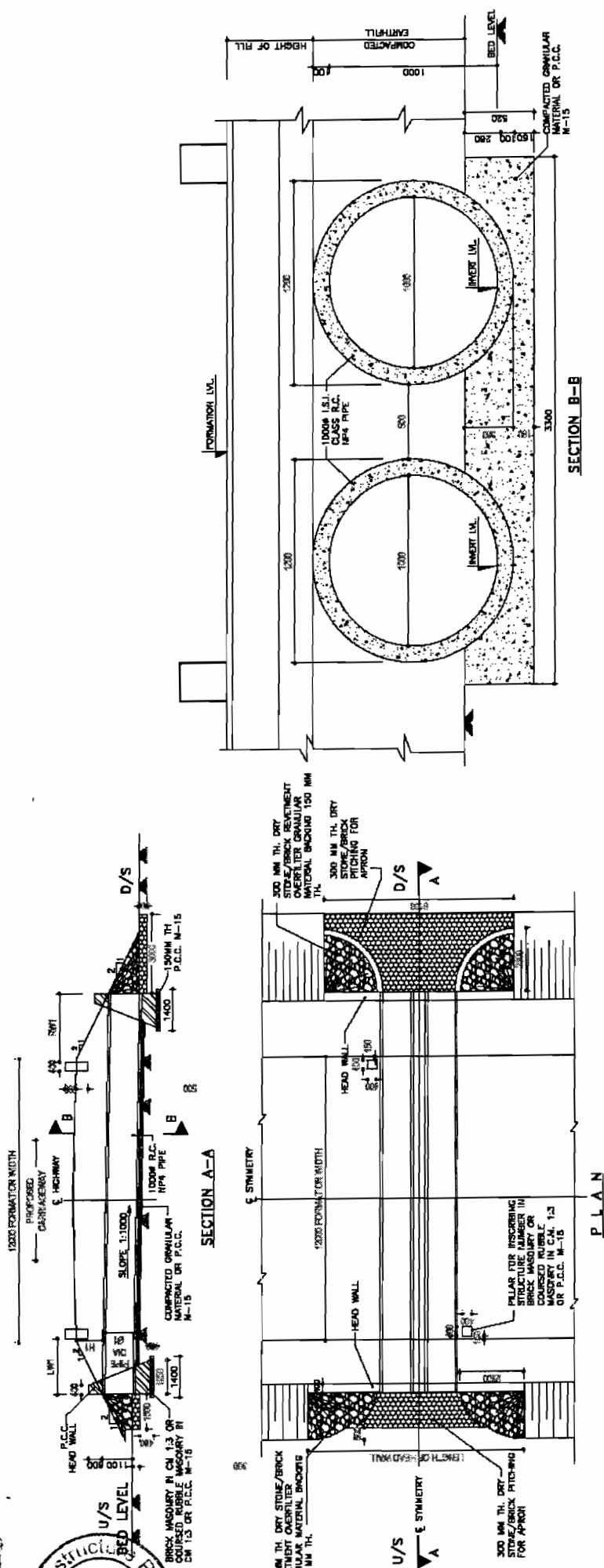
TYPICAL ANIMAL PASS : SINGLE PIPE CULVERT

BHADRAK TO CHANDBAL (SH-9, KM 0/00 TO 45/00)

DRG NO. ER/PC/MA/AN-C1	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
SH. NO. 59	DATE	REV	RD	
SCALE	NTS	J.P.	R.R.D.K	S.G
		N.B.M.		



SOM DATT BUILDERS-ARSS CONTRACTORS



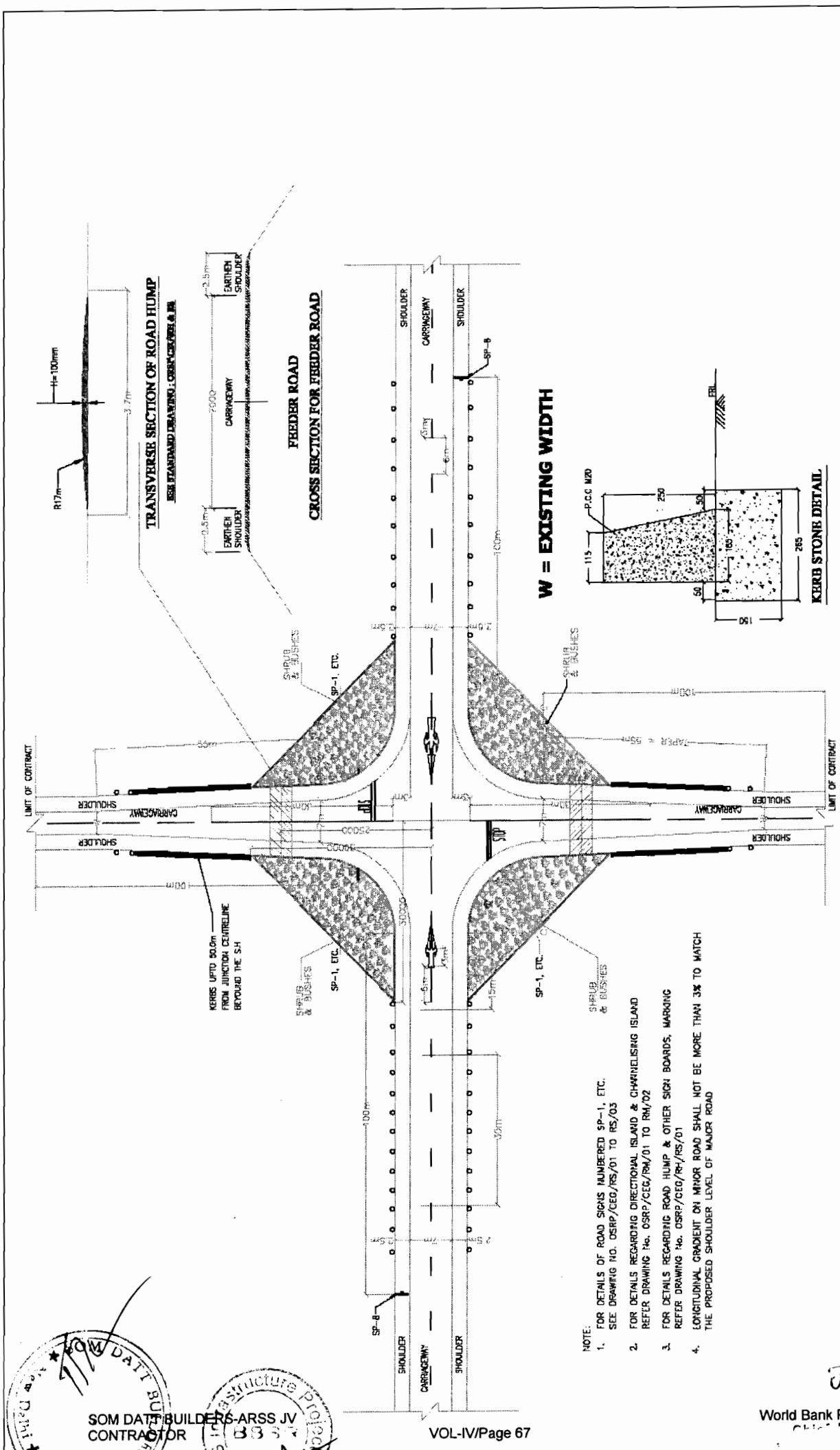
Chief Eng.
World Bank Projects, Chief Eng.
Chief EMPLOYER

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

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TYPICAL ANIMAL PASS : DOUBLE PIPE CULVERT
BHADRAK TO CHANDBALI (SH-9, KM 0/00 TO 45/00)

DRG. NO.	REV.	DATE	BY	CHKD.	APPD.
SH. NO.	60				
SCALE	NTS		J.P.	R.R.D.K	S.G
			N.B.M.		



- 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/RS/01 TO RM/02
 3. FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING No. OSRP/CEG/RS/01
 4. LONGITUDINAL GRADIENT ON MINOR ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

PROJECT:
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
 DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
 ASSISTANCE

CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD
 JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.

DRG NO	OSRP/CEG/SH/ENV/01-A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	01	DATE	REV	RO	
SCALE	NTS			M	JYOTI
					G.P.M
					S.G

SOM DATTA BUILDERS-ARSS JV
 CONTRACTOR

CONSTRUCTURE PROJECT

333

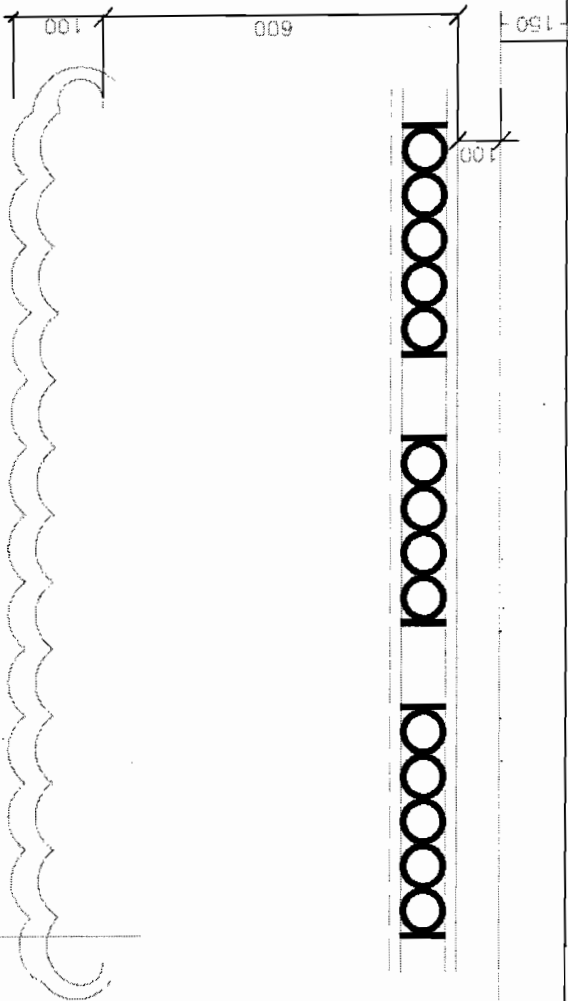
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Chief Engineer

World Bank Project

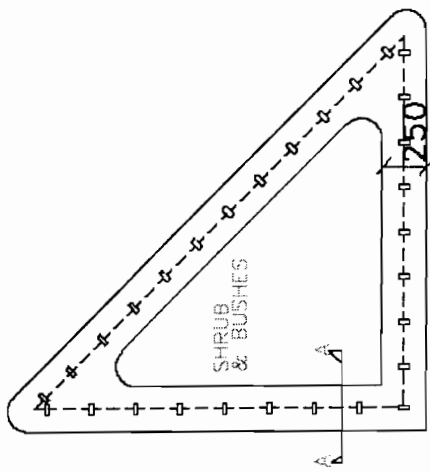
CEG

M.S FLAT 10mm x 2mm

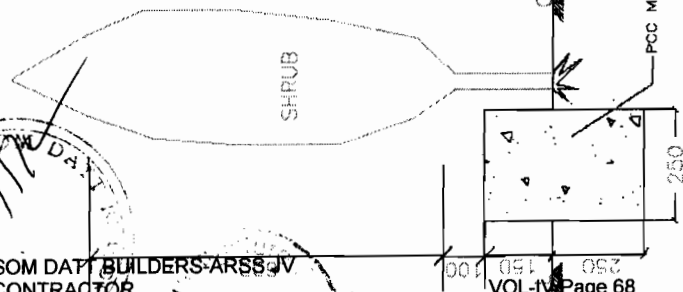


FRONT ELEVATION
MS GRILL FOR JUNCTION

(ALL DIMENSIONS ARE IN mm)



PLAN OF TS LAND AT JUNCTION



SECTION A-A

NOTE : SURFACE TO BE PAINTED WITH APPROVED ACRYLICK PAINT YELLOW & BLACK

World Bank Project

CORNERS AS SITE ENHANCEMENT AND PREVENTION OF ENCREACHED COMMERCIAL ACTIVITY AND KIOSKS WITHIN 20m ON EITHER SIDE OF FEEDER ROAD & SH JUNCTION ZEBRA CROSSINGS & SPEED ARRESTER RUMBLERS TO BE 10m AND 50m AWAY FROM THE JUNCTION.

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

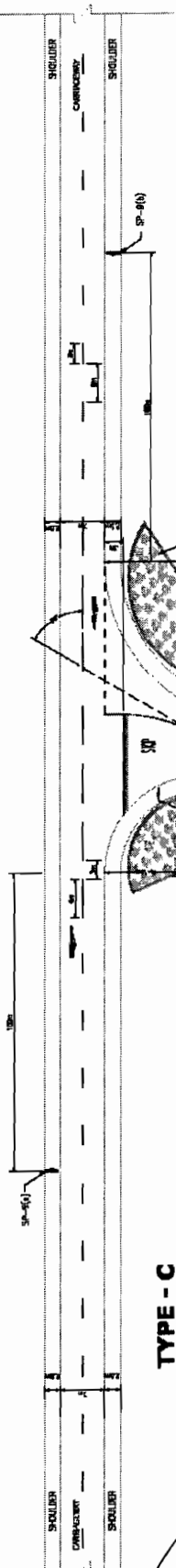
CONSULTING ENGINEERS GROUP LTD.
E-12, Moji Colony, Malviya Nagar Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegindia.com

TYPICAL DESIGN OF
MS GRILL FOR JUNCTION

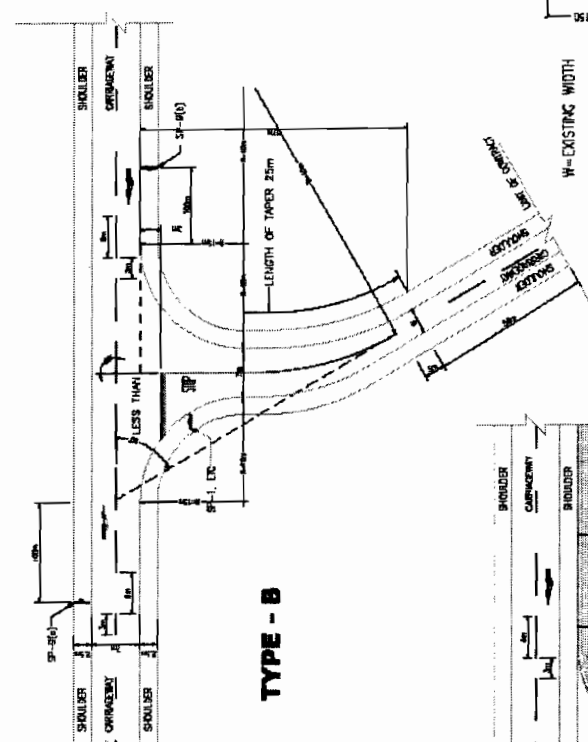
DRG NO. | OSRP/CEG/SH/ENV/01-B	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. | 02	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G



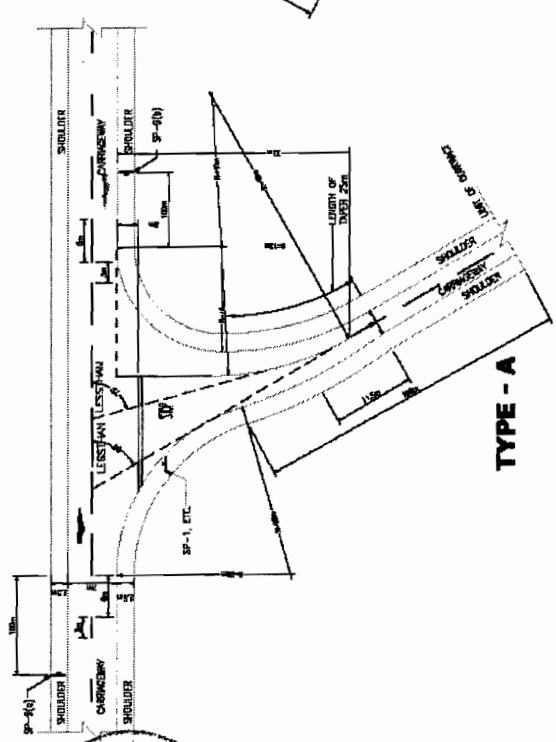
SOM DATT BUILDERS-ARSS JV
CONTRACTOR



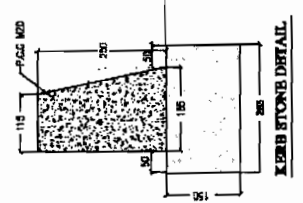
TYPE - C



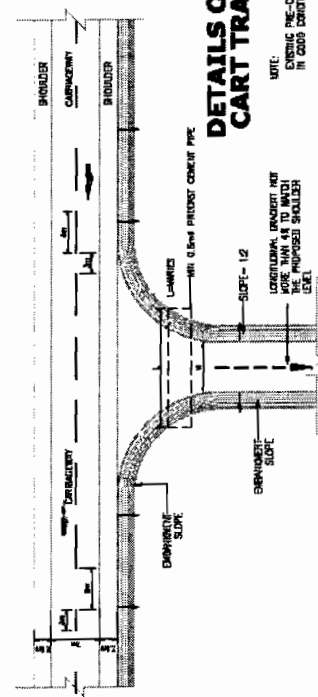
TYPE - B



TYPE - A



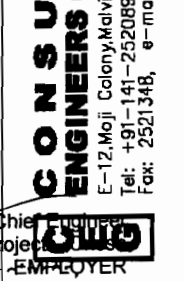
DETAILS OF CART TRACK



- NOTE:
1. 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.
 2. FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING NO. O/SRP/CEG/SH/ENV/01 TO RM/02.
 3. FOR DETAILS REGARDING ROAD HUMPS & OTHER SIGN BOARDS, MARKING REFER DRAWING NO. O/SRP/CEG/SH/ENV/01.
 4. UNBUNDLED GRADIENT ON HIGHWAY ROAD SHALL NOT BE MORE THAN 0% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD.

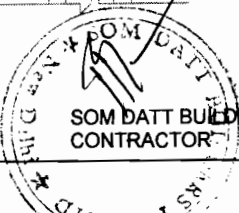
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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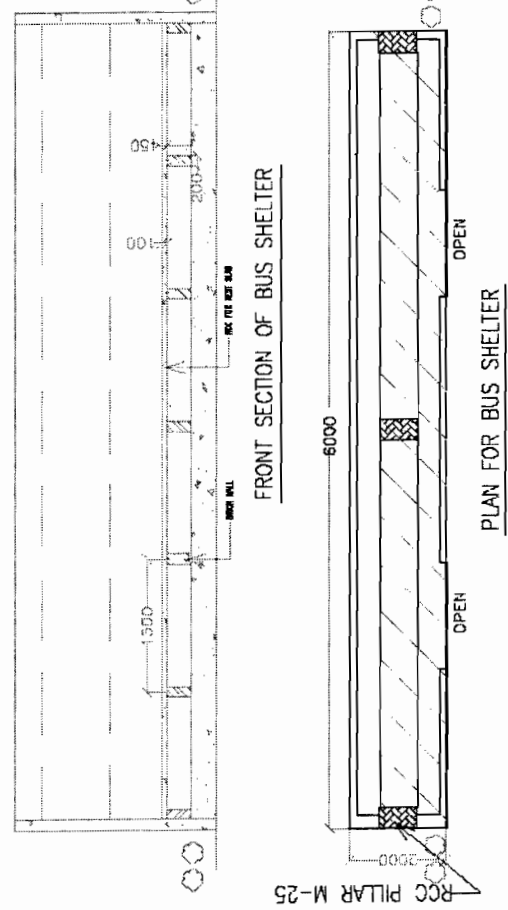
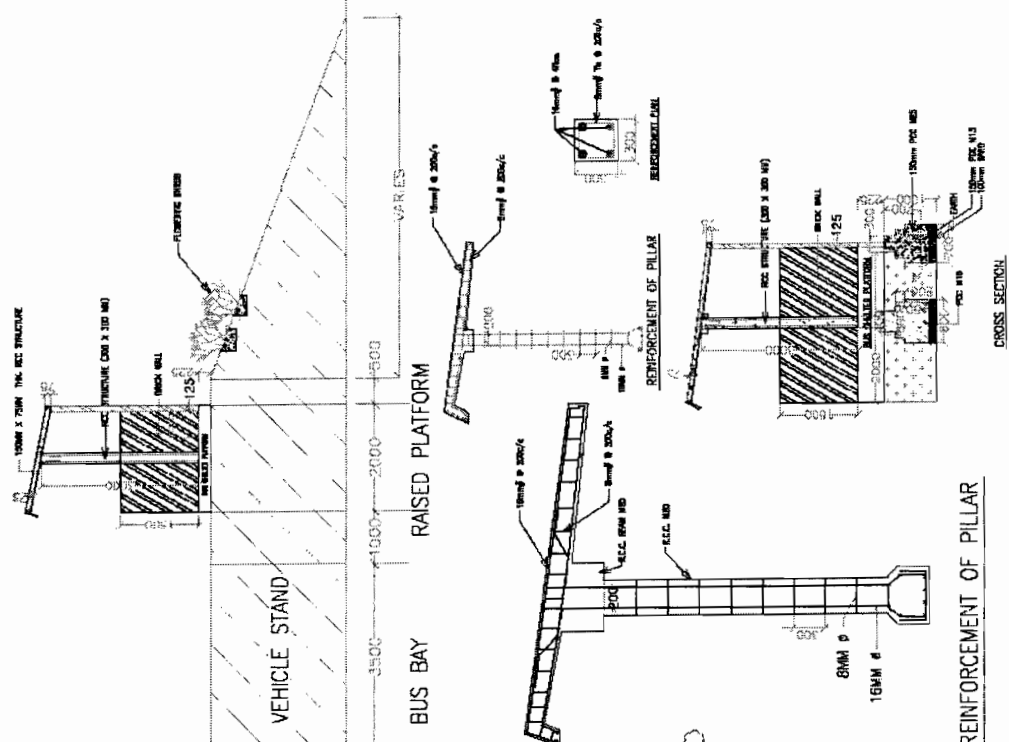


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CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.			
DRG. NO. O/SRP/CEG/SH/ENV/01-C	DESIGNED (A)	DRAWN (B)	CHECKED (C) APPROVED (D)
SH. NO. 53	DATE	REV	RD
SCALE	NTS		M
			JYOTI
			G.P.M
			S.G



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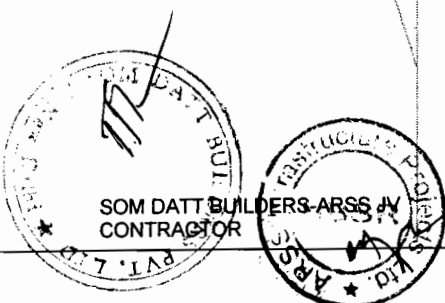


DESIGN OF PASSENGER SHED AT BUS BAY & BUS STOP

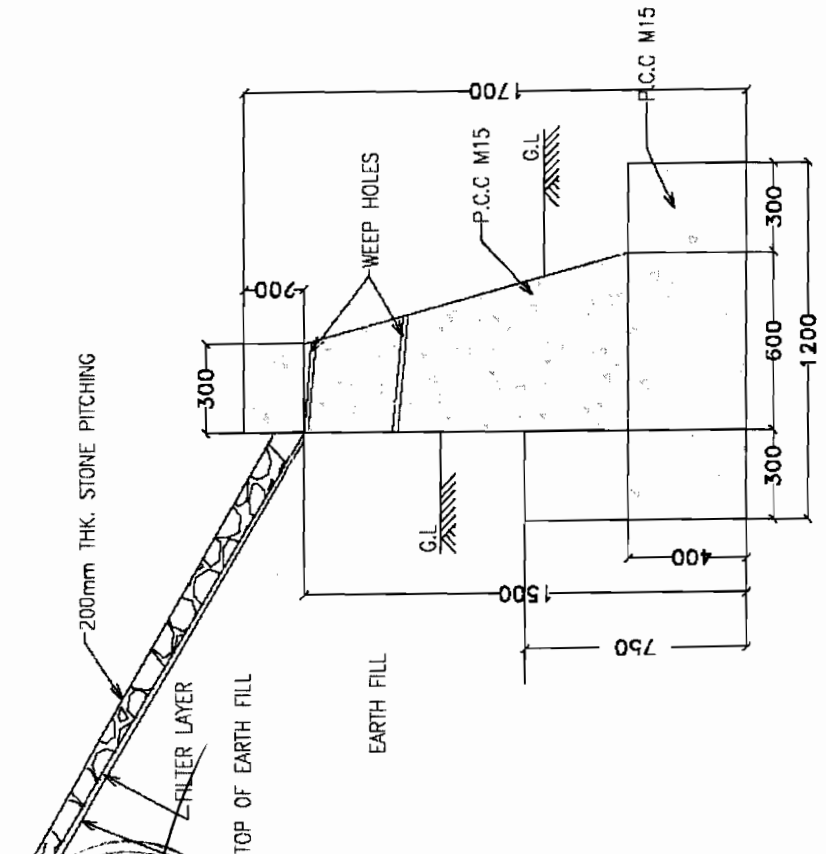
DRG. NO. OSRP/CEG/SH/ENV/02	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 54	DATE	REV	RD	
SCALE	NTS			
	M	JYOTI	G.P.M	S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

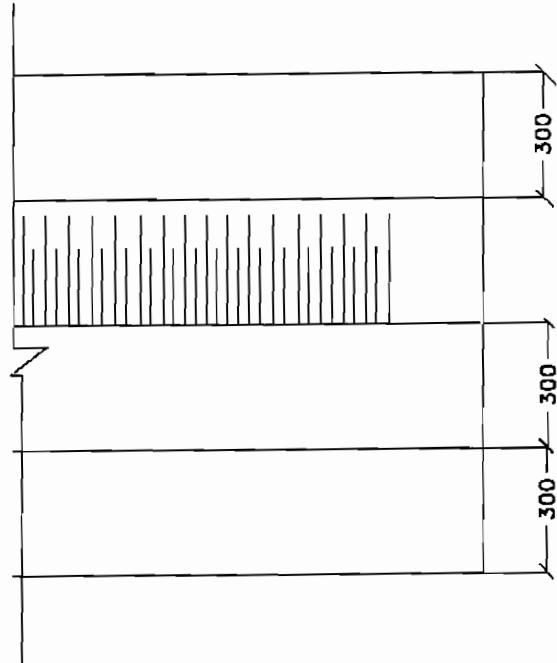
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TOE WALL FOR POND
(CROSS SECTION)



PLAN OF TOE WALL FOR WATER BODY

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

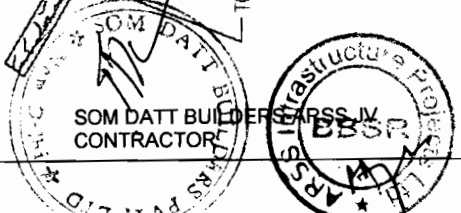
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

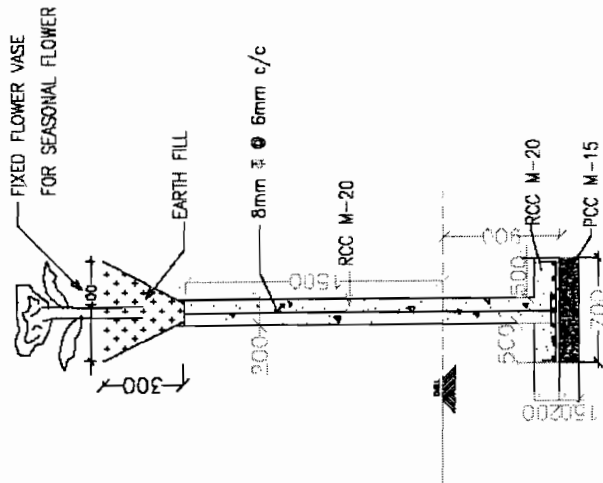
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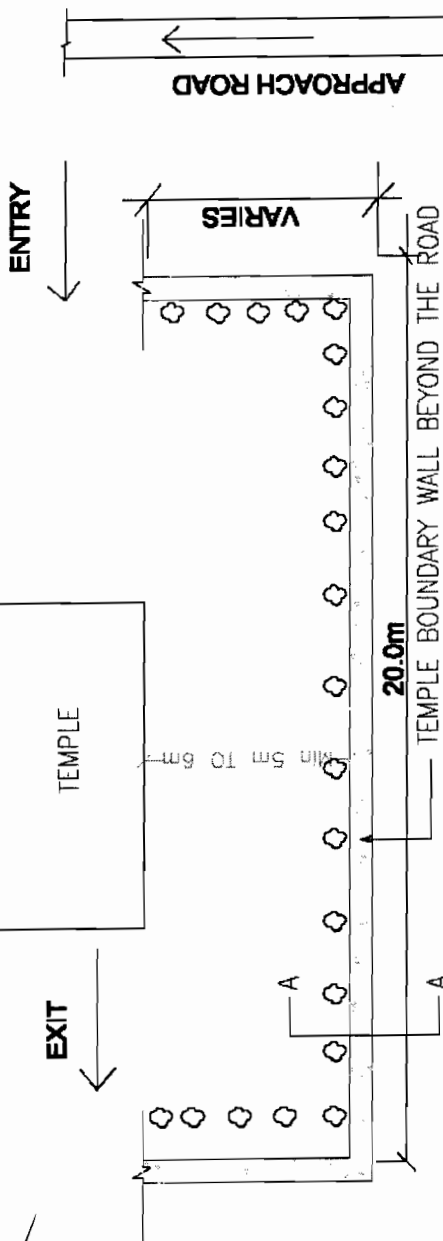
TYPICAL PCC TOE WALL FOR
WATER BODIES AS ENVIRONMENTAL MITIGATION.

DRG. NO.	GSRP/CEG/SH/ENV/03	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	65	DATE	REV	RD	
SCALE		NTS	M	JYOTI	G.P.M
					S.G





RCC RETAINING WALL FOR TEMPLE
(CROSS SECTION A-A)



STATE HIGHWAY (PROPOSED ROAD)

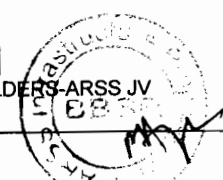
- ALL RELOCATED TEMPLES TO HAVE ENTRY AND EXIT AWAY FROM ROAD AND ROW
- EVERGREEN SHRUBS & MEDIUM TREES LIKE TAGAR, TARAT, MANDAR, PLUMERIA NICTANTHES, MALLIKA, JASHMINE, KUNDA, KANCHAN, KARABIRA, TULSI, BELA, SHAMI, ASHOK (*Saraca asoka*), KAMINI, NAGESWAR AND CHAMPA [PLANT TO PLANT SPACE 1.5m TO 2.0m DEPENDING ON THE SPECIES]
- FIXED FLOWER VASE ON THE BOUNDARY WALL FOR SEASONAL FLOWER & TULSI.

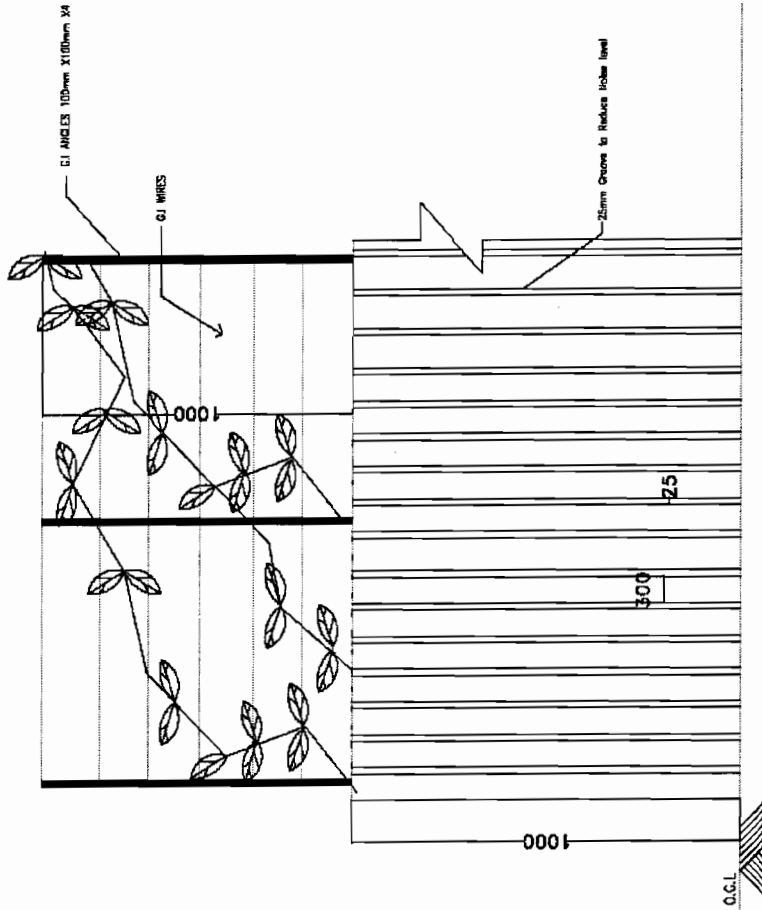
CONCEPTUAL RCC BOUNDARY WALL OF TEMPLES, STATUES
RELIGIOUS TREES AS SITE ENHANCEMENT UNDER
ENVIRONMENT MITIGATION PLAN.

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

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Fax: 2521348, e-mail: ceg@cegindia.com

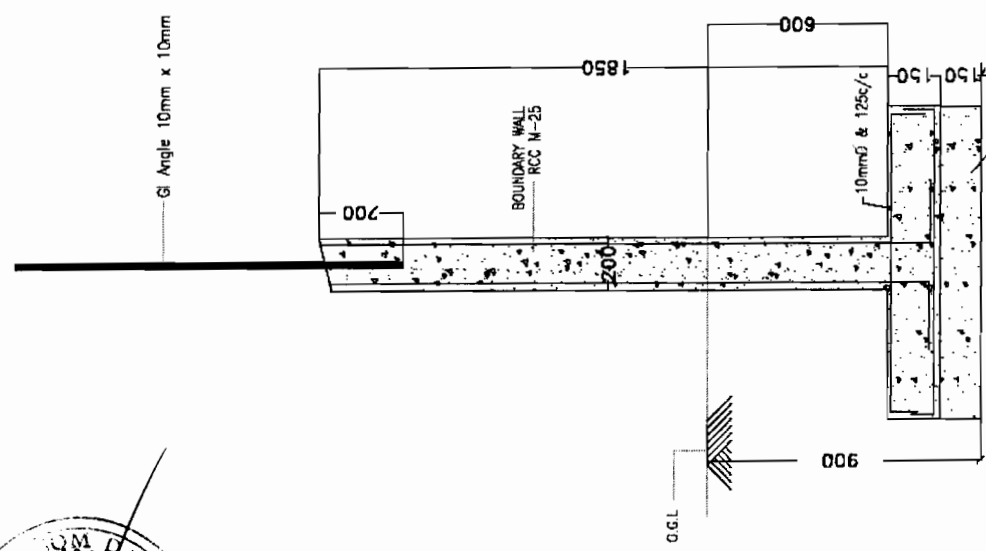
DRG NO. GSRP/CEG/SH/ENV/04-A	DESCRIBED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 186	DATE	REV	RD	
SCALE	NTS			
	M	JYOTI	G.P.M	S.G





FRONT ELEVATION

RCC BOUNDARY WALL FOR SENSITIVE RECEPTORS WITH NOISE & DUST REDUCTION ARRANGEMENT



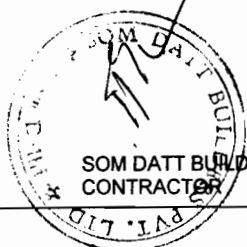
RCC BOUNDARY WALL FOR SCHOOL (CROSS SECTION)

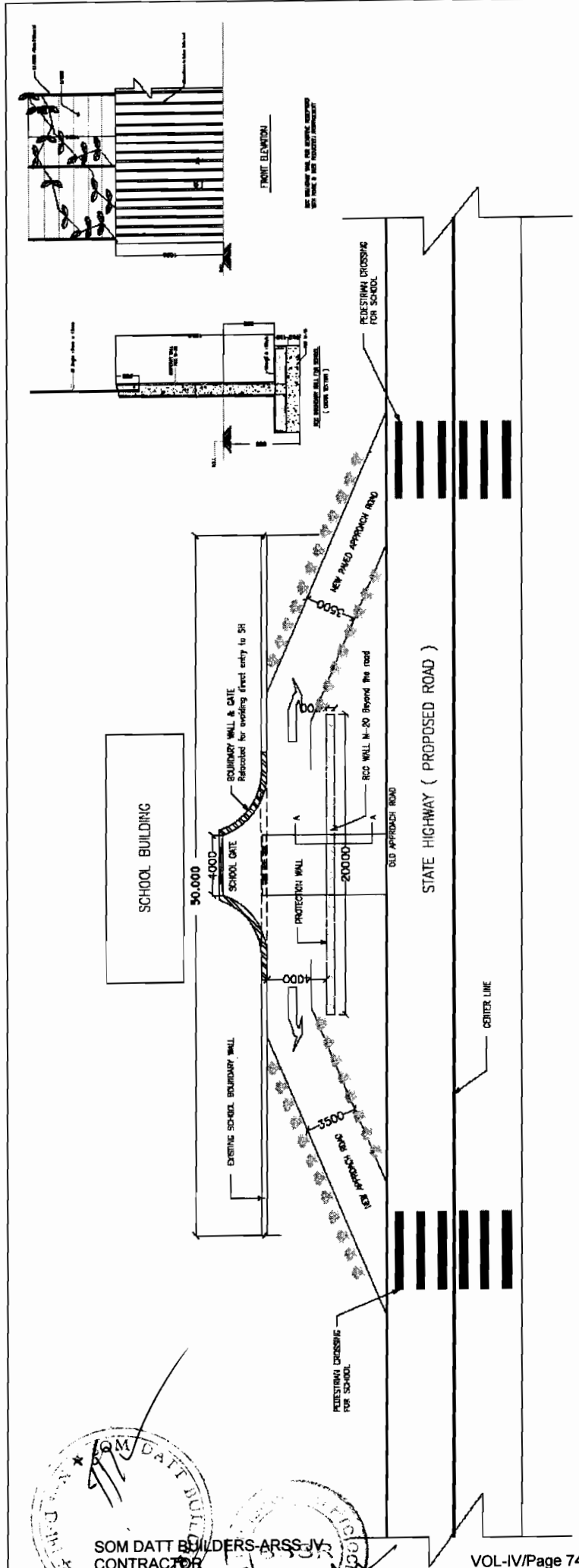
TYPICAL NOISES & DUST BARRIER FOR ENVIRONMENTAL MITIGATION.

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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DIRG NO. DSIRP/CEG/SH/ENV/04-B	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 67	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.-M	S.G





- THERE SHALL BE RUMBLER STRIPS & SPEED BREAKERS 150m & 10m AWAY FROM PEDESTRIAN CROSSINGS NEAR SCHOOLS, COLLEGES, HOSTELS, TEMPLES, HOSPITALS, DISPENSARIES AND OLD AGE HOMES, WEEKLY MARKET AREA, G.P MARKET COMPLEX ADJACENT TO THE ROAD WITHIN 25m TO 50m DISTANCE FROM CENTRE LINE. THE BOUNDARY WALL SHOULD HAVE G.I ANGLE POSTS WITH G.I WIRE MESH GRILL/ STRINGS FOR GROWING CREEPERS TO MUFFLE NOISE AND DUST.
- CREEPERS WITH SCENTED/COLOUREFUL FLOWERS TO BE PLANTED WHICH HAVE TOMENTOSE LEAVES TO ABSORB MORE DUST AND NOISE.
- THE BOUNDARY WALL PLASTERING TO HAVE VERTICAL GROOVES TO DEFELECT NOISE TOWARDS THE ROAD WHICH WILL ACT AS A COUNTER NOISE SOURCE TO DAMPEN THE HIGH WAY NOISE LEVEL.
- VEGETATIVE SHRUBS AND BUSHES WHICH ARE NON BROWSABLE AND HAVING SCENTED FLOWERS TO BE PLANTED ON THE PERIPHERY OR EDGE OF THE APPROACH ROAD TO SUCH PLACES. THE BOUNDARY ENTRY POINT TO BE SHIFTED IN WORDS IN CASE OF CLOSE WITH NAME OF THE INSTITUTION ENGRAVED.
- PROXIMITY AND DIRECT ENTRY TO THE ROAD WITH AND A BARRICADE WALL SHALL BE ERRECTED 4m AWAY FROM THE ENTRY POINT INFRONT OF THE GATE

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONCEPTUAL APPROACH DESIGN FOR EDUCATIONAL AND MEDICAL INSTITUTIONAL APPROACHES AS ENVIRONMENTAL MITIGATION PLAN.

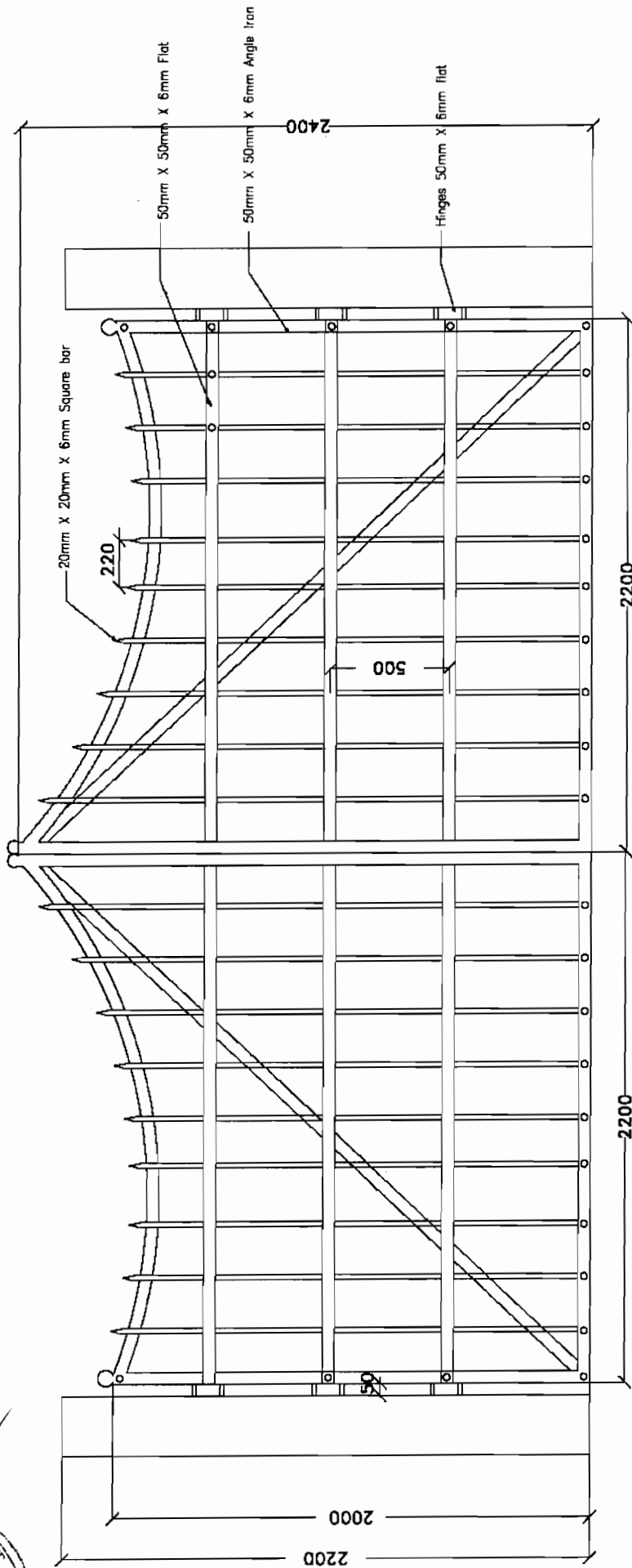
CONSULTING ENGINEERS GROUP LTD.
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DRG. NO.	OSRP/CEG/SH/ERY/05	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	88	DATE	REV	RO	
SCALE	NTS			M	JYOTI
				G.P.M	S.G

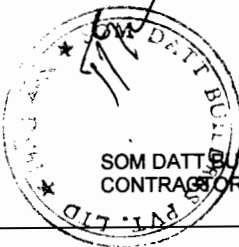
World Bank Project EMPLOYER



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 CONTRACTOR



ORNAMENTAL GATE



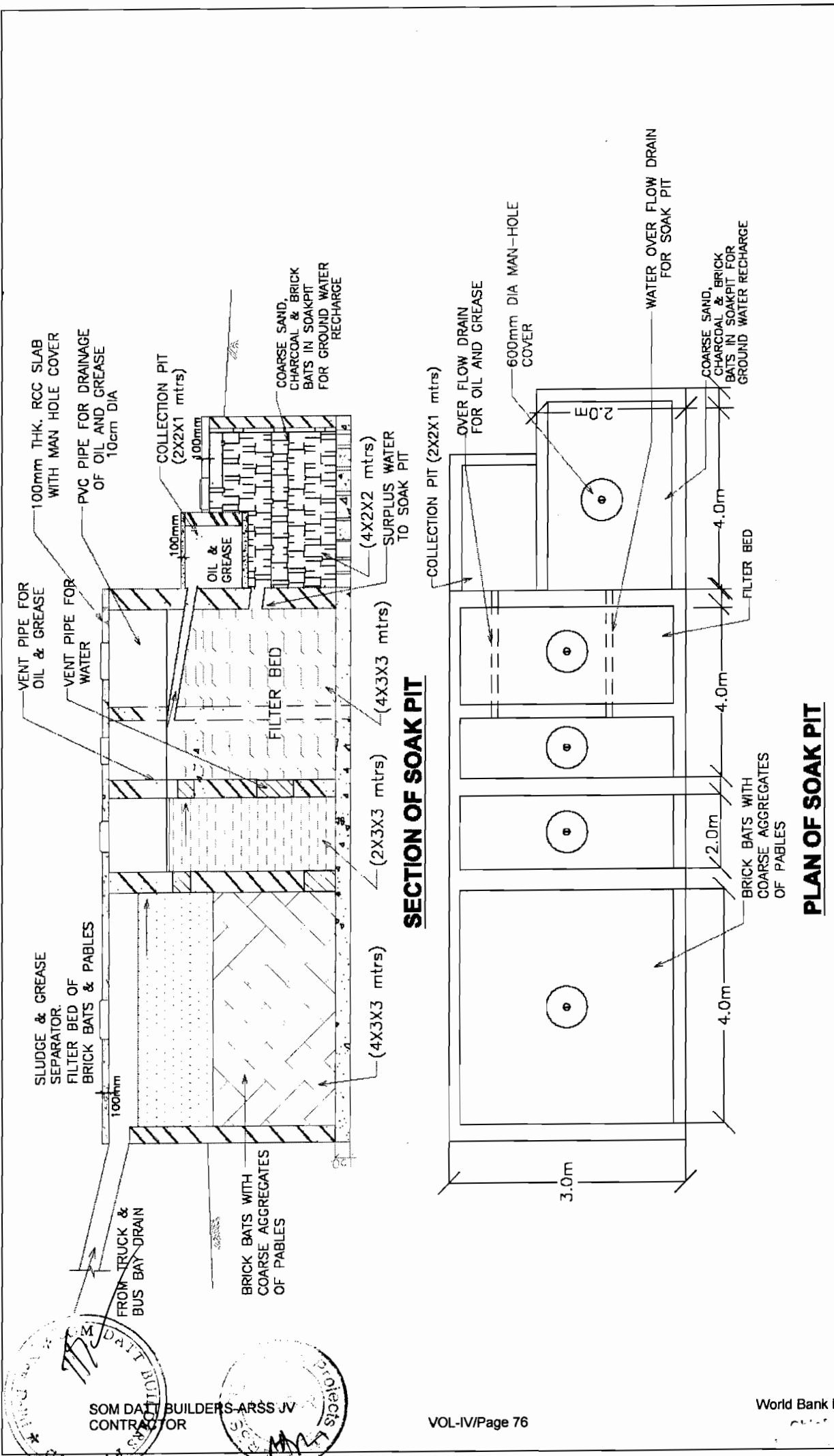
ORNAMENTAL GATE DESIGN FOR EDUCATIONAL AND MEDICAL INSTITUTIONAL APPROACHES AS ENVIRONMENTAL MITIGATION PLAN.

DIRG. NO. | OSRP/CEG/SH/ENV/05 A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. | 89	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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Chief Engineer
 World Bank-Project



SECTION OF SOAK PIT

PLAN OF SOAK PIT

CONCEPTUAL DESIGN FOR SEPARATION OF OIL, GREASE AND SLUDGE OF TRUCK & BUS TERMINALS & BUS BAY

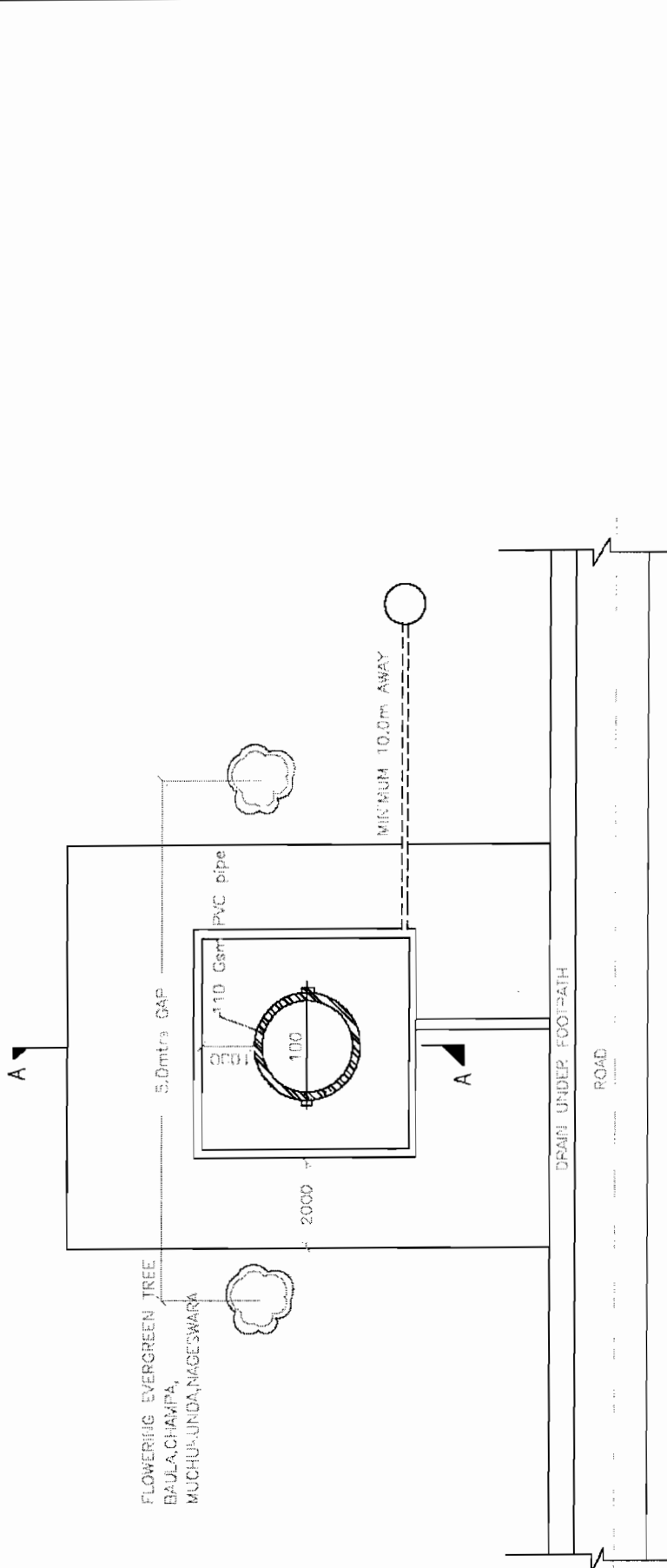
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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 Tel: +91-141-2520899, 2521888, 2520556
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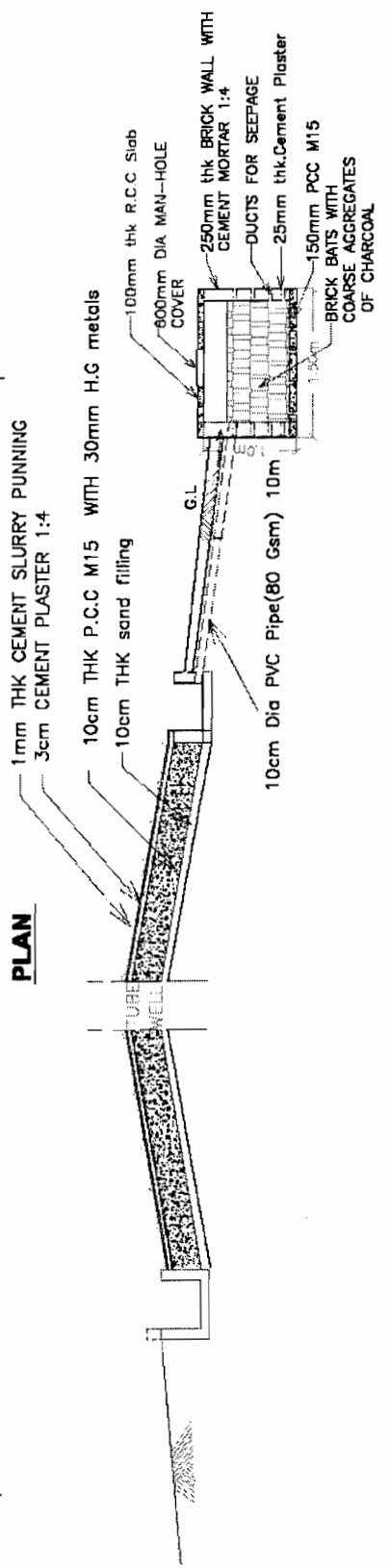
DRG NO. DSRP/CEG/SH/ENV/06	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 70	DATE	REV	RO	
SCALE	NTS	M	JYOTI	G.P.M
				S.G

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PLAN



SECTION OF SOAK PIT

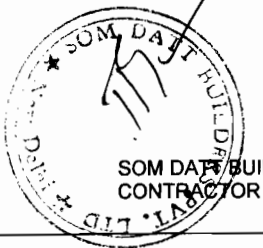
CONCEPTUAL C.C. PLATFORM AND DRAINAGE DESIGN FOR HAND PUMPS AND TAPS.

DRG. NO. QSRP/CEG/SH/ENV/07	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 71	DATE	REV	RO	
SCALE	NTS			
			JYOTI	G.P.M
			M	S.G

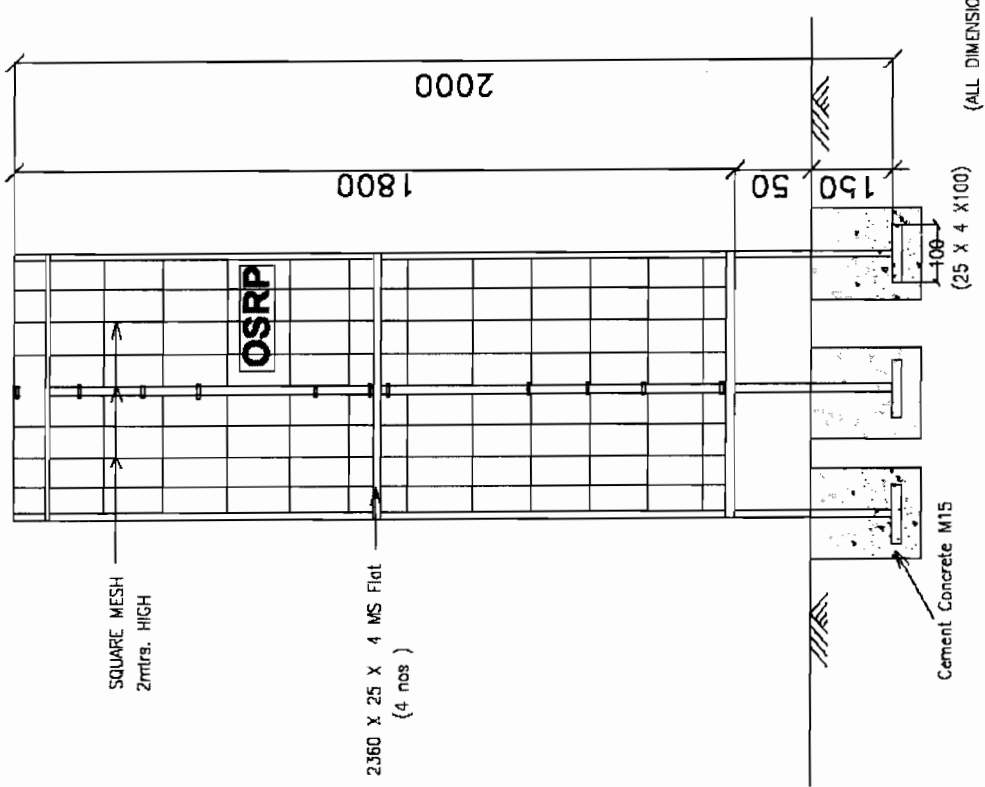
PROJECT:-
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 Fax: 2521348, e-mail: ceg@egindia.com

Chief Engineer
 World Bank Project, Orissa
CEG



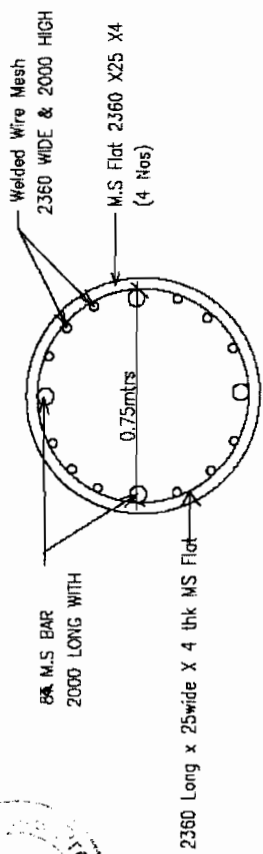
TREE GUARD



ELEVATION

CONCEPTUAL DESIGN FOR TYPICAL TREE GUARD
WITH M.S BARS.

DRG NO. OSRP/CEG/SH/ENV/08	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 72	DATE	REV	RO	
SCALE	NTS		M	JYOTI
				G.P.M.
				S.G

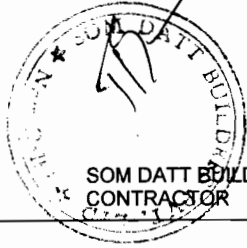


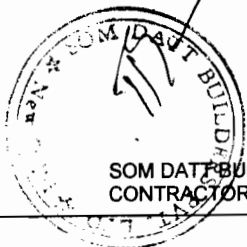
PLAN

TYPICAL PLAN OF TREE GUARD WITH MS BARS

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

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Tel: +91-141-2520699, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegroupindia.com

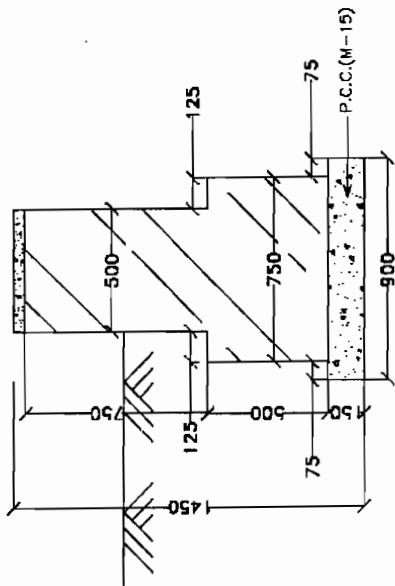
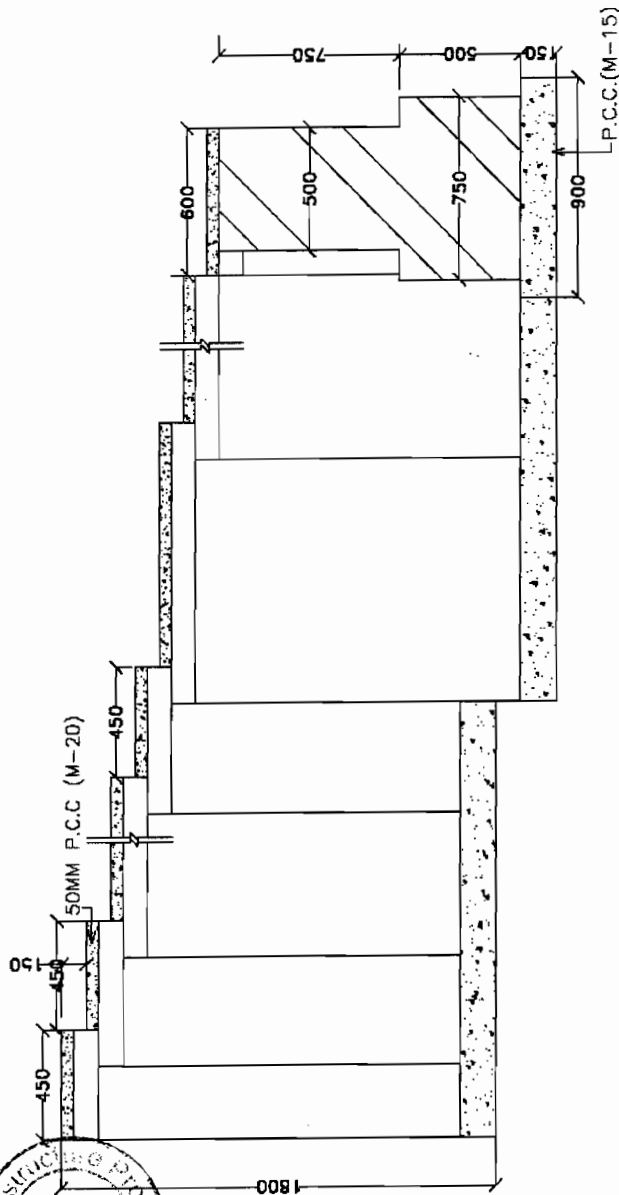




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CONTRACTOR



VOL-IV/Page 79



SIDE AND
BOTTOM WALL

PROJECT:-

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

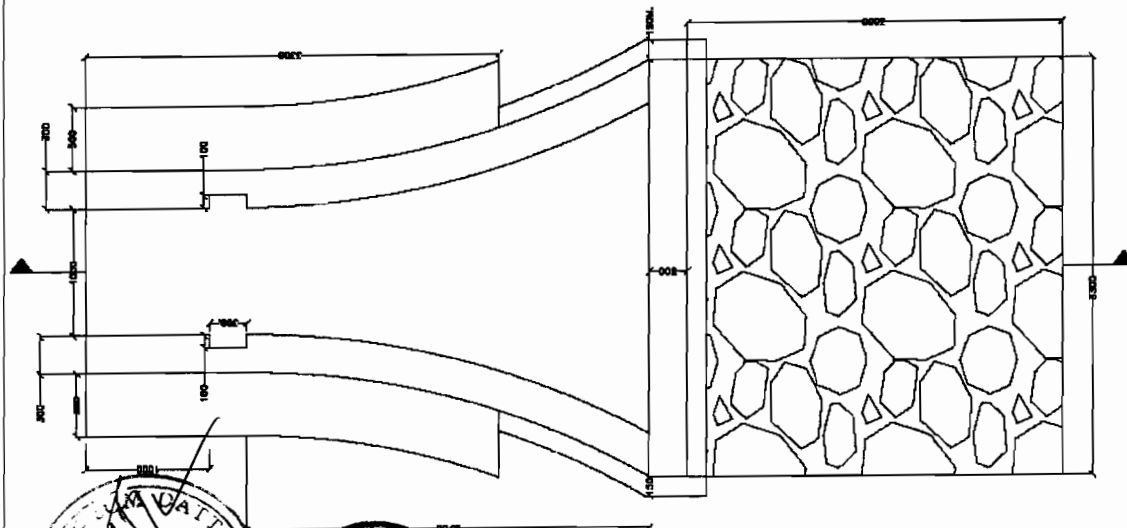
**C O N S U L T I N G
E N G I N E E R S G R O U P L T D .**

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Fax: 2521348, e-mail: ceg@cegroupindia.com

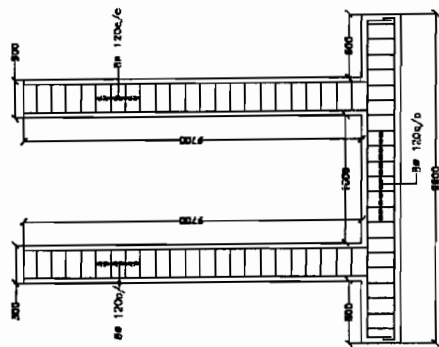
Chief Engineer
World Bank Project
EMPLOYER

CONCEPTUAL DESIGN FOR BATHING GHAT

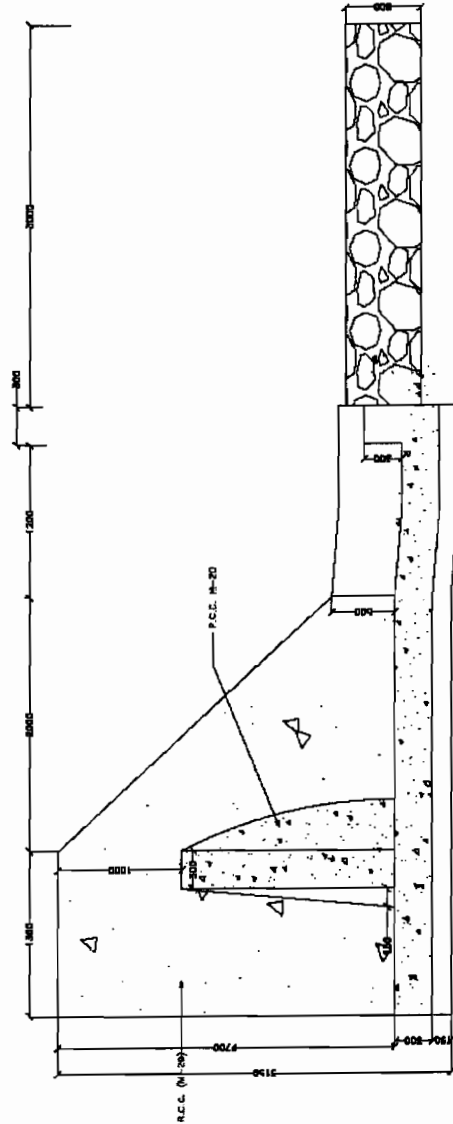
DRG NO.	OSRP/CEG/SH/ERV/09	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	73	DATE	REV	RO	
SCALE	NTS				
		M	JYOTI	G.P.M	S.G



PLAN



CROSS-SECTION AT B-B



CROSS-SECTION AT A-A

PROJECT:-

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

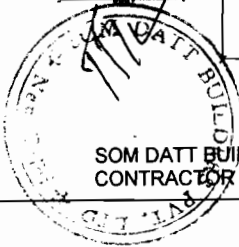
**C O N S U L T I N G
E N G I N E E R S G R O U P L T D .**

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Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegindia.com



Chief Engineer
EMPLOYER

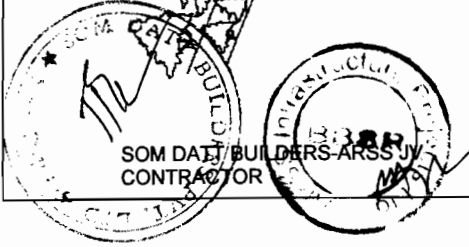
World Bank Project



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CONCEPTUAL DESIGN FOR SPILLWAY GATE

DRG NO.	OSRP/CEG/SH/ENV/10	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	74	DATE	REV	RO	
SCALE		NTS			
		M	JYOTI	G.P.M	S.G

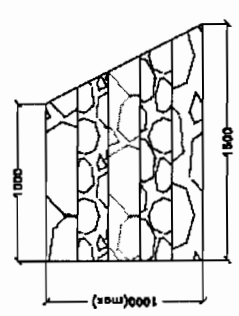
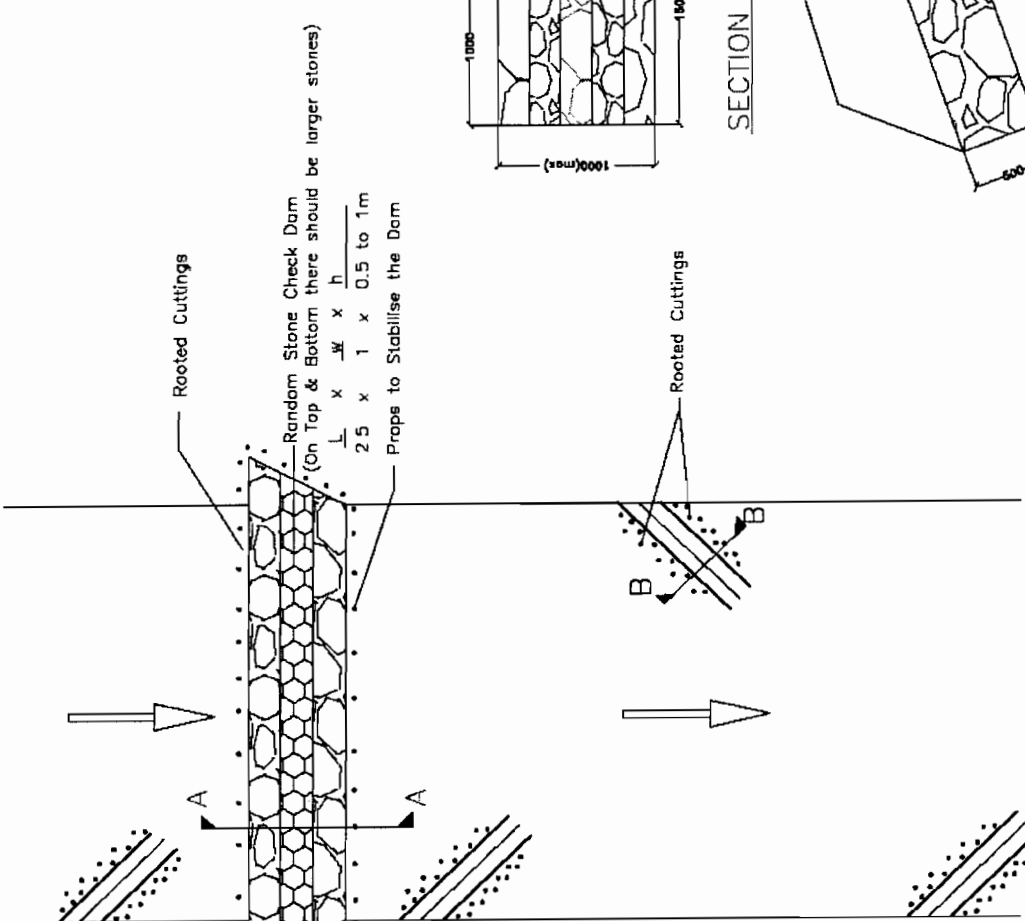


GULLY/NALABED WITH SOILFILL GUNNYBAG CHECK DAM

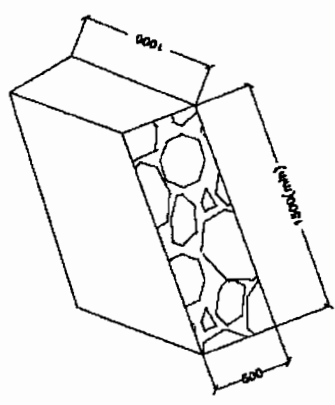
VEGETATIVE SPUR

C.S. OF GULLY CONTROL

Gunny Bag Filled with sand and Gravel to Form Check Dam of 0.5 to 1Mtr. Hight/1Mtr Wide - Length $1\frac{1}{2}$ times the width of the Nala/Gully.



SECTION ON A-A



SECTION ON B-B

PLAN OF NALLA/ GULLY CONTROL

APPROXIMATE DISTANCE OF SPURS WILL BE ON THE NUMBER OF TURNS/ BENDS ON THE WATER FLOW AND GRADIENT STEEPER THE GRADIENT MORE THE NUMBER OF SPUR & DAM.

SOIL AND WATER CONSERVATION MEASURES
(GULLY PLUGGING AND CHECK DAMING)

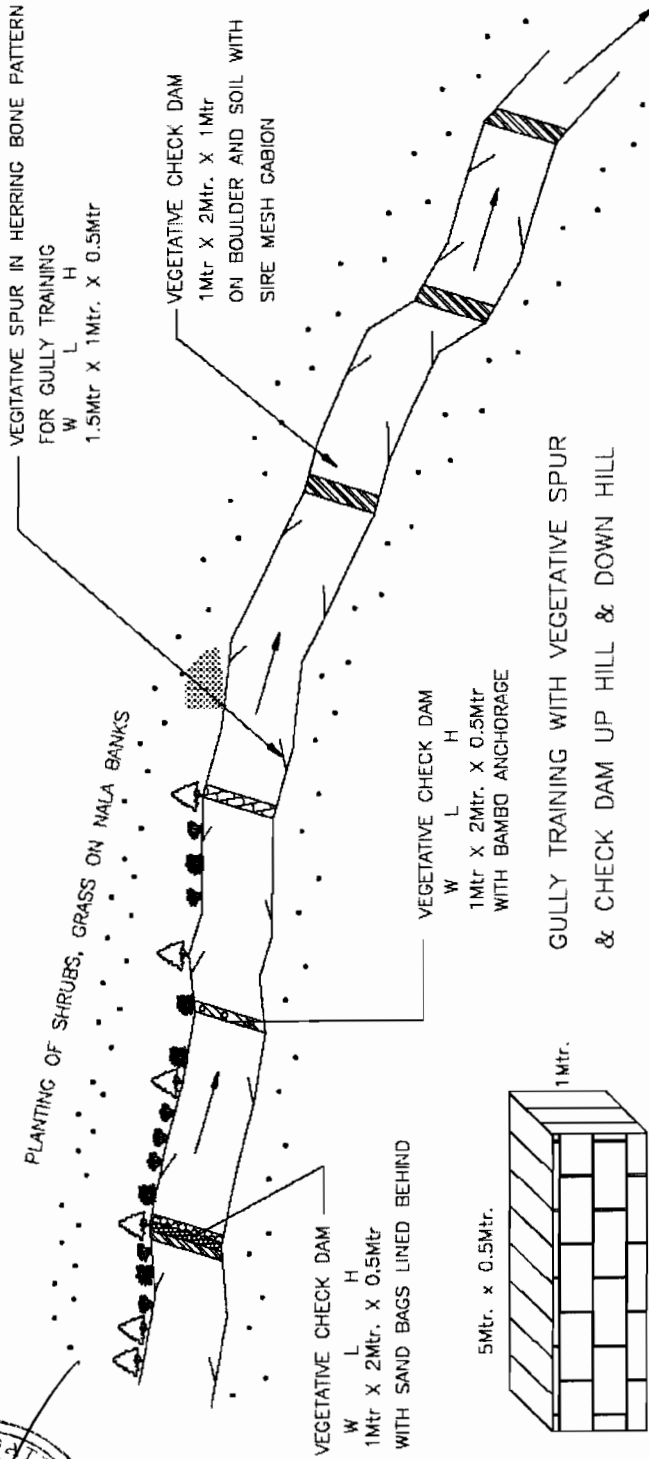
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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

World Bank Project
EMPLOYER

DRG NO. DSRP/DEG/SH/ERNV/11 A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 75	DATE	REV	RO	
SCALE	NTS	M	JYOTI	G.P.M
				S.G

EROSION CONTROL AND HABITAT DEVELOPMENT MEASURES



G. 1 WIRE MESH/GABION TO ACT AS MINI SPURS & CHECK DAM BARRIER. DOWNSTREAM FILLED WITH RANDOM STONES & BOULDERS FROM NALA BED.

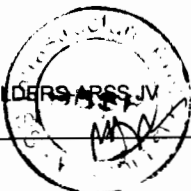
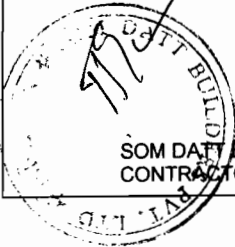
THE TREES/ GRASSES/ SHRUBS/HERBS (ROOTED CUTTINGS) TOBE PLANED AT 1 Mtr. INTERIOR LENGTH AS PER LOCAL CONDITION.

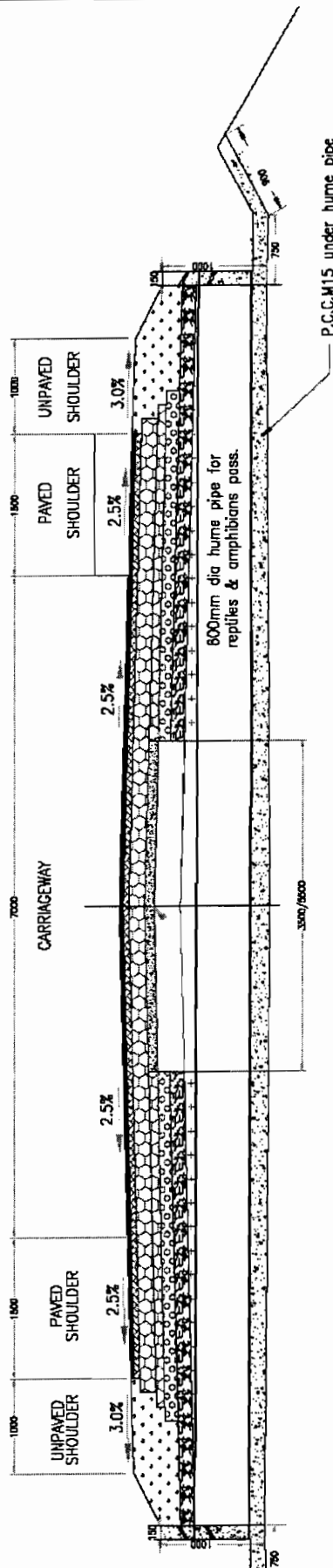
AROUND 5 nala on Bramhapur Bangi Jr. to be Gully Plugged and Check dams done.

**SOIL AND WATER CONSERVATION MEASURES
(GULLY PLUGGING AND CHECK DAMING)**

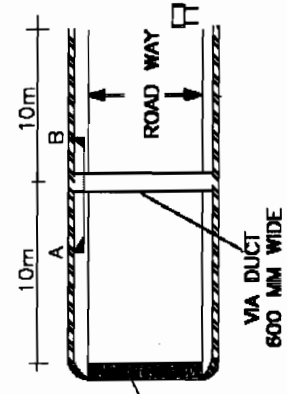
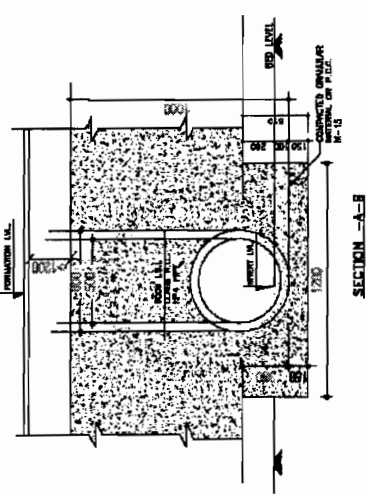
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

DRG. NO.	DSRP/CEG/SH/ERN/11 B	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	76	DATE	REV	RO	
SCALE	NTS				M
			JYOTI	G.P.M	S.G





CROSS SECTION OF REPTILES & AMPHIBIANS UNDERPASS WITH TRAP DRAINS AT WET LANDS



PLAN OF REPTILES & AMPHIBIANS UNDERPASS WITH TRAP DRAINS

PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
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 ASSISTANCE

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 Fax: 2521348, e-mail: ceg@cegindia.com

World Bank Project EMPLOYER

DRG NO. OSRP/CEG/SH/ENR/12	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 77	DATE	REV	RO	
SCALE	NTS			
	M	JYOTI	G.P.M	S.G

SOM DATE BUILDERS ARSE JV
 CONTRACTOR

SCHEDULE OF NOISE BARRIERS

Sl No.	STRUCTURE	CHAINAGE AT Km	SIDE
1	Temple	0.030	Left
2	Temple	0.060	Right
3	School	0.150	Right
4	Temple	0.800	Left
5	School	2.800	Right
6	School	12.800	Left
7	School	13.190	Left
8	Govt.Hospital	13.300	Left
9	Burial ground	16.245	Left
10	School	16.250	Left
11	School	16.300	Right
12	School	16.590	Left
13	Police Station	17.100	Left
14	Hospital	17.190	Left
15	Dibyabhumii Ashram	21.000	Left
16	School	22.780	Left
17	School	22.780	Right
18	Temple	23.640	Right
18	School	27.580	Left
20	Temple	27.748	Right
21	Co-Operative Bank	31.300	Left
22	School	39.300	Right
23	Primary Health Centre	39.600	Left
24	Temple	40.000	Right
25	School	41.600	Left
26	School	41.690	Left
27	Temple	43.317	Right
28	Temple	46.505	Left
29	School	47.300	Right
30	Temple	47.557	Left
31	Temple	47.820	Left
32	Bank	48.750	Left
33	Temple	49.470	Right
34	Temple	49.725	Right
35	Office Bldg.	49.875	Right
36	Govt.Bldg.	50.000	Left

SCHEDULE OF PCC TOEWALL, SPILLWAY AND BATHING GHAT

Sl No.	Items	Chainage at km	Location at left/right	PCC TOE WALL	SPILLWAY	BATHING GHAT
37	Pond	29.250	L	YES	-	-
38	Pond	29.300	L	YES	-	-
39	Pond	29.400	L	YES	-	-
40	Pond	29.500	R	YES	-	-
41	Pond	29.533	L	YES	-	-
42	Pond	29.713	L	YES	-	-
43	Pond	29.700	R	YES	-	-
44	Pond	30.013	L	YES	-	-
45	Pond	30.563	L	YES	-	-
46	Pond	30.683	L	YES	-	-
47	Pond	30.970	L	YES	-	-
48	Pond	31.300	L	YES	-	-
49	Pond	31.417	R	YES	-	-
50	Pond	31.823	R	YES	-	-
51	Pond	31.960	R	YES	-	-
52	Pond	32.100	L	YES	-	-
53	Pond	32.450	R	YES	-	-
54	Pond	32.490	L	YES	-	-
55	Pond	32.200	L	YES	-	-
56	Pond	33.600	L	YES	-	-
57	Pond	33.670	L	YES	-	-
58	Pond	34.000	R	YES	-	-
59	Pond	36.100	L	YES	-	-
60	Pond	36.104	R	YES	-	-
61	Pond	36.428	L	YES	-	-
62	Pond	39.100	R	YES	-	-
63	Pond	39.263	L	YES	-	-
64	Pond	39.640	R	YES	-	-
65	Pond	40.266	R	YES	-	-
66	Pond	40.360	L	YES	YES	YES
67	Pond	41.500	L	YES	-	-
68	Pond	41.760	L	YES	-	-
69	Pond	42.436	R	YES	-	-
70	Pond	42.440	L	YES	-	-
71	Pond	43.240	R	YES	-	-
72	Pond	43.863	L	YES	-	-
73	Pond	44.000	L	YES	-	-

Sl No.	Items	Chainage at km	Location at left/right	PCC TOE WALL	SPILLWAY	BATHING GHAT
1	Pond	1.017	R	YES	-	-
2	Pond	2.483	L	YES	-	-
3	Pond	2.822	R	YES	-	-
4	Canal	4.624	R	YES	-	-
5	Canal	4.470	L	YES	-	-
6	Canal	5.820	R	YES	-	-
7	Pond	8.190	R	YES	-	-
8	Pond	9.280	L	YES	-	-
9	Pond	6.900	L	YES	-	-
10	Pond	12.302	R	YES	-	-
11	Pond	12.580	R	YES	-	-
12	Pond	12.900	L	YES	-	-
13	Pond	13.112	R	YES	-	-
14	Pond	11.780	L	YES	-	-
15	Pond	19.555	L	YES	-	-
16	Pond	20.400	R	YES	-	-
17	Pond	20.470	L	YES	-	-
18	Pond	20.600	L	YES	-	-
19	Pond	20.670	L	YES	-	-
20	Pond	20.725	R	YES	-	-
21	Pond	20.758	R	YES	-	-
22	Pond	20.900	L	YES	-	-
23	Pond	21.900	R	YES	-	-
24	Pond	22.200	R	YES	-	-
25	Pond	22.248	L	YES	-	-
26	Pond	22.542	R	YES	-	-
27	Pond	22.900	R	YES	-	-
28	Pond	24.900	R	YES	-	-
29	Pond	25.050	L	YES	-	-
30	Pond	27.700	R	YES	-	-
31	Pond	27.705	L	YES	-	-
32	Pond	27.790	R	YES	-	-
33	Pond	28.000	L	YES	-	-
34	Pond	28.062	R	YES	-	-
35	Pond	28.800	L	YES	-	-
36	Pond	29.147	R	YES	-	-

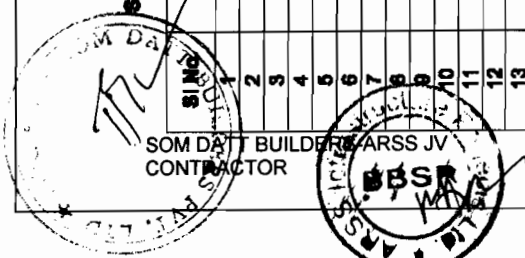
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
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ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Moj Colony, Malviya Nagar, Jaipur-17
 Tel: +91-141-2520899/2521899/2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

World Bank Project, Orissa
 Chief Engineer
 EM

SCHEDULE OF ENVIRONMENTAL ASPECTS

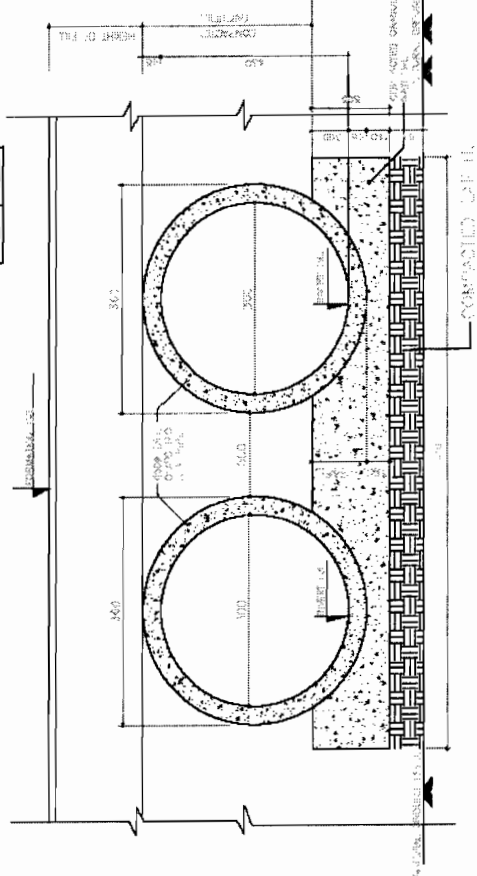
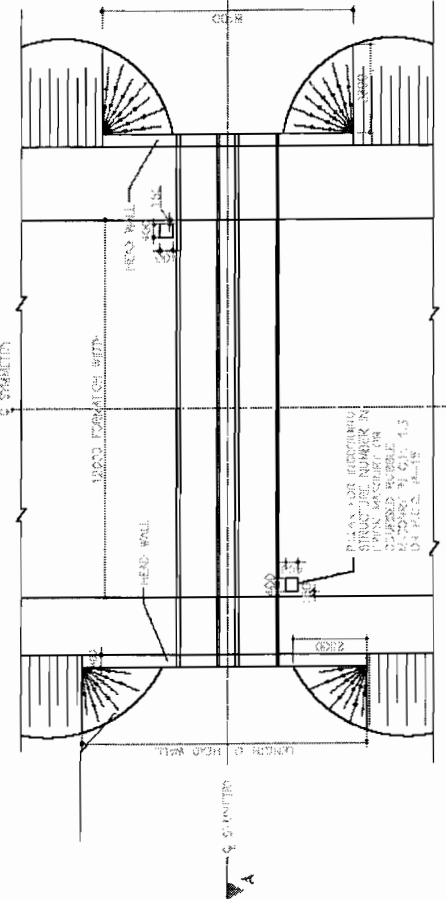
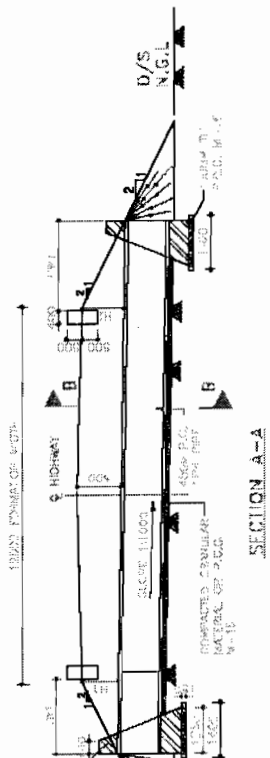
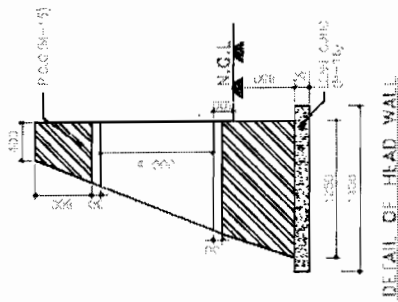
DRG NO.	QSRP/CEG/SH/ENW/13	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 78	DATE	REV	RO	JYOTI	A.J.
SCALE	NTS	M			S.G



NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ONLY REINFORCED DIMENSIONS ARE TO BE FOLLOWED.
3. SLOPE 1:1 UNLESS OTHERWISE SPECIFIED.
4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE STATED.
5. THE FINISH ROAD LEVEL SHALL BE KEPT WITH SURE COORDINATE WITH THE RECORD.
6. MINIMUM SLOPE OF PAVEMENT SHALL BE 1% IN ALL DIRECTIONS.

Sl. No.	Quantity	Unit	Remarks
1	1.00	m ³	Concrete
2	1.00	m ³	Concrete
3	1.00	m ³	Concrete
4	1.00	m ³	Concrete
5	1.00	m ³	Concrete
6	1.00	m ³	Concrete
7	1.00	m ³	Concrete
8	1.00	m ³	Concrete
9	1.00	m ³	Concrete
10	1.00	m ³	Concrete
11	1.00	m ³	Concrete
12	1.00	m ³	Concrete
13	1.00	m ³	Concrete
14	1.00	m ³	Concrete
15	1.00	m ³	Concrete
16	1.00	m ³	Concrete



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 Tel: +91-141-2520889, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

Chief Engineer

TYPICAL ARRANGEMENT FOR UTILITY DUCT

DRG NO. OSRP/CEG/SH/UD/01	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 79	DATE	REV	RD	
SCALE	NTS	M	JYOTI	A.J.
				S.G



GOVERNMENT OF ORISSA

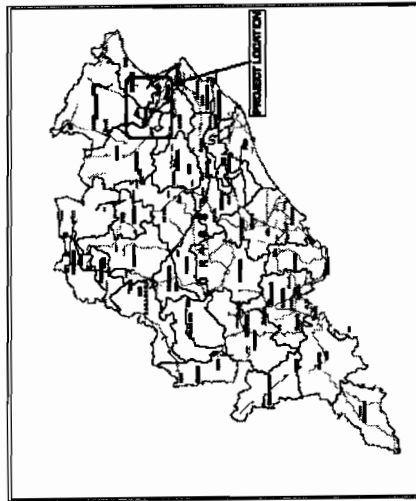
WORKS DEPARTMENT ORISSA STATE ROAD PROJECT

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

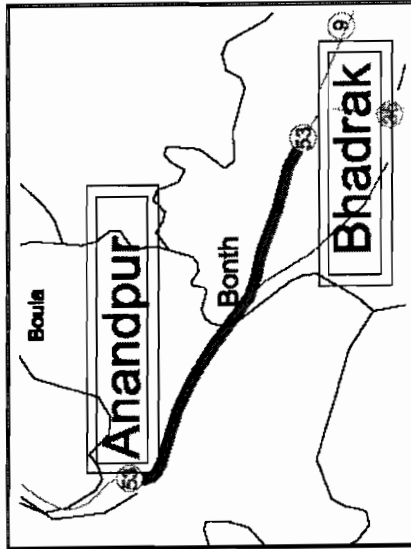
FOR
BHADRAK TO ANANDPUR
(SH - 53) FROM KM 0 / 000 TO 50/ 000
PLAN AND PROFILE

INDEX

- (1) - COVER SHEET
- (2) - INDEX OF DRAWINGS
- (3) - LIST OF STRUCTURES
- (4) - CURVE DETAILS
- (5) - PLAN AND PROFILE SHEETS
- (6) - SCHEDULING



ORISSA ROAD NETWORK



PROJECT LOCATION

LEGEND

EXISTING CARRIAGE WAY	
PRO. CARRIAGE WAY EDGES	
PROPOSED CENTER LINE	
EXISTING CENTER LINE	
PRO. SHOULDER EDGES	
ELECTRIC POLE	
ELECTRIC LINE	
TRANSFORMER	
TELEPHONE POLE	
TELEPHONE LINE	
M.T. TOWER	
M.T. LINE	
PIPE LINE	
HOUSE/BUILDING/STRUCTURE	
EXISTING ROW BOUNDARY	
PROPOSED ROW BOUNDARY	
BRIDGE/CULVERT	
WATER/NALLA/DRAIN	
HAND PUMP, TAP	
EMBANKMENT	
CULVERT	
GLASS CULVERT	
NAME BOARD	

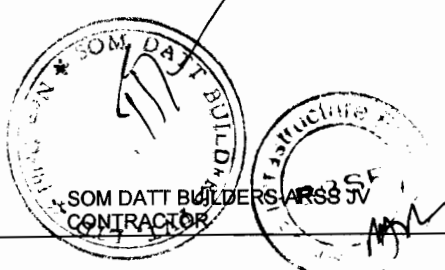
CONSULTING ENGINEERS GROUP LTD.
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 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, E-mail: ceg@cegindia.com

INDEX

Sl.No.	Description	Drawing No.
A	COVER SHEET	OSRP/CEG/SH-53/INDEX
B	INDEX SHEET	OSRP/CEG/SH-53/INDEX
C	List of Structure	OSRP/CEG/SH-53/INDEX
D	Horizontal Curve Details (1 of 2)	OSRP/CEG/SH-53/INDEX
E	Horizontal Curve Details (2 of 2)	OSRP/CEG/SH-53/INDEX
F	Vertical Curve Details (1 of 3)	OSRP/CEG/SH-53/INDEX
G	Vertical Curve Details (2 of 3)	OSRP/CEG/SH-53/INDEX
H	Vertical Curve Details (3 of 3)	OSRP/CEG/SH-53/INDEX
PLAN & PROFILE		
01	Plan & Profile Km 0/000 to Km 1/000	OSRP/CEG/SH-53/P&P/01
02	Plan & Profile Km 1/000 to Km 2/000	OSRP/CEG/SH-53/P&P/02
03	Plan & Profile Km 2/000 to Km 3/000	OSRP/CEG/SH-53/P&P/03
04	Plan & Profile Km 3/000 to Km 4/000	OSRP/CEG/SH-53/P&P/04
05	Plan & Profile Km 4/000 to Km 5/000	OSRP/CEG/SH-53/P&P/05
06	Plan & Profile Km 5/000 to Km 6/000	OSRP/CEG/SH-53/P&P/06
07	Plan & Profile Km 6/000 to Km 7/000	OSRP/CEG/SH-53/P&P/07
08	Plan & Profile Km 7/000 to Km 8/000	OSRP/CEG/SH-53/P&P/08
09	Plan & Profile Km 8/000 to Km 9/000	OSRP/CEG/SH-53/P&P/09
10	Plan & Profile Km 9/000 to Km 10/000	OSRP/CEG/SH-53/P&P/10
11	Plan & Profile Km 10/000 to Km 11/000	OSRP/CEG/SH-53/P&P/11
12	Plan & Profile Km 11/000 to Km 12/000	OSRP/CEG/SH-53/P&P/12
13	Plan & Profile Km 12/000 to Km 13/000	OSRP/CEG/SH-53/P&P/13
14	Plan & Profile Km 13/000 to Km 14/000	OSRP/CEG/SH-53/P&P/14
15	Plan & Profile Km 14/000 to Km 15/000	OSRP/CEG/SH-53/P&P/15
16	Plan & Profile Km 15/000 to Km 16/000	OSRP/CEG/SH-53/P&P/16
17	Plan & Profile Km 16/000 to Km 17/000	OSRP/CEG/SH-53/P&P/17
18	Plan & Profile Km 17/000 to Km 18/000	OSRP/CEG/SH-53/P&P/18
19	Plan & Profile Km 18/000 to Km 19/000	OSRP/CEG/SH-53/P&P/19
20	Plan & Profile Km 19/000 to Km 20/000	OSRP/CEG/SH-53/P&P/20
21	Plan & Profile Km 20/000 to Km 21/000	OSRP/CEG/SH-53/P&P/21
22	Plan & Profile Km 21/000 to Km 22/000	OSRP/CEG/SH-53/P&P/22
23	Plan & Profile Km 22/000 to Km 23/000	OSRP/CEG/SH-53/P&P/23
24	Plan & Profile Km 23/000 to Km 24/000	OSRP/CEG/SH-53/P&P/24
25	Plan & Profile Km 24/000 to Km 25/000	OSRP/CEG/SH-53/P&P/25
26	Plan & Profile Km 25/000 to Km 26/000	OSRP/CEG/SH-53/P&P/26
27	Plan & Profile Km 26/000 to Km 27/000	OSRP/CEG/SH-53/P&P/27
28	Plan & Profile Km 27/000 to Km 28/000	OSRP/CEG/SH-53/P&P/28
29	Plan & Profile Km 28/000 to Km 29/000	OSRP/CEG/SH-53/P&P/29
30	Plan & Profile Km 29/000 to Km 30/000	OSRP/CEG/SH-53/P&P/30
31	Plan & Profile Km 30/000 to Km 31/000	OSRP/CEG/SH-53/P&P/31
32	Plan & Profile Km 31/000 to Km 32/000	OSRP/CEG/SH-53/P&P/32
33	Plan & Profile Km 32/000 to Km 33/000	OSRP/CEG/SH-53/P&P/33
34	Plan & Profile Km 33/000 to Km 34/000	OSRP/CEG/SH-53/P&P/34
35	Plan & Profile Km 34/000 to Km 35/000	OSRP/CEG/SH-53/P&P/35
36	Plan & Profile Km 35/000 to Km 36/000	OSRP/CEG/SH-53/P&P/36

NOTE: FOR DETAILED SCHEDULE OF SL.NO. 65 TO 81, "ENVIRONMENTAL MANAGEMENT PLAN OF BHADRAK-CHANDRAU AND BHADRAK - ANANDPUR" MAY BE REFERRED

Sl.No.	Description	Drawing No.
37	Plan & Profile Km 36/000 to Km 37/000	OSRP/CEG/SH-53/P&P/37
38	Plan & Profile Km 37/000 to Km 38/000	OSRP/CEG/SH-53/P&P/38
39	Plan & Profile Km 38/000 to Km 39/000	OSRP/CEG/SH-53/P&P/39
40	Plan & Profile Km 39/000 to Km 40/000	OSRP/CEG/SH-53/P&P/40
41	Plan & Profile Km 40/000 to Km 41/000	OSRP/CEG/SH-53/P&P/41
42	Plan & Profile Km 41/000 to Km 42/000	OSRP/CEG/SH-53/P&P/42
43	Plan & Profile Km 42/000 to Km 43/000	OSRP/CEG/SH-53/P&P/43
44	Plan & Profile Km 43/000 to Km 44/000	OSRP/CEG/SH-53/P&P/44
45	Plan & Profile Km 44/000 to Km 45/000	OSRP/CEG/SH-53/P&P/45
46	Plan & Profile Km 45/000 to Km 46/000	OSRP/CEG/SH-53/P&P/46
47	Plan & Profile Km 46/000 to Km 47/000	OSRP/CEG/SH-53/P&P/47
48	Plan & Profile Km 47/000 to Km 48/000	OSRP/CEG/SH-53/P&P/48
49	Plan & Profile Km 48/000 to Km 49/000	OSRP/CEG/SH-53/P&P/49
50	Plan & Profile Km 49/000 to Km 50/000	OSRP/CEG/SH-53/P&P/50
MAJOR JUNCTION		
51	Plan for Major Junction at Km.42/400	OSRP/CEG/SH-53/MAJ/01
52	Plan for Major Junction at Km.42/600	OSRP/CEG/SH-53/MAJ/02
SCHEDULES		
53	Schedule of Road Sign.	OSRP/CEG/SH-53/SCH/01
54	Schedule of Road Sign.	OSRP/CEG/SH-53/SCH/02
55	Schedule of Road Sign.	OSRP/CEG/SH-53/SCH/03
56	Schedule of Bus Bays & Extra Widening & Pedestrian Crossing	OSRP/CEG/SH-53/SCH/04
57	Schedule of Line Drain, Foot Path Barriers & Pedestrian Crossing	OSRP/CEG/SH-53/SCH/05
58	Schedule of Junctions & Road Humps	OSRP/CEG/SH-53/SCH/06
59	Schedule of Guard Posts & Road Delineator	OSRP/CEG/SH-53/SCH/07
60	Schedule of Pavement Design & Built-up Sections	OSRP/CEG/SH-53/SCH/08
61	Detailed Pavement Design & Cross Section Type	OSRP/CEG/SH-53/SCH/09
ENVIRONMENTAL DRAWINGS		
62	Typical Animal Pass - Box Culvert	ER/BC/B/S/MC/XXV-B1
63	Typical Animal Pass - Single Pipe Culvert	ER/PC/B/S/XXV-C1
64	Typical Animal Pass - Double Pipe Culvert	ER/PC/B/D/MC/XXV-C2
65	Site Enhancement Design for 4 Legged Junction	OSRP/CEG/SH/ENV-01 A
66	Feeder Road Junction	OSRP/CEG/SH/ENV-01 B
67	Site Enhancement Design for 3 Legged Junction	OSRP/CEG/SH/ENV-01 C
68	Passenger Shed at Bus Bay	OSRP/CEG/SH/ENV-02
69	PCC Toe Wall For Water Bodies	OSRP/CEG/SH/ENV-03
70	RCC Boundary Wall Temples and Statues	OSRP/CEG/SH/ENV-04 A
71	Houses & Dust Barrier	OSRP/CEG/SH/ENV-04 B
72	Approaches of Educational & Medical Institutions	OSRP/CEG/SH/ENV-05
73	Gate For Educational & Medical Institutions	OSRP/CEG/SH/ENV-05 A
74	Separation of Oil & Grease - Truck & Bus bays	OSRP/CEG/SH/ENV-06
75	C.C.Platform and Drainage-Handpumps and Taps	OSRP/CEG/SH/ENV-07
76	Tree Guard With W.S.Bars	OSRP/CEG/SH/ENV-08
77	Typical Bathing Ghat	OSRP/CEG/SH/ENV-09
78	Typical Spillway Gate	OSRP/CEG/SH/ENV-10
79	Soil and Water Conservation Measures	OSRP/CEG/SH/ENV-11 A
80	Soil and Water Conservation Measures	OSRP/CEG/SH/ENV-11 B
81	Typical Trap Drain with Hume Pipe	OSRP/CEG/SH/ENV-12
82	Schedule for Environmental Aspects	OSRP/CEG/SH/ENV-13
UTILITY PURPOSE DRAWINGS		
83	Typical Arrangement of Utility Duct	OSRP/CEG/SH/UD-01



PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

CONSULTING ENGINEERS GROUP LTD.
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 Tel: +91-141-2520898, 2521959, 25202556
 Fax: 2521348, e-mail: ceg@cegroup.com

Chief Engineer
 World Bank Projects
 EMPLOYER

INDEX

BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)

DRG. NO.	OSRP/CEG/SH-53/INDEX	CHECKED (C)	APPROVED (A)
SH. NO.	B	DATE	REV
SCALE	NTS		

R.R.D.K. S.G.

LIST OF STRUCTURE

Sl.No.	Existing Challenges	Proposed Challenges	Type of Structure	Span Arrangement
1	1/0/10	1/1/05	Box Cell	1 x 2.0
2	1/2/5	1/2/28	Box Cell	1 x 2.0
3	1/6/00	2/0/10	Box Cell	1 x 3.0
4	2/1/50	2/2/01	Box Cell	1 x 4.0
5	2/4/00	2/3/54	Box Cell	1 x 2.0
6	2/6/00	2/6/68	Box Cell	1 x 3.0
7	3/7/00	3/5/04	Box Cell	1 x 2.0
8	3/8/00	3/7/79	Box Cell	1 x 2.0
9	4/5/00	4/4/11	Box Cell	1 x 3.0
10	5/0/10	5/1/22	Box Cell	1 x 3.0
11	5/5/00	5/5/75	Pipe	2 x 1.0
12	7/6/00	7/7/85	Box Cell	1 x 3.0
13	8/3/00	8/4/98	Pipe	2 x 1.0
14	8/7/50	8/8/58	Box Cell	1 x 2.0
15	8/8/50	8/9/27	-	2 x 0.9
16	11/1/50	10/8/89	Box Cell	1 x 3.0
17	-	11/2/48	Box Cell	1 x 2.0
18	-	11/8/88	Box Cell	1 x 2.0
19	-	11/8/88	Pipe (ENV)	1 x 2.0
20	12/2/00	11/8/88	Pipe	1 x 1.0
21	13/1/10	12/8/09	Pipe	1 x 1.0
22	13/6/00	13/5/07	Pipe (ENV)	1 x 1.0
23	14/2/00	13/8/09	-	1 x 0.9
24	14/4/00	14/1/88	Box Cell	1 x 2.0
25	14/6/00	14/5/00	Box Cell	1 x 3.0
26	15/5/00	15/1/10	-	2 x 0.9
27	17/2/00	17/0/02	Box Cell (ENV)	1 x 2.0
28	17/5/00	17/1/23	Box Cell	1 x 2.0
29	-	17/5/98	Box Cell	1 x 3.0
30	18/5/00	17/5/44	-	2 x 0.9
31	18/7/00	18/2/11	Pipe	2 x 1.0
32	18/8/00	18/4/44	Pipe	1 x 1.0
33	18/8/50	18/4/86	Pipe	1 x 1.0
34	19/2/50	18/9/02	Pipe	2 x 1.0
35	20/1/00	19/6/95	Pipe	1 x 1.0
36	20/6/00	20/4/26	Pipe	2 x 1.0
37	20/8/25	20/4/50	Box Cell	1 x 2.0
38	21/6/50	20/8/48	Box Cell	1 x 4.0
39	21/7/60	21/0/24	Pipe (ENV)	2 x 1.0
40	22/6/00	22/2/25	Box Cell	1 x 3.0
41	23/6/00	22/7/94	Pipe	2 x 1.0
42	24/1/50	23/7/00	Pipe	2 x 1.0
43	24/7/00	24/2/05	Pipe	2 x 1.0
44	24/7/50	24/3/75	Pipe	2 x 1.0
45	25/7/00	25/2/33	Box Cell	1 x 2.0
46	25/7/10	25/2/65	Pipe	2 x 1.0
47	25/9/60	25/5/11	Pipe	2 x 1.0
48	26/4/50	26/0/25	Pipe	2 x 1.0
49	26/7/00	25/5/11	Pipe	1 x 1.0
50	27/0/50	26/6/45	Pipe	1 x 1.0
51	27/1/00	26/6/89	Pipe	2 x 1.0

Sl.No.	Existing Challenges	Proposed Challenges	Type of Structure	Span Arrangement
52	27/5/00	27/4/40	-	2 x 0.9
53	28/2/00	27/7/23	Pipe	1 x 1.0
54	28/8/60	28/6/81	Pipe	2 x 1.0
55	29/1/00	28/6/84	Pipe	2 x 1.0
56	29/6/50	29/1/59	Pipe	1 x 1.0
57	29/7/00	28/2/50	Pipe	1 x 1.0
58	29/8/50	28/3/74	-	2 x 0.9
59	30/1/50	28/6/01	-	2 x 0.9
60	30/2/00	28/6/94	-	2 x 0.9
61	30/8/00	30/5/01	-	2 x 0.9
62	31/1/00	30/6/94	Pipe	2 x 1.0
63	31/6/00	31/0/47	Box Cell	1 x 2.0
64	31/6/00	31/3/83	Pipe	2 x 1.0
65	31/8/00	31/4/94	Pipe	1 x 1.0
66	32/2/00	31/7/78	Pipe	2 x 1.0
67	32/4/00	32/1/08	Pipe	2 x 1.0
68	32/5/50	32/5/28	Pipe	2 x 1.0
69	33/4/80	32/6/44	Pipe	2 x 1.0
70	33/5/00	33/0/13	Box Cell	1 x 2.0
71	34/4/00	33/7/80	-	1 x 0.9
72	34/7/60	34/3/04	-	2 x 1.0
73	35/3/30	34/6/82	-	2 x 1.0
74	35/7/00	34/8/85	Pipe	1 x 1.0
75	35/8/00	35/2/81	Box Cell	1 x 0.0
76	36/1/00	35/4/44	Box Cell	1 x 2.0
77	36/2/50	35/5/95	Box Cell	1 x 3.0
78	36/6/00	35/8/86	Box Cell	1 x 3.0
79	37/1/50	36/4/30	Box Cell	1 x 2.0
80	37/2/00	36/5/10	Box Cell	1 x 3.0
81	37/3/00	36/5/24	Box Cell	1 x 4.0
82	38/6/00	36/8/86	Box Cell	1 x 3.0
83	-	36/9/98	Box Cell	1 x 3.0
84	39/4/50	36/8/65	Box Cell	1 x 4.0
85	40/8/00	36/8/67	Box Cell	1 x 2.0
86	40/8/50	40/0/17	Box Cell	1 x 2.0
87	41/1/00	40/2/42	Box Cell (ENV)	1 x 4.0
88	41/7/00	40/8/08	Box Cell	1 x 3.0
89	42/2/00	42/1/61	Box Cell	1 x 2.0
90	-	42/4/28	Box Cell	1 x 3.0
91	-	42/8/88	Box Cell	1 x 3.0
92	-	44/4/88	Box Cell	1 x 2.0
93	45/5/00	44/6/80	Box Cell	1 x 2.0
94	45/7/00	45/9/44	Box Cell	1 x 2.0
95	45/8/00	45/2/75	Box Cell	1 x 2.0
96	45/8/50	45/8/85	Box Cell	1 x 2.0
97	46/6/00	45/7/20	Box Cell	1 x 2.0
98	46/6/00	46/0/32	Box Cell	1 x 2.0
99	47/5/00	46/8/11	Box Cell	1 x 2.0
100	47/6/00	47/2/46	Box Cell	1 x 3.0
101	48/5/50	47/6/31	Box Cell	1 x 3.0
102	48/7/00	48/5/30	Box Cell	1 x 3.0

NOTE :
1) FOR DETAILS REFER STRUCTURAL DRAWINGS.

PROJECT:-

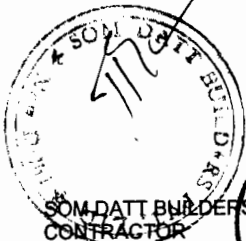
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

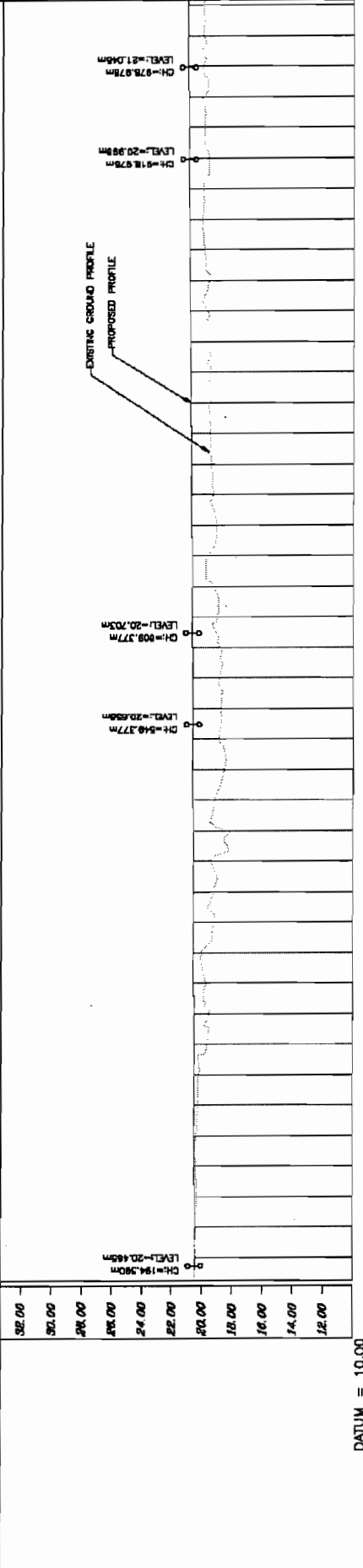
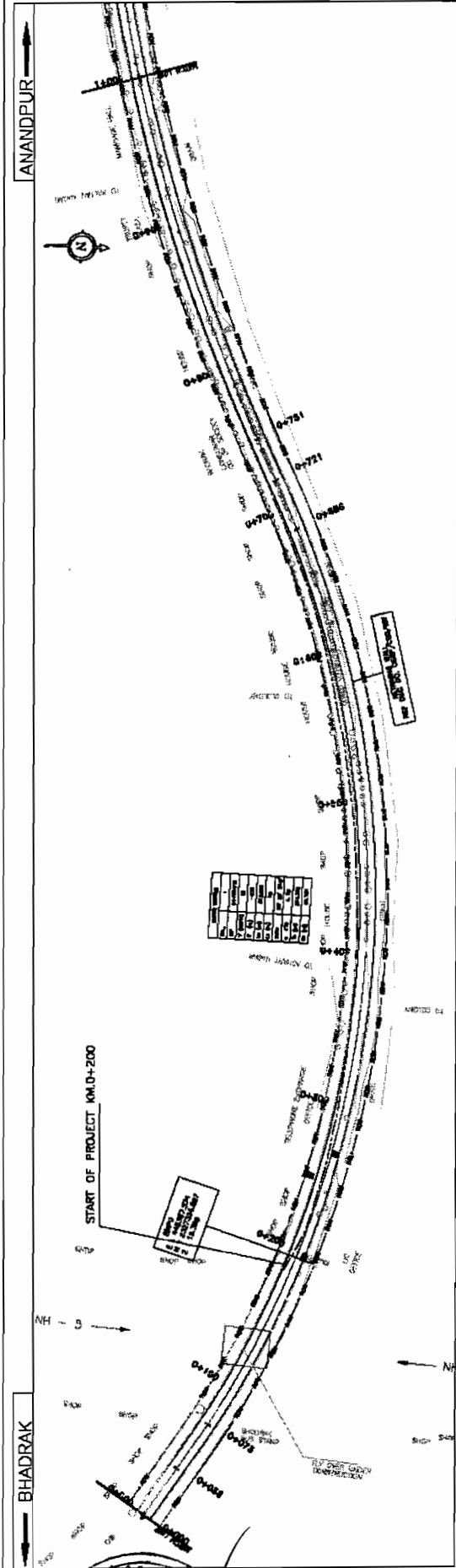
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Chief Engineer
World Bank Projects
EMPLE

LIST OF STRUCTURE
BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)

SH. NO.	C	DATE	REV	RD	NTS	B.M.	J.P.	R.R.D.K	S.G
DWG NO.	DSRF/232/SH-53/LR/ 01	REVISION	04	DRAWN BY				CHECKED (C)	APPROVED (P)





DATUM = 10.00

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION / CROSSFALL	CHAINAGE
32.00	21.075				200.000
30.00	21.085				200.000
28.00	21.031				250.000
26.00	21.015				300.000
24.00	20.987				350.000
22.00	20.978				400.000
20.00	20.950				450.000
18.00	20.840				500.000
16.00	20.821				550.000
14.00	20.802				600.000
12.00	20.843				650.000
	20.854				700.000
	20.877				750.000
	20.788				800.000
	20.791				850.000
	20.732				900.000
	20.713				950.000
	20.684				1000.000
	20.678				1050.000
	20.654				1100.000
	20.653				1150.000
	20.642				1200.000
	20.631				1250.000
	20.620				1300.000
	20.609				1350.000
	20.598				1400.000
	20.588				1450.000
	20.577				1500.000
	20.568				1550.000
	20.554				1600.000
	20.544				1650.000
	20.533				1700.000
	20.522				1750.000
	20.512				1800.000
	20.501				1850.000
	20.480				1900.000
	20.479				1950.000
	20.458				2000.000

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 0/000 TO 1/000

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

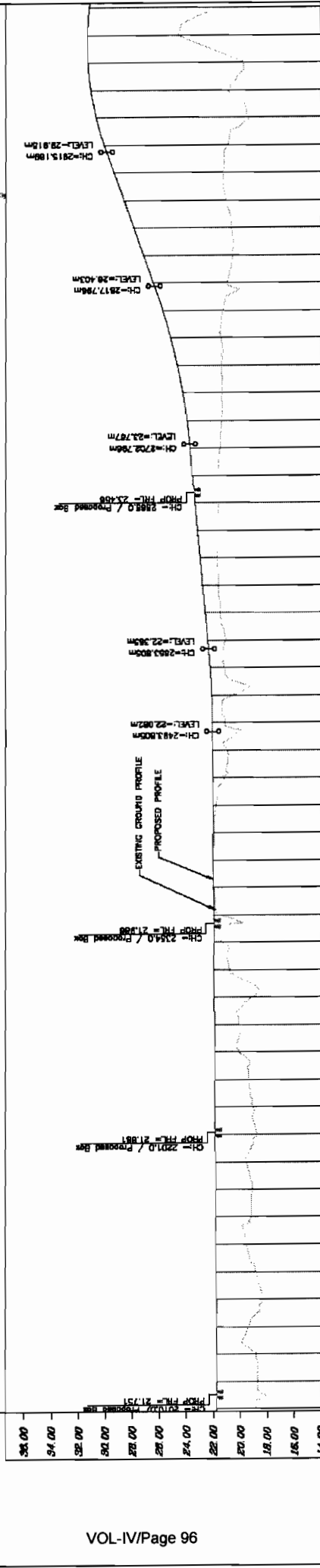
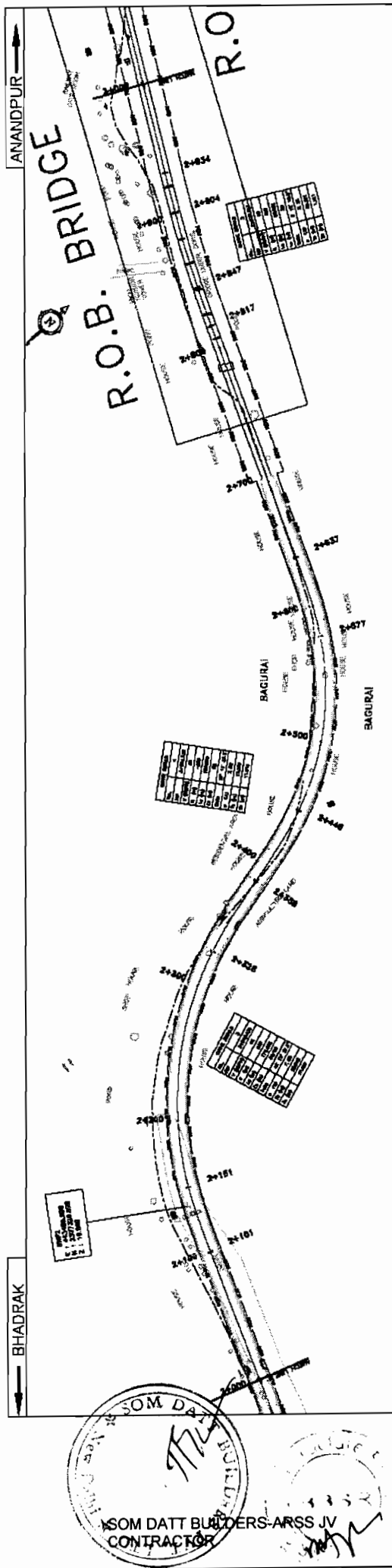
CONSULTING ENGINEERS GROUP LTD.
E-12, H-9/1, Eastern Market, New Delhi-110 055
Tel: 261 7411, 261 7888, 261 7889, 261 7895
Fax: 261 7414, e-mail: cegbeng@rediffmail.com

LEGEND

[Symbol]	RIGHT OF WAY
[Symbol]	EXISTING ROAD
[Symbol]	PROPOSED ROAD
[Symbol]	ROAD CROSSING
[Symbol]	RAILWAY
[Symbol]	UTILITY LINE
[Symbol]	OBSTACLE
[Symbol]	AREA UNDER CONSTRUCTION
[Symbol]	AREA OF DEPOSIT
[Symbol]	AREA OF EXCAVATION
[Symbol]	AREA OF CUT
[Symbol]	AREA OF FILL
[Symbol]	AREA OF RETAINMENT
[Symbol]	AREA OF EMBANKMENT
[Symbol]	AREA OF DRAINAGE
[Symbol]	AREA OF LAND ACQUISITION
[Symbol]	AREA OF SOCIAL RESERVE
[Symbol]	AREA OF BUFFER ZONE
[Symbol]	AREA OF PROTECTIVE ZONE
[Symbol]	AREA OF RESTRICTION
[Symbol]	AREA OF NO BUILDING
[Symbol]	AREA OF NO PARKING
[Symbol]	AREA OF NO LOADS
[Symbol]	AREA OF NO TRAFFIC
[Symbol]	AREA OF NO STOPPING
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[Symbol]	AREA OF NO REVERSING
[Symbol]	AREA OF NO DIVERTING
[Symbol]	AREA OF NO SIGHTING
[Symbol]	AREA OF NO SLEEPING
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[Symbol]	AREA OF NO RUNNING
[Symbol]	AREA OF NO STOPPING
[Symbol]	AREA OF NO PARKING
[Symbol]	AREA OF NO LOADS
[Symbol]	AREA OF NO TRAFFIC
[Symbol]	AREA OF NO STOPPING
[Symbol]	AREA OF NO PARKING
[Symbol]	AREA OF NO LOADS
[Symbol]	AREA OF NO TRAFFIC

SOM DATT BUILDERS PRIVATE LIMITED CONTRACTOR
63SR ARS Engineering & Construction Project

Chief Engineer
World Bank Projects, Orissa
Chief EMPLOYER



DATUM = 14.00

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSS-FALL
31.74	18.81				
31.75	18.82				
31.76	18.83				
31.77	18.84				
31.78	18.85				
31.79	18.86				
31.80	18.87				
31.81	18.88				
31.82	18.89				
31.83	18.90				
31.84	18.91				
31.85	18.92				
31.86	18.93				
31.87	18.94				
31.88	18.95				
31.89	18.96				
31.90	18.97				
31.91	18.98				
31.92	18.99				
31.93	19.00				
31.94	19.01				
31.95	19.02				
31.96	19.03				
31.97	19.04				
31.98	19.05				
31.99	19.06				
32.00	19.07				

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 2/000 TO 3/000

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

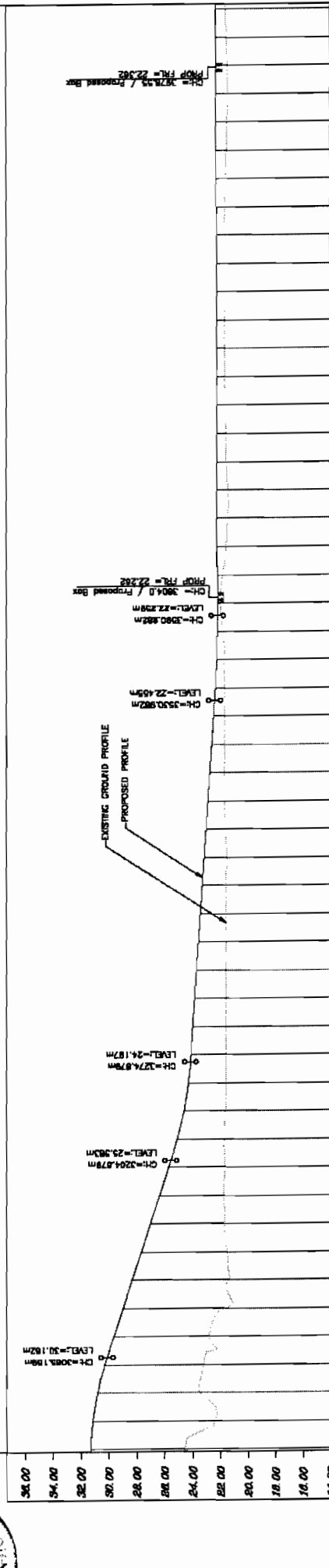
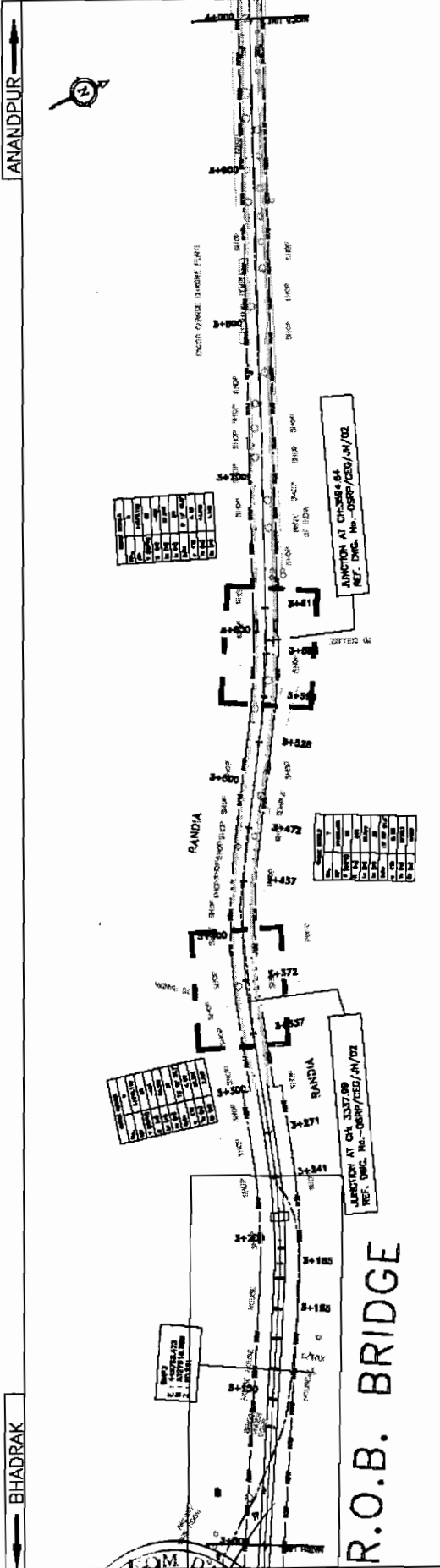
CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Colony, Malviya Nagar, Jaipur-17
 Tel: +91-141-2520899, 2521846, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

LEGEND

CONTRACTOR: SOM DATT BUILDERS ARSS JV CONTRACTOR

EMPLOYER: Chief Engineer, Projects, Orissa

Scale: HORIZONTAL: 1:2000, VERTICAL: 1:200



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
36.00	35.80				
34.00	33.80				
32.00	31.80				
30.00	29.80				
28.00	27.80				
26.00	25.80				
24.00	23.80				
22.00	21.80				
20.00	19.80				
18.00	17.80				
16.00	15.80				
14.00	13.80				
300,000	31,324				
300,000	30,842				
300,000	30,456				
300,000	29,974				
300,000	29,492				
300,000	29,010				
300,000	28,528				
300,000	28,046				
300,000	27,564				
300,000	27,082				
300,000	26,600				
300,000	26,118				
300,000	25,636				
300,000	25,154				
300,000	24,672				
300,000	24,190				
300,000	23,708				
300,000	23,226				
300,000	22,744				
300,000	22,262				
300,000	21,780				
300,000	21,298				
300,000	20,816				
300,000	20,334				
300,000	19,852				
300,000	19,370				
300,000	18,888				
300,000	18,406				
300,000	17,924				
300,000	17,442				
300,000	16,960				
300,000	16,478				
300,000	15,996				
300,000	15,514				
300,000	15,032				
300,000	14,550				
300,000	14,068				
300,000	13,586				
300,000	13,104				
300,000	12,622				
300,000	12,140				
300,000	11,658				
300,000	11,176				
300,000	10,694				
300,000	10,212				
300,000	9,730				
300,000	9,248				
300,000	8,766				
300,000	8,284				
300,000	7,802				
300,000	7,320				
300,000	6,838				
300,000	6,356				
300,000	5,874				
300,000	5,392				
300,000	4,910				
300,000	4,428				
300,000	3,946				
300,000	3,464				
300,000	2,982				
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300,000	2,018				
300,000	1,536				
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300,000	90				

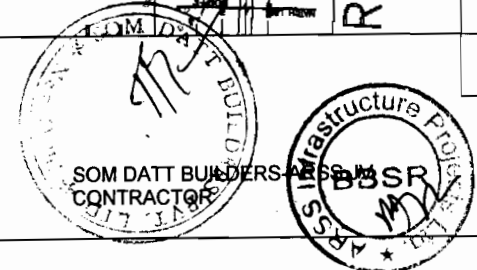
CONSULTING ENGINEERS GROUP LTD.
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 Fax: 2521348, e-mail: cog@coengineers.com

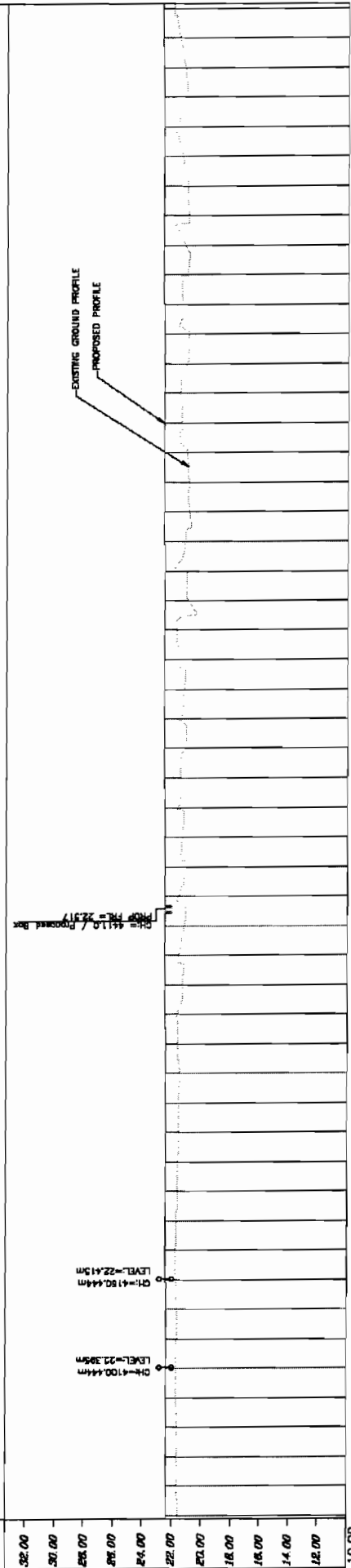
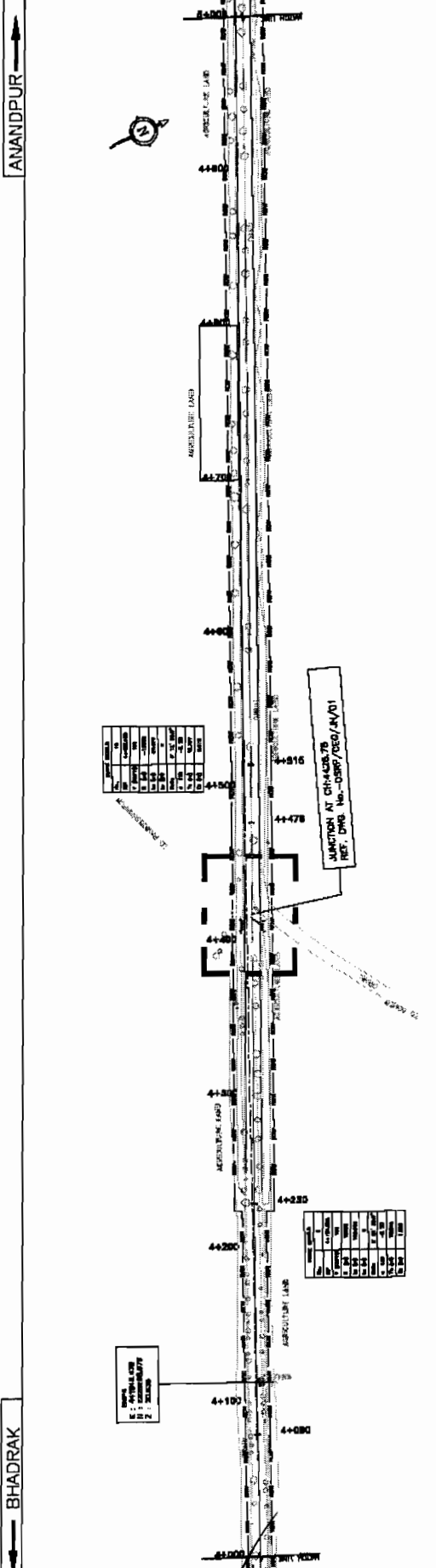
PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 3/000 TO 4/000

LEGEND:
 1. PROPOSED ROAD LEVEL
 2. EXISTING GROUND PROFILE
 3. PROPOSED PROFILE
 4. HORIZONTAL ALIGNMENT
 5. VERTICAL PROFILE
 6. SUPERELEVATION
 7. CROSSFALL

DATE: 14.00
DATUM: 14.00
SCALE: VERTICAL 1:200

APPROVED BY: [Signature]
PROJECT ENGINEER: [Signature]
EMPLOYER: [Signature]





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
22.368	21.602				
22.378	21.602				
22.384	21.602				
22.395	21.707				
22.407	21.602				
22.415	21.309				
22.423	21.302				
22.431	21.651				
22.438	21.308				
22.447	21.303				
22.458	21.300				
22.464	21.007				
22.472	21.304				
22.480	21.608				
22.488	21.303				
22.497	21.008				
22.505	21.308				
22.513	21.302				
22.521	21.500				
22.528	21.308				
22.537	21.302				
22.546	21.308				
22.554	21.304				
22.562	21.302				
22.570	21.304				
22.578	21.309				
22.586	21.309				
22.595	21.309				
22.593	21.302				
22.701	21.308				
22.709	21.302				
22.717	21.302				
22.726	21.304				
22.734	21.302				
22.742	21.302				
22.750	21.302				
22.758	21.302				
22.766	21.302				

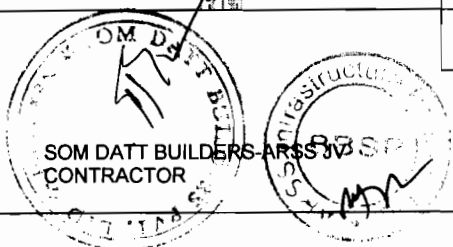
CONSULTING ENGINEERS GROUP LTD.
 E-17, May Colony, Mohiye Nagar, Jhansi-17
 Tel: +91-11-2550888, 2521889, 2520556
 Fax: 2521348, e-mail: ceg@cegltd.com

PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 4/000 TO 5/000

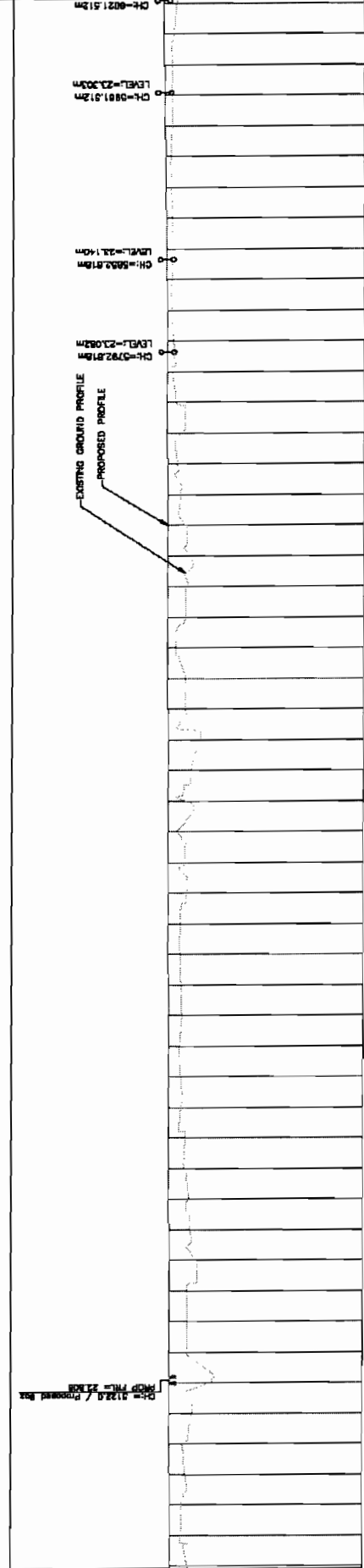
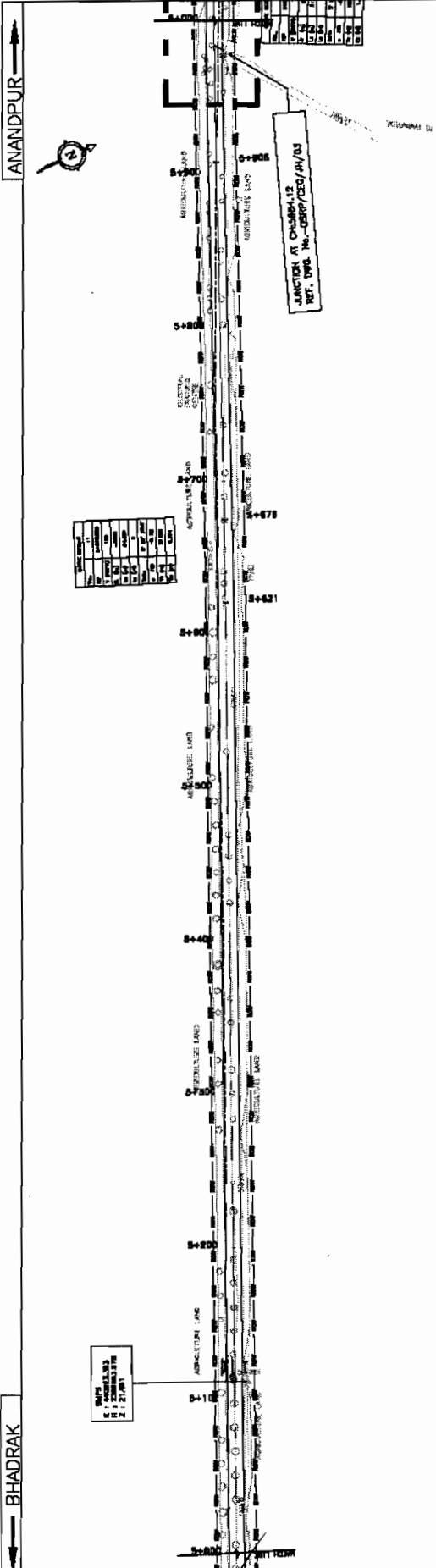
LEGEND:
 (Detailed legend symbols for road types, levels, etc.)

DATE	BY	DATE	REV.	RD	K.S.C	R.D.	R.D.K	S.C

Scale: HORIZONTAL 1" = 200'
 VERTICAL 1" = 20'



CHIEF ENGINEER
 CHIEF EMPLOYER



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
27.58	27.58				
27.78	27.78				
27.73	27.73				
27.78	27.78				
27.79	27.79				
22.907	22.907				
22.815	22.815				
22.824	22.824				
22.832	22.832				
22.840	22.840				
22.848	22.848				
22.856	22.856				
22.864	22.864				
22.872	22.872				
22.880	22.880				
22.887	22.887				
22.895	22.895				
22.902	22.902				
22.908	22.908				
22.912	22.912				
22.920	22.920				
22.928	22.928				
22.936	22.936				
22.944	22.944				
22.952	22.952				
22.960	22.960				
22.968	22.968				
22.976	22.976				
22.984	22.984				
22.992	22.992				
23.000	23.000				
23.004	23.004				
23.012	23.012				
23.020	23.020				
23.028	23.028				
23.036	23.036				
23.044	23.044				
23.052	23.052				
23.060	23.060				
23.068	23.068				
23.076	23.076				
23.084	23.084				
23.092	23.092				
23.100	23.100				
23.108	23.108				
23.116	23.116				
23.124	23.124				
23.132	23.132				
23.140	23.140				
23.148	23.148				
23.156	23.156				
23.164	23.164				
23.172	23.172				
23.180	23.180				
23.188	23.188				
23.196	23.196				
23.204	23.204				
23.212	23.212				
23.220	23.220				
23.228	23.228				
23.236	23.236				
23.244	23.244				
23.252	23.252				
23.260	23.260				
23.268	23.268				
23.276	23.276				
23.284	23.284				
23.292	23.292				
23.300	23.300				
23.308	23.308				
23.316	23.316				
23.324	23.324				
23.332	23.332				
23.340	23.340				

PROJECT:-
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-S3) KM 5/000 TO 6/000
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Major Colony, Moha-Vya Nagar, Jajpur-75
 Tel: +91-141-3520699, 2520699, 2520698
 Fax: 2520734, e-mail: ceggroup@rediffmail.com

LEGEND

ROAD WIDTH	10m
ROAD WIDTH	12m
ROAD WIDTH	15m
ROAD WIDTH	20m
ROAD WIDTH	25m
ROAD WIDTH	30m
ROAD WIDTH	35m
ROAD WIDTH	40m
ROAD WIDTH	45m
ROAD WIDTH	50m
ROAD WIDTH	55m
ROAD WIDTH	60m
ROAD WIDTH	65m
ROAD WIDTH	70m
ROAD WIDTH	75m
ROAD WIDTH	80m
ROAD WIDTH	85m
ROAD WIDTH	90m
ROAD WIDTH	95m
ROAD WIDTH	100m

SCALE
 HORIZONTAL: 1 : 200
 VERTICAL: 1 : 200

DATE: 15/08/2017
TIME: 11:30 AM

APPROVED BY:
 [Signature]
 Chief Engineer,
 World Bank Project

EMPLOYER:
 World Bank Project

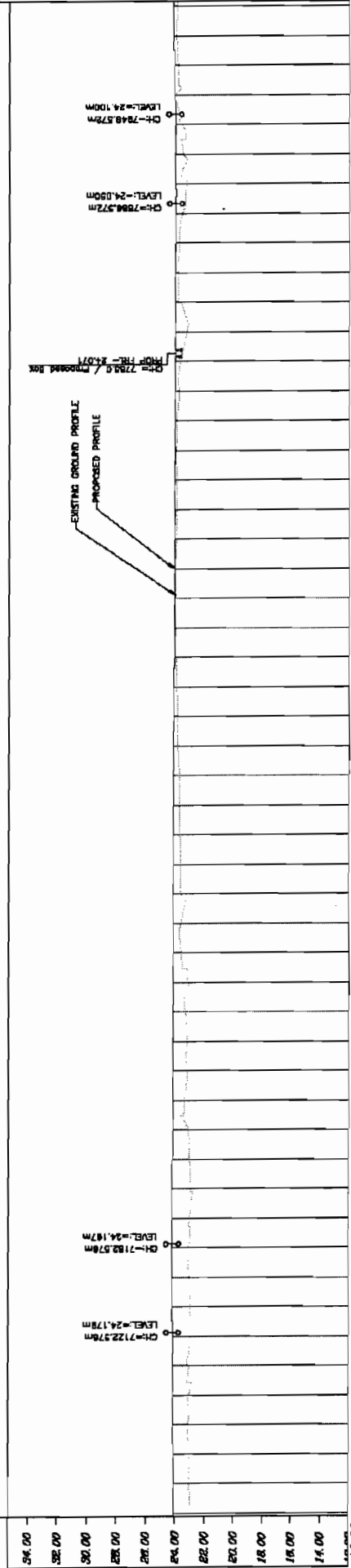
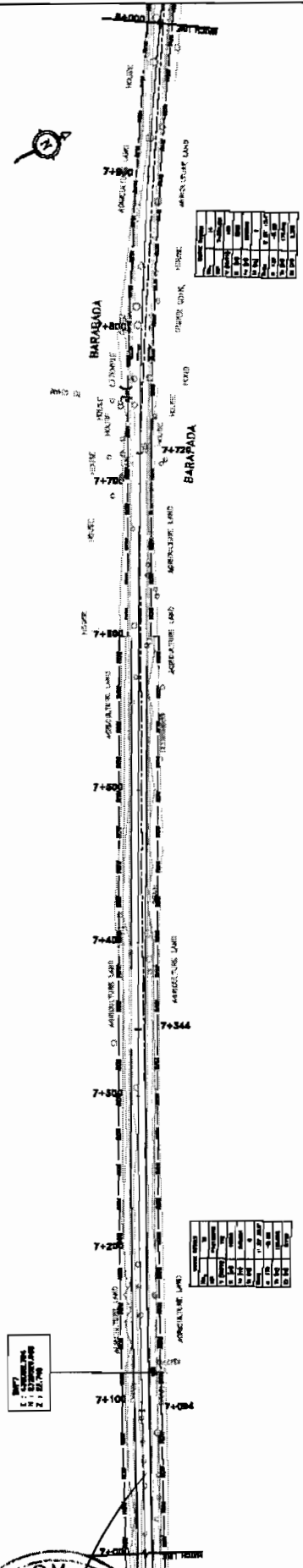
SOM DATTA BUILDERS-ARSS JV
 CONTRACTOR

SOM DATTA BUILDERS

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BHADRAK

ANANDPUR



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
24.238	24.238				
24.201	24.201				
24.183	24.183				
24.125	24.125				
24.088	24.088				
24.082	24.082				
24.000	24.000				
24.031	24.031				
24.095	24.095				
24.084	24.084				
24.072	24.072				
24.076	24.076				
24.080	24.080				
24.085	24.085				
24.080	24.080				
24.093	24.093				
24.097	24.097				
24.101	24.101				
24.106	24.106				
24.110	24.110				
24.114	24.114				
24.118	24.118				
24.122	24.122				
24.126	24.126				
24.131	24.131				
24.136	24.136				
24.139	24.139				
24.143	24.143				
24.147	24.147				
24.152	24.152				
24.156	24.156				
24.160	24.160				
24.164	24.164				
24.168	24.168				
24.173	24.173				
24.177	24.177				
24.181	24.181				
24.185	24.185				
24.189	24.189				
24.193	24.193				
24.198	24.198				
24.198	24.198				
24.191	24.191				
24.177	24.177				
24.181	24.181				
24.146	24.146				
24.129	24.129				
24.113	24.113				
24.097	24.097				
24.081	24.081				
24.065	24.065				
24.049	24.049				
24.033	24.033				
24.017	24.017				
24.001	24.001				

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 7/000 TO KM 8/000

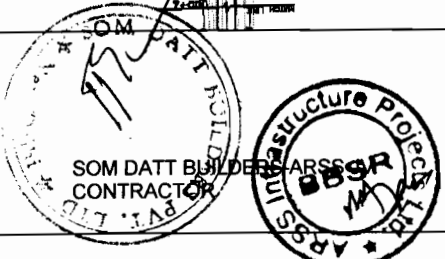
PROJECT:
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

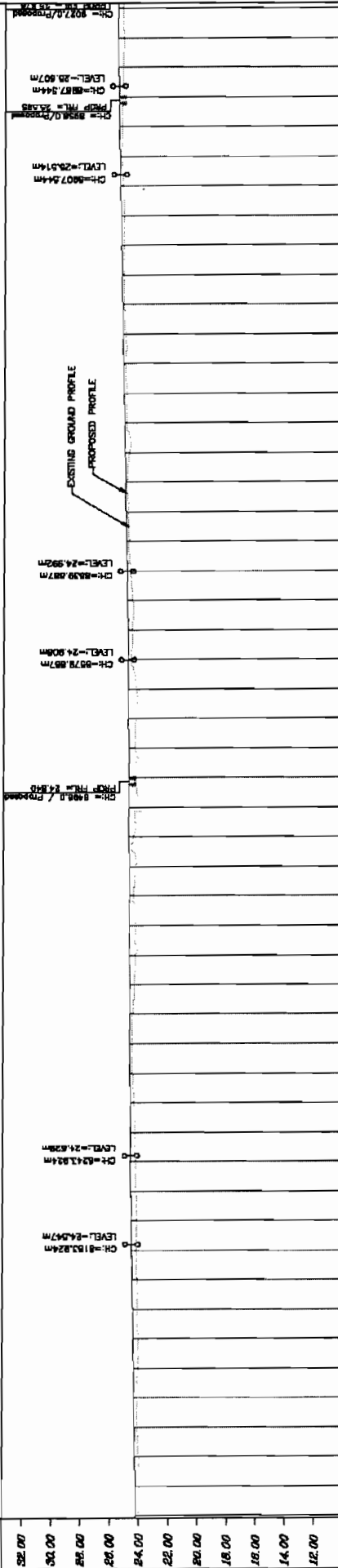
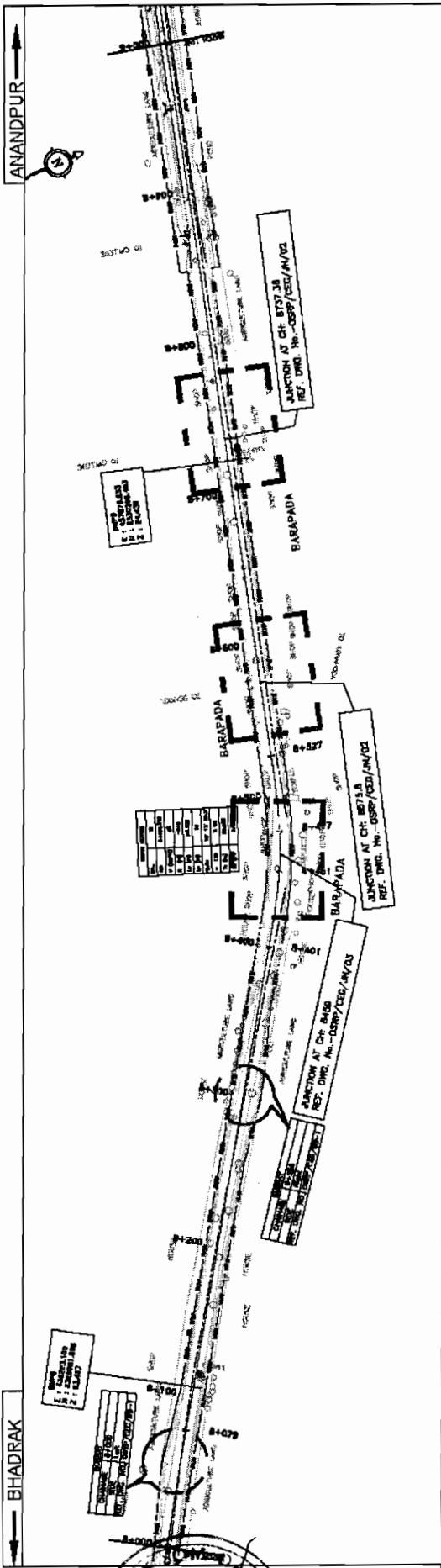
CONSULTING ENGINEERS GROUP LTD.
 E-12, Netaji Subhas Marg, New Delhi-110029
 Tel: +91-11-2320890, 2320899, 2320256
 Fax: 2321334, e-mail: ceg@engineersgroup.com

LEGEND

EXISTING ROAD	PROPOSED ROAD
EXISTING SIDEWALK	PROPOSED SIDEWALK
EXISTING FOOTPATH	PROPOSED FOOTPATH
EXISTING UTILITY LINE	PROPOSED UTILITY LINE
EXISTING FENCE	PROPOSED FENCE
EXISTING TREE	PROPOSED TREE
EXISTING SIGN	PROPOSED SIGN
EXISTING LIGHTING	PROPOSED LIGHTING
EXISTING DRAINAGE	PROPOSED DRAINAGE
EXISTING LANDSCAPING	PROPOSED LANDSCAPING
EXISTING OTHER	PROPOSED OTHER

SCALE: HORIZONTAL: 1 : 200 VERTICAL: 1 : 20





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
92.00	92.00				
90.00	90.00				
88.00	88.00				
86.00	86.00				
84.00	84.00				
82.00	82.00				
80.00	80.00				
78.00	78.00				
76.00	76.00				
74.00	74.00				
72.00	72.00				
70.00	70.00				
68.00	68.00				
66.00	66.00				
64.00	64.00				
62.00	62.00				
60.00	60.00				
58.00	58.00				
56.00	56.00				
54.00	54.00				
52.00	52.00				
50.00	50.00				
48.00	48.00				
46.00	46.00				
44.00	44.00				
42.00	42.00				

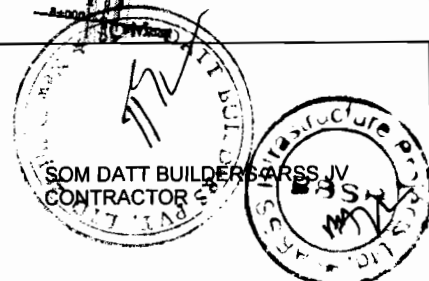
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR CRISBA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

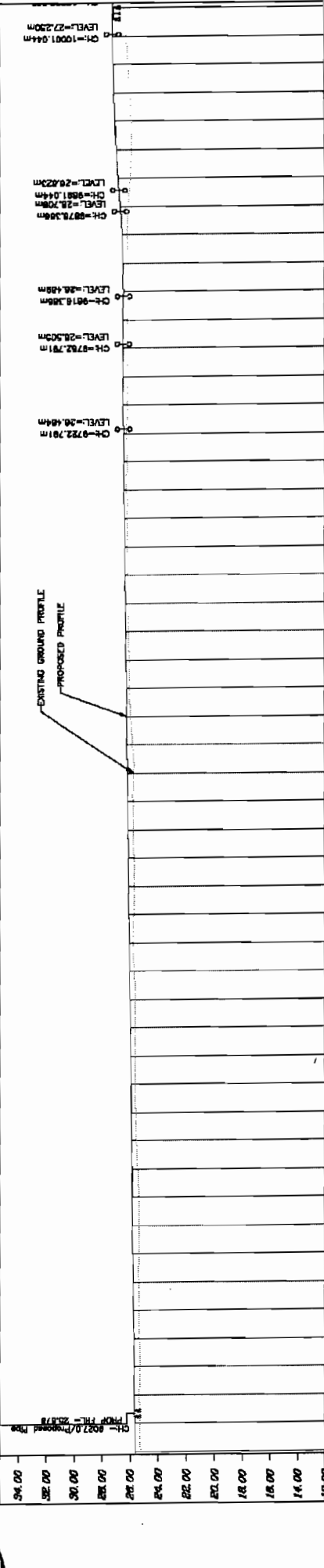
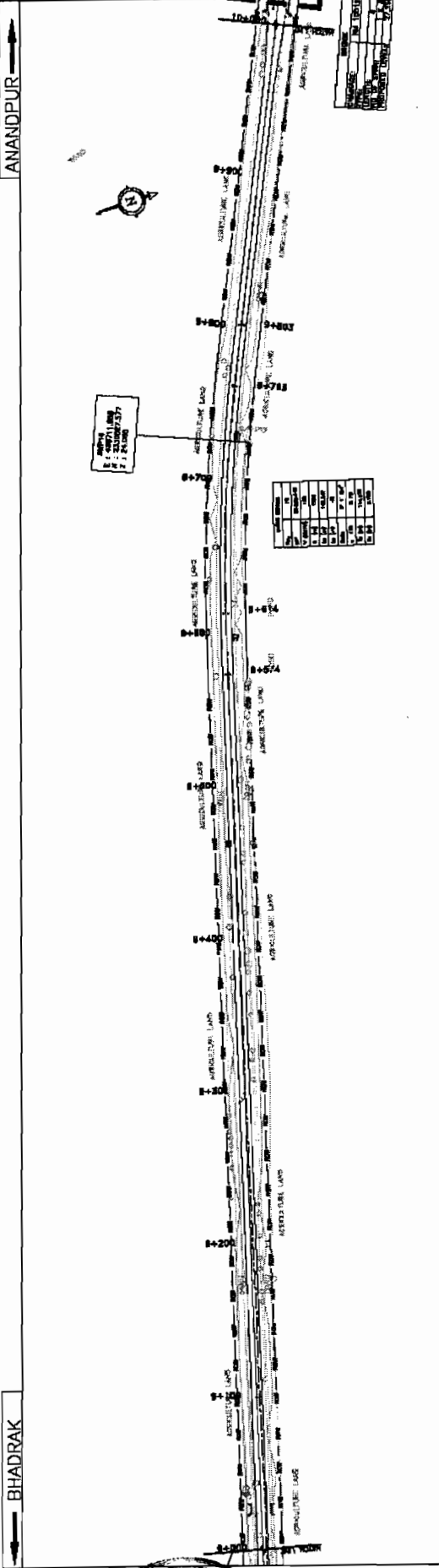
CONSULTING ENGINEERS GROUP LTD.
 E-12/607, Connaught Place, New Delhi-110029
 Tel: +91-11-2610899, 2621808, 2620008
 Fax: 2571348, e-mail: coneg@coneg.com

LEGEND

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 8/000 TO KM 9/000

Scale: HORIZONTAL: 1 : 2000, VERTICAL: 1 : 200





Station	Proposed Road Level (m)	Existing Level (m)	Horizontal Alignment	Vertical Profile	Super Elevation	Crossfall
0+00	25.585	25.585				
1+00	25.591	25.591				
2+00	25.784	25.784				
3+00	25.791	25.791				
4+00	25.738	25.738				
5+00	25.714	25.714				
6+00	25.691	25.691				
7+00	25.688	25.688				
8+00	25.688	25.688				
9+00	25.688	25.688				
10+00	27.250	27.250				

PROJECT:
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Mahape Nagar, Jubilee-17
 Tel: 491-41-2430889, 2521899, 2520556
 Fax: 2621344, e-mail: ceg@cegindia.com

LEGEND:

PROPOSED ROAD	EXISTING ROAD
PROPOSED GRADE	EXISTING GRADE
PROPOSED CROSSFALL	EXISTING CROSSFALL
PROPOSED SUPER ELEVATION	EXISTING SUPER ELEVATION
PROPOSED HORIZONTAL ALIGNMENT	EXISTING HORIZONTAL ALIGNMENT
PROPOSED VERTICAL ALIGNMENT	EXISTING VERTICAL ALIGNMENT
PROPOSED DRAINAGE	EXISTING DRAINAGE
PROPOSED STRUCTURES	EXISTING STRUCTURES
PROPOSED LAND ACQUISITION	EXISTING LAND ACQUISITION
PROPOSED RIGHT OF WAY	EXISTING RIGHT OF WAY
PROPOSED BOUNDARY	EXISTING BOUNDARY
PROPOSED PROPERTY	EXISTING PROPERTY
PROPOSED DISTANCE	EXISTING DISTANCE
PROPOSED AREA	EXISTING AREA
PROPOSED VOLUME	EXISTING VOLUME
PROPOSED WEIGHT	EXISTING WEIGHT
PROPOSED LENGTH	EXISTING LENGTH
PROPOSED PERIMETER	EXISTING PERIMETER
PROPOSED SURFACE AREA	EXISTING SURFACE AREA
PROPOSED VOLUME	EXISTING VOLUME
PROPOSED WEIGHT	EXISTING WEIGHT
PROPOSED LENGTH	EXISTING LENGTH
PROPOSED PERIMETER	EXISTING PERIMETER
PROPOSED SURFACE AREA	EXISTING SURFACE AREA

SCALE: HORIZONTAL: 1:2000 VERTICAL: 1:200

DATE: 10/10/2011

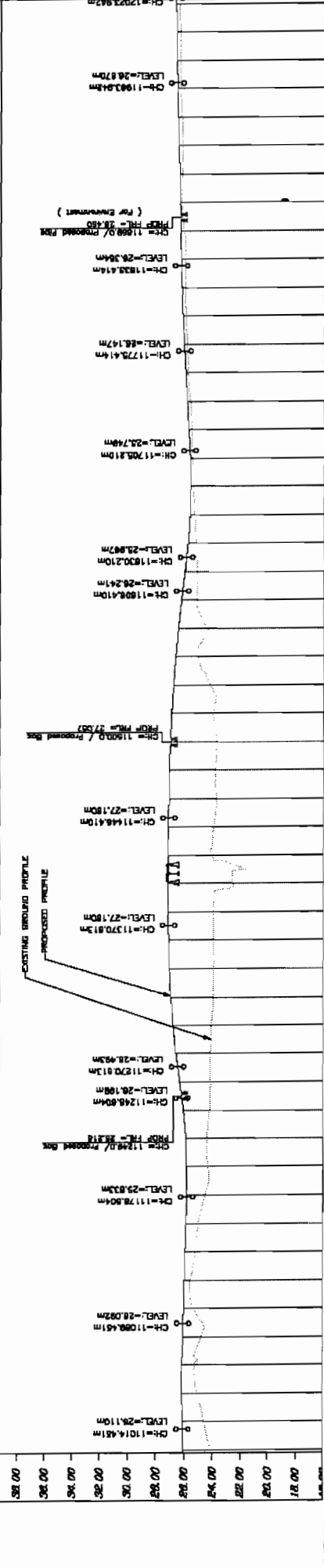
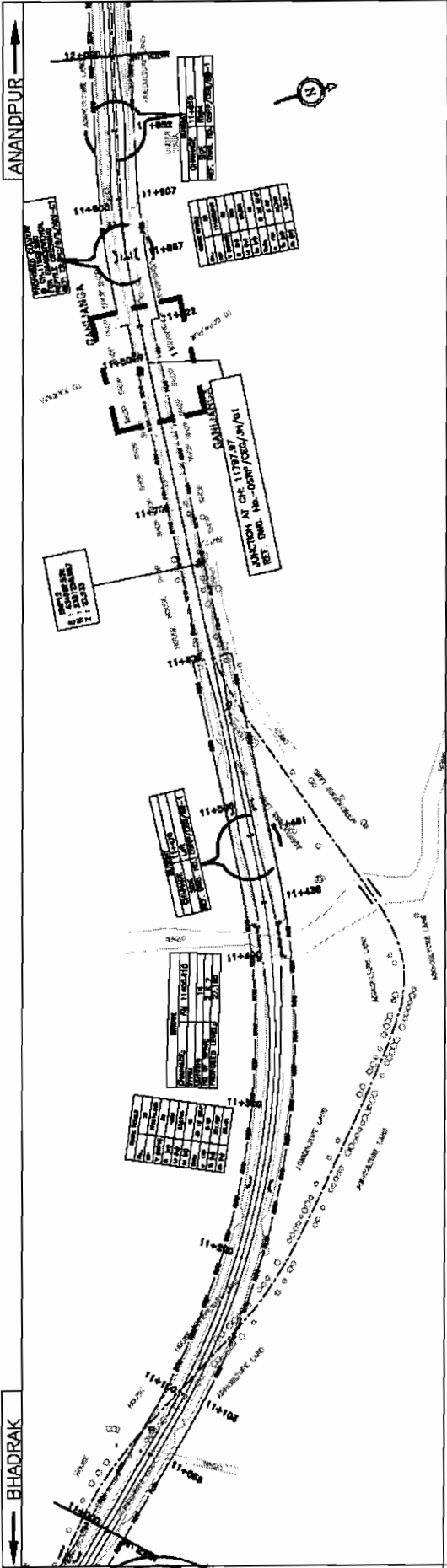
PROJECT NO.: 10/10/2011

SCALE: HORIZONTAL: 1:2000 VERTICAL: 1:200

DATE: 10/10/2011

PROJECT NO.: 10/10/2011

SOM DATTA BUILDERS & CONTRACTORS
 BBSR
 CROSS INFRASTRUCTURE PROJECTS




DATUM = 16.00

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
28.075	28.075	11700.00		0.00	0.00
28.122	28.122	11704.50		0.00	0.00
28.148	28.148	11708.50		0.00	0.00
28.148	28.148	11712.50		0.00	0.00
28.061	28.061	11716.50		0.00	0.00
28.003	28.003	11720.50		0.00	0.00
28.943	28.943	11724.50		0.00	0.00
25.867	25.867	11728.50		0.00	0.00
25.830	25.830	11732.50		0.00	0.00
25.824	25.824	11736.50		0.00	0.00
25.912	25.912	11740.50		0.00	0.00
26.033	26.033	11744.50		0.00	0.00
26.827	26.827	11748.50		0.00	0.00
26.855	26.855	11752.50		0.00	0.00
27.097	27.097	11756.50		0.00	0.00
27.152	27.152	11760.50		0.00	0.00
27.150	27.150	11764.50		0.00	0.00
27.150	27.150	11768.50		0.00	0.00
27.153	27.153	11772.50		0.00	0.00
27.057	27.057	11776.50		0.00	0.00
26.865	26.865	11780.50		0.00	0.00
26.845	26.845	11784.50		0.00	0.00
26.867	26.867	11788.50		0.00	0.00
26.919	26.919	11792.50		0.00	0.00
26.912	26.912	11796.50		0.00	0.00
26.904	26.904	11800.50		0.00	0.00
25.855	25.855	11804.50		0.00	0.00
25.726	25.726	11808.50		0.00	0.00
25.678	25.678	11812.50		0.00	0.00
25.722	25.722	11816.50		0.00	0.00
25.833	25.833	11820.50		0.00	0.00
25.949	25.949	11824.50		0.00	0.00
25.949	25.949	11828.50		0.00	0.00
26.270	26.270	11832.50		0.00	0.00
26.343	26.343	11836.50		0.00	0.00
26.372	26.372	11840.50		0.00	0.00
26.483	26.483	11844.50		0.00	0.00
26.483	26.483	11848.50		0.00	0.00
26.428	26.428	11852.50		0.00	0.00
26.384	26.384	11856.50		0.00	0.00
26.343	26.343	11860.50		0.00	0.00
26.314	26.314	11864.50		0.00	0.00
26.300	26.300	11868.50		0.00	0.00
26.300	26.300	11872.50		0.00	0.00
26.300	26.300	11876.50		0.00	0.00
26.300	26.300	11880.50		0.00	0.00
26.300	26.300	11884.50		0.00	0.00
26.300	26.300	11888.50		0.00	0.00
26.300	26.300	11892.50		0.00	0.00
26.300	26.300	11896.50		0.00	0.00
26.300	26.300	11900.50		0.00	0.00
26.300	26.300	11904.50		0.00	0.00
26.300	26.300	11908.50		0.00	0.00
26.300	26.300	11912.50		0.00	0.00
26.300	26.300	11916.50		0.00	0.00
26.300	26.300	11920.50		0.00	0.00
26.300	26.300	11924.50		0.00	0.00
26.300	26.300	11928.50		0.00	0.00
26.300	26.300	11932.50		0.00	0.00
26.300	26.300	11936.50		0.00	0.00
26.300	26.300	11940.50		0.00	0.00
26.300	26.300	11944.50		0.00	0.00
26.300	26.300	11948.50		0.00	0.00
26.300	26.300	11952.50		0.00	0.00
26.300	26.300	11956.50		0.00	0.00
26.300	26.300	11960.50		0.00	0.00
26.300	26.300	11964.50		0.00	0.00
26.300	26.300	11968.50		0.00	0.00
26.300	26.300	11972.50		0.00	0.00
26.300	26.300	11976.50		0.00	0.00
26.300	26.300	11980.50		0.00	0.00
26.300	26.300	11984.50		0.00	0.00
26.300	26.300	11988.50		0.00	0.00
26.300	26.300	11992.50		0.00	0.00
26.300	26.300	11996.50		0.00	0.00
26.300	26.300	12000.50		0.00	0.00

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 11/7000 TO 12/000

DATE: 12/12/2010	REV: 01	NO: 1	SCALE: HORIZONTAL: 1:200	S.G.
SH. NO. 12	DATE: 12/12/2010	REV: 01	SCALE: VERTICAL: 1:200	R.B.D.K.

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD UNDER WORLD BANK ASSISTANCE



SEG ENGINEERS GROUP LTD.
E-12, K.J. Colony, Makya, Kesor, Jharpur-75
Tel: 491-141-2320991, 2321999, 2320555
Fax: 2631348, e-mail: segengr@rediffmail.com

<input type="checkbox"/> Survey of area.	<input type="checkbox"/> Details of drainage.	<input type="checkbox"/> Details of civil works.	<input type="checkbox"/> Details of electrical works.	<input type="checkbox"/> Details of road works.
<input type="checkbox"/> Details of road works.	<input type="checkbox"/> Details of drainage.	<input type="checkbox"/> Details of civil works.	<input type="checkbox"/> Details of electrical works.	<input type="checkbox"/> Details of road works.

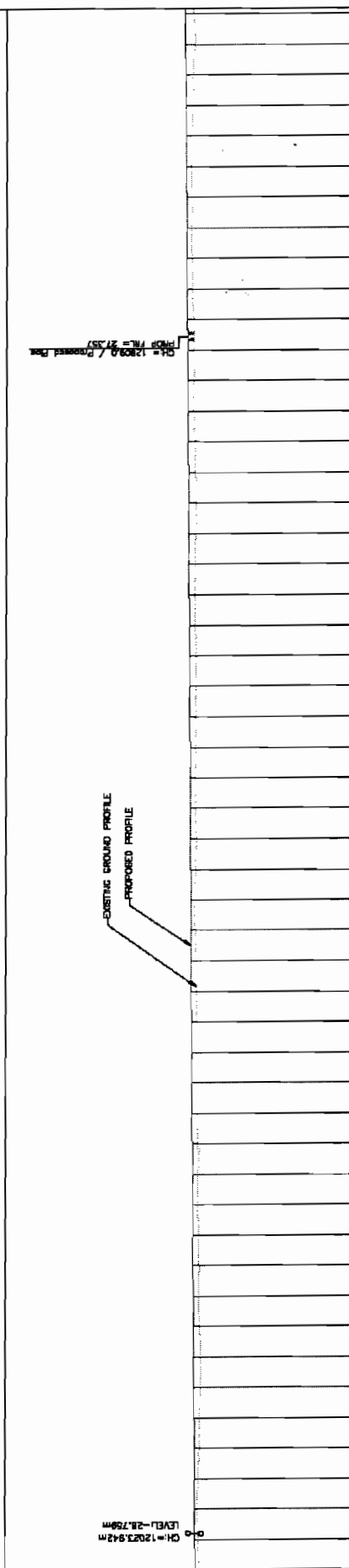
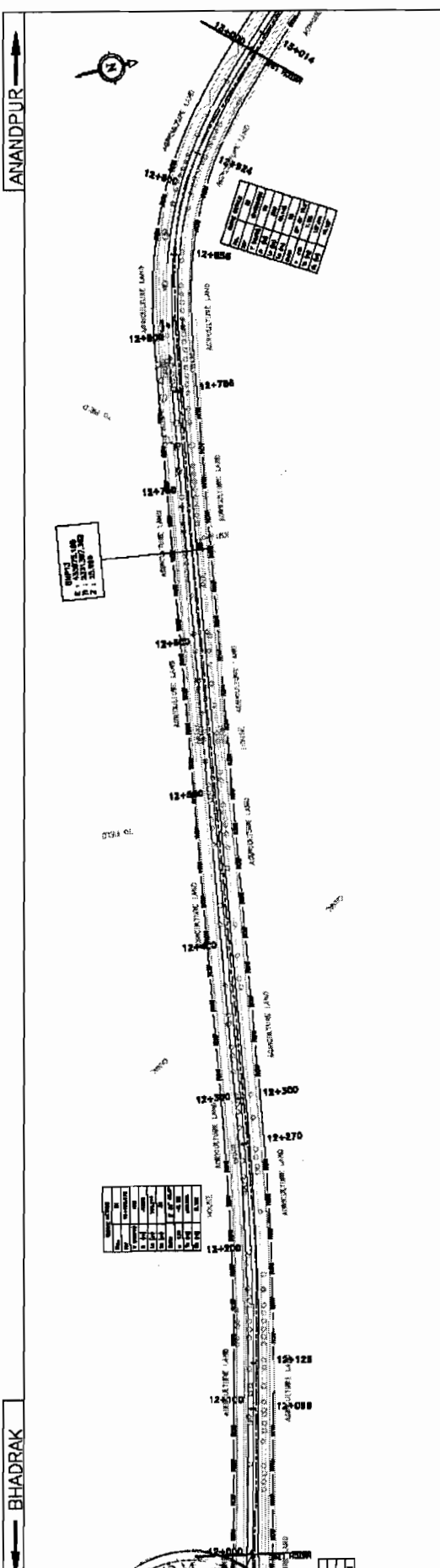
LEGEND

SOM DATTA BUILDERS & CONTRACTORS
KSS Infrastructure Ltd.

EMPLOYER,

SOM DATTA BUILDERS & CONTRACTORS

KSS Infrastructure Ltd.



STATION	EXISTING GROUND PROFILE (m)	PROPOSED PROFILE (m)
12+000	28.75	28.75
12+005	28.79	28.79
12+010	28.82	28.82
12+015	28.85	28.85
12+020	28.88	28.88
12+025	28.91	28.91
12+030	28.94	28.94
12+035	28.97	28.97
12+040	29.00	29.00
12+045	29.03	29.03
12+050	29.06	29.06
12+055	29.09	29.09
12+060	29.12	29.12
12+065	29.15	29.15
12+070	29.18	29.18
12+075	29.21	29.21
12+080	29.24	29.24
12+085	29.27	29.27
12+090	29.30	29.30
12+095	29.33	29.33
13+000	29.36	29.36

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 12/000 TO KM 13/000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

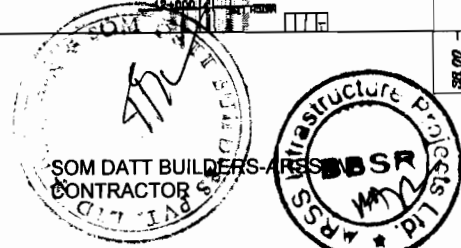
PROJECT: WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 12/000 TO KM 13/000

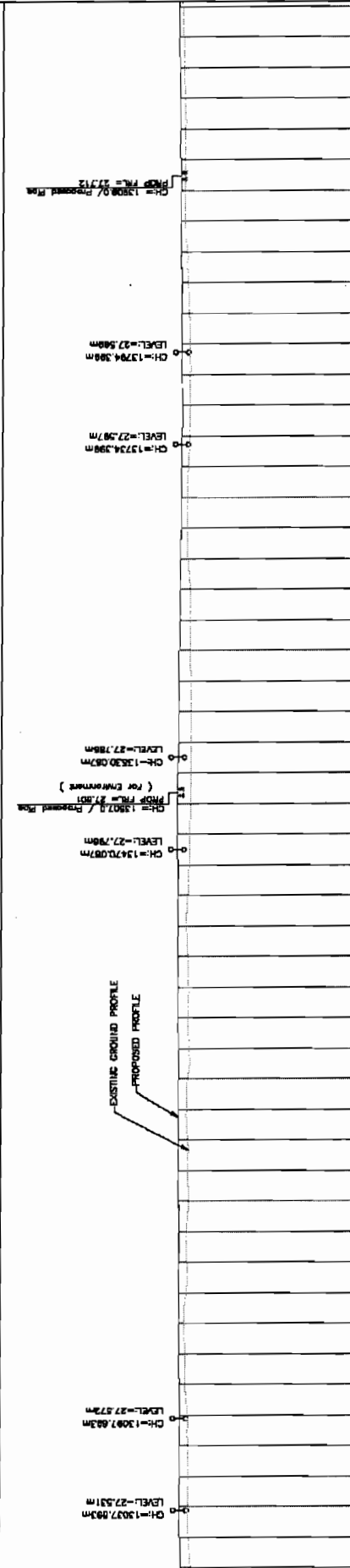
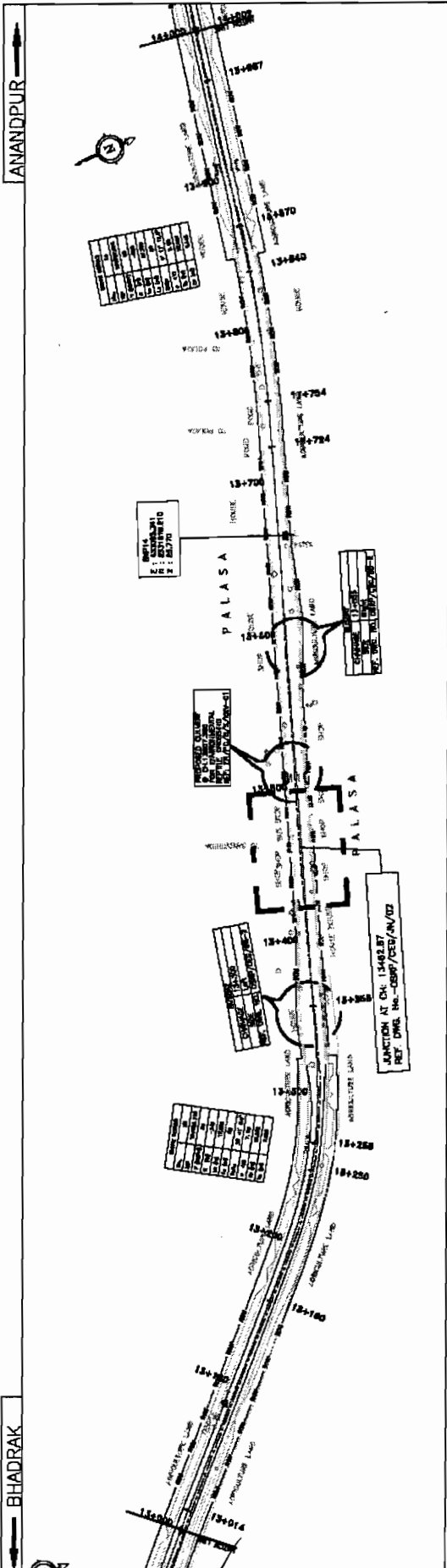
CONSULTING ENGINEERS GROUP LTD.
 E-12/24/3 Colony Malabar Nagar, Cuttack-751017
 Tel: +91-674-2520999, 2521659, 2520326
 Fax: 2521345, e-mail: ceg@cegroup.com

LEGEND

CONTRACTOR: SOM DATT BUILDERS & CONTRACTORS PVT. LTD.

EMPLOYER: Project





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	PERELEVATION	CROSSFALL
27.518	27.518			0-2.500	0-2.500
27.517	27.517			0-2.500	0-2.500
27.518	27.518			0-2.500	0-2.500
27.519	27.519			0-2.500	0-2.500
27.520	27.520			0-2.500	0-2.500
27.521	27.521			0-2.500	0-2.500
27.522	27.522			0-2.500	0-2.500
27.523	27.523			0-2.500	0-2.500
27.524	27.524			0-2.500	0-2.500
27.525	27.525			0-2.500	0-2.500
27.526	27.526			0-2.500	0-2.500
27.527	27.527			0-2.500	0-2.500
27.528	27.528			0-2.500	0-2.500
27.529	27.529			0-2.500	0-2.500
27.530	27.530			0-2.500	0-2.500
27.531	27.531			0-2.500	0-2.500
27.532	27.532			0-2.500	0-2.500
27.533	27.533			0-2.500	0-2.500
27.534	27.534			0-2.500	0-2.500
27.535	27.535			0-2.500	0-2.500
27.536	27.536			0-2.500	0-2.500
27.537	27.537			0-2.500	0-2.500
27.538	27.538			0-2.500	0-2.500
27.539	27.539			0-2.500	0-2.500
27.540	27.540			0-2.500	0-2.500
27.541	27.541			0-2.500	0-2.500
27.542	27.542			0-2.500	0-2.500
27.543	27.543			0-2.500	0-2.500
27.544	27.544			0-2.500	0-2.500
27.545	27.545			0-2.500	0-2.500
27.546	27.546			0-2.500	0-2.500
27.547	27.547			0-2.500	0-2.500
27.548	27.548			0-2.500	0-2.500
27.549	27.549			0-2.500	0-2.500
27.550	27.550			0-2.500	0-2.500
27.551	27.551			0-2.500	0-2.500
27.552	27.552			0-2.500	0-2.500
27.553	27.553			0-2.500	0-2.500
27.554	27.554			0-2.500	0-2.500
27.555	27.555			0-2.500	0-2.500
27.556	27.556			0-2.500	0-2.500
27.557	27.557			0-2.500	0-2.500
27.558	27.558			0-2.500	0-2.500
27.559	27.559			0-2.500	0-2.500
27.560	27.560			0-2.500	0-2.500
27.561	27.561			0-2.500	0-2.500
27.562	27.562			0-2.500	0-2.500
27.563	27.563			0-2.500	0-2.500
27.564	27.564			0-2.500	0-2.500
27.565	27.565			0-2.500	0-2.500
27.566	27.566			0-2.500	0-2.500
27.567	27.567			0-2.500	0-2.500
27.568	27.568			0-2.500	0-2.500
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27.571	27.571			0-2.500	0-2.500
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27.580	27.580			0-2.500	0-2.500
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27.583	27.583			0-2.500	0-2.500
27.584	27.584			0-2.500	0-2.500
27.585	27.585			0-2.500	0-2.500
27.586	27.586			0-2.500	0-2.500
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27.599	27.599			0-2.500	0-2.500
27.600	27.600			0-2.500	0-2.500

PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 13/000 TO KM 14/000

CONSULTING ENGINEERS GROUP LTD.
 C-12, Major Colony, Malviya Nagar, Jaipur-302017
 Tel: +91-141-2520888, 2521699, 2520556
 Fax: 2521348, e-mail: ceg@cegroup.com

LEGEND:

DATE: 10/11/2010
SCALE: HORIZONTAL 1:2000 VERTICAL 1:100

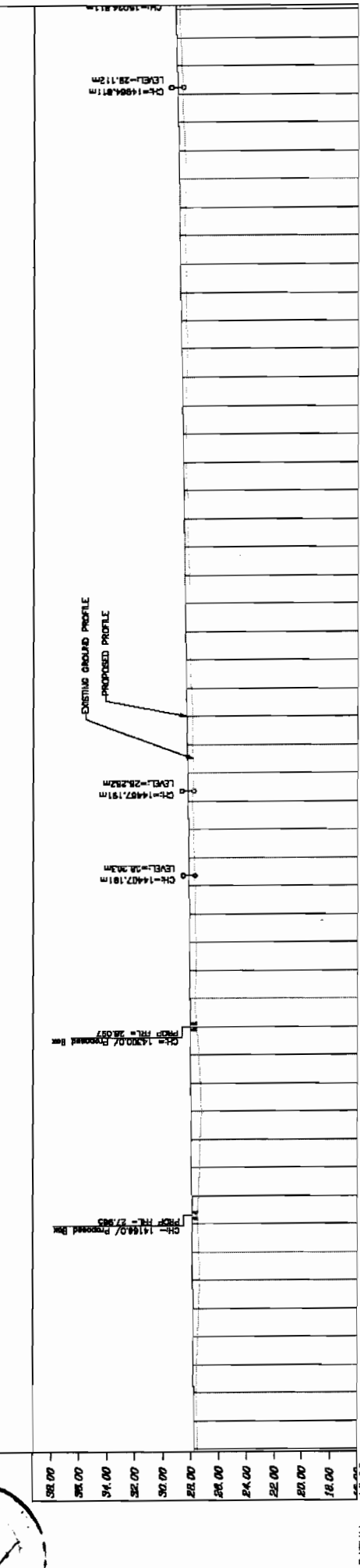
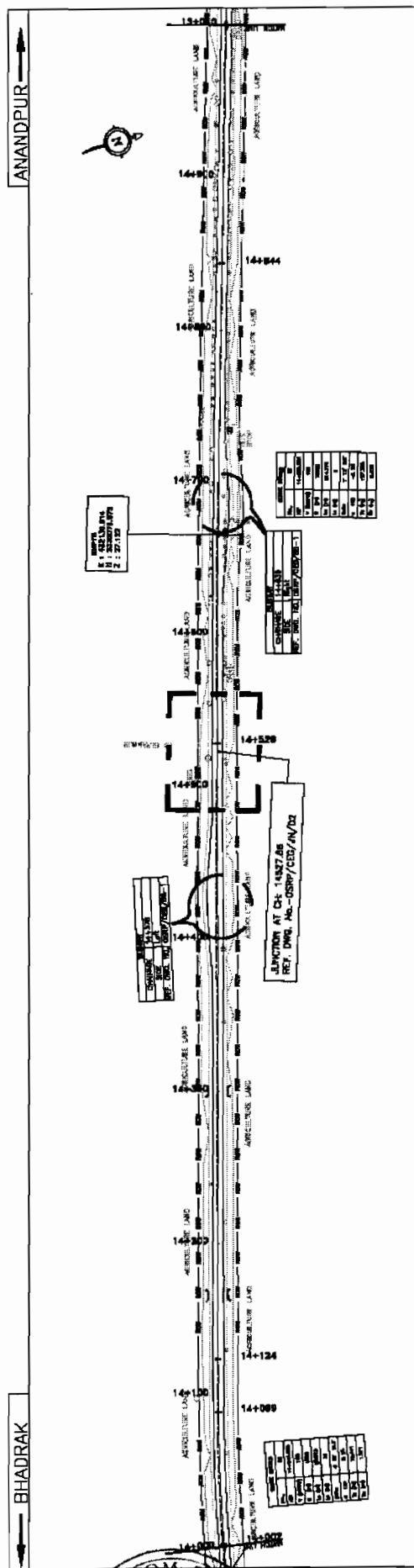
ANANDPUR (North Arrow)

BHADRAK (North Arrow)

SOM DATTA BUILDERS-ARSS JV CONTRACTOR
 PVT. LTD. (Seal)

STRUCTURE ENGINEER
 (Seal)

VOL-IV/Page 107



DATUM = 16.00

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	PERELEVATION	CROSSFALL
29.258	29.258				
29.193	29.193				
29.142	29.142				
29.104	29.104				
29.071	29.071				
29.037	29.037				
28.994	28.994				
28.971	28.971				
28.937	28.937				
28.904	28.904				
28.871	28.871				
28.837	28.837				
28.804	28.804				
28.771	28.771				
28.737	28.737				
28.704	28.704				
28.670	28.670				
28.637	28.637				
28.604	28.604				
28.570	28.570				
28.537	28.537				
28.504	28.504				
28.470	28.470				
28.437	28.437				
28.404	28.404				
28.370	28.370				
28.337	28.337				
28.304	28.304				
28.270	28.270				
28.241	28.241				
28.210	28.210				
28.175	28.175				
28.136	28.136				
28.117	28.117				
28.097	28.097				
28.077	28.077				
28.038	28.038				
28.018	28.018				
27.999	27.999				
27.979	27.979				
27.959	27.959				
27.939	27.939				
27.920	27.920				
27.900	27.900				
27.880	27.880				
27.861	27.861				
27.841	27.841				
27.821	27.821				
27.802	27.802				

**WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAC TO ANANDPUR (SH-53) KM 14/000 TO KM 15/000**

SCALE: HORIZONTAL 1:200 VERTICAL 1:200

DATE: ... SHEET NO: ...

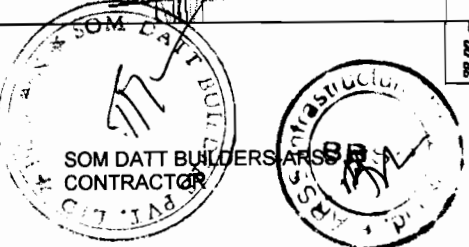
REVISIONS: ...

PROJECT: ...

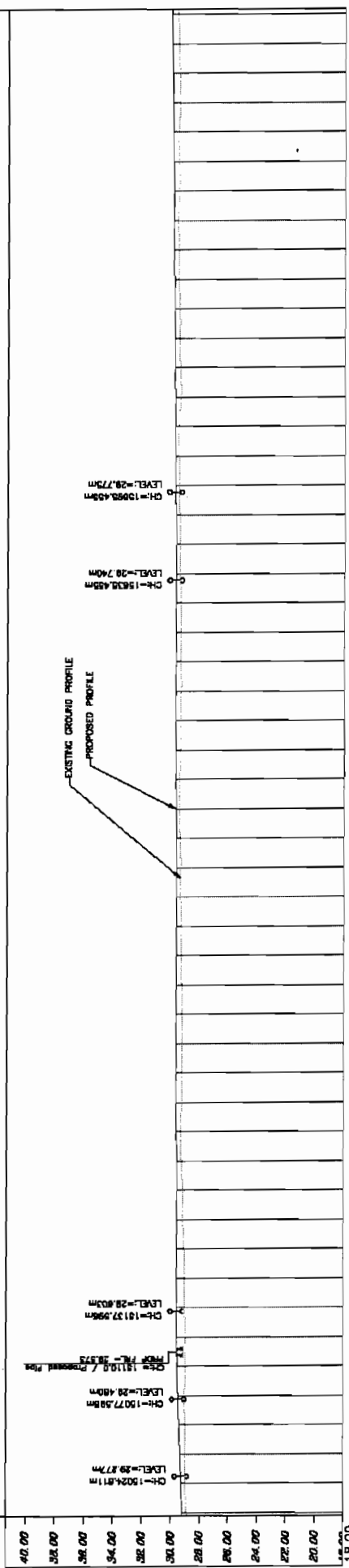
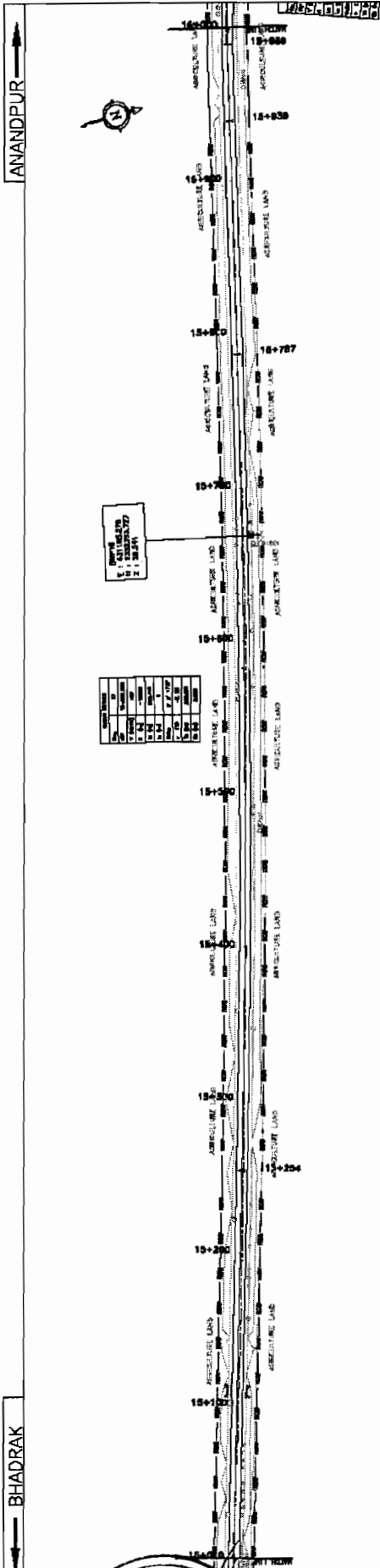
CONSULTING ENGINEERS GROUP LTD.
 E-12(M-3) Colony, Midway Niger, Jaipur-17
 Tel: +91-141-2520889, 2520892, 2520956
 Fax: 2521346, e-mail: ceg@engineersgroup.com

- 1. GENERAL NOTES
- 2. CONTRACT DOCUMENTS
- 3. BILL OF MATERIALS
- 4. ESTIMATE
- 5. SPECIFICATIONS
- 6. DRAWINGS
- 7. CONTRACT AGREEMENT
- 8. CONDITIONS OF CONTRACT
- 9. GENERAL CONDITIONS
- 10. PARTICULAR CONDITIONS

- 1. GENERAL NOTES
- 2. CONTRACT DOCUMENTS
- 3. BILL OF MATERIALS
- 4. ESTIMATE
- 5. SPECIFICATIONS
- 6. DRAWINGS
- 7. CONTRACT AGREEMENT
- 8. CONDITIONS OF CONTRACT
- 9. GENERAL CONDITIONS
- 10. PARTICULAR CONDITIONS



EMPLOYER



Station	Proposed Road Level (m)	Existing Level (m)	Horizontal Alignment	Vertical Profile	Super Elevation	Crossfall	Grade
15+00	29.811	29.811	100%	100%	0%	0%	0%
15+10	29.838	29.838	100%	100%	0%	0%	0%
15+20	29.865	29.865	100%	100%	0%	0%	0%
15+30	29.892	29.892	100%	100%	0%	0%	0%
15+40	29.919	29.919	100%	100%	0%	0%	0%
15+50	29.946	29.946	100%	100%	0%	0%	0%
15+60	29.973	29.973	100%	100%	0%	0%	0%
15+70	29.999	29.999	100%	100%	0%	0%	0%
15+80	30.026	30.026	100%	100%	0%	0%	0%
15+90	30.053	30.053	100%	100%	0%	0%	0%
16+00	30.080	30.080	100%	100%	0%	0%	0%
16+10	30.107	30.107	100%	100%	0%	0%	0%
16+20	30.134	30.134	100%	100%	0%	0%	0%
16+30	30.161	30.161	100%	100%	0%	0%	0%
16+40	30.188	30.188	100%	100%	0%	0%	0%
16+50	30.215	30.215	100%	100%	0%	0%	0%

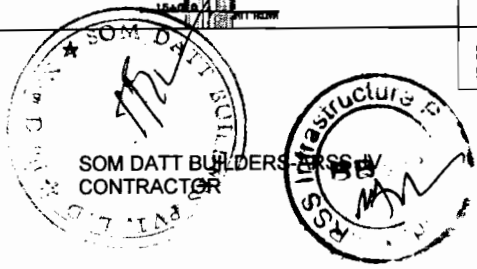
PROJECT:-
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 15/000 TO KM 16/000

CONSULTING ENGINEERS GROUP LTD.
E-12, Hoj Colony, Kalya Nagar, Jaipur-17
Tel: +91-141-2620899, 2621889, 2520806
Fax: 2621342, E-mail: eng@cegroup.co.in

LEGEND

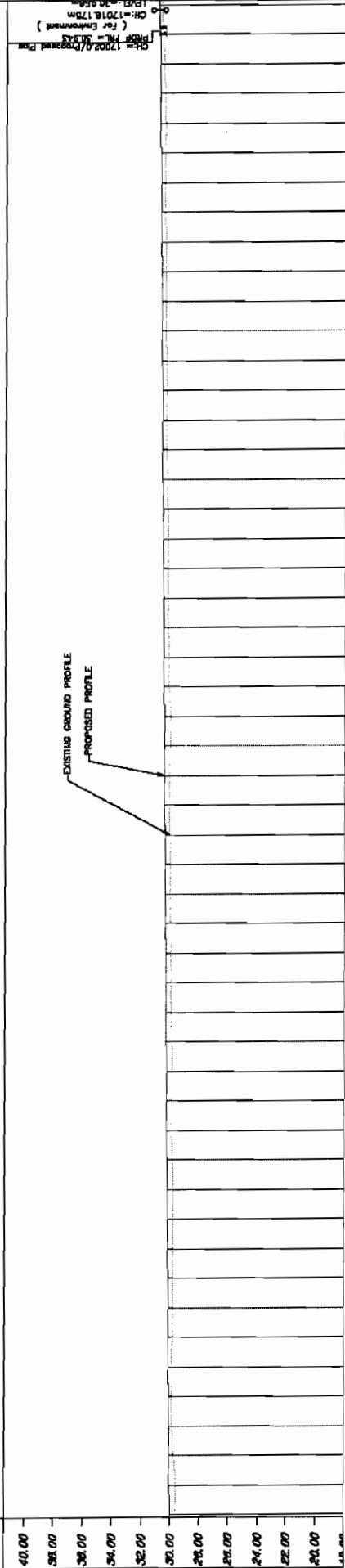
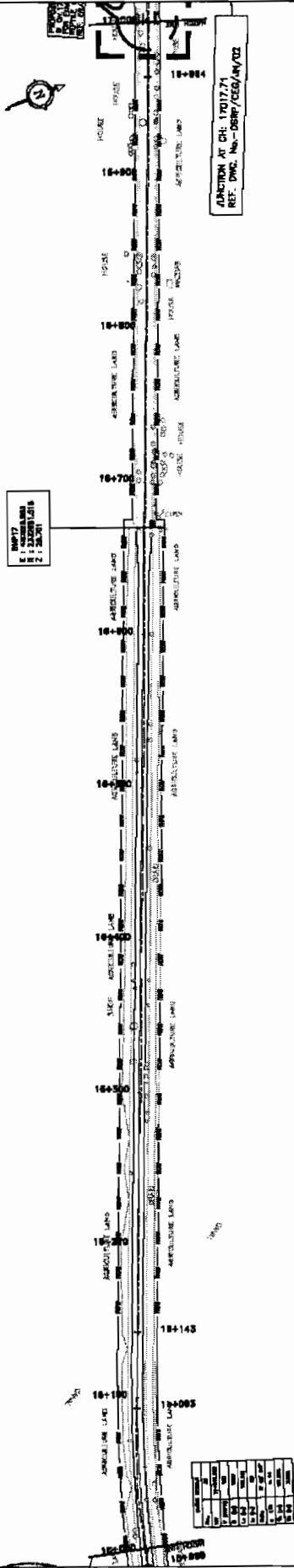
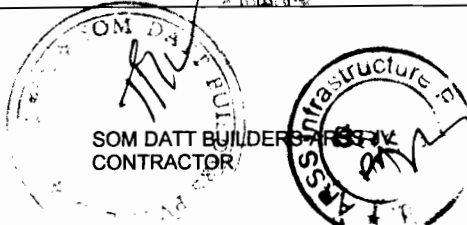
DATE: 15/05/2020
SCALE: HORIZONTAL: 1:2000, VERTICAL: 1:1,250

APPROVED BY: [Signature]
DATE: 15/05/2020



BHADRAK

ANANDPUR



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	CROSSFALL
30.67	30.65	10+000	1:100	0.00
30.68	30.66	10+010	1:100	0.00
30.69	30.67	10+020	1:100	0.00
30.70	30.68	10+030	1:100	0.00
30.71	30.69	10+040	1:100	0.00
30.72	30.70	10+050	1:100	0.00
30.73	30.71	10+060	1:100	0.00
30.74	30.72	10+070	1:100	0.00
30.75	30.73	10+080	1:100	0.00
30.76	30.74	10+090	1:100	0.00
30.77	30.75	10+100	1:100	0.00
30.78	30.76	10+110	1:100	0.00
30.79	30.77	10+120	1:100	0.00
30.80	30.78	10+130	1:100	0.00
30.81	30.79	10+140	1:100	0.00
30.82	30.80	10+150	1:100	0.00
30.83	30.81	10+160	1:100	0.00
30.84	30.82	10+170	1:100	0.00
30.85	30.83	10+180	1:100	0.00
30.86	30.84	10+190	1:100	0.00
30.87	30.85	10+200	1:100	0.00
30.88	30.86	10+210	1:100	0.00
30.89	30.87	10+220	1:100	0.00
30.90	30.88	10+230	1:100	0.00
30.91	30.89	10+240	1:100	0.00
30.92	30.90	10+250	1:100	0.00
30.93	30.91	10+260	1:100	0.00
30.94	30.92	10+270	1:100	0.00
30.95	30.93	10+280	1:100	0.00
30.96	30.94	10+290	1:100	0.00
30.97	30.95	10+300	1:100	0.00
30.98	30.96	10+310	1:100	0.00
30.99	30.97	10+320	1:100	0.00
31.00	30.98	10+330	1:100	0.00
31.01	30.99	10+340	1:100	0.00
31.02	31.00	10+350	1:100	0.00
31.03	31.01	10+360	1:100	0.00
31.04	31.02	10+370	1:100	0.00
31.05	31.03	10+380	1:100	0.00
31.06	31.04	10+390	1:100	0.00
31.07	31.05	10+400	1:100	0.00
31.08	31.06	10+410	1:100	0.00
31.09	31.07	10+420	1:100	0.00
31.10	31.08	10+430	1:100	0.00
31.11	31.09	10+440	1:100	0.00
31.12	31.10	10+450	1:100	0.00
31.13	31.11	10+460	1:100	0.00
31.14	31.12	10+470	1:100	0.00
31.15	31.13	10+480	1:100	0.00
31.16	31.14	10+490	1:100	0.00
31.17	31.15	10+500	1:100	0.00
31.18	31.16	10+510	1:100	0.00
31.19	31.17	10+520	1:100	0.00
31.20	31.18	10+530	1:100	0.00
31.21	31.19	10+540	1:100	0.00
31.22	31.20	10+550	1:100	0.00
31.23	31.21	10+560	1:100	0.00
31.24	31.22	10+570	1:100	0.00
31.25	31.23	10+580	1:100	0.00
31.26	31.24	10+590	1:100	0.00
31.27	31.25	10+600	1:100	0.00
31.28	31.26	10+610	1:100	0.00
31.29	31.27	10+620	1:100	0.00
31.30	31.28	10+630	1:100	0.00
31.31	31.29	10+640	1:100	0.00
31.32	31.30	10+650	1:100	0.00
31.33	31.31	10+660	1:100	0.00
31.34	31.32	10+670	1:100	0.00
31.35	31.33	10+680	1:100	0.00
31.36	31.34	10+690	1:100	0.00
31.37	31.35	10+700	1:100	0.00
31.38	31.36	10+710	1:100	0.00
31.39	31.37	10+720	1:100	0.00
31.40	31.38	10+730	1:100	0.00
31.41	31.39	10+740	1:100	0.00
31.42	31.40	10+750	1:100	0.00
31.43	31.41	10+760	1:100	0.00
31.44	31.42	10+770	1:100	0.00
31.45	31.43	10+780	1:100	0.00
31.46	31.44	10+790	1:100	0.00
31.47	31.45	10+800	1:100	0.00
31.48	31.46	10+810	1:100	0.00
31.49	31.47	10+820	1:100	0.00
31.50	31.48	10+830	1:100	0.00
31.51	31.49	10+840	1:100	0.00
31.52	31.50	10+850	1:100	0.00
31.53	31.51	10+860	1:100	0.00
31.54	31.52	10+870	1:100	0.00
31.55	31.53	10+880	1:100	0.00
31.56	31.54	10+890	1:100	0.00
31.57	31.55	10+900	1:100	0.00

PROJECT:-
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 16/000 TO 17/000

CONSULTING ENGINEERS GROUP LTD.
 E-12, Meji Colony, Madhya Nagar, Anjar-17
 Tel. +91-141-2530889, 2537899, 2520256
 Fax: 2531348, e-mail: ceg@cegroup.com

LEGEND

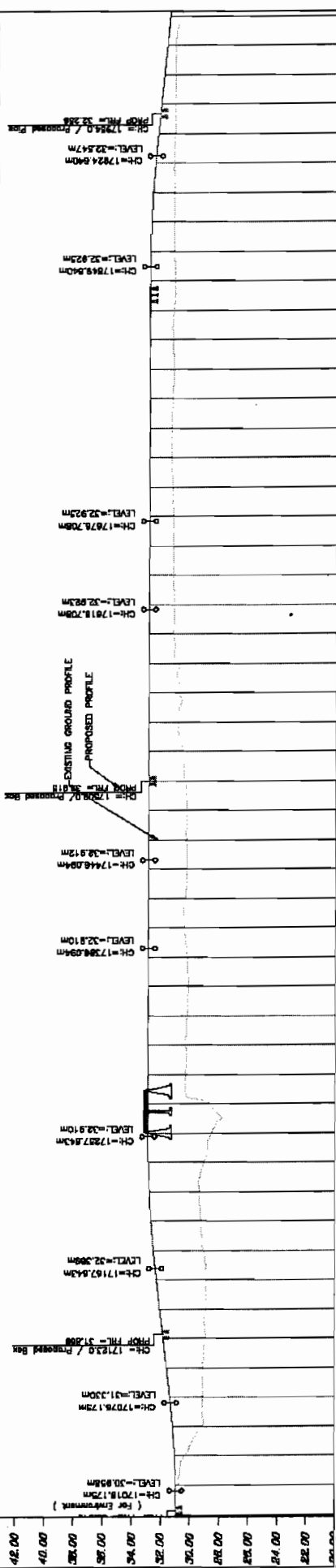
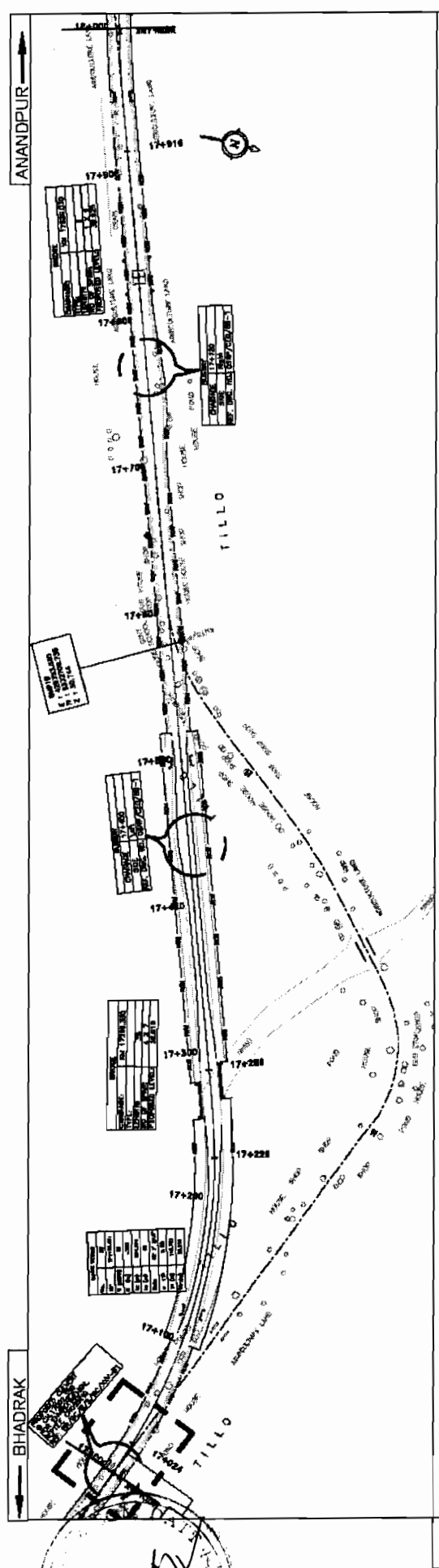
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- 2. EXISTING CANAL BANK
- 3. EXISTING CANAL
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- 99. EXISTING DRAIN CUT CHANNEL
- 100. EXISTING DRAIN CUT BANK

SCALE
 HORIZONTAL: 1 : 500
 VERTICAL: 1 : 100

DATE: 10/01/2018
PROJECT NO.: 10/01/2018
DRAWN BY: [Signature]
CHECKED BY: [Signature]
DATE OF ISSUE: 10/01/2018



SOM DATA BUILDERS JV
CONTRACTOR



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CH	LEVEL (m)
30.94	30.94	0.00%	0.00%			CH=17018.175M	LEVEL=30.958M
31.08	31.08	0.45%	0.45%			CH=17028.83M	LEVEL=31.108M
31.37	31.37	0.90%	0.90%			CH=17167.643M	LEVEL=31.403M
32.09	32.09	2.25%	2.25%			CH=17287.813M	LEVEL=32.103M
32.89	32.89	4.50%	4.50%			CH=17388.094M	LEVEL=32.810M
32.92	32.92	4.50%	4.50%			CH=17811.708M	LEVEL=32.825M
32.95	32.95	4.50%	4.50%			CH=17878.708M	LEVEL=32.825M
32.92	32.92	4.50%	4.50%			CH=17892.925M	LEVEL=32.825M
32.80	32.80	4.50%	4.50%			CH=17924.840M	LEVEL=32.825M
32.54	32.54	4.50%	4.50%			CH=17924.547M	LEVEL=32.825M
32.18	32.18	4.50%	4.50%			CH=17964.840M	LEVEL=32.825M
31.79	31.79	4.50%	4.50%			CH=17964.840M	LEVEL=32.825M
31.28	31.28	4.50%	4.50%			CH=17964.840M	LEVEL=32.825M
30.94	30.94	4.50%	4.50%			CH=17964.840M	LEVEL=32.825M

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION

BHADRAK TO ANANDPUR (SH-53) KM 17.000 TO KM 18/000

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

DRG NO. 03/08/18/11	REV 03	DATE 18/03/2018	K.S.G.	R.B.L.	R.D.K.	S.S.
SCALE	1:500	1:500	1:500	1:500	1:500	1:500

HORIZONTAL SCALE: 1:2,000
VERTICAL SCALE: 1:2,000

LEGEND:

- Proposed Road
- Existing Road
- Level of drainage
- Level of ground
- Level of road
- Level of bank
- Level of crest
- Level of drainage
- Level of drainage
- Level of drainage
- Level of drainage
- Level of drainage

VERTICAL CURVE DATA

CH=17018.175M

CH=17028.83M

CH=17167.643M

CH=17287.813M

CH=17388.094M

CH=17811.708M

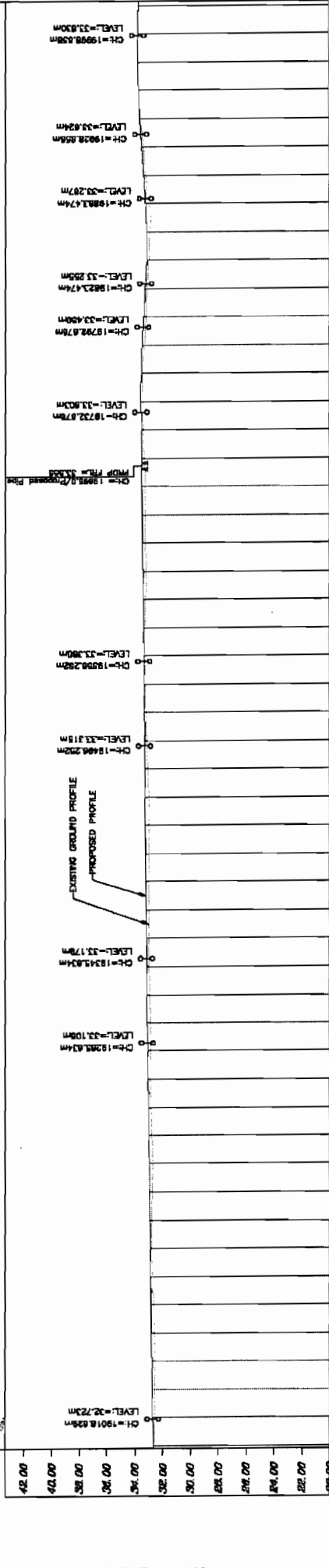
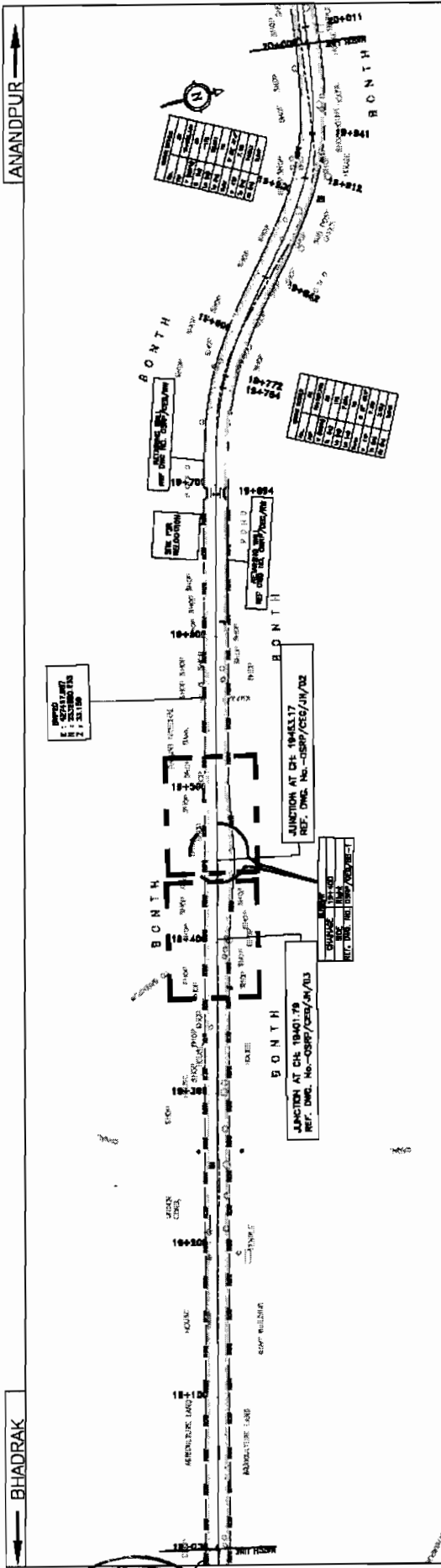
CH=17878.708M

CH=17892.925M

CH=17924.840M

CH=17924.547M

CH=17964.840M



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
42.00	32.731				
40.00	32.729				
38.00	32.724				
36.00	32.712				
34.00	32.692				
32.00	32.673				
30.00	32.654				
28.00	32.632				
26.00	32.607				
24.00	32.578				
22.00	32.542				
20.00	32.498				
18.00	32.446				
16.00	32.387				
14.00	32.321				
12.00	32.248				
10.00	32.168				
8.00	32.082				
6.00	31.982				
4.00	31.878				
2.00	31.761				
0.00	31.631				
1900.000	31.500				
1920.000	31.358				
1940.000	31.208				
1960.000	31.050				
1980.000	30.882				
2000.000	30.706				
2020.000	30.521				
2040.000	30.328				
2060.000	30.127				
2080.000	29.918				
2100.000	29.701				
2120.000	29.476				
2140.000	29.244				
2160.000	29.005				
2180.000	28.759				
2200.000	28.506				
2220.000	28.246				
2240.000	27.979				
2260.000	27.706				
2280.000	27.427				
2300.000	27.142				
2320.000	26.851				
2340.000	26.555				
2360.000	26.254				
2380.000	25.948				
2400.000	25.637				
2420.000	25.321				
2440.000	25.000				
2460.000	24.675				
2480.000	24.346				
2500.000	24.012				
2520.000	23.675				
2540.000	23.334				
2560.000	22.989				
2580.000	22.641				
2600.000	22.290				
2620.000	21.936				
2640.000	21.579				
2660.000	21.219				
2680.000	20.856				
2700.000	20.491				
2720.000	20.124				
2740.000	19.755				
2760.000	19.384				
2780.000	19.011				
2800.000	18.636				
2820.000	18.259				
2840.000	17.880				
2860.000	17.500				
2880.000	17.117				
2900.000	16.732				
2920.000	16.345				
2940.000	15.956				
2960.000	15.565				
2980.000	15.172				
3000.000	14.777				
3020.000	14.380				
3040.000	13.981				
3060.000	13.580				
3080.000	13.177				
3100.000	12.772				
3120.000	12.365				
3140.000	11.956				
3160.000	11.545				
3180.000	11.132				
3200.000	10.717				
3220.000	10.300				
3240.000	9.881				
3260.000	9.460				
3280.000	9.037				
3300.000	8.612				
3320.000	8.185				
3340.000	7.756				
3360.000	7.325				
3380.000	6.892				
3400.000	6.457				
3420.000	6.020				
3440.000	5.581				
3460.000	5.140				
3480.000	4.697				
3500.000	4.252				
3520.000	3.805				
3540.000	3.356				
3560.000	2.905				
3580.000	2.452				
3600.000	2.000				
3620.000	1.547				
3640.000	1.095				
3660.000	0.642				
3680.000	0.188				
3700.000	-0.265				
3720.000	-0.717				
3740.000	-1.168				
3760.000	-1.618				
3780.000	-2.067				
3800.000	-2.515				
3820.000	-2.962				
3840.000	-3.408				
3860.000	-3.854				
3880.000	-4.300				
3900.000	-4.745				
3920.000	-5.190				
3940.000	-5.635				
3960.000	-6.080				
3980.000	-6.525				
4000.000	-6.970				
4020.000	-7.415				
4040.000	-7.860				
4060.000	-8.305				
4080.000	-8.750				
4100.000	-9.195				
4120.000	-9.640				
4140.000	-10.085				
4160.000	-10.530				
4180.000	-10.975				
4200.000	-11.420				

PROJECT: WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 19/000 TO KM 20/000
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Colony, Khandagiri, Cuttack - 751007
 Tel: +91-674-2520959, 2521059, 2520055
 Fax: 2521344, e-mail: ceg@cegroupindia.com

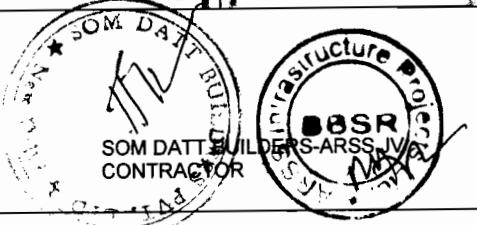
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DATUM = 20.00

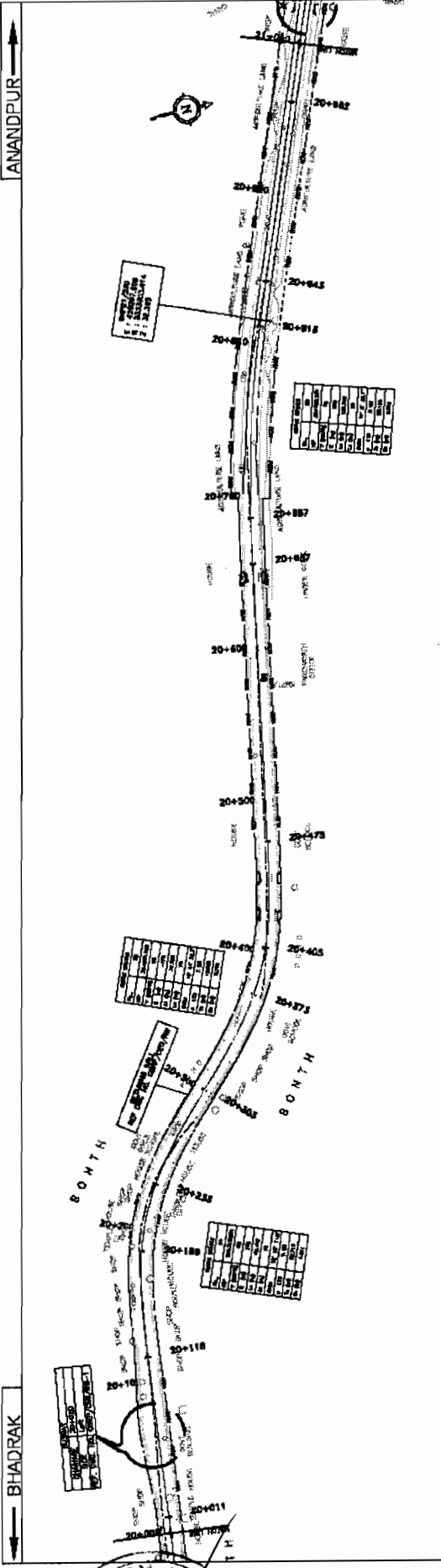
CHANGES:
 Checked by: _____
 Approved by: _____

EMPLOYER:

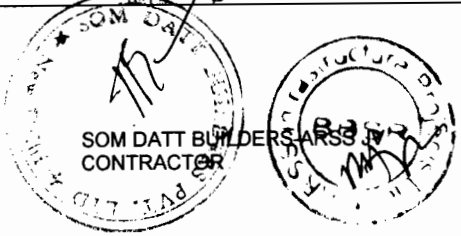


ANANDPUR

BHADRAK



Stationing	Proposed Road Level (m)	Existing Level (m)	Horizontal Alignment	Vertical Profile	Super Elevation	Crossfall	Change
110+00	33.830m	33.787m					
111+00	33.895m	33.757m					
112+00	33.881m	33.789m					
113+00	33.881m	33.851m					
114+00	34.044m	34.044m					
115+00	34.135m	34.135m					
116+00	34.285m	34.285m					
117+00	34.308m	34.308m					
118+00	34.348m	34.348m					
119+00	34.359m	34.359m					
120+00	34.370m	34.370m					
121+00	34.413m	34.413m					
122+00	34.458m	34.458m					
123+00	34.499m	34.499m					
124+00	34.542m	34.542m					
125+00	34.575m	34.575m					
126+00	34.583m	34.583m					
127+00	34.597m	34.597m					
128+00	34.530m	34.530m					
129+00	34.510m	34.510m					
130+00	34.491m	34.491m					
131+00	34.451m	34.451m					
132+00	34.424m	34.424m					
133+00	34.385m	34.385m					
134+00	34.347m	34.347m					
135+00	34.357m	34.357m					
136+00	34.391m	34.391m					
137+00	34.124m	34.124m					
138+00	34.208m	34.208m					
139+00	34.238m	34.238m					
140+00	34.241m	34.241m					
141+00	34.244m	34.244m					
142+00	34.248m	34.248m					
143+00	34.251m	34.251m					



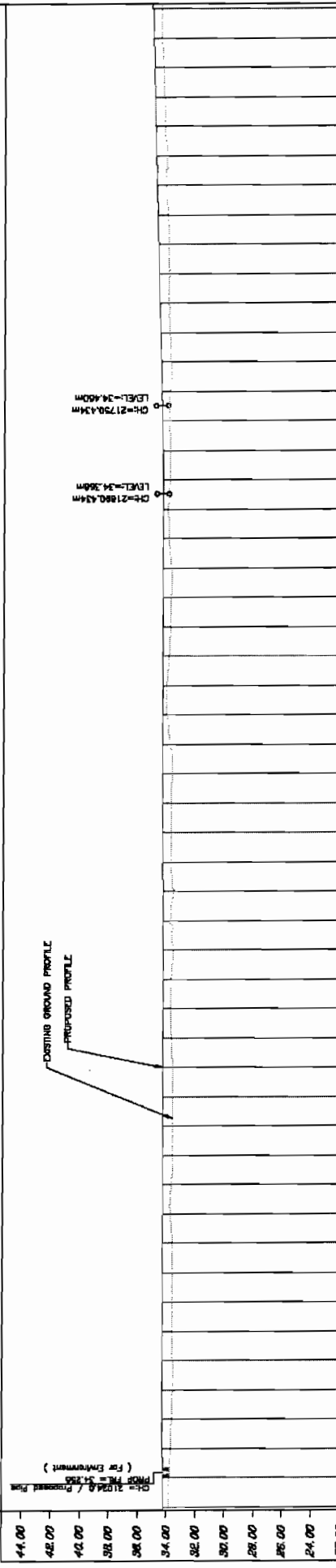
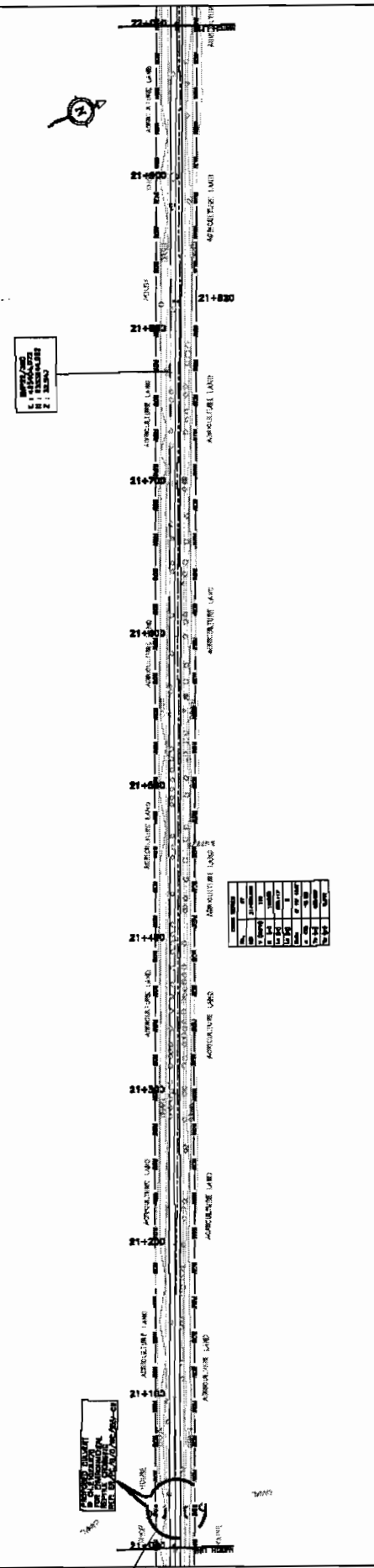
WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 20/000 TO KM 21/000
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

PROJECT:
CONSULTING ENGINEERS GROUP LTD.
 E-12, 60/1 Colony, Mohakhola, Bhubaneswar, Odisha-751005
 Tel. 91-674-2520895/2521899/2520558
 Fax: 91-674-2521545, e-mail: ceng@cegroup.com

LEGEND
 SYMBOLS AND SHORT NAMES FOR USE ON DRAWINGS
 1. EXISTING ROAD 2. PROPOSED ROAD 3. RIGHT OF WAY
 4. WATERWAY 5. FENCE 6. DRAINAGE
 7. UNIDENTIFIED OBJECT 8. UNIDENTIFIED OBJECT
 9. UNIDENTIFIED OBJECT 10. UNIDENTIFIED OBJECT
 11. UNIDENTIFIED OBJECT 12. UNIDENTIFIED OBJECT
 13. UNIDENTIFIED OBJECT 14. UNIDENTIFIED OBJECT
 15. UNIDENTIFIED OBJECT 16. UNIDENTIFIED OBJECT
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 195. UNIDENTIFIED OBJECT 196. UNIDENTIFIED OBJECT
 197. UNIDENTIFIED OBJECT 198. UNIDENTIFIED OBJECT
 199. UNIDENTIFIED OBJECT 200. UNIDENTIFIED OBJECT

BHADRAK

ANANDPUR



Station	Proposed Level (m)	Existing Level (m)	Grade (%)
21+00	34.285	34.285	0.00
21+05	34.285	34.285	0.00
21+10	34.285	34.285	0.00
21+15	34.285	34.285	0.00
21+20	34.285	34.285	0.00
21+25	34.285	34.285	0.00
21+30	34.285	34.285	0.00
21+35	34.285	34.285	0.00
21+40	34.285	34.285	0.00
21+45	34.285	34.285	0.00
21+50	34.285	34.285	0.00
21+55	34.285	34.285	0.00
21+60	34.285	34.285	0.00
21+65	34.285	34.285	0.00
21+70	34.285	34.285	0.00
21+75	34.285	34.285	0.00
21+80	34.285	34.285	0.00
21+85	34.285	34.285	0.00
21+90	34.285	34.285	0.00
21+95	34.285	34.285	0.00
22+00	34.285	34.285	0.00

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 21/000 TO KM 22/000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12/A of Colony Kalyani Nagar, New Delhi-110028
 Ph: 2611141, 2620886, 2621858, 2620356
 Fax: 2611140, e-mail: ceg@engineersgroup.com

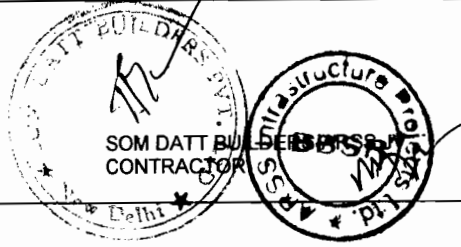
LEGEND

PROPOSED ROAD	EXISTING ROAD
AGRICULTURE LAND	AGRICULTURE LAND
ROAD	ROAD
DRAINAGE	DRAINAGE
CROSSING	CROSSING
...	...

SCALE
 HORIZONTAL: 1 : 200
 VERTICAL: 1 : 20

DATE: 22/01/2000
BY: [Signature]
CHECKED BY: [Signature]
APPROVED BY: [Signature]

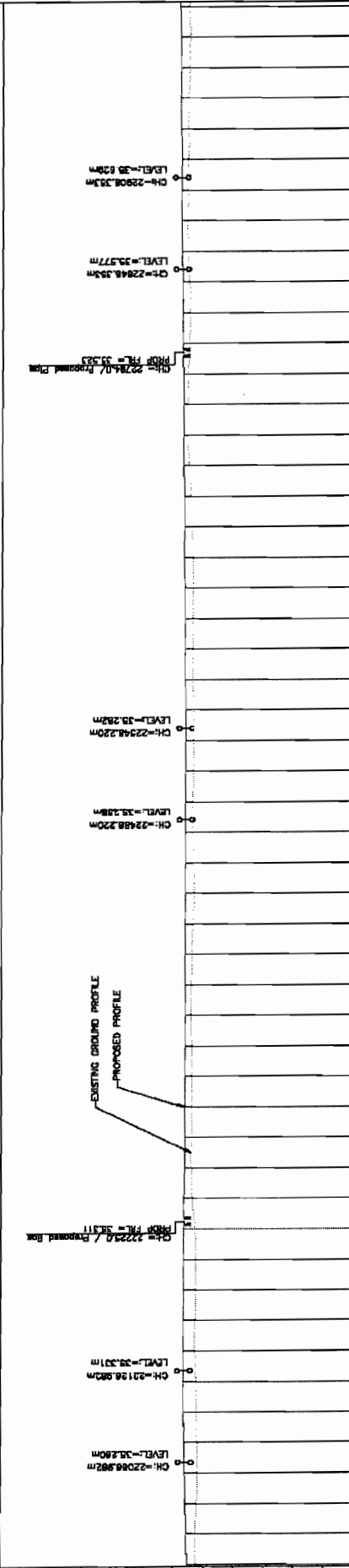
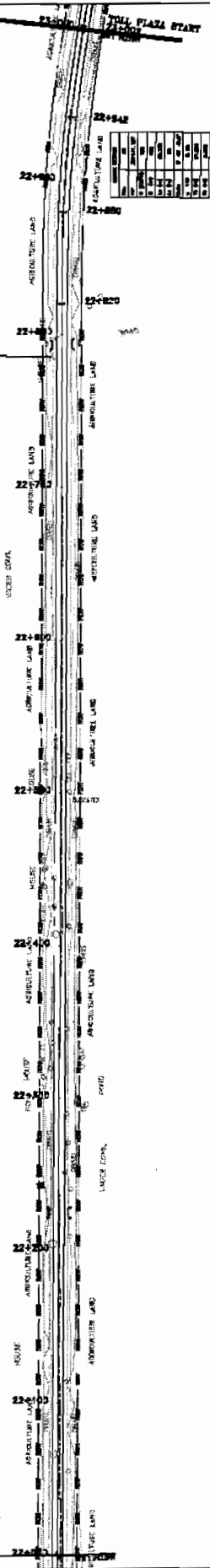
PROJECT NO.: [Blank]
DATE: 22/01/2000



← BHADRAK →

← ANANDPUR →

CONTRACT NO.
 12-1402
DATE OF CONTRACT
 12-10-2010



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGE
35.000	35.140					
35.050	35.191					
35.100	35.242					
35.150	35.293					
35.200	35.344					
35.250	35.395					
35.300	35.446					
35.350	35.497					
35.400	35.548					
35.450	35.599					
35.500	35.650					
35.550	35.701					
35.600	35.752					
35.650	35.803					
35.700	35.854					
35.750	35.905					
35.800	35.956					
35.850	36.007					
35.900	36.058					
35.950	36.109					
36.000	36.160					
36.050	36.211					
36.100	36.262					
36.150	36.313					
36.200	36.364					
36.250	36.415					
36.300	36.466					
36.350	36.517					
36.400	36.568					
36.450	36.619					
36.500	36.670					
36.550	36.721					
36.600	36.772					
36.650	36.823					
36.700	36.874					
36.750	36.925					
36.800	36.976					
36.850	37.027					
36.900	37.078					
36.950	37.129					
37.000	37.180					
37.050	37.231					
37.100	37.282					
37.150	37.333					
37.200	37.384					
37.250	37.435					
37.300	37.486					
37.350	37.537					
37.400	37.588					
37.450	37.639					
37.500	37.690					
37.550	37.741					
37.600	37.792					
37.650	37.843					
37.700	37.894					
37.750	37.945					
37.800	38.000					
37.850	38.055					
37.900	38.110					
37.950	38.165					
38.000	38.220					
38.050	38.275					
38.100	38.330					
38.150	38.385					
38.200	38.440					
38.250	38.495					
38.300	38.550					
38.350	38.605					
38.400	38.660					
38.450	38.715					
38.500	38.770					
38.550	38.825					
38.600	38.880					
38.650	38.935					
38.700	38.990					
38.750	39.045					
38.800	39.100					
38.850	39.155					
38.900	39.210					
38.950	39.265					
39.000	39.320					
39.050	39.375					
39.100	39.430					
39.150	39.485					
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39.250	39.595					
39.300	39.650					
39.350	39.705					
39.400	39.760					
39.450	39.815					
39.500	39.870					
39.550	39.925					
39.600	39.980					
39.650	40.035					
39.700	40.090					
39.750	40.145					
39.800	40.200					
39.850	40.255					
39.900	40.310					
39.950	40.365					
40.000	40.420					
40.050	40.475					
40.100	40.530					
40.150	40.585					
40.200	40.640					
40.250	40.695					
40.300	40.750					
40.350	40.805					
40.400	40.860					
40.450	40.915					
40.500	40.970					
40.550	41.025					
40.600	41.080					
40.650	41.135					
40.700	41.190					
40.750	41.245					
40.800	41.300					
40.850	41.355					
40.900	41.410					
40.950	41.465					
41.000	41.520					

DATUM = 24.00	
PROPOSED ROAD LEVEL (m)	
EXISTING LEVEL (m)	
HORIZONTAL ALIGNMENT	
VERTICAL PROFILE	
SUPERELEVATION	
CROSSFALL	
CHANGE	

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION

BHADRAK TO ANANDPUR (SH-53) KM 22/000 TO KM 23/000

NO.	DATE	REV.	NO.	R.E.	R.E.D.K.	S.G.
1	22/05/11		1			

SCALE: HORIZONTAL: 1 : 200
VERTICAL: 1 : 100

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12/1402 Colony, Mohape Nagar, Bhubaneswar - 751006
 Tel: 91-674-2503895, 2503896, 2503897
 Fax: 2503894, 2503895
 e-mail: cegroup@cegroup.com

LEGEND

THICK LINE: BOUNDARY OF CHALK LINE

THIN LINE: BOUNDARY OF CHALK LINE

DASHED LINE: BOUNDARY OF CHALK LINE

DOTTED LINE: BOUNDARY OF CHALK LINE

DASH-DOTTED LINE: BOUNDARY OF CHALK LINE

SOLID LINE: BOUNDARY OF CHALK LINE

DASH-DOTTED LINE: BOUNDARY OF CHALK LINE

DOTTED LINE: BOUNDARY OF CHALK LINE

DASH-DOTTED LINE: BOUNDARY OF CHALK LINE

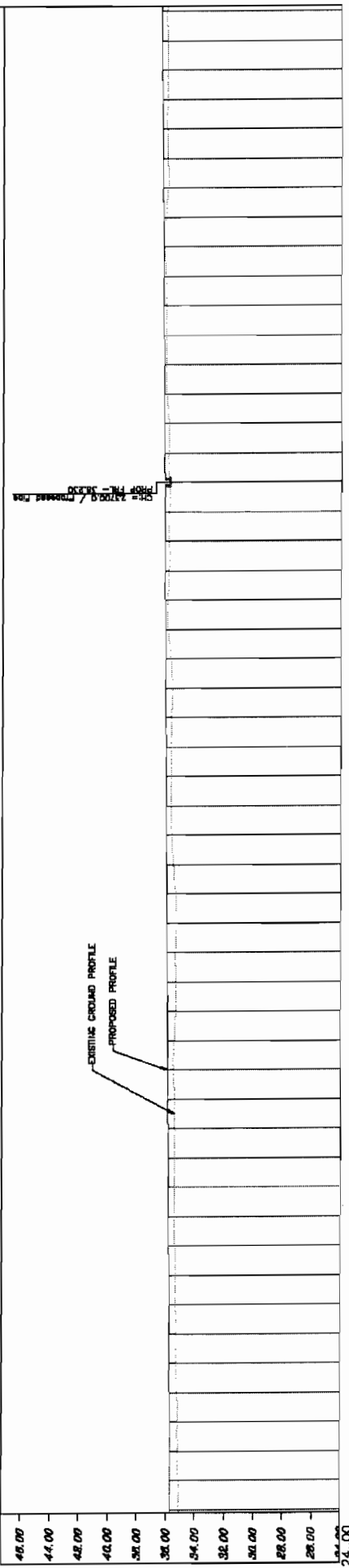
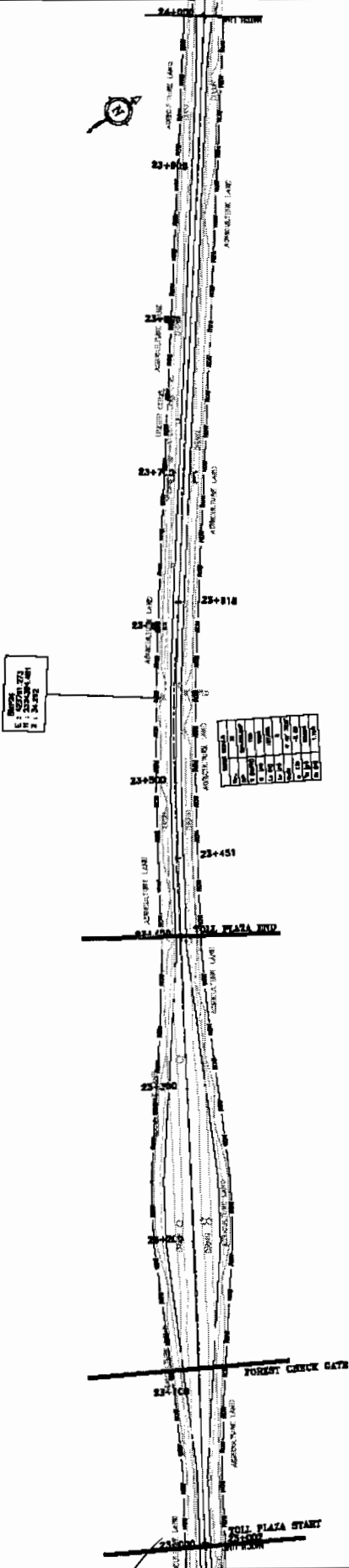
SOLID LINE: BOUNDARY OF CHALK LINE

SOM DATI BUILDERS PVT. LTD.
 CONTRACTOR

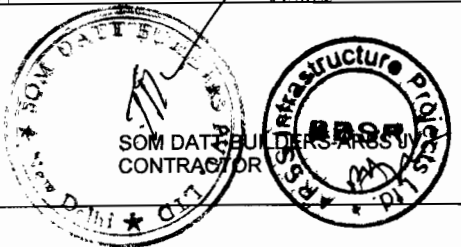
CONTRACT NO. 12-1402

BHADRAK

ANANDPUR



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHINAGE
24.00	24.00					
24.25	24.25					
24.50	24.50					
24.75	24.75					
25.00	25.00					
25.25	25.25					
25.50	25.50					
25.75	25.75					
26.00	26.00					
26.25	26.25					
26.50	26.50					
26.75	26.75					
27.00	27.00					
27.25	27.25					
27.50	27.50					
27.75	27.75					
28.00	28.00					
28.25	28.25					
28.50	28.50					
28.75	28.75					
29.00	29.00					
29.25	29.25					
29.50	29.50					
29.75	29.75					
30.00	30.00					
30.25	30.25					
30.50	30.50					
30.75	30.75					
31.00	31.00					
31.25	31.25					
31.50	31.50					
31.75	31.75					
32.00	32.00					
32.25	32.25					
32.50	32.50					
32.75	32.75					
33.00	33.00					
33.25	33.25					
33.50	33.50					
33.75	33.75					
34.00	34.00					
34.25	34.25					
34.50	34.50					
34.75	34.75					
35.00	35.00					
35.25	35.25					
35.50	35.50					
35.75	35.75					
36.00	36.00					
36.25	36.25					
36.50	36.50					
36.75	36.75					
37.00	37.00					
37.25	37.25					
37.50	37.50					
37.75	37.75					
38.00	38.00					
38.25	38.25					
38.50	38.50					
38.75	38.75					
39.00	39.00					
39.25	39.25					
39.50	39.50					
39.75	39.75					
40.00	40.00					
40.25	40.25					
40.50	40.50					
40.75	40.75					
41.00	41.00					
41.25	41.25					
41.50	41.50					
41.75	41.75					
42.00	42.00					
42.25	42.25					
42.50	42.50					
42.75	42.75					
43.00	43.00					
43.25	43.25					
43.50	43.50					
43.75	43.75					
44.00	44.00					
44.25	44.25					
44.50	44.50					
44.75	44.75					
45.00	45.00					
45.25	45.25					
45.50	45.50					
45.75	45.75					
46.00	46.00					
46.25	46.25					
46.50	46.50					
46.75	46.75					
47.00	47.00					
47.25	47.25					
47.50	47.50					
47.75	47.75					
48.00	48.00					



PROJECT:
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM. 23/000 TO KM. 24/000

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Colony, Madhya Nagar, Jaipur-302008
 P.O. Box 258194, E-mail: ceng@engineersgroup.com

LEGEND

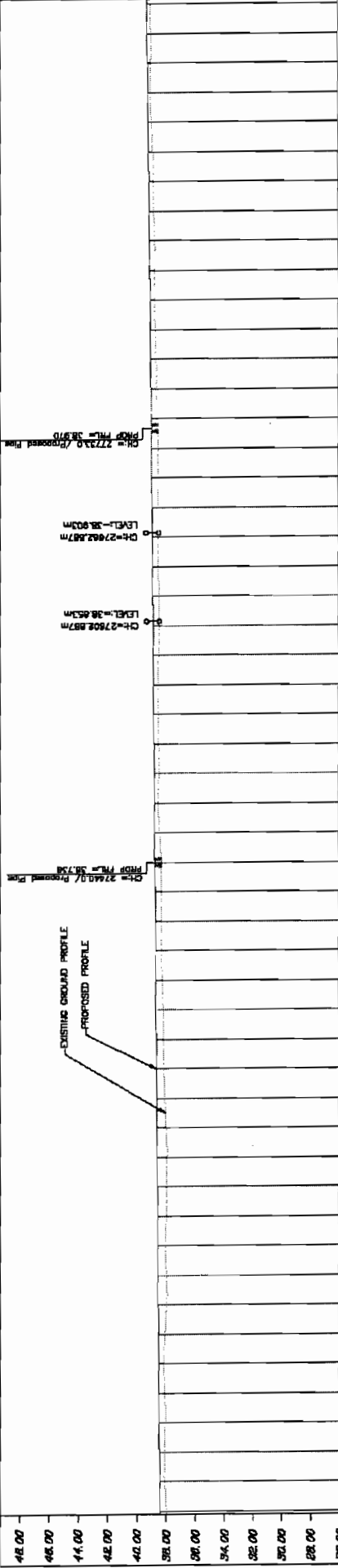
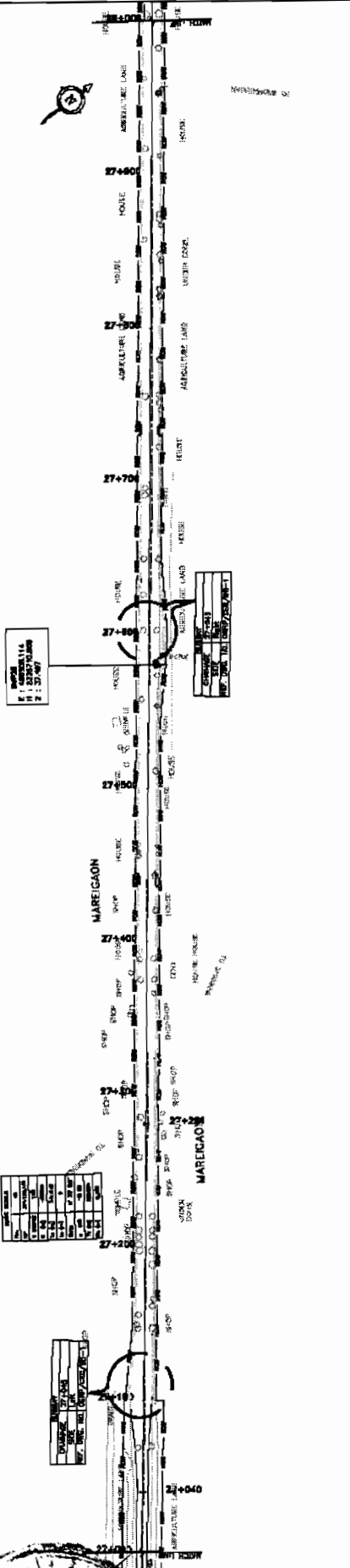
1	PROPOSED ROAD
2	EXISTING ROAD
3	APPROXIMATE LANE
4	APPROXIMATE LANE
5	APPROXIMATE LANE
6	APPROXIMATE LANE
7	APPROXIMATE LANE
8	APPROXIMATE LANE
9	APPROXIMATE LANE
10	APPROXIMATE LANE
11	APPROXIMATE LANE
12	APPROXIMATE LANE
13	APPROXIMATE LANE
14	APPROXIMATE LANE
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30	APPROXIMATE LANE
31	APPROXIMATE LANE
32	APPROXIMATE LANE
33	APPROXIMATE LANE
34	APPROXIMATE LANE
35	APPROXIMATE LANE
36	APPROXIMATE LANE
37	APPROXIMATE LANE
38	APPROXIMATE LANE
39	APPROXIMATE LANE
40	APPROXIMATE LANE
41	APPROXIMATE LANE
42	APPROXIMATE LANE
43	APPROXIMATE LANE
44	APPROXIMATE LANE
45	APPROXIMATE LANE
46	APPROXIMATE LANE
47	APPROXIMATE LANE
48	APPROXIMATE LANE
49	APPROXIMATE LANE
50	APPROXIMATE LANE
51	APPROXIMATE LANE
52	APPROXIMATE LANE
53	APPROXIMATE LANE
54	APPROXIMATE LANE
55	APPROXIMATE LANE
56	APPROXIMATE LANE
57	APPROXIMATE LANE
58	APPROXIMATE LANE
59	APPROXIMATE LANE
60	APPROXIMATE LANE
61	APPROXIMATE LANE
62	APPROXIMATE LANE
63	APPROXIMATE LANE
64	APPROXIMATE LANE
65	APPROXIMATE LANE
66	APPROXIMATE LANE
67	APPROXIMATE LANE
68	APPROXIMATE LANE
69	APPROXIMATE LANE
70	APPROXIMATE LANE
71	APPROXIMATE LANE
72	APPROXIMATE LANE
73	APPROXIMATE LANE
74	APPROXIMATE LANE
75	APPROXIMATE LANE
76	APPROXIMATE LANE
77	APPROXIMATE LANE
78	APPROXIMATE LANE
79	APPROXIMATE LANE
80	APPROXIMATE LANE
81	APPROXIMATE LANE
82	APPROXIMATE LANE
83	APPROXIMATE LANE
84	APPROXIMATE LANE
85	APPROXIMATE LANE
86	APPROXIMATE LANE
87	APPROXIMATE LANE
88	APPROXIMATE LANE
89	APPROXIMATE LANE
90	APPROXIMATE LANE
91	APPROXIMATE LANE
92	APPROXIMATE LANE
93	APPROXIMATE LANE
94	APPROXIMATE LANE
95	APPROXIMATE LANE
96	APPROXIMATE LANE
97	APPROXIMATE LANE
98	APPROXIMATE LANE
99	APPROXIMATE LANE
100	APPROXIMATE LANE

SCALE: HORIZONTAL: 1 : 200
 VERTICAL: 1 : 200

DATE: 24/01/2020
 REV: 01
 R.E.: R.L.D.K
 M.S.P.: M.S.P
 S.P.: S.P

ANANDPUR

BHADRAK



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION & CROSSFALL	CHANGES
68.222	68.222				
68.203	68.203				
68.184	68.184				
68.165	68.165				
68.148	68.148				
68.127	68.127				
68.108	68.108				
68.088	68.088				
68.070	68.070				
68.052	68.052				
68.033	68.033				
68.014	68.014				
67.995	67.995				
67.976	67.976				
67.957	67.957				
67.938	67.938				
67.919	67.919				
67.900	67.900				
67.882	67.882				
67.863	67.863				
67.847	67.847				
67.823	67.823				
67.809	67.809				
67.795	67.795				
67.780	67.780				
67.766	67.766				
67.752	67.752				
67.738	67.738				
67.724	67.724				
67.710	67.710				
67.695	67.695				
67.681	67.681				
67.667	67.667				
67.653	67.653				
67.639	67.639				
67.625	67.625				
67.610	67.610				
67.596	67.596				
67.582	67.582				
67.568	67.568				
67.554	67.554				
67.540	67.540				
67.525	67.525				
67.511	67.511				
67.497	67.497				
67.483	67.483				
67.469	67.469				
67.455	67.455				
67.440	67.440				
67.426	67.426				
67.412	67.412				
67.398	67.398				
67.384	67.384				
67.370	67.370				
67.356	67.356				
67.342	67.342				
67.328	67.328				
67.314	67.314				
67.300	67.300				
67.286	67.286				
67.272	67.272				
67.258	67.258				
67.244	67.244				

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR CRISGA STATE ROAD ASSISTANCE UNDER WORLD BANK ASSISTANCE

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 27/000 TO KM 28/000

DATE: 28/10/2014
 DRAWN: S.D. / S.D.
 CHECKED: S.D. / S.D.
 APPROVED: S.D. / S.D.

SCALE: HORIZONTAL: 1:200 VERTICAL: 1:200

S.O. H.S.D.K. S.G.

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Gurgaon, Haryana
 Tel: 91-11-41-2350899, 2321899, 2320558
 Fax: 2821344, e-mail: ce@cegindia.com

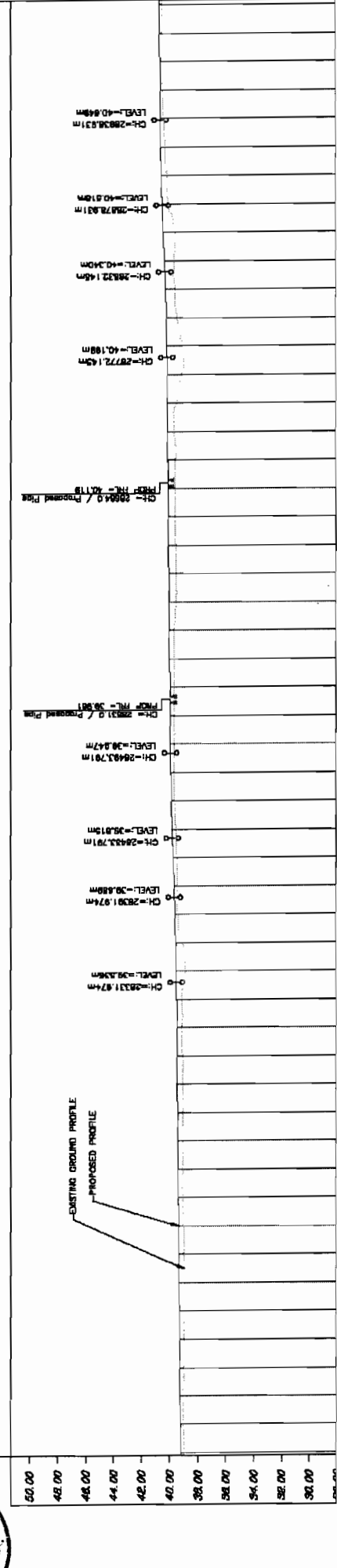
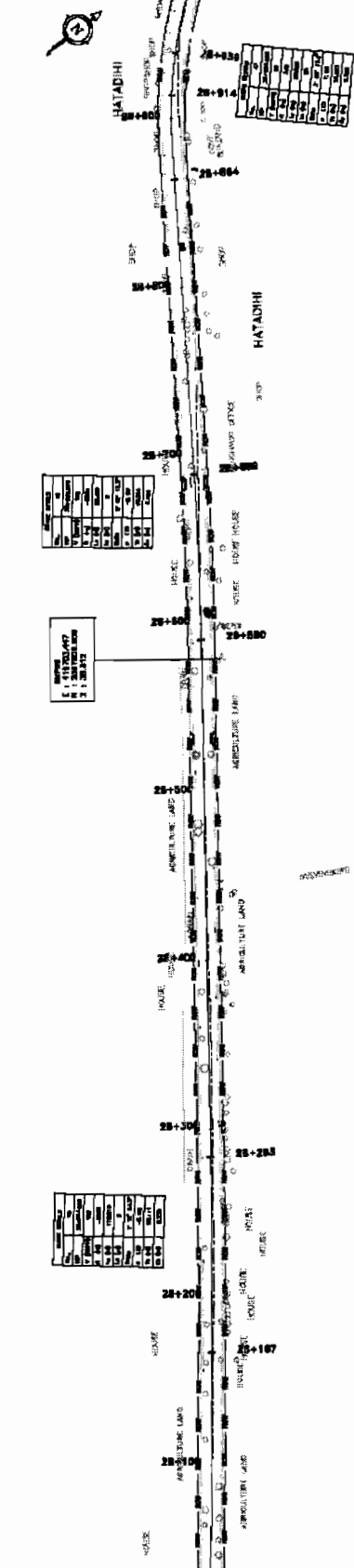
LEGEND

1	PROPOSED ROAD	1	EXISTING ROAD
2	EXISTING ROAD	2	EXISTING ROAD
3	EXISTING ROAD	3	EXISTING ROAD
4	EXISTING ROAD	4	EXISTING ROAD
5	EXISTING ROAD	5	EXISTING ROAD
6	EXISTING ROAD	6	EXISTING ROAD
7	EXISTING ROAD	7	EXISTING ROAD
8	EXISTING ROAD	8	EXISTING ROAD
9	EXISTING ROAD	9	EXISTING ROAD
10	EXISTING ROAD	10	EXISTING ROAD
11	EXISTING ROAD	11	EXISTING ROAD
12	EXISTING ROAD	12	EXISTING ROAD
13	EXISTING ROAD	13	EXISTING ROAD
14	EXISTING ROAD	14	EXISTING ROAD
15	EXISTING ROAD	15	EXISTING ROAD
16	EXISTING ROAD	16	EXISTING ROAD
17	EXISTING ROAD	17	EXISTING ROAD
18	EXISTING ROAD	18	EXISTING ROAD
19	EXISTING ROAD	19	EXISTING ROAD
20	EXISTING ROAD	20	EXISTING ROAD

SOM DATT BUILDERS & ARCHITECTS
CONTRACTOR

BBSR Infrastructure Projects Ltd.

BHADRAK ← → ANANDPUR



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	ROAD CROSSFALL	CHWAGE
50.000	49.998	0.000				
49.990	49.988	0.000				
49.980	49.978	0.000				
49.970	49.968	0.000				
49.960	49.958	0.000				
49.950	49.948	0.000				
49.940	49.938	0.000				
49.930	49.928	0.000				
49.920	49.918	0.000				
49.910	49.908	0.000				
49.900	49.898	0.000				
49.890	49.888	0.000				
49.880	49.878	0.000				
49.870	49.868	0.000				
49.860	49.858	0.000				
49.850	49.848	0.000				
49.840	49.838	0.000				
49.830	49.828	0.000				
49.820	49.818	0.000				
49.810	49.808	0.000				
49.800	49.798	0.000				
49.790	49.788	0.000				
49.780	49.778	0.000				
49.770	49.768	0.000				
49.760	49.758	0.000				
49.750	49.748	0.000				
49.740	49.738	0.000				
49.730	49.728	0.000				
49.720	49.718	0.000				
49.710	49.708	0.000				
49.700	49.698	0.000				
49.690	49.688	0.000				
49.680	49.678	0.000				
49.670	49.668	0.000				
49.660	49.658	0.000				
49.650	49.648	0.000				
49.640	49.638	0.000				
49.630	49.628	0.000				
49.620	49.618	0.000				
49.610	49.608	0.000				
49.600	49.598	0.000				
49.590	49.588	0.000				
49.580	49.578	0.000				
49.570	49.568	0.000				
49.560	49.558	0.000				
49.550	49.548	0.000				
49.540	49.538	0.000				
49.530	49.528	0.000				
49.520	49.518	0.000				
49.510	49.508	0.000				
49.500	49.498	0.000				
49.490	49.488	0.000				
49.480	49.478	0.000				
49.470	49.468	0.000				
49.460	49.458	0.000				
49.450	49.448	0.000				
49.440	49.438	0.000				
49.430	49.428	0.000				
49.420	49.418	0.000				
49.410	49.408	0.000				
49.400	49.398	0.000				
49.390	49.388	0.000				
49.380	49.378	0.000				
49.370	49.368	0.000				
49.360	49.358	0.000				
49.350	49.348	0.000				
49.340	49.338	0.000				
49.330	49.328	0.000				
49.320	49.318	0.000				
49.310	49.308	0.000				
49.300	49.298	0.000				
49.290	49.288	0.000				
49.280	49.278	0.000				
49.270	49.268	0.000				
49.260	49.258	0.000				
49.250	49.248	0.000				
49.240	49.238	0.000				
49.230	49.228	0.000				
49.220	49.218	0.000				

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 28/000 TO KM 29/000

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

CONTRACT NO.
S.R.L.S. NO.
S.H.S. NO.
SCALE: HORIZONTAL: 1:2000 VERTICAL: 1:200

LEGEND


SYMBOL	DESCRIPTION
—	LIMITS OF SPECIAL CLASS
- - -	LIMITS OF GENERAL CLASS
.....	LIMITS OF INTERMEDIATE CLASS
----	LIMITS OF A CLASS
—	LIMITS OF B CLASS
- - -	LIMITS OF C CLASS
.....	LIMITS OF D CLASS
----	LIMITS OF E CLASS
—	LIMITS OF F CLASS
- - -	LIMITS OF G CLASS
.....	LIMITS OF H CLASS
----	LIMITS OF I CLASS
—	LIMITS OF J CLASS
- - -	LIMITS OF K CLASS
.....	LIMITS OF L CLASS
----	LIMITS OF M CLASS
—	LIMITS OF N CLASS
- - -	LIMITS OF O CLASS
.....	LIMITS OF P CLASS
----	LIMITS OF Q CLASS
—	LIMITS OF R CLASS
- - -	LIMITS OF S CLASS
.....	LIMITS OF T CLASS
----	LIMITS OF U CLASS
—	LIMITS OF V CLASS
- - -	LIMITS OF W CLASS
.....	LIMITS OF X CLASS
----	LIMITS OF Y CLASS
—	LIMITS OF Z CLASS

REVISIONS

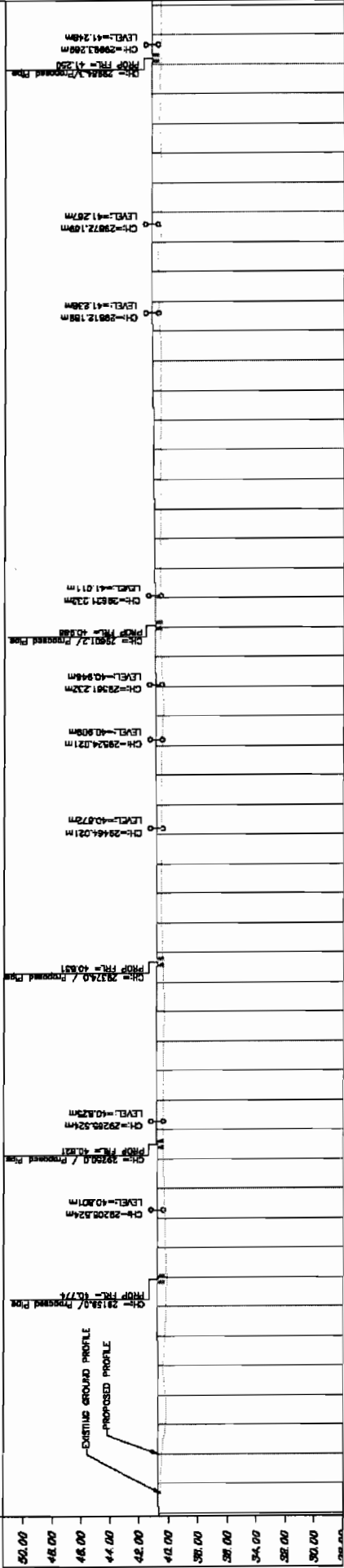
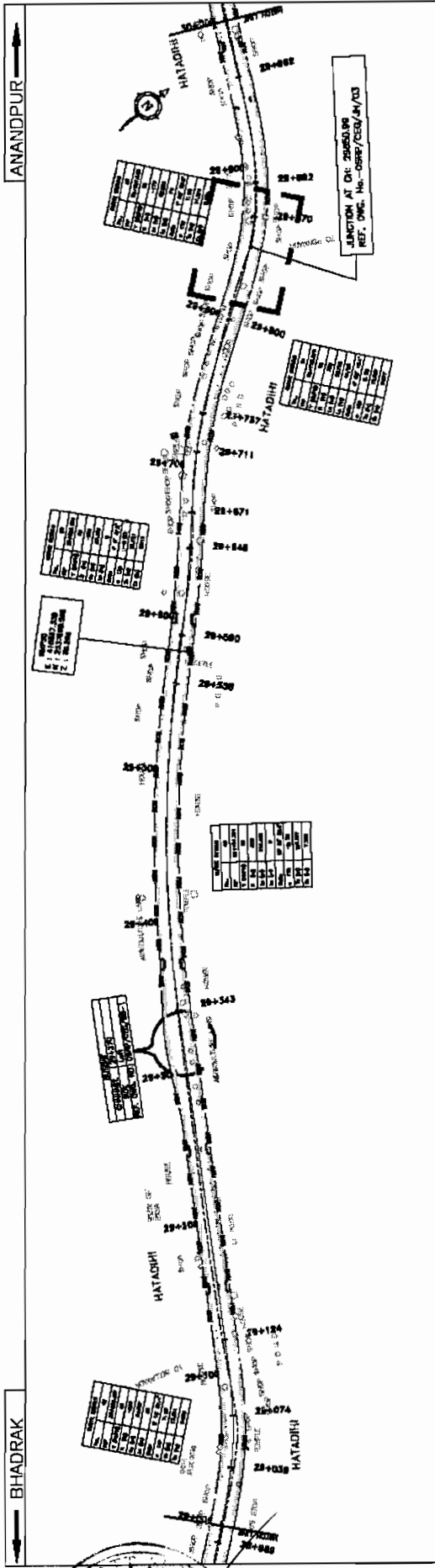
NO.	DESCRIPTION	DATE
1	ISSUED FOR TENDER	15.12.2010
2	ISSUED FOR EXECUTION	15.12.2010

PREPARED BY: *[Signature]*
CHECKED BY: *[Signature]*
DATE: 15/12/2010

SOM DATT BUILDERS & CONTRACTORS



BBSR Infrastructure Projects Ltd.



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGEM
47.250	47.250					
47.260	47.260					
47.270	47.270					
47.280	47.280					
47.290	47.290					
47.300	47.300					
47.310	47.310					
47.320	47.320					
47.330	47.330					
47.340	47.340					
47.350	47.350					
47.360	47.360					
47.370	47.370					
47.380	47.380					
47.390	47.390					
47.400	47.400					
47.410	47.410					
47.420	47.420					
47.430	47.430					
47.440	47.440					
47.450	47.450					
47.460	47.460					
47.470	47.470					
47.480	47.480					
47.490	47.490					
47.500	47.500					
47.510	47.510					
47.520	47.520					
47.530	47.530					
47.540	47.540					
47.550	47.550					
47.560	47.560					
47.570	47.570					
47.580	47.580					
47.590	47.590					
47.600	47.600					
47.610	47.610					
47.620	47.620					
47.630	47.630					
47.640	47.640					
47.650	47.650					
47.660	47.660					
47.670	47.670					
47.680	47.680					
47.690	47.690					
47.700	47.700					
47.710	47.710					
47.720	47.720					
47.730	47.730					
47.740	47.740					
47.750	47.750					
47.760	47.760					
47.770	47.770					
47.780	47.780					
47.790	47.790					
47.800	47.800					
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47.820	47.820					
47.830	47.830					
47.840	47.840					
47.850	47.850					
47.860	47.860					
47.870	47.870					
47.880	47.880					
47.890	47.890					
47.900	47.900					
47.910	47.910					
47.920	47.920					
47.930	47.930					
47.940	47.940					
47.950	47.950					
47.960	47.960					
47.970	47.970					
47.980	47.980					
47.990	47.990					
48.000	48.000					

PROJECT:-
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 29.000 TO KM 30.000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Colony, New Market, Bhubaneswar - 751017
 Tel : +91-674-2520550, 2521550, 2521550
 Fax : 2521548, e-mail : ceg@cegroup.com

LEGEND

<input type="checkbox"/>	LEVEL OF EXISTING GROUND
<input type="checkbox"/>	LEVEL OF PROPOSED ROAD
<input type="checkbox"/>	LEVEL OF EXISTING BANK
<input type="checkbox"/>	LEVEL OF PROPOSED BANK
<input type="checkbox"/>	LEVEL OF EXISTING CHANNEL
<input type="checkbox"/>	LEVEL OF PROPOSED CHANNEL
<input type="checkbox"/>	LEVEL OF EXISTING STRUCTURE
<input type="checkbox"/>	LEVEL OF PROPOSED STRUCTURE
<input type="checkbox"/>	LEVEL OF EXISTING UTILITY
<input type="checkbox"/>	LEVEL OF PROPOSED UTILITY

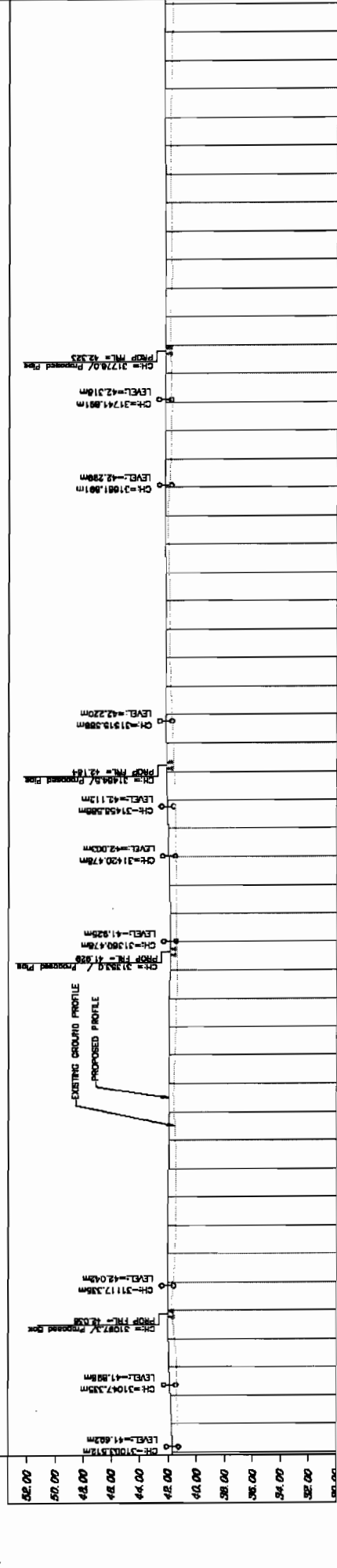
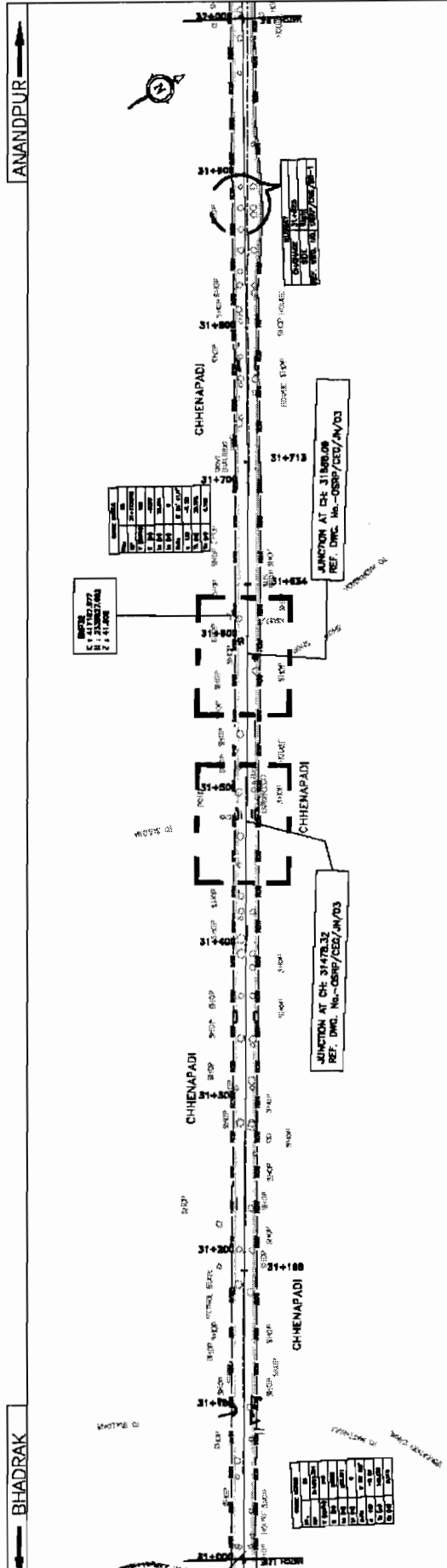
SOM DATT BUILDERS & CONTRACTORS
 ANANDPUR

ASSOCIATION OF ROAD & INFRASTRUCTURE PROJECTS LTD.

DATUM = 28.00

VOL-IV/Page 123

EMPLOYER



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHARGE
42.358	42.358					
42.356	42.356					
42.353	42.353					
42.350	42.350					
42.348	42.348					
42.345	42.345					
42.342	42.342					
42.338	42.338					
42.335	42.335					
42.333	42.333					
42.330	42.330					
42.327	42.327					
42.324	42.324					
42.321	42.321					
42.318	42.318					
42.314	42.314					
42.307	42.307					
42.298	42.298					
42.279	42.279					
42.270	42.270					
42.260	42.260					
42.251	42.251					
42.241	42.241					
42.232	42.232					
42.222	42.222					
42.207	42.207					
42.175	42.175					
42.128	42.128					
42.094	42.094					
42.002	42.002					
41.927	41.927					
41.923	41.923					
41.936	41.936					
41.944	41.944					
41.954	41.954					
41.984	41.984					
41.973	41.973					
41.983	41.983					
41.993	41.993					
42.002	42.002					
42.012	42.012					
42.021	42.021					
42.031	42.031					
42.041	42.041					
42.038	42.038					
42.008	42.008					
41.949	41.949					
41.882	41.882					
41.798	41.798					
41.78	41.78					

CONSULTING ENGINEERS GROUP LTD.
 E-12, Mohi Colony, Mohi Nagar, Jaipur-302017
 Tel. +91-141-3520881, 3521666, 3520555
 Fax 3521544, e-mail: ceg@cegltd.com

PROJECT:-
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 31/000 TO KM 32/000

DATE: 24/11/2022
 DRAWN BY: J.S.
 CHECKED BY: J.S.
 SCALE: HORIZONTAL: 1:2000, VERTICAL: 1:500

LEGEND

PROPOSED ROAD LEVEL (m)

EXISTING LEVEL (m)

HORIZONTAL ALIGNMENT

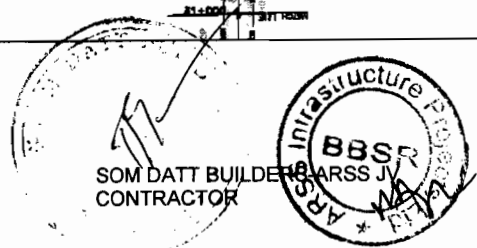
VERTICAL PROFILE

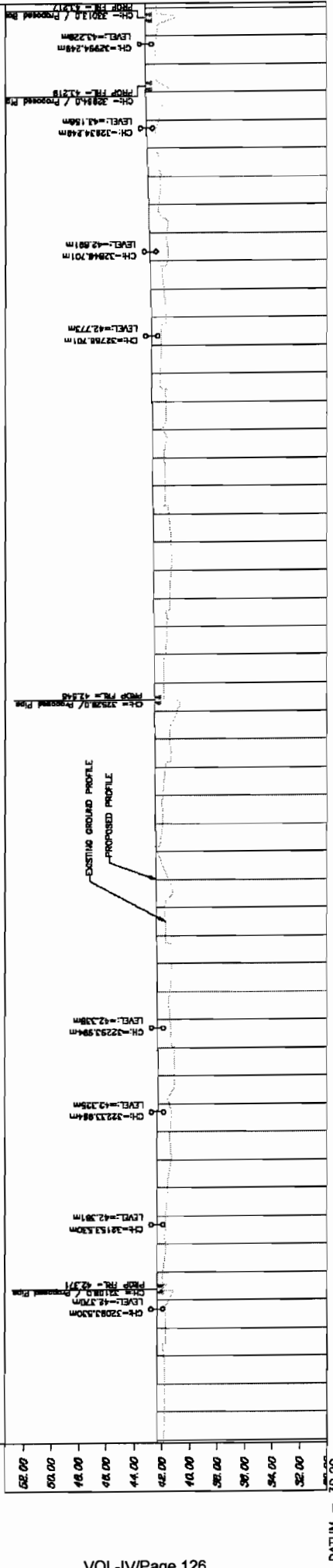
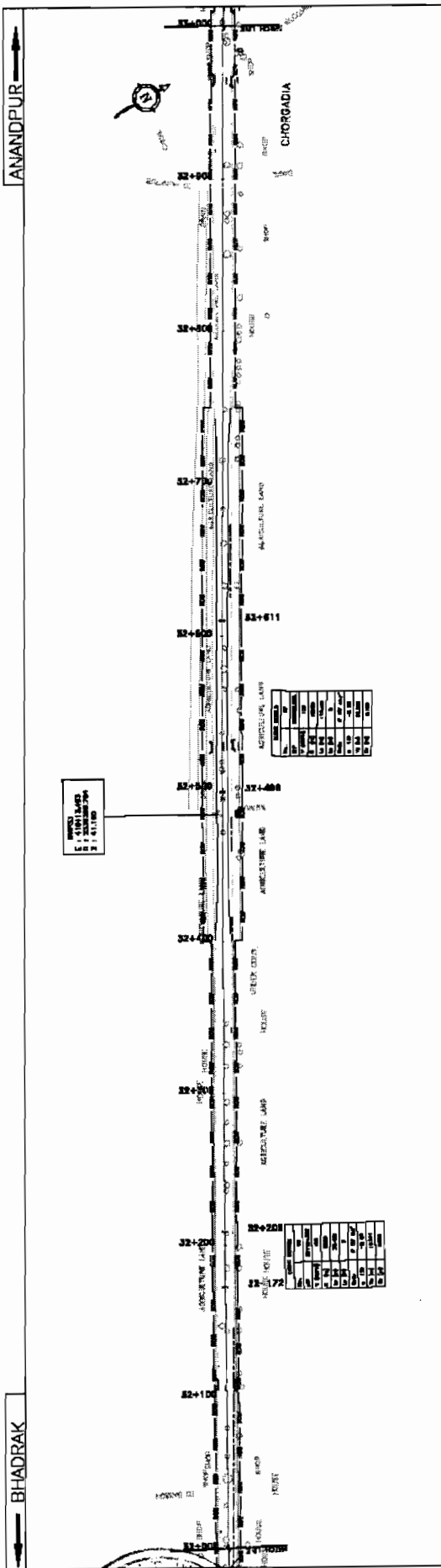
SUPERELEVATION

CROSSFALL

CHARGE

EMPLOYER





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGING
42.358	41.213					
42.359	41.214					
42.360	41.215					
42.361	41.216					
42.362	41.217					
42.363	41.218					
42.364	41.219					
42.365	41.220					
42.366	41.221					
42.367	41.222					
42.368	41.223					
42.369	41.224					
42.370	41.225					
42.371	41.226					
42.372	41.227					
42.373	41.228					
42.374	41.229					
42.375	41.230					
42.376	41.231					
42.377	41.232					
42.378	41.233					
42.379	41.234					
42.380	41.235					
42.381	41.236					
42.382	41.237					
42.383	41.238					
42.384	41.239					
42.385	41.240					
42.386	41.241					
42.387	41.242					
42.388	41.243					
42.389	41.244					
42.390	41.245					
42.391	41.246					
42.392	41.247					
42.393	41.248					
42.394	41.249					
42.395	41.250					
42.396	41.251					
42.397	41.252					
42.398	41.253					
42.399	41.254					
42.400	41.255					
42.401	41.256					
42.402	41.257					
42.403	41.258					
42.404	41.259					
42.405	41.260					
42.406	41.261					
42.407	41.262					
42.408	41.263					
42.409	41.264					
42.410	41.265					
42.411	41.266					
42.412	41.267					
42.413	41.268					
42.414	41.269					
42.415	41.270					
42.416	41.271					
42.417	41.272					
42.418	41.273					
42.419	41.274					
42.420	41.275					
42.421	41.276					
42.422	41.277					
42.423	41.278					
42.424	41.279					
42.425	41.280					
42.426	41.281					
42.427	41.282					
42.428	41.283					
42.429	41.284					
42.430	41.285					
42.431	41.286					
42.432	41.287					
42.433	41.288					
42.434	41.289					
42.435	41.290					
42.436	41.291					
42.437	41.292					
42.438	41.293					
42.439	41.294					
42.440	41.295					
42.441	41.296					
42.442	41.297					
42.443	41.298					
42.444	41.299					
42.445	41.300					
42.446	41.301					
42.447	41.302					
42.448	41.303					
42.449	41.304					
42.450	41.305					
42.451	41.306					
42.452	41.307					
42.453	41.308					
42.454	41.309					
42.455	41.310					
42.456	41.311					
42.457	41.312					
42.458	41.313					
42.459	41.314					
42.460	41.315					
42.461	41.316					
42.462	41.317					
42.463	41.318					
42.464	41.319					
42.465	41.320					
42.466	41.321					
42.467	41.322					
42.468	41.323					
42.469	41.324					
42.470	41.325					
42.471	41.326					
42.472	41.327					
42.473	41.328					
42.474	41.329					
42.475	41.330					
42.476	41.331					
42.477	41.332					
42.478	41.333					
42.479	41.334					
42.480	41.335					
42.481	41.336					
42.482	41.337					
42.483	41.338					
42.484	41.339					
42.485	41.340					
42.486	41.341					
42.487	41.342					
42.488	41.343					
42.489	41.344					
42.490	41.345					
42.491	41.346					
42.492	41.347					
42.493	41.348					
42.494	41.349					
42.495	41.350					
42.496	41.351					
42.497	41.352					
42.498	41.353					
42.499	41.354					
42.500	41.355					
42.501	41.356					
42.502	41.357					
42.503	41.358					
42.504	41.359					
42.505	41.360					
42.506	41.361					
42.507	41.362					
42.508	41.363					
42.509	41.364					
42.510	41.365					

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 32/000 TO KM 33/000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Bhubaneswar, Odisha - 751005, India
 Tel: +91-674-2520895, 2520956, 2520957
 Fax: 2521346, e-mail: ceg@cegroupindia.com

LEGEND

- EXISTING ROAD
- PROPOSED ROAD
- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- EXISTING ROAD CROSSFALL
- PROPOSED ROAD CROSSFALL
- EXISTING ROAD SUPERELEVATION
- PROPOSED ROAD SUPERELEVATION
- EXISTING ROAD CHANGING
- PROPOSED ROAD CHANGING

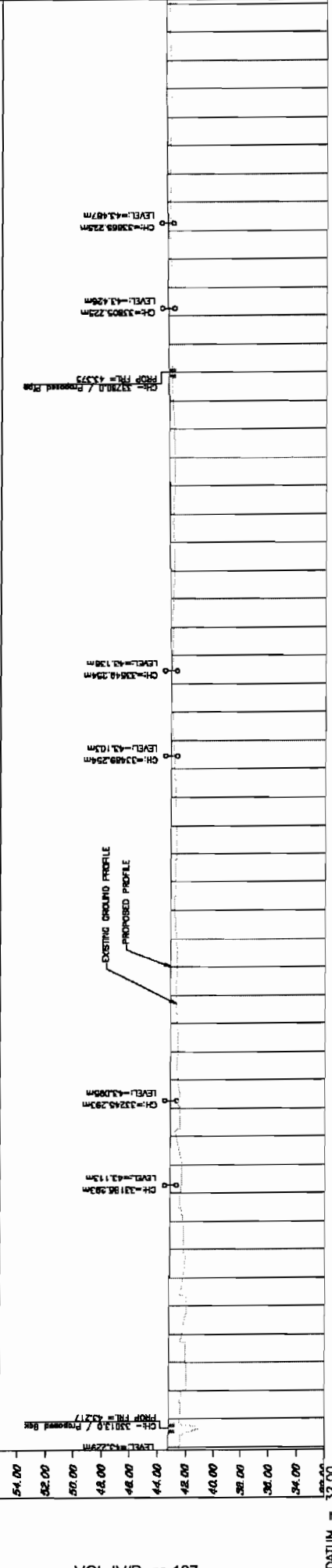
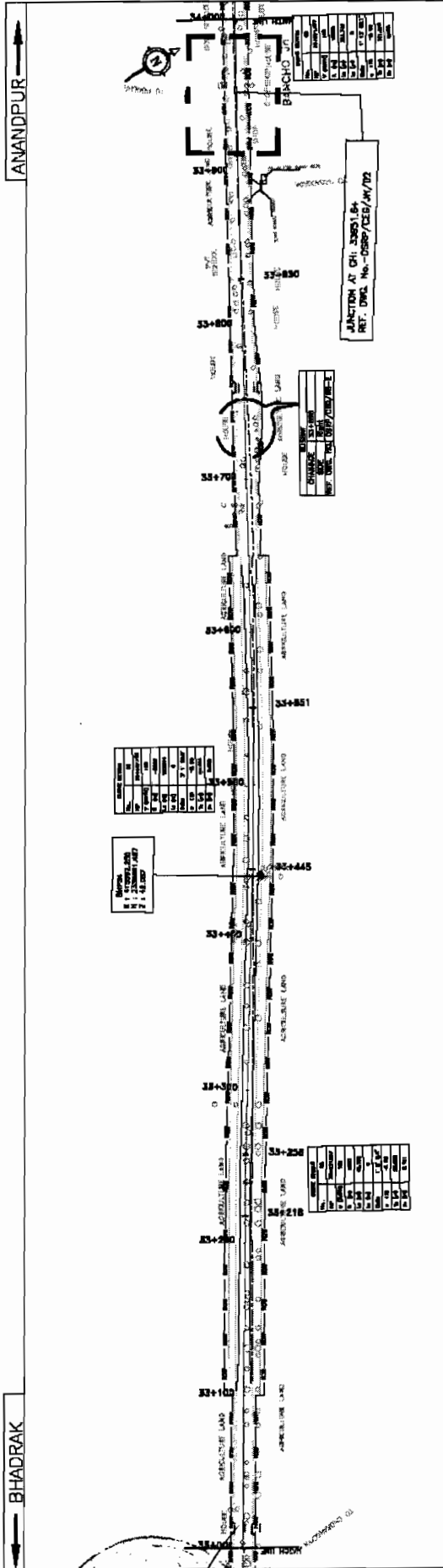
DATE: 11/08/2011
 SCALE: 1:200
 SECTION: 1: 200

SOM DATT BUILDERS & CONTRACTORS

BBSR Infrastructure Projects

ANANDPUR

BHADRAK



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGING POINTS
32.00	43.225					
32.50	43.213					
33.00	43.201					
33.50	43.189					
34.00	43.177					
34.50	43.165					
35.00	43.153					
35.50	43.141					
36.00	43.129					
36.50	43.117					
37.00	43.105					
37.50	43.093					
38.00	43.081					
38.50	43.069					
39.00	43.057					
39.50	43.045					
40.00	43.033					
40.50	43.021					
41.00	43.009					
41.50	42.997					
42.00	42.985					
42.50	42.973					
43.00	42.961					
43.50	42.949					
44.00	42.937					
44.50	42.925					
45.00	42.913					
45.50	42.901					
46.00	42.889					
46.50	42.877					
47.00	42.865					
47.50	42.853					
48.00	42.841					
48.50	42.829					
49.00	42.817					
49.50	42.805					
50.00	42.793					
50.50	42.781					
51.00	42.769					
51.50	42.757					
52.00	42.745					
52.50	42.733					
53.00	42.721					
53.50	42.709					
54.00	42.697					

SOM DATT BUILDERS ARSS JX
CONTRACTOR

BSSR

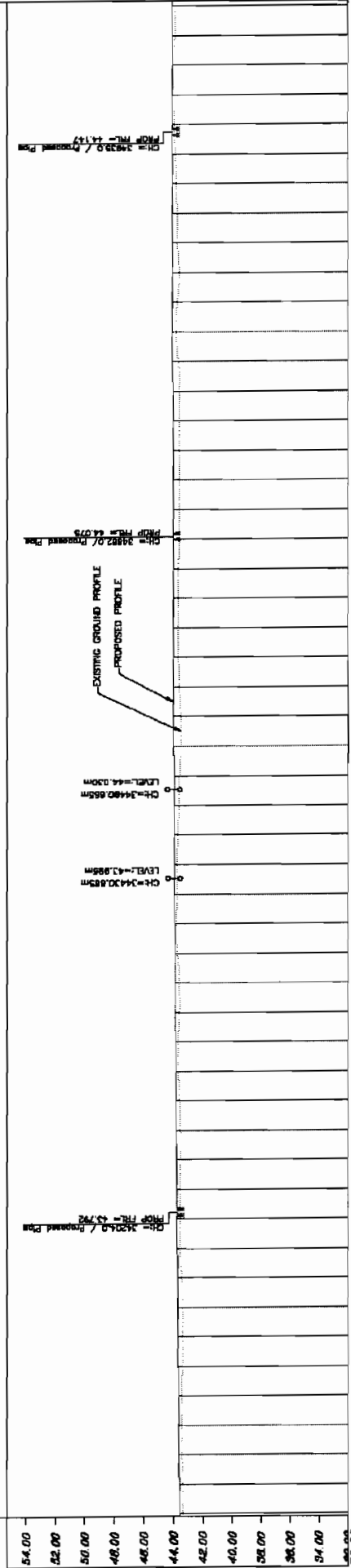
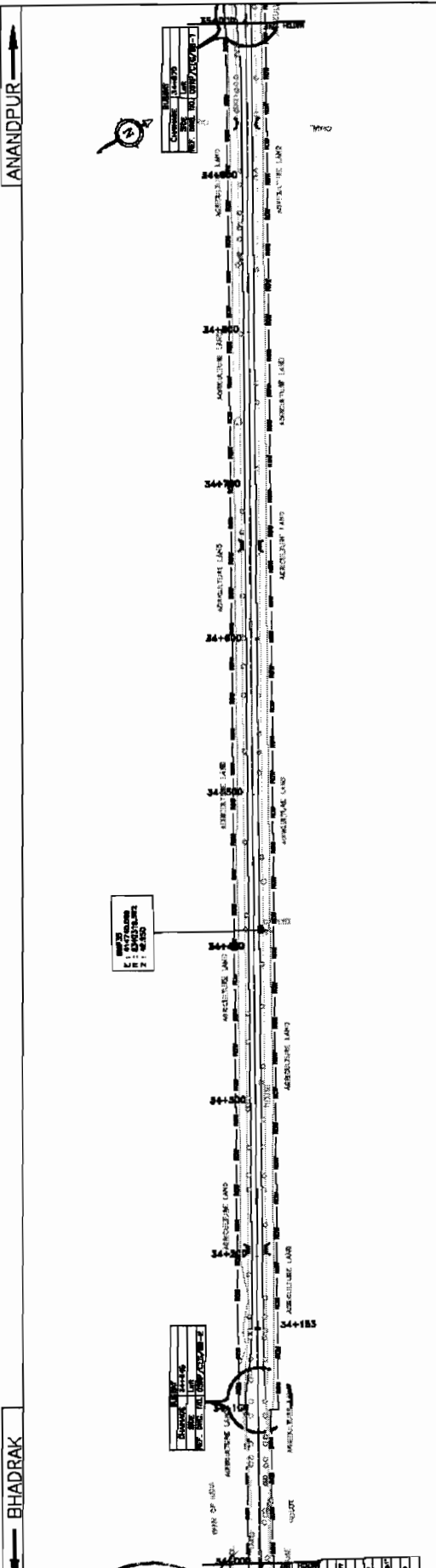
PROJECT:-
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO AMANDPUR (SH-53) KM 33/000 TO KM 34/000

CONSULTING ENGINEERS GROUP LTD.
E-12, Major Colony, Malviya Nagar, Jaipur-17
Tel: +91-141-2520995, 2521899, 2520055
Fax: 2521348, e-mail: eng@egroupindia.com

DATE:	11.05.2010	SCALE:	HORIZONTAL: 1:2000 VERTICAL: 1:200
PROJECT NO.:	1001	DESIGNED BY:	
APPROVED BY:		CHECKED BY:	
DATE OF ISSUE:	10.05.2010	DATE OF PRINT:	10.05.2010
PROJECT LOCATION:	BHADRAK TO AMANDPUR (SH-53) KM 33/000 TO KM 34/000		
PROJECT TYPE:	ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE		

LEGEND

- ROAD LANE
- SIDEWALK
- FOOTPATH
- GRADE SEPARATION
- UNDERPASS
- OVERPASS
- LANDSCAPE
- LANDSCAPE PLANT
- LANDSCAPE TREES
- LANDSCAPE SHRUBS
- LANDSCAPE FLOWERS
- LANDSCAPE FOLIAGE
- LANDSCAPE FRUIT
- LANDSCAPE SEED
- LANDSCAPE WOOD
- LANDSCAPE BARK
- LANDSCAPE LEAF
- LANDSCAPE BRANCH
- LANDSCAPE TWIG
- LANDSCAPE ROOT



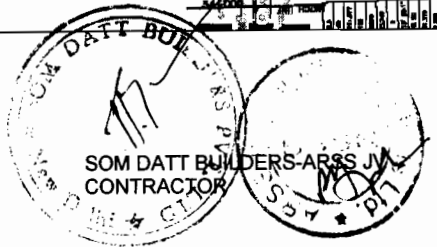
PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGELINE
44.170	43.820	1:100.000	1:100.000	0+2.500	0+2.500	
44.185	43.820	1:100.000	1:100.000	0+2.500	0+2.500	
44.190	43.820	1:100.000	1:100.000	0+2.500	0+2.500	
44.194	43.820	1:100.000	1:100.000	0+2.500	0+2.500	
44.198	43.820	1:100.000	1:100.000	0+2.500	0+2.500	
44.200	43.820	1:100.000	1:100.000	0+2.500	0+2.500	

PROJECT:-
CONSULTING ENGINEERS GROUP LTD.
 E-12, Major Colony, Midway, Nagar, Jharkhand-17
 Tel: +91-141-2520599, 2521899, 2520556
 Fax: 2521348, E-mail: ceg@cegroup.com

LEGEND

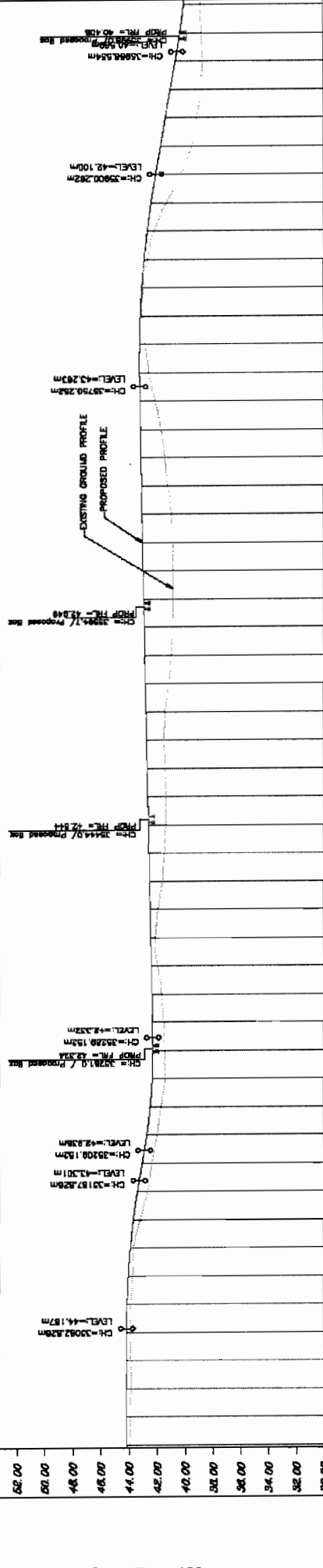
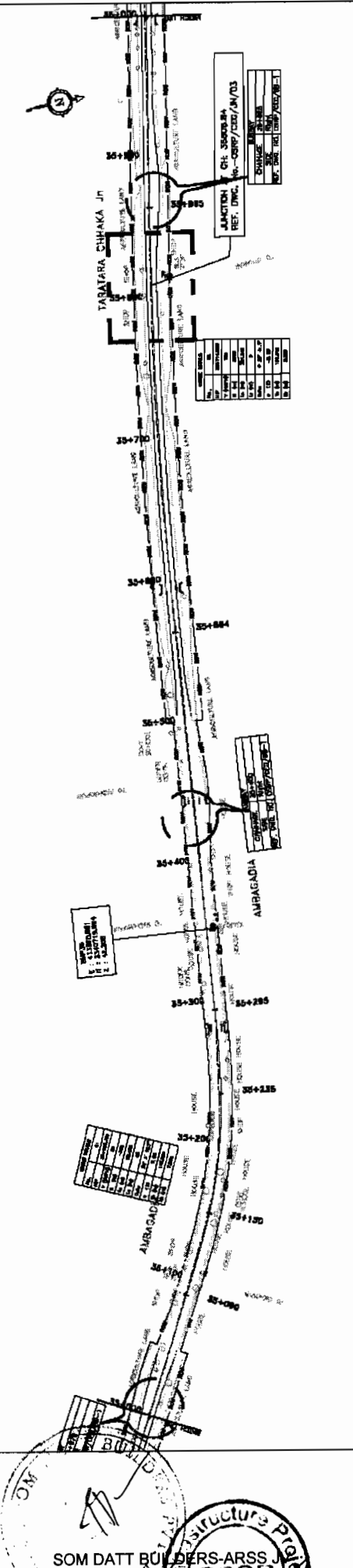
WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 34/000 TO KM 35/000 PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DATE: 05/05/2010
 SHEET NO: 35
 SCALE: HORIZONTAL: 1:2000, VERTICAL: 1:1250



ANANDPUR

BHADRAK



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGES
62.00	62.00					
60.00	60.00					
48.00	48.00					
46.00	46.00					
44.00	44.00					
42.00	42.00					
40.00	40.00					
38.00	38.00					
36.00	36.00					
34.00	34.00					
32.00	32.00					
30.00	30.00					
28.00	28.00					
26.00	26.00					
24.00	24.00					
22.00	22.00					
20.00	20.00					
18.00	18.00					
16.00	16.00					
14.00	14.00					
12.00	12.00					
10.00	10.00					
8.00	8.00					
6.00	6.00					
4.00	4.00					
2.00	2.00					
0.00	0.00					

CONSULTING ENGINEERS GROUP LTD.
 E-12, May Colony, New Jaipur-17
 Tel: +91-141-2520889, 2521893, 2520256
 Fax: 2521343, e-mail: cege@cegeindia.com

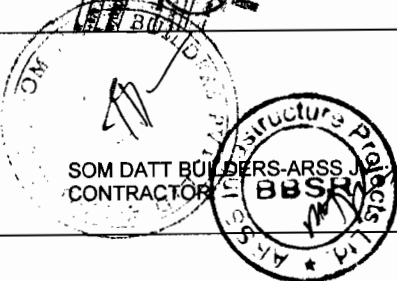
PROJECT:-
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 35/000 TO KM 36/000
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

LEGEND

1	EXISTING ROAD
2	PROPOSED ROAD
3	PROPOSED ROAD
4	PROPOSED ROAD
5	PROPOSED ROAD
6	PROPOSED ROAD
7	PROPOSED ROAD
8	PROPOSED ROAD
9	PROPOSED ROAD
10	PROPOSED ROAD
11	PROPOSED ROAD
12	PROPOSED ROAD
13	PROPOSED ROAD
14	PROPOSED ROAD
15	PROPOSED ROAD
16	PROPOSED ROAD
17	PROPOSED ROAD
18	PROPOSED ROAD
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20	PROPOSED ROAD
21	PROPOSED ROAD
22	PROPOSED ROAD
23	PROPOSED ROAD
24	PROPOSED ROAD
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26	PROPOSED ROAD
27	PROPOSED ROAD
28	PROPOSED ROAD
29	PROPOSED ROAD
30	PROPOSED ROAD
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42	PROPOSED ROAD
43	PROPOSED ROAD
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45	PROPOSED ROAD
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61	PROPOSED ROAD
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70	PROPOSED ROAD
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72	PROPOSED ROAD
73	PROPOSED ROAD
74	PROPOSED ROAD
75	PROPOSED ROAD
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77	PROPOSED ROAD
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82	PROPOSED ROAD
83	PROPOSED ROAD
84	PROPOSED ROAD
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86	PROPOSED ROAD
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88	PROPOSED ROAD
89	PROPOSED ROAD
90	PROPOSED ROAD
91	PROPOSED ROAD
92	PROPOSED ROAD
93	PROPOSED ROAD
94	PROPOSED ROAD
95	PROPOSED ROAD
96	PROPOSED ROAD
97	PROPOSED ROAD
98	PROPOSED ROAD
99	PROPOSED ROAD
100	PROPOSED ROAD

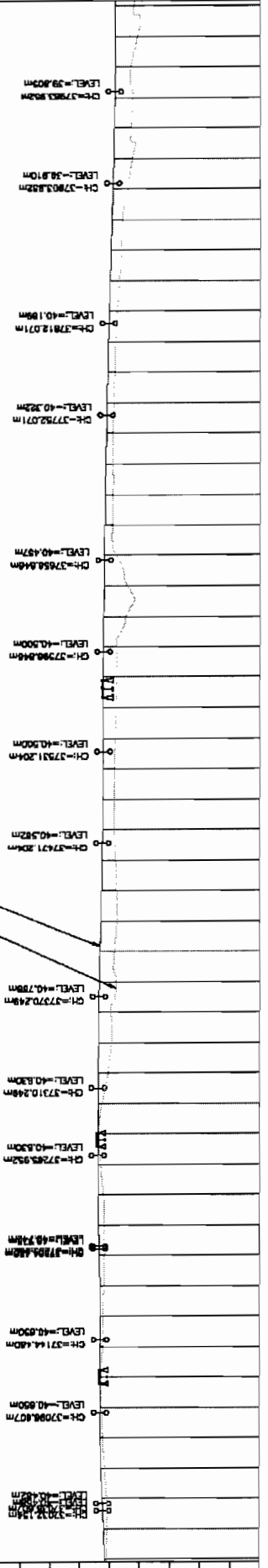
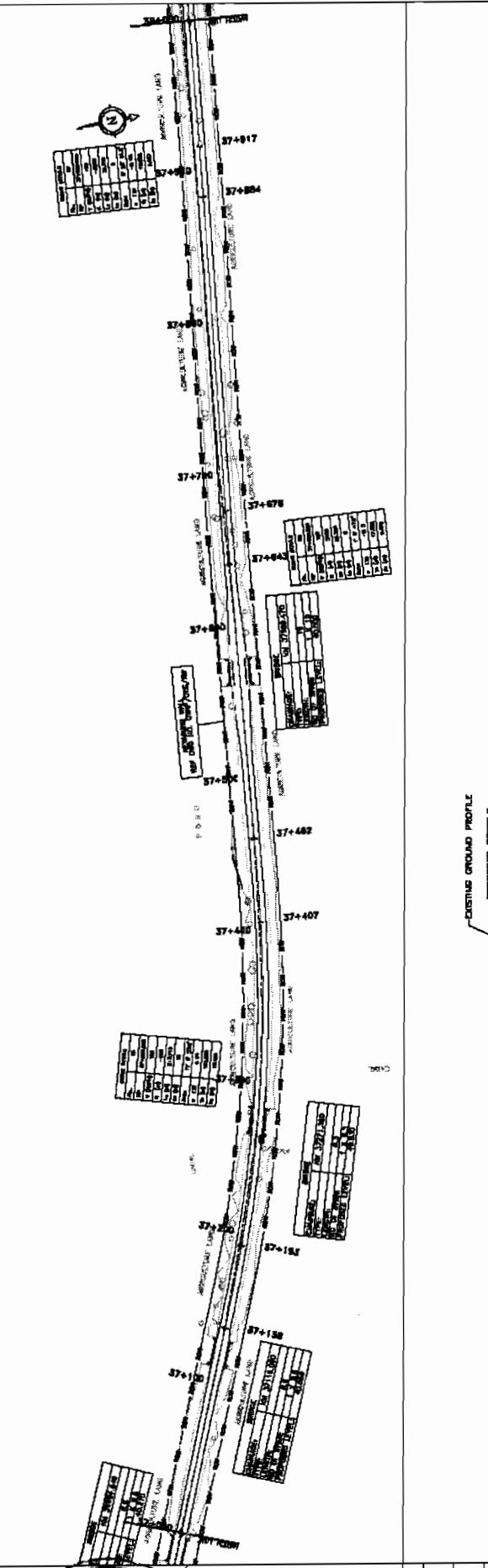
DATE: 30.00
SCALE: HORIZONTAL: 1:2000 VERTICAL: 1:200

EMPLOYER: ORISSA STATE ROAD PROJECT



ANANDPUR

BHADRAK



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
38.278	39.779				
38.244	39.788				
38.210	39.807				
38.176	39.826				
38.142	39.845				
38.108	39.864				
38.074	39.883				
38.040	39.902				
38.006	39.921				
37.972	39.940				
37.938	39.959				
37.904	39.978				
37.870	39.997				
37.836	40.016				
37.802	40.184				
37.768	40.272				
37.734	40.370				
37.700	40.338				
37.666	40.388				
37.632	40.396				
37.598	40.424				
37.564	40.453				
37.530	40.478				
37.496	40.494				
37.462	40.500				
37.428	40.500				
37.394	40.500				
37.360	40.507				
37.326	40.517				
37.292	40.545				
37.258	40.584				
37.224	40.625				
37.190	40.666				
37.156	40.707				
37.122	40.748				
37.088	40.788				
37.054	40.815				
37.020	40.828				
36.986	40.830				
36.952	40.828				
36.918	40.814				
36.884	40.778				
36.850	40.725				
36.816	40.681				
36.782	40.656				
36.748	40.630				
36.714	40.600				
36.680	40.570				
36.646	40.537				
36.612	40.500				
36.578	40.450				
36.544	40.397				
36.510	40.345				
36.476	40.297				
36.442	40.250				
36.408	40.200				
36.374	40.150				
36.340	40.100				
36.306	40.050				
36.272	40.000				

SOM DATTA BUILDERS & ARCHITECTS
 CONTRACTOR

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 37+000 TO KM 36+000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Jay Colony, Midway Nagar, Bhubaneswar-751017
 Tel: +91-674-2520995, 2521069, 2520558
 Fax: 2521376, e-mail: ceg@cegroupindia.com

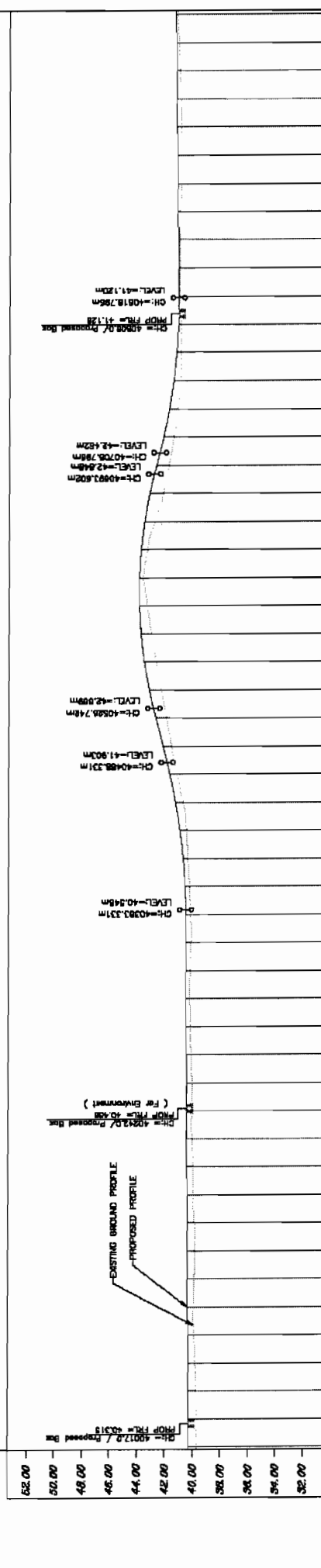
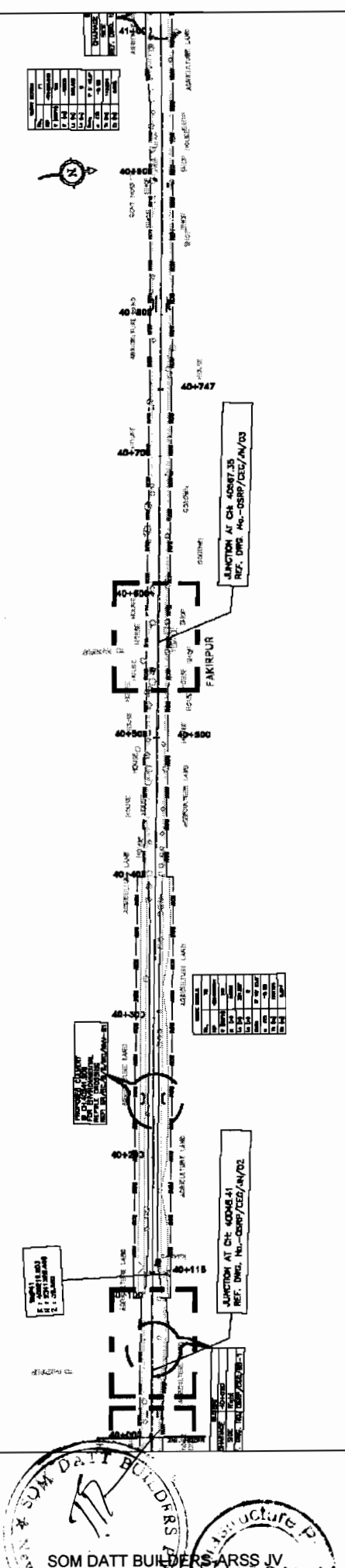
LEGEND

PROPOSED ROAD	EXISTING ROAD
PROPOSED BRIDGE	EXISTING BRIDGE
PROPOSED DRAINAGE	EXISTING DRAINAGE
PROPOSED UTILITY	EXISTING UTILITY
PROPOSED FENCE	EXISTING FENCE
PROPOSED LAND ACQUISITION	EXISTING LAND ACQUISITION

DATE: 15/11/2010
 SCALE: HORIZONTAL 1:2000, VERTICAL 1:200

BHADRAK

ANANDPUR



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGING
43.304	43.317					
43.300	43.310					
43.280	43.290					
43.260	43.270					
43.240	43.250					
43.220	43.230					
43.200	43.210					
43.180	43.190					
43.160	43.170					
43.140	43.150					
43.120	43.130					
43.100	43.110					
43.080	43.090					
43.060	43.070					
43.040	43.050					
43.020	43.030					
43.000	43.010					
42.980	42.990					
42.960	42.970					
42.940	42.950					
42.920	42.930					
42.900	42.910					
42.880	42.890					
42.860	42.870					
42.840	42.850					
42.820	42.830					
42.800	42.810					
42.780	42.790					
42.760	42.770					
42.740	42.750					
42.720	42.730					
42.700	42.710					
42.680	42.690					
42.660	42.670					
42.640	42.650					
42.620	42.630					
42.600	42.610					
42.580	42.590					
42.560	42.570					
42.540	42.550					
42.520	42.530					
42.500	42.510					
42.480	42.490					
42.460	42.470					
42.440	42.450					
42.420	42.430					
42.400	42.410					
42.380	42.390					
42.360	42.370					
42.340	42.350					
42.320	42.330					
42.300	42.310					
42.280	42.290					
42.260	42.270					
42.240	42.250					
42.220	42.230					
42.200	42.210					
42.180	42.190					
42.160	42.170					
42.140	42.150					
42.120	42.130					
42.100	42.110					
42.080	42.090					
42.060	42.070					
42.040	42.050					
42.020	42.030					
42.000	42.010					

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 40/000 TO KM 41/000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-2, 1st Floor, Chhatrapati Shivaji Maharaj Building, Jharkhand
 Reg. No. 2520087.252 (OR) 14/05/2006
 Reg. No. 2621144 (M.P.) 07/08/2010

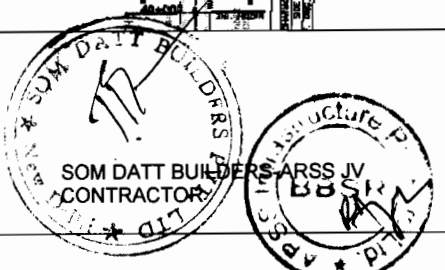
CEG

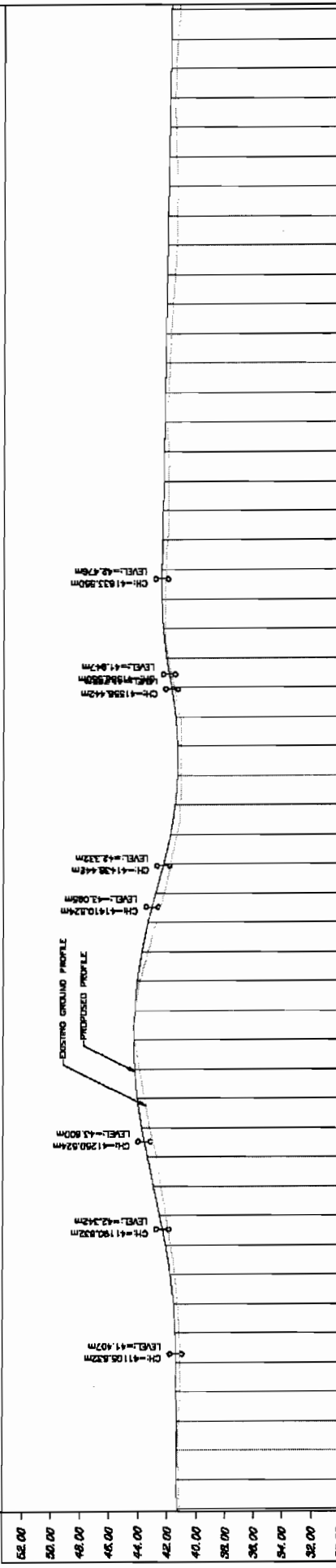
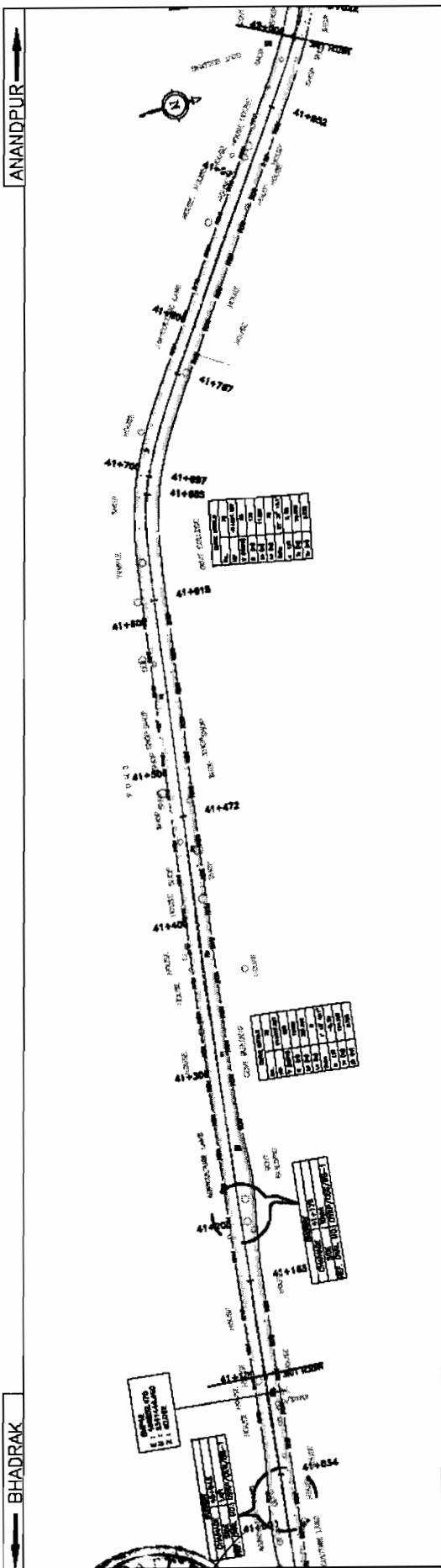
LEGEND

1	EXISTING ROAD	10	EXISTING SIDE DRAIN
2	PROPOSED ROAD	11	PROPOSED SIDE DRAIN
3	EXISTING CULVERT	12	PROPOSED CULVERT
4	PROPOSED CULVERT	13	PROPOSED BRIDGE
5	PROPOSED BRIDGE	14	PROPOSED TUNNEL
6	PROPOSED TUNNEL	15	PROPOSED UNDERPASS
7	PROPOSED UNDERPASS	16	PROPOSED OVERPASS
8	PROPOSED OVERPASS	17	PROPOSED GATE
9	PROPOSED GATE	18	PROPOSED SIGN
19	PROPOSED SIGN	19	PROPOSED SIGN

DATUM = 50.00

SCALE: HORIZONTAL: 1:2500 VERTICAL: 1:200





DATUM = 30.00

PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGING
41.301	41.301					
41.321	41.321					
41.341	41.341					
41.361	41.361					
41.381	41.381					
41.401	41.401					
41.421	41.421					
41.441	41.441					
41.461	41.461					
41.481	41.481					
41.500	41.500					
41.520	41.520					
41.540	41.540					
41.560	41.560					
41.580	41.580					
41.600	41.600					
41.620	41.620					
41.640	41.640					
41.660	41.660					
41.680	41.680					
41.700	41.700					
41.720	41.720					
41.740	41.740					
41.760	41.760					
41.780	41.780					
41.800	41.800					
41.820	41.820					
41.840	41.840					
41.860	41.860					
41.880	41.880					
41.900	41.900					
41.920	41.920					
41.940	41.940					
41.960	41.960					
41.980	41.980					
42.000	42.000					
42.020	42.020					
42.040	42.040					
42.060	42.060					
42.080	42.080					
42.100	42.100					
42.120	42.120					
42.140	42.140					
42.160	42.160					
42.180	42.180					
42.200	42.200					
42.220	42.220					
42.240	42.240					
42.260	42.260					
42.280	42.280					
42.300	42.300					
42.320	42.320					
42.340	42.340					
42.360	42.360					
42.380	42.380					
42.400	42.400					
42.420	42.420					
42.440	42.440					
42.460	42.460					
42.480	42.480					
42.500	42.500					
42.520	42.520					
42.540	42.540					
42.560	42.560					
42.580	42.580					
42.600	42.600					
42.620	42.620					
42.640	42.640					
42.660	42.660					
42.680	42.680					
42.700	42.700					
42.720	42.720					
42.740	42.740					
42.760	42.760					
42.780	42.780					
42.800	42.800					
42.820	42.820					
42.840	42.840					
42.860	42.860					
42.880	42.880					
42.900	42.900					
42.920	42.920					
42.940	42.940					
42.960	42.960					
42.980	42.980					
43.000	43.000					

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Colony, Vidya Nagar, Jalandhar-171005
 Tel: 261141 - 250889, 250109, 250258
 Fax: 261141, e-mail: cog@engineers.com

PROJECT:
 WIDENING AND STRENGTHENING TO TWO LANE
 PLAN AND LONGITUDINAL SECTION
 BHADRAK TO ANANDPUR (SH-53) KM 41/000 TO KM 42/000

EMPLOYER:
 STATE ROAD DEVELOPMENT CORPORATION
 JALANDHAR

SCALE: HORIZONTAL 1 : 2000 VERTICAL 1 : 500

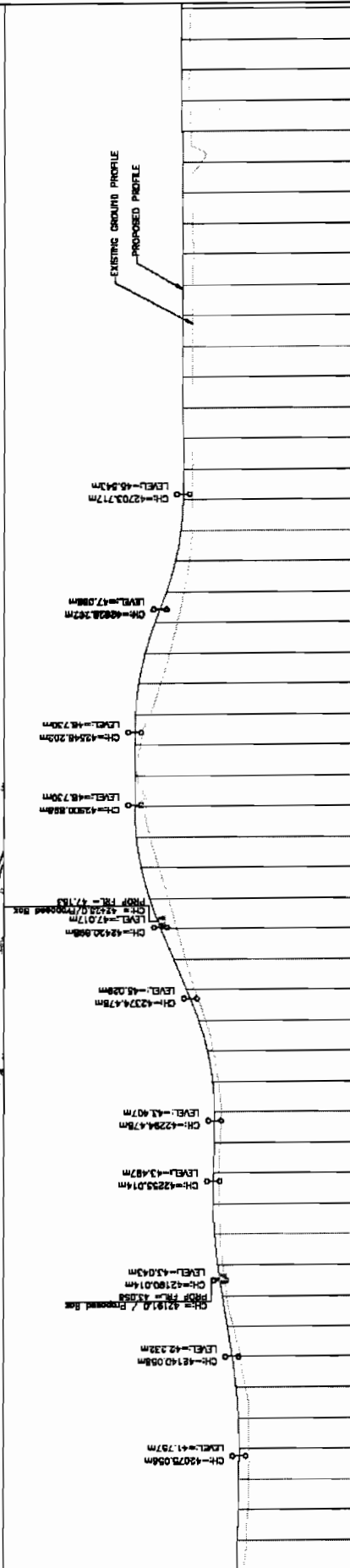
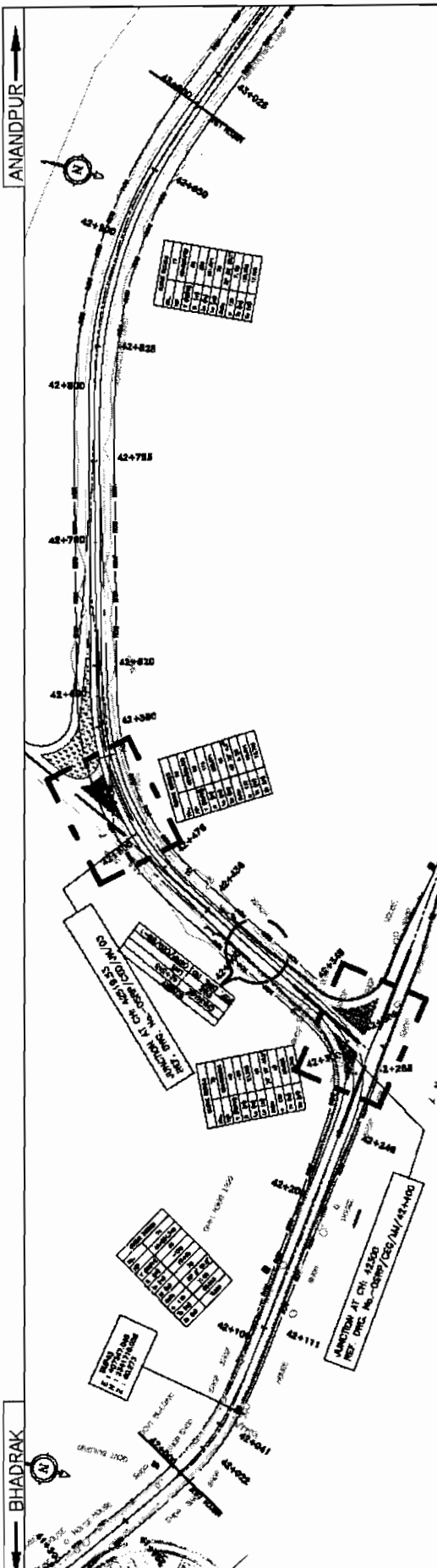
DATE: 15/08/2010
REV: 01
BY: [Signature]
CHK: [Signature]

DESIGNED BY: [Signature]
CHECKED BY: [Signature]
APPROVED BY: [Signature]

LEGEND:

- ROADS: [Symbol] ROAD
- RAILWAYS: [Symbol] RAILWAY
- POWER LINES: [Symbol] POWER LINE
- TELEPHONE LINES: [Symbol] TELEPHONE LINE
- WATER SUPPLY LINES: [Symbol] WATER SUPPLY LINE
- SEWERAGE LINES: [Symbol] SEWERAGE LINE
- STREET LIGHTS: [Symbol] STREET LIGHT
- LANDSCAPING: [Symbol] LANDSCAPING
- VEGETATION: [Symbol] VEGETATION





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL	CHANGES
56.00	55.854					
54.00	55.78					
52.00	55.66					
50.00	55.54					
48.00	55.42					
46.00	55.30					
44.00	55.18					
42.00	55.06					
40.00	54.94					
38.00	54.82					
36.00	54.70					
34.00	54.58					
32.00	54.46					
30.00	54.34					
28.00	54.22					
26.00	54.10					
24.00	53.98					
22.00	53.86					
20.00	53.74					
18.00	53.62					
16.00	53.50					
14.00	53.38					
12.00	53.26					
10.00	53.14					
8.00	53.02					
6.00	52.90					
4.00	52.78					
2.00	52.66					
0.00	52.54					

ANANDPUR →

← BHADRAK

SOM DATT BUILDERS-ARSS JM
CONTRACTOR

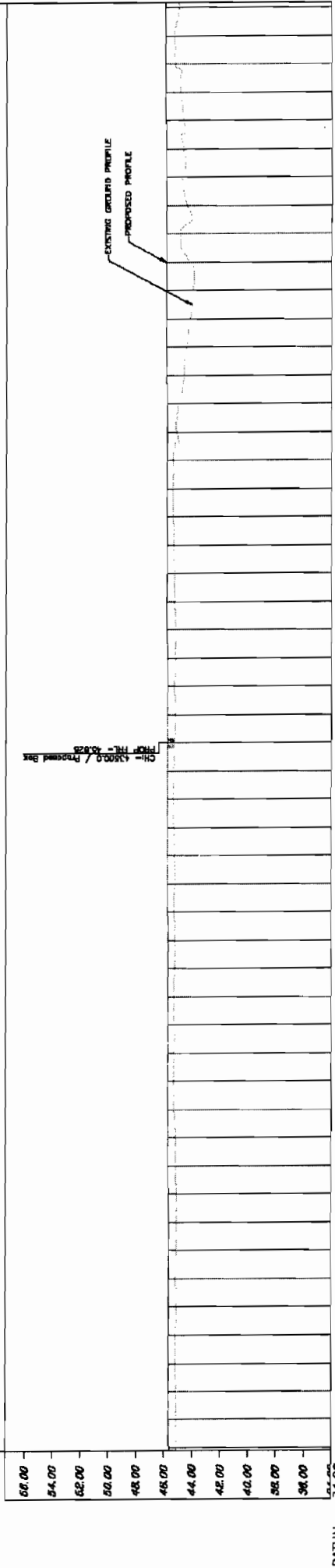
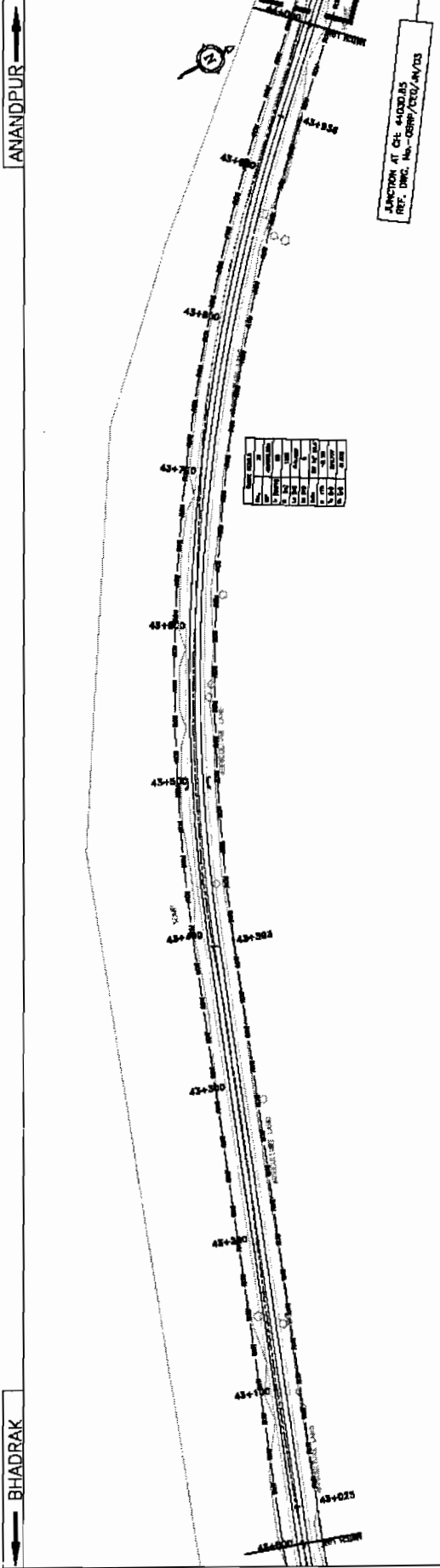
VOL-IV/Page 136

PROJECT:-
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 42/000 TO KM 43/000
PREPARATION OF PHASE-(I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

CONSULTING
ENGINEERS GROUP LTD.
E-124/7 Colony, Bhubaneswar, India
Tel: 43-141-2820999, 2821866, 2350006
Fax: 2821346, e-mail: eng@engineersindia.com

DATE: 23/10/2011

SCALE: HORIZONTAL: 1:2000, VERTICAL: 1:500



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
66.00	66.00				
64.00	64.00				
62.00	62.00				
60.00	60.00				
58.00	58.00				
56.00	56.00				
54.00	54.00				
52.00	52.00				
50.00	50.00				
48.00	48.00				
46.00	46.00				
44.00	44.00				
42.00	42.00				
40.00	40.00				
38.00	38.00				
36.00	36.00				
34.00	34.00				
32.00	32.00				
30.00	30.00				
28.00	28.00				
26.00	26.00				
24.00	24.00				
22.00	22.00				
20.00	20.00				
18.00	18.00				
16.00	16.00				
14.00	14.00				
12.00	12.00				
10.00	10.00				
8.00	8.00				
6.00	6.00				
4.00	4.00				
2.00	2.00				
0.00	0.00				

PROJECT:
WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM 43/000 TO KM 44/000

CONSULTING ENGINEERS GROUP LTD.
E-12, M.J. Colony, Malviya Nagar, Jaipur-302017
Tel: +91-141-2320889, 2321889, 2320556
Fax: 2321348, e-mail: ceg@cegroup.com

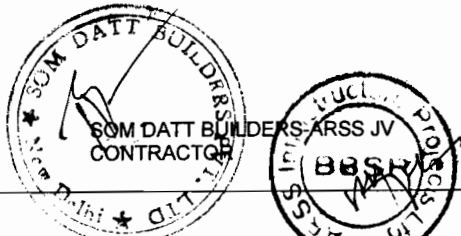
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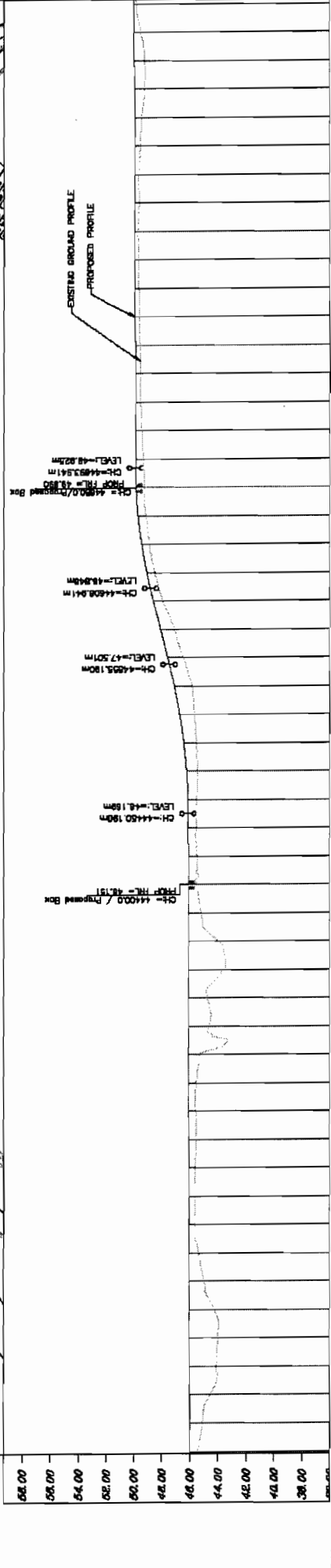
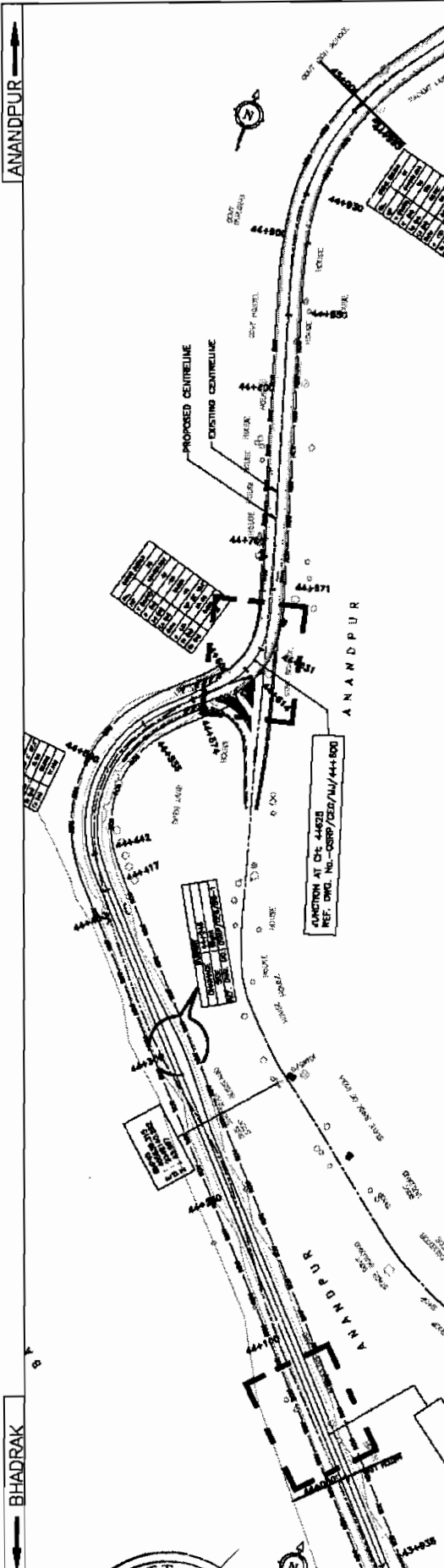
- PROPOSED ROAD LEVEL (m)
- EXISTING LEVEL (m)
- HORIZONTAL ALIGNMENT
- VERTICAL PROFILE
- SUPERELEVATION
- CROSSFALL

DATE: 15/08/2017
SCALE: HORIZONTAL 1:2000, VERTICAL 1:1000

ANANDPUR

BHADRAK





PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	CURB RELEVATION	CROSSFALL
68.00	68.00				
67.00	67.00				
66.00	66.00				
65.00	65.00				
64.00	64.00				
63.00	63.00				
62.00	62.00				
61.00	61.00				
60.00	60.00				
59.00	59.00				
58.00	58.00				
57.00	57.00				
56.00	56.00				
55.00	55.00				
54.00	54.00				
53.00	53.00				
52.00	52.00				
51.00	51.00				
50.00	50.00				
49.00	49.00				
48.00	48.00				
47.00	47.00				
46.00	46.00				
45.00	45.00				
44.00	44.00				
43.00	43.00				
42.00	42.00				
41.00	41.00				
40.00	40.00				
39.00	39.00				
38.00	38.00				
37.00	37.00				
36.00	36.00				

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 44.000 TO KM 45.000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR CRISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

PROJECT:

CONSULTING ENGINEERS GROUP LTD.
 E-12, Hoshi Colony, Mehra Nagar, Jaipur-302015
 Tel: 0141-2550989, 2521660, 2520556
 Fax: 2621545, e-mail: ceg@cegindia.com

LEGEND:

DATE: 11/01/2008
SCALE: HORIZONTAL: 1:1000 VERTICAL: 1:100

REVISIONS:

NO.	DATE	BY	REASON
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

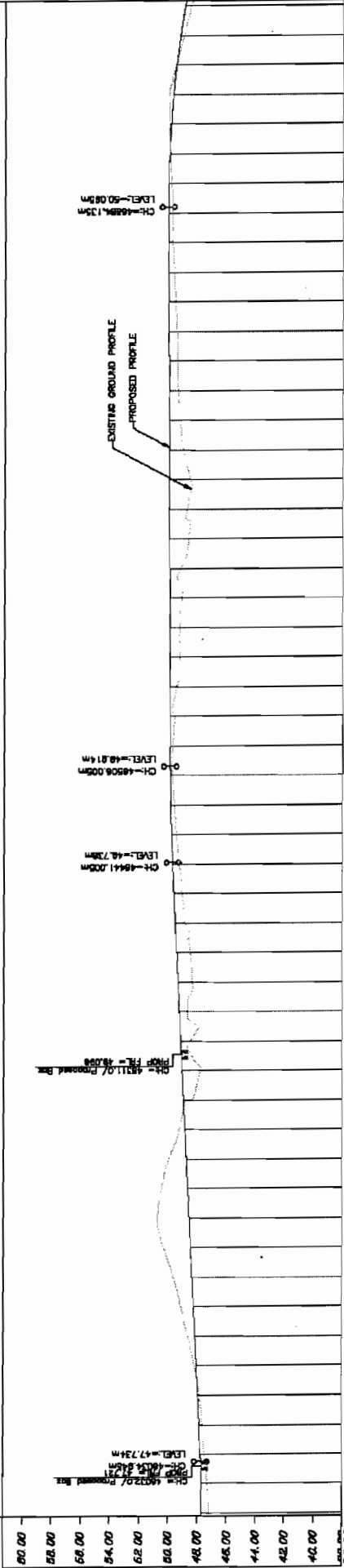
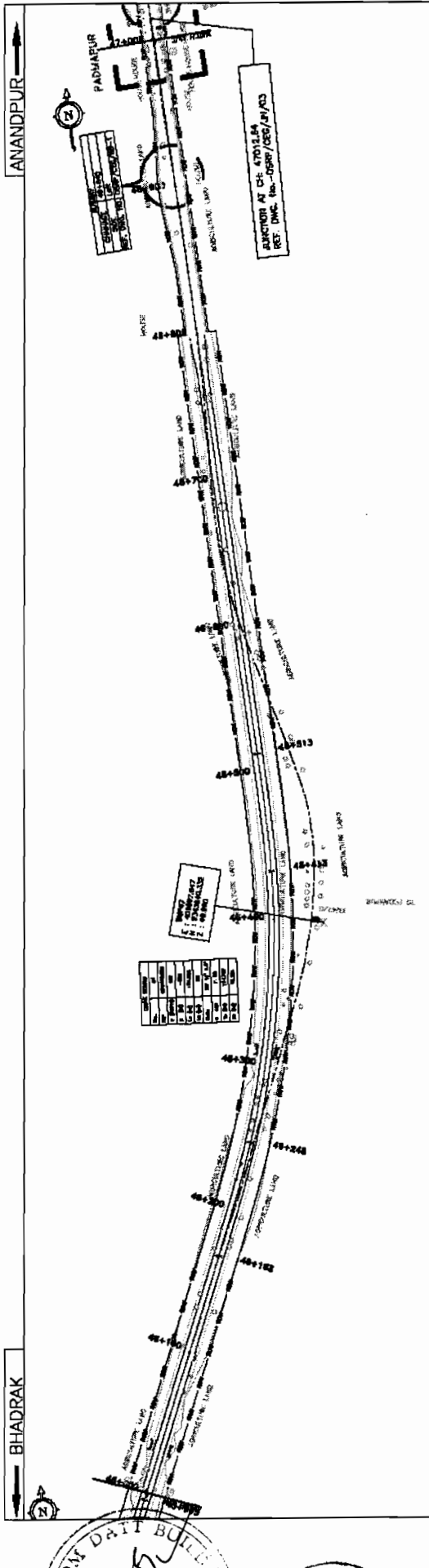
APPROVED FOR: [Signature] **EMPLOYER**

DATE: 11/01/2008

SOM DATT BUILDERS-ARSS JV CONTRACTOR

ANANDPUR

BHADRAK



PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)	HORIZONTAL ALIGNMENT	VERTICAL PROFILE	SUPERELEVATION	CROSSFALL
80.00					
78.00					
76.00					
74.00					
72.00					
70.00					
68.00					
66.00					
64.00					
62.00					
60.00					
58.00					
56.00					
54.00					
52.00					
50.00					
48.00					
46.00					
44.00					
42.00					
40.00					
38.00					
36.00					
34.00					
32.00					
30.00					
28.00					
26.00					
24.00					
22.00					
20.00					
18.00					
16.00					
14.00					
12.00					
10.00					
8.00					
6.00					
4.00					
2.00					
0.00					

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION
BHADRAK TO ANANDPUR (SH-53) KM. 46/000 TO KM. 47/000

PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SCALE: HORIZONTAL 1 : 200 VERTICAL 1 : 200

DATE	NO.	BY	CHKD.	APPD.	REVISED BY	REVISED DATE	NO.	BY	CHKD.	APPD.

SCALE: HORIZONTAL 1 : 200 VERTICAL 1 : 200

CONSULTING ENGINEERS GROUP LTD.
E-12/13/3 Colony, Kalyan Nagar, Jaipur-17
Tel: +91-141-2520892, 2521883, 2520256
Fax: 2521346, e-mail: ceg@cegroupindia.com

CEG

LEGEND

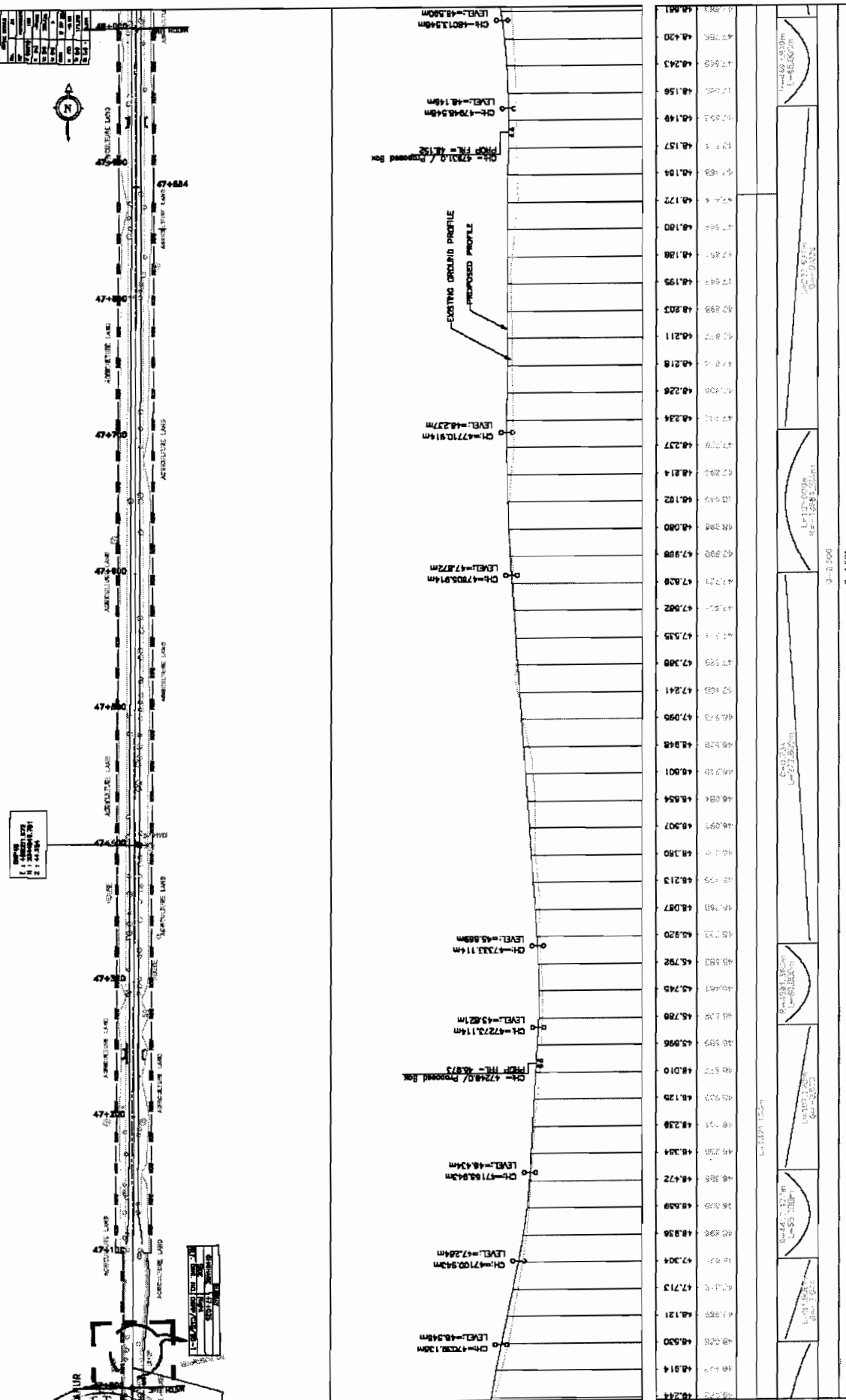
EXISTING ROAD: Solid line
PROPOSED ROAD: Dashed line
RIGHT OF WAY: Dotted line
LAND: Stippled area
ADJUSTMENT LAND: Dotted area
ROAD CROSSING: Double line with T-junction

Chief Engineer,
Projects, Orissa
EMPLOYER

SOM DATT BUILDERS-ARSS JV
CONTRACTOR

ANANDPUR

BHADRAK



STATION	EXISTING LEVEL	PROPOSED LEVEL
7300+00	58.50	58.50
7300+20	58.50	58.50
7300+40	58.50	58.50
7300+60	58.50	58.50
7300+80	58.50	58.50
7301+00	58.50	58.50
7301+20	58.50	58.50
7301+40	58.50	58.50
7301+60	58.50	58.50
7301+80	58.50	58.50
7302+00	58.50	58.50
7302+20	58.50	58.50
7302+40	58.50	58.50
7302+60	58.50	58.50
7302+80	58.50	58.50
7303+00	58.50	58.50
7303+20	58.50	58.50
7303+40	58.50	58.50
7303+60	58.50	58.50
7303+80	58.50	58.50
7304+00	58.50	58.50
7304+20	58.50	58.50
7304+40	58.50	58.50
7304+60	58.50	58.50
7304+80	58.50	58.50

STATION	EXISTING LEVEL (m)	PROPOSED LEVEL (m)	CH	LEVEL (m)
7300+00	58.50	58.50		
7300+20	58.50	58.50		
7300+40	58.50	58.50		
7300+60	58.50	58.50		
7300+80	58.50	58.50		
7301+00	58.50	58.50		
7301+20	58.50	58.50		
7301+40	58.50	58.50		
7301+60	58.50	58.50		
7301+80	58.50	58.50		
7302+00	58.50	58.50		
7302+20	58.50	58.50		
7302+40	58.50	58.50		
7302+60	58.50	58.50		
7302+80	58.50	58.50		
7303+00	58.50	58.50		
7303+20	58.50	58.50		
7303+40	58.50	58.50		
7303+60	58.50	58.50		
7303+80	58.50	58.50		
7304+00	58.50	58.50		
7304+20	58.50	58.50		
7304+40	58.50	58.50		
7304+60	58.50	58.50		
7304+80	58.50	58.50		

DATUM = 36.00

PROPOSED ROAD LEVEL (m)

EXISTING LEVEL (m)

HORIZONTAL ALIGNMENT

VERTICAL PROFILE

SUPERELEVATION

CROSSFALL

CHANGE

PROJECTS, OR

EMPLOYER

WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION BHADRAK TO ANANDPUR (SH-53) KM 47+000 TO KM 48/000

PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SCALE: HORIZONTAL: 1 : 200 VERTICAL: 1 : 200

REV. NO. DATE

NO. OF SHEETS

TOTAL SHEETS

CONSULTING ENGINEERS GROUP LTD. (C/12 Raj Category, Madhya Nagar, Jaipur-17)

PREPARED BY: S. S. SINGH

CHECKED BY: S. S. SINGH

DATE: 15/11/11

LEGEND

EXISTING GROUND PROFILE

PROPOSED ROAD PROFILE

VERTICAL CURVE

SUPERELEVATION

CROSSFALL

ROAD MARKINGS

STRUCTURE

OBSTACLE

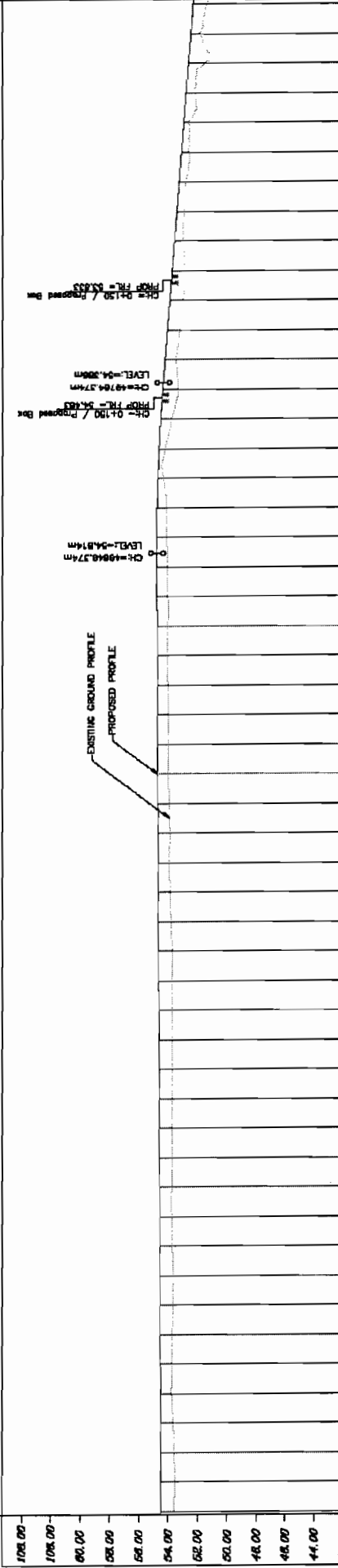
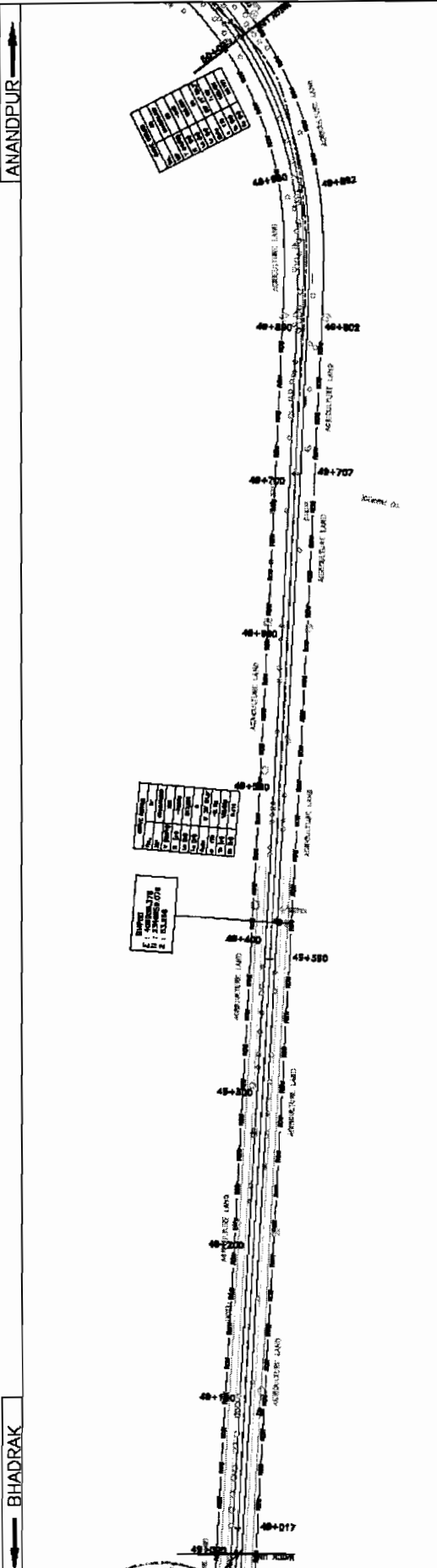
LAND

WATER

PLANTATION

SOM DATTA BUILDERS PRIVATE LIMITED
CONTRACTOR

SS Infrastructure Projects Ltd



50+100	50+095	50+090	50+085	50+080	50+075	50+070	50+065	50+060	50+055	50+050	50+045	50+040	50+035	50+030	50+025	50+020	50+015	50+010	50+005	50+000
50+100	50+095	50+090	50+085	50+080	50+075	50+070	50+065	50+060	50+055	50+050	50+045	50+040	50+035	50+030	50+025	50+020	50+015	50+010	50+005	50+000
50+100	50+095	50+090	50+085	50+080	50+075	50+070	50+065	50+060	50+055	50+050	50+045	50+040	50+035	50+030	50+025	50+020	50+015	50+010	50+005	50+000

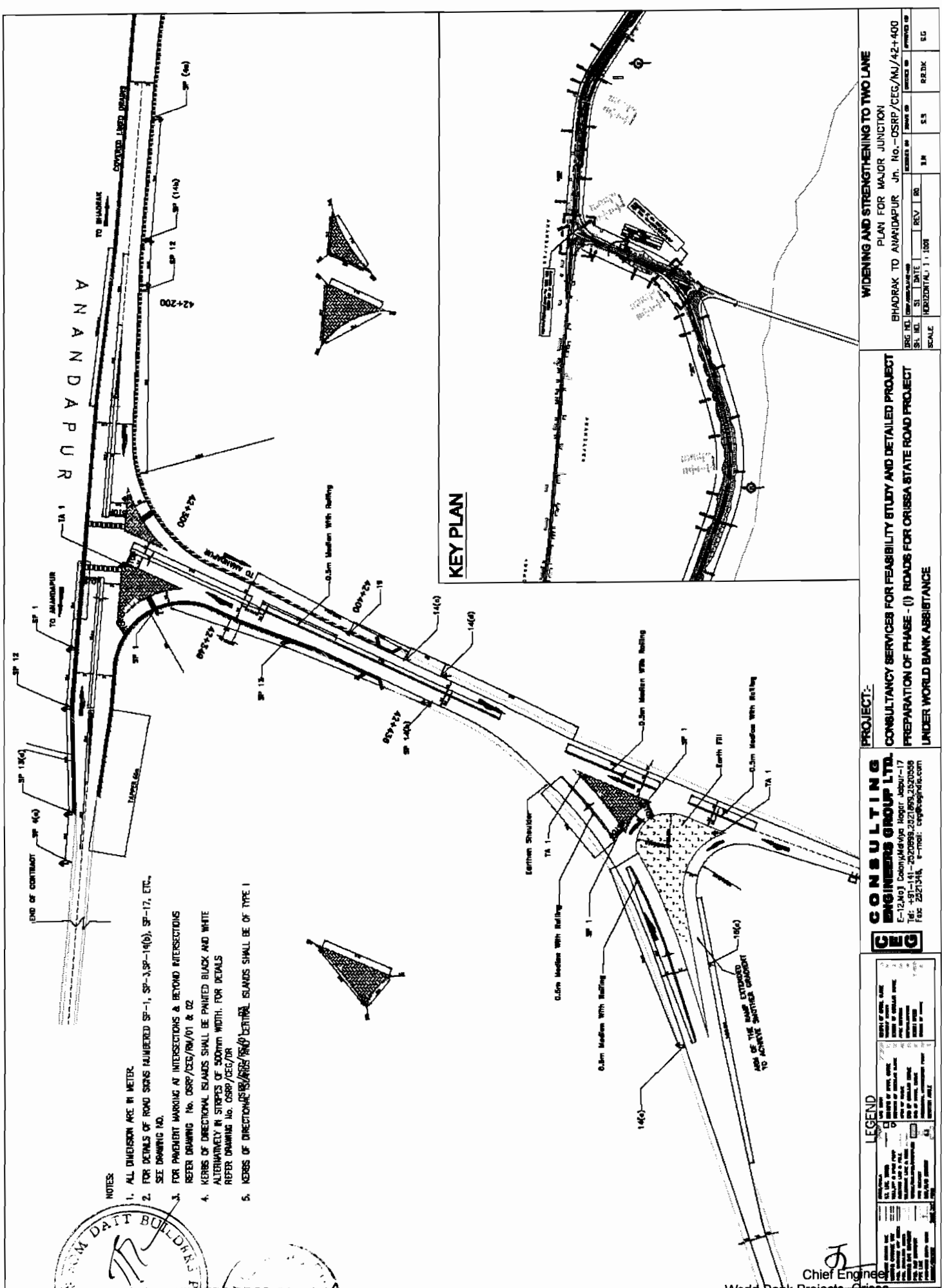
WIDENING AND STRENGTHENING TO TWO LANE		PLAN AND LONGITUDINAL SECTION		BHADRAK TO ANANDPUR (SH-53) KM 49/000 TO KM 50/000	
PREPARED BY	DATE	SCALE	PROJECT NO.	DATE	SCALE
PROJECT NO.	DATE	SCALE	PROJECT NO.	DATE	SCALE
PROJECT NO.	DATE	SCALE	PROJECT NO.	DATE	SCALE

SOM DATT BUILDERS
CONTRACTOR
ARSS JV

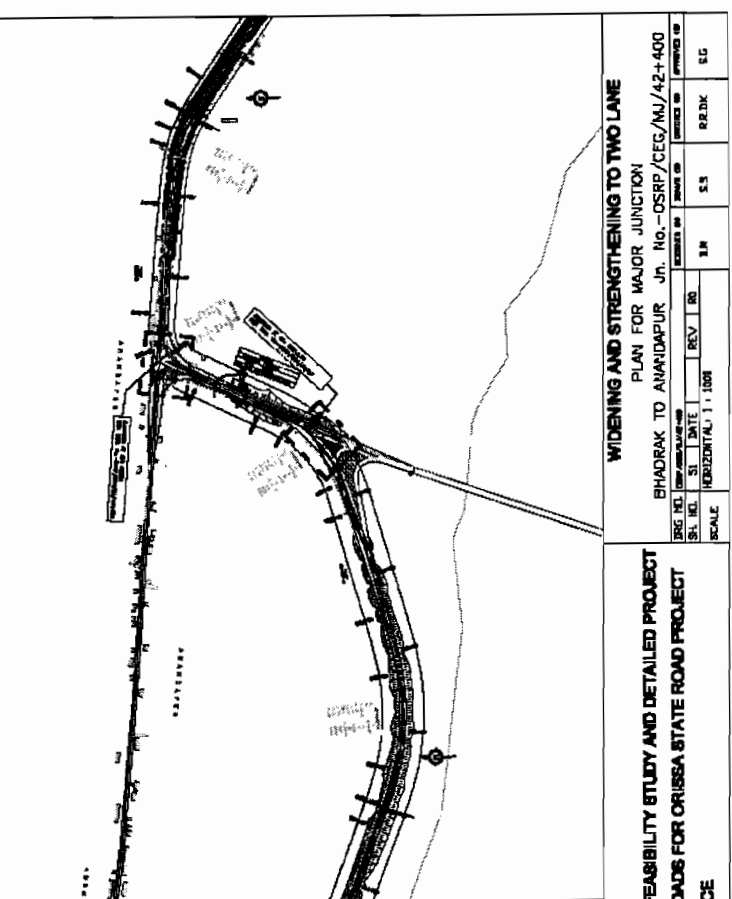
CONSULTING ENGINEERS GROUP LTD.
 E-12, Raj Colony, Madhya Nagar, Jaipur-17
 TEL: +91-(0141)-2520893, 2520899, 2520856
 FAX: 2521346, e-mail: engeegroup@rediffmail.com

LEGEND

1	EXISTING ROAD	1	PROPOSED ROAD
2	EXISTING ROAD	2	PROPOSED ROAD
3	EXISTING ROAD	3	PROPOSED ROAD
4	EXISTING ROAD	4	PROPOSED ROAD
5	EXISTING ROAD	5	PROPOSED ROAD



KEY PLAN



- 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 PAVIDENT MARKING AT INTERSECTIONS & BEYOND INTERSECTIONS REFER DRAWING No. OSRP/CEG/RM/01 & 02
 4. KERBS OF DIRECTIONAL ISLANDS SHALL BE PAINTED BLACK AND WHITE ALTERNATIVELY IN STRIPS OF 500mm WIDTH. FOR DETAILS REFER DRAWING No. OSRP/CEG/08
 5. KERBS OF DIRECTIONAL ISLANDS SHALL BE OF TYPE I

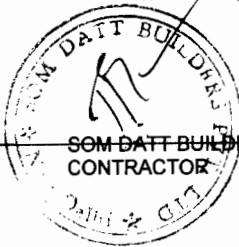
WIDENING AND STRENGTHENING TO TWO LANE
 PLAN FOR MAJOR JUNCTION
 BHADRAK TO ANANDAPUR Jn. No. - OSRP/CEG/MJ/42-400

SL. NO.	DATE	REV.	BY	CHK.	APP.	SCALE

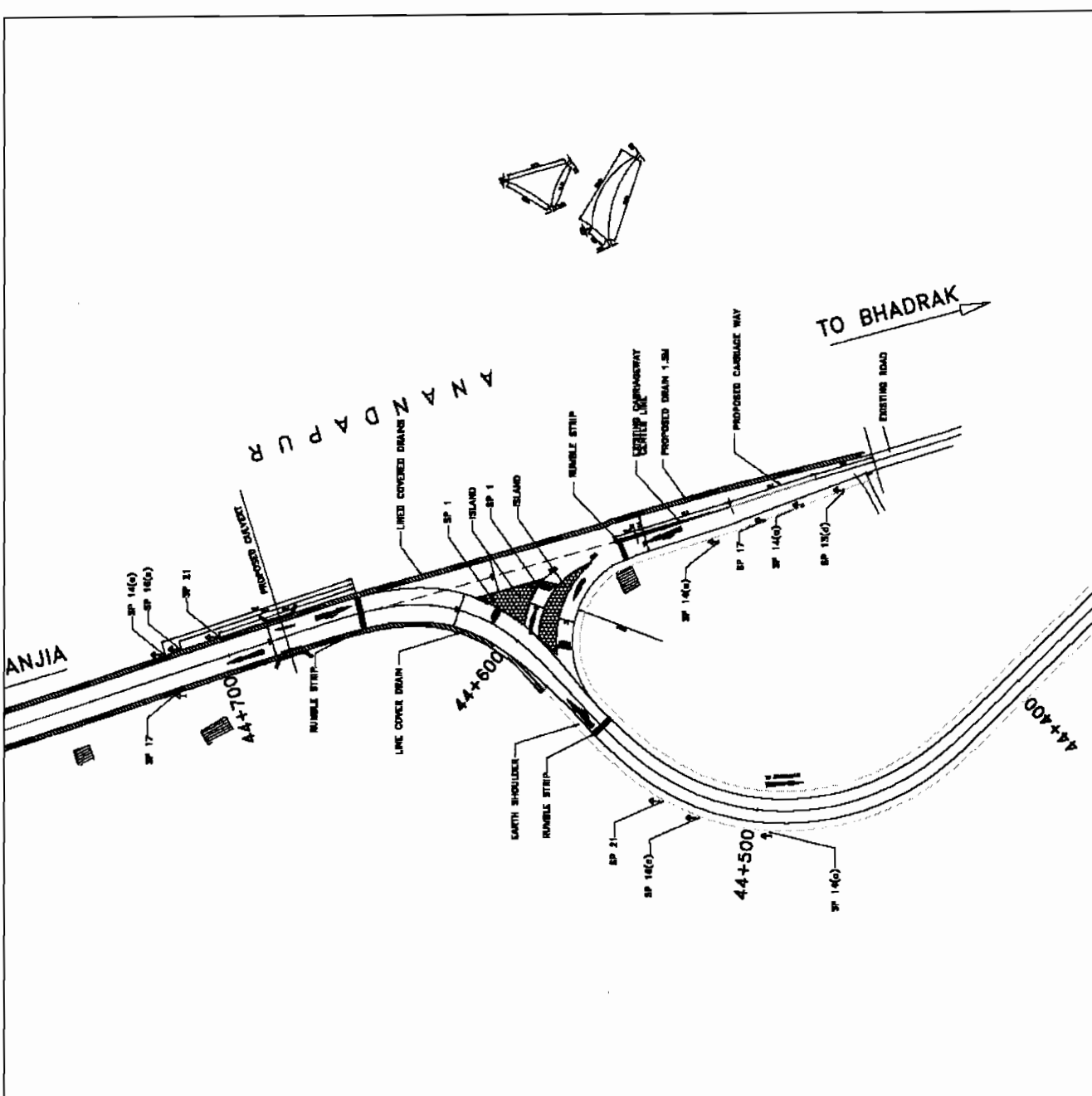
PROJECT:
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 C-12, 1st Floor, Market, Sector-17, Gurgaon, Haryana
 Tel: 011-41-220890, 221558, 2210058
 Fax: 221514, e-mail: ceg@cegroupia.com

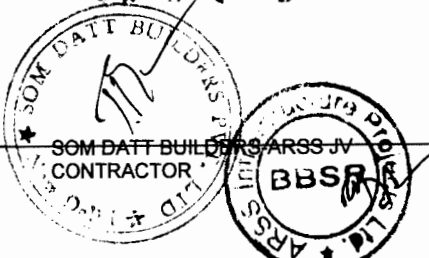
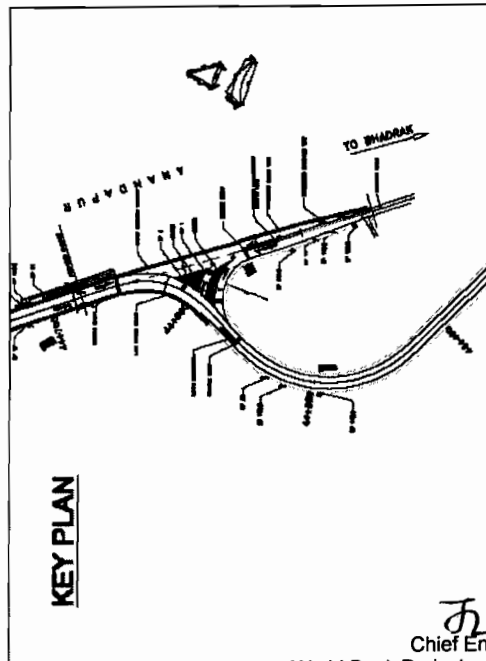
LEGEND



Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER



- NOTES**
1. ALL DIMENSION ARE IN METER.
 2. FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, SP-3, SP-14(G), SP-17, ETC. SEE DRAWING NO. OSRP/CEG/RS/D1 - 03
 3. FOR PAVEMENT MARKING AT INTERSECTIONS & BEYOND INTERSECTIONS REFER DRAWING No. OSRP/CEG/RM/D1 & D2
 4. KERBS OF DIRECTIONAL ISLANDS SHALL BE PAINTED BLACK AND WHITE ALTERNATIVELY IN STRIPES OF 500mm WIDTH. FOR DETAILS REFER DRAWING No. OSRP/CEG/DR
 5. KERBS OF DIRECTIONAL ISLANDS AND CENTRAL ISLANDS SHALL BE OF TYPE I



WIDENING AND STRENGTHENING TO TWO LANE
 PLAN FOR MAJOR JUNCTION
 BHADRAK TO ANANDAPUR Jn. No. - OSRP/CEG/MJ/44+800

SCALE	DATE	REV	RO	SM	CS	PRJX	SG

PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st, 2nd, 3rd Floor, Sector-17
 Tel: +91-11-25078890, 25078891, 25078892
 Fax: 25073448, e-mail: ceg@cegroup.com

LEGEND

SP-1	SP-17	SP-14(G)	SP-16(G)	SP-13(G)	SP-21
ISLAND	ISLAND	ISLAND	ISLAND	ISLAND	ISLAND
LINE COVERED DRAIN	LIVE COVER DRAIN	PROPOSED DRAIN 1.5M	PROPOSED CABLEWAY	EXISTING ROAD	RUBBLE STRIP
EARTH SHOULDER	PROPOSED GRANITE	PROPOSED CEMENT CONCRETE	PROPOSED ASPHALT	PROPOSED BITUMEN	PROPOSED SAND

SCHEDULE OF SIGN POSTS

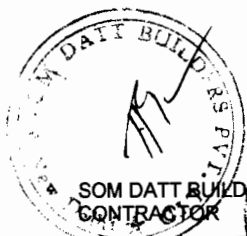
Sign Post ID	Description of the Sign Board	Chattopadhyay	Location			Remarks
			LL	R	CH (B.T)	
SP - 10B	LEFT HAND CURVE	43				
		44				
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1. LL = LEFT LANE
2. RL = RIGHT LANE
3. CH(L) = CROSS ROAD LEFT
4. CH(R) = CROSS ROAD RIGHT
5. SIGN POST SHALL BE INSTALLED AT AN OFFSET DISTANCE OF 2M FROM THE EDGE OF CARRIAGE WAY
6. FOR DETAILS OF ROAD SIGNS REFER D.M.C. II STANDARD DRAWINGS

PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION
 OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
 ASSISTANCE.

SCHEDULE OF SIGN POSTS
 BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)

DRG. NO. ORR/CEP/SH-53/RSCH-02
 SH. NO. 54 DATE / / REV. NO. NTS
 SCALE R.B. K.S.R. R.R.D.K S.G

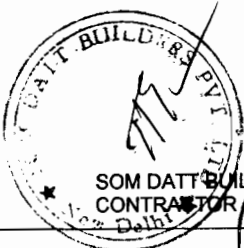


SOM DATT BUILDERS ARSS JV
 CONTRACTOR



Chief Engineer
 World Bank Projects,
 Chief Engineer, EMP

CONSULTING ENGINEERS GROUP LTD.
 E-12, Neel Colony, Mahiya Nagar, Jajpur-75
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceeg@ceindia.com



SOM DATT BUILDERS PRIVATE LIMITED
CONTRACTOR
Delhi

SCHEDULE OF BUS BAYS

Sl.No.	Name of Village	Up (Left)		Type	Ref. Drawing
		From	To		
1	Barrapada	8000	8105	1	OSRP/CEG/BB/01
2	Ganjamada	11425	11530	1	OSRP/CEG/BB/01
3	Palaes**	13300	13405	1	OSRP/CEG/BB/01
4	Brahmapur	14375	14480	1	OSRP/CEG/BB/01
5	Tilo	17400	17505	1	OSRP/CEG/BB/01
6	Berth	18445	18550	1	OSRP/CEG/BB/01
7	Oral Chhokla**	20020	20125	1	OSRP/CEG/BB/01
8	Basanthiya	24085	24200	1	OSRP/CEG/BB/01
9	Marsagan	25345	25450	1	OSRP/CEG/BB/01
10	Hataidh	29270	29375	1	OSRP/CEG/BB/01
11	Chhainapadi	30845	30950	1	OSRP/CEG/BB/01
12	Blancha Jn**	34050	34155	1	OSRP/CEG/BB/01
13	Amlogada	34970	35075	1	OSRP/CEG/BB/01
14	Tarolara Chhokla Jn	39730	39835	1	OSRP/CEG/BB/01
15	Chelavanthi Jn	40945	41050	1	OSRP/CEG/BB/01
16	Faldirpur	42345	42450	1	OSRP/CEG/BB/01
17	Amalpur	45100	45205	1	OSRP/CEG/BB/01
18	Palaes**	46845	46950	1	OSRP/CEG/BB/01
19	Patinapur	48100	48205	1	OSRP/CEG/BB/01
20	Sodavant	48100	48205	1	OSRP/CEG/BB/01

SCHEDULE OF BUS BAYS

Sl.No.	Name of Village	Down (Right)		Type	Ref. Drawing
		From	To		
1	Barrapada	8255	8360	1	OSRP/CEG/BB/01
2	Ganjamada	11900	12005	1	OSRP/CEG/BB/01
3	Palaes**	13555	13660	1	OSRP/CEG/BB/01
4	Brahmapur	14630	14735	1	OSRP/CEG/BB/01
5	Tilo	17720	17825	1	OSRP/CEG/BB/01
6	Berth	18400	18505	1	OSRP/CEG/BB/01
7	Oral Chhokla**	24345	24450	1	OSRP/CEG/BB/01
8	Basanthiya	26005	26110	1	OSRP/CEG/BB/01
9	Marsagan	27545	27650	1	OSRP/CEG/BB/01
10	Hataidh	30020	30125	1	OSRP/CEG/BB/01
11	Chhainapadi	31625	31730	1	OSRP/CEG/BB/01
12	Blancha Jn**	35685	35790	1	OSRP/CEG/BB/01
13	Amlogada	35400	35505	1	OSRP/CEG/BB/01
14	Tarolara Chhokla Jn	35825	35930	1	OSRP/CEG/BB/01
15	Chelavanthi Jn	40020	40125	1	OSRP/CEG/BB/01
16	Faldirpur	41175	41280	1	OSRP/CEG/BB/01
17	Amalpur	44245	44350	1	OSRP/CEG/BB/01
18	Palaes**	45955	46060	1	OSRP/CEG/BB/01
19	Patinapur	47025	47130	1	OSRP/CEG/BB/01
20	Sodavant	48150	48255	1	OSRP/CEG/BB/01

SCHEDULE OF EXTRA WIDENING

Sl.No.	Transition Start	Curve Start	Transition End	Radius	Spiral In	Spiral Out	Extra Widening
1	2100.772	2150.772	2197.634	240	50	60	0.6
2	2187.634	2447.634	2637.464	200	60	60	0.6
3	3491.032	3451.032	3477.361	240	50	50	0.6
4	12785.602	12855.8	12923.75	240	30	30	0.6
5	13180.378	13250.38	13327.97	240	30	30	0.6
6	19493.788	19743.8	19771.6	1984.602	170	70	0.6
7	19441.602	19511.6	19541.21	2001.212	170	70	0.6
8	20117.518	20372.68	20302.678	170	70	70	0.6
9	20302.678	20372.68	20404.57	20474.587	170	70	0.6
10	20864	20914	20939.03	28989.035	240	50	0.6
11	26940.083	28039.08	28073.77	29123.77	240	50	0.6
12	28670.981	28710.98	28736.75	28789.748	300	40	6.3
13	29700.749	29869.75	29882.97	29882.973	170	70	0.6
14	36412.185	36487.37	36510.94	36485.237	300	75	0.6
15	41415.316	41669.33	41668.98	41768.983	170	70	0.6
16	41952.198	42027.16	42041.32	42111.318	170	70	0.6
17	42247.818	42297.82	42309.1	42349.103	50	40	1.2
18	42436.796	42476.76	42476.77	42476.768	170	40	0.6
19	42753.131	42828.13	42849.7	43024.702	300	75	0.6
20	44416.924	44441.82	44536.33	44574.331	80	25	3.6
21	44574.331	44614.33	44631.23	44671.234	50	40	1.2
22	44850.021	44930.02	44982.66	45072.678	150	80	0.6

NOTE:

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

- NOTE:
- FOR DETAILS OF BUS BAYS REFER TO I.D. CURVE/CEG/BB/01 AND 02
 - LOCATIONS OF THE BUS BAYS MAY BE CHANGED AT SITE AS PER THE REQUIREMENTS AND CONDITIONS DURING THE CONSTRUCTION
 - LOWER BUS BAYS STANDINGS SHALL BE ADOPTED AS PER THE REQUIREMENTS AND CONDITIONS DURING THE TIME OF CONSTRUCTION
- (TYPE-2 STANDINGS SHALL BE ADOPTED WHEREVER TYPE-1 STANDINGS ARE NOT FEASIBLE FROM ECONOMIC POINT OF VIEW)

PROJECT:-

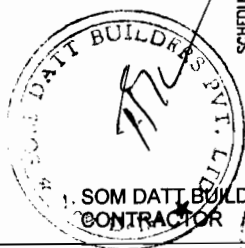
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

CONSULTING ENGINEERS GROUP LTD.
E-12, MeoJ Colony, Matulya Nagar, Jajpur-17
Tel: +91-141-2520895, 2521895, 2520556
Fax: 2521348, e-mail: ceg@ceginfolia.com

World Bank Projects, EMPLOYEES

DRG NO.	DATE	REV	RO	K.S.R.	R.B.	CHECKED (C)	APPROVED (A)
SH. NO.	SB	DATE	REV	RO	K.S.R.	R.B.	R.R.D.K
SCALE	NTS						

SCHEDULE OF BUS BAYS & EXTRA WIDENING
BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)



SOM DATT BUILDERS ARSS JV
CONTRACTOR

SCHEDULE OF LINED DRAIN

Sl.No.	Village Name	Proposed From	To	Distance
1	BAGURAI	1800	2670	870
2	KANDIA	3330	4330	900
3	BADAPADA	7800	8850	1050
4	GANJANICA	11800	11900	100
5	PALASA	13320	13850	530
6	TILLO	16670	17100	430
7	BONTH	17500	20700	3180
8	ORALI CHHAKA	24000	24330	330
9	BASANTIA	25450	26100	650
10	MAREIGARH	27100	27950	850
11	HATAADI	27950	30500	2550
12	CHHENAPADA	30920	32400	1480
13	CHORAGADIA	32750	33100	350
14	BANCHO Jin	33650	34100	450
15	AMBAGADIA	35030	35500	470
16	CHAUAVANTHI	36900	40100	3200
17	FAKIRPUR&ANANDPUR	40400	42300	1900
18	ANANDPUR&PIRSON	44800	45550	750
19	PADMAPUR	46800	47100	300
20	SADAYONI	48150	48450	300

SCHEDULE OF FOOTPATH BARRIERS

Sl.No.	Village Name	Proposed From	To	Side
1	Ramdia	3300	3325	Both
2	Birapada	3550	3900	Both
3	Ganjaraga	8575	8800	Both
4	Bonth	11600	11900	Both
5	Basantibha	19275	20850	Both
6	Mareigarh	25550	26100	Both
7	Hataadi	27150	27500	Both
8	Chhenapad	28800	29240	Both
9	Ambapad	29650	30000	Both
10	Fakirpur	35075	35400	Both
11	Anandpur	40400	42300	Both

SCHEDULE OF PEDESTRIAN CROSSING

Sl.No.	Description	Proposed Chainage	No. of Ped Crossing
1	Bus Bay/Stop	8045.000	1
2	.	8315.000	1
3	.	11470.000	1
4	.	11980.000	1
5	.	13345.000	1
6	.	13615.000	1
7	.	14420.000	1
8	.	14980.000	1
9	.	17445.000	1
10	.	17805.000	1
11	.	18490.000	1
12	.	19480.000	1
13	.	20065.000	1
14	.	24140.000	1
15	.	24405.000	1
16	.	25380.000	1
17	.	26155.000	1
18	.	27080.000	1
19	.	27805.000	1
20	.	29315.000	1
21	.	30080.000	1
22	.	30990.000	1
23	.	31885.000	1
24	.	33755.000	1
25	.	34095.000	1
26	.	35015.000	1

Sl.No.	Description	Proposed Chainage	No. of Ped Crossing
27	Bus Bay/Stop	35480.000	1
28	.	35885.000	1
29	.	39795.000	1
30	.	40080.000	1
31	.	40980.000	1
32	.	41235.000	1
33	.	42380.000	1
34	.	44305.000	1
35	.	45145.000	1
36	.	45655.000	1
37	.	46880.000	1
38	.	47085.000	1
39	.	48210.000	1
40	.	48645.000	1
41	School	17588.000	1
42	.	20245.000	1
43	.	20384.000	1
44	.	20478.000	1
45	.	33991.000	1
46	.	35165.000	1
47	.	44623.000	1
48	.	45044.000	1
49	.	45381.000	1
50	.	48783.000	1
51	Hospital	6413.000	1
52	.	40887.000	1

- NOTE:-
1. FOR DETAILS OF LINED DRAINS REFER DWG NO. DSRRP/CEG/DIR
 2. THE PROVISION AND LENGTH OF THE LINED DRAIN SHALL BE REASSESSED DURING THE TIME OF CONSTRUCTION
 3. FOOTPATH BARRIERS SHALL BE PROVIDED AS PER DWG. NO DSRRP/CEG/FB
 4. FOR BARRICADES OPENING SHALL BE PROVIDED WHEREVER CROSS ROAD/ GATES
 5. LINED DRAIN SCHEDULE SUPER SEED THE PLAN

NOTE:-

1. FOR DETAILS OF PEDESTRIAN CROSSING REFER ROAD MARKINGS
2. FOR DETAILS OF RPMs AT PEDESTRIAN CROSSING REFER STANDARD DRAWINGS

World Bank Projects,
EMP

Chief Engineer

CONSULTING ENGINEERS GROUP LTD.
E-12, Meji Colony, Malviya Nagar, Jaipur-17
Tel: +91-141-2520899, 2521899, 2520856
Fax: 2521348, e-mail: ceg@cegroupindia.com

PROJECT:-

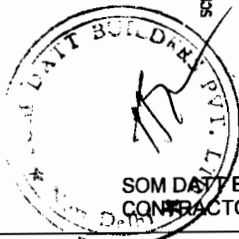
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE--(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

SCHEDULE OF LINED DRAIN AND PEDESTRIAN CROSSING
BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)

DRG NO. GRRP/CEG/SH-53/SGH 00
SH. NO. 67 DATE REV RO SCALE

DESIGNED (A) DRAWN (B) CHECKED (C) APPROVED (D)

K.S.R R.B. R.R.D.K S.G



SOM DATT BUILDERS PRIVATE LIMITED
CONTRACTOR



SCHEDULE OF MINOR JUNCTIONS TO BE IMPROVED

Sl.No.	Chainage Proposed	Slab Type	Type of Junction	Name of Village	Ref Drawing
1	1358	Both	Cross	Puthawal & Jambhali	OSRP/CEG/JN/01
2	1785	RHS	Y - Jn	Dhankabati	OSRP/CEG/JN/03
3	3369	LHS	Y - Jn	Ranaga	OSRP/CEG/JN/03
4	3563	RHS	Y - Jn	Collega	OSRP/CEG/JN/03
5	4427	Both	Cross	Ramkrishnagar & Odhar	OSRP/CEG/JN/01
6	5884	RHS	Y - Jn	Bardoda	OSRP/CEG/JN/03
7	8469	RHS	Y - Jn	Agrazoda	OSRP/CEG/JN/02
8	8578	LHS	Y - Jn	School	OSRP/CEG/JN/03
9	8737	LHS	Y - Jn	Collega	OSRP/CEG/JN/03
10	10024	LHS	Y - Jn	Aandhar	OSRP/CEG/JN/02
11	11786	LHS	Y - Jn	Ganigaman	OSRP/CEG/JN/03
12	13463	LHS	Y - Jn	Santibhada	OSRP/CEG/JN/03
13	14228	LHS	Y - Jn	Brahmanpur	OSRP/CEG/JN/03
14	17018	RHS	Y - Jn	Boithanada & Bhabhanada	OSRP/CEG/JN/01
15	19088	Both	Cross	Haripur	OSRP/CEG/JN/02
16	19462	LHS	Y - Jn	Manjira	OSRP/CEG/JN/03
17	19453	LHS	Y - Jn	Pannoda	OSRP/CEG/JN/03
18	24252	RHS	Y - Jn	Somnaga	OSRP/CEG/JN/02
19	25857	RHS	Y - Jn	Suljaga	OSRP/CEG/JN/03
20	30336	LHS	Y - Jn	Harandada	OSRP/CEG/JN/02
21	31478	LHS	Y - Jn	Bhamb	OSRP/CEG/JN/03
22	31588	RHS	Y - Jn	Dharam	OSRP/CEG/JN/03
23	33852	LHS	Y - Jn	Ratna	OSRP/CEG/JN/03
24	34806	RHS	Y - Jn	Machhadha	OSRP/CEG/JN/02
25	36571	LHS	Y - Jn	Chandrabati	OSRP/CEG/JN/03
26	38543	RHS	Y - Jn	Fakrabati	OSRP/CEG/JN/03
27	39577	RHS	Y - Jn	Paljaga	OSRP/CEG/JN/02
28	40448	LHS	Y - Jn	Amardpur main road	OSRP/CEG/JN/02
29	40587	LHS	Y - Jn	Padmabati	OSRP/CEG/JN/03
30	44031	RHS	Y - Jn	Sudarni	OSRP/CEG/JN/03
31	47013	RHS	Y - Jn		
32	48340	RHS	Y - Jn		

SCHEDULE OF ROAD HUMPS

Sl.No.	Description	Chainage	Numbers	Remarks
1	4 Legged Junction	1356	2	Provide on cross road
2		4427	2	.db.
3		18866	2	.db.
4	T-Junction	1785	1	.db.
5		3369	1	.db.
6		3563	1	.db.
7		5884	1	.db.
8		8578	1	.db.
9		8737	1	.db.
10		11786	1	.db.
11		13463	1	.db.
12		14228	1	.db.
13		17018	1	.db.
14		19453	1	.db.
15		24252	1	.db.
16		30339	1	.db.
17		31478	1	.db.
18		33852	1	.db.
19		35806	1	.db.
20		36571	1	.db.
21		38577	1	.db.
22		40048	1	.db.
23		42300	1	.db.
24		44031	1	.db.

SCHEDULE OF ROAD HUMPS

Sl.No.	Description	Chainage	Numbers	Remarks
25		47013	1	Provide on cross road
26		48340	1	.db.
27	Y-Junction	8459	1	.db.
28		10024	1	.db.
29		19402	1	.db.
30		29651	1	.db.
31		31588	1	.db.
32		38543	1	.db.
33		40567	1	.db.
34		42320	1	.db.
35		44625	1	.db.
36	School	17586	1	.db.
37		20246	1	.db.
38		20479	1	.db.
39		33891	1	.db.
40		35488	1	.db.
41		44623	1	.db.
42		45044	1	.db.
43		45382	1	.db.
44		48783	1	.db.

NOTE:

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

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Chief Engineer
World Bank Projects
EMP

PROJECT:-

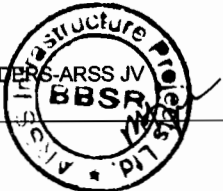
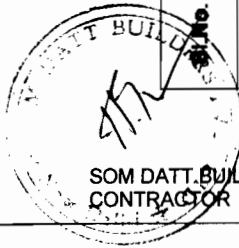
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

SCHEDULE OF JUNCTIONS & ROAD HUMPS
BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)

DRG. NO. OSRP/CEG/JN-53/SH.08	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 08	DATE	REV	RD	
SCALE	NTS			R.B.
		K.S.R.	R.R.D.K	S.G

DETAILED PAVEMENT SCHEDULE FOR BHADRAK - ANANDPUR (SH-53)

Sl.No.	Proposed Chainage		Distance in mts	Type of Construction	Type of Area	TCS	Sl.No.	Proposed Chainage		Distance in mts	Type of Construction	Type of Area	TCS
	From	To						From	To				
1	200	1800	1600	New Construction	OPEN	TCS - 8	32	28600	27100	500	Reconstruction	OPEN	TCS - 2
2	1800	2700	900	New Construction	BUILT	TCS - 6	33	27100	28600	1500	Reconstruction	BUILT	TCS - 6
3	2700	3300	600	ROB			34	28600	29600	1000	New Construction	BUILT	TCS - 6
4	3300	4300	1000	New Construction	BUILT	TCS - 6	35	29600	30600	900	Reconstruction	BUILT	TCS - 5
5	4300	6150	1850	Reconstruction	OPEN	TCS - 6	36	30600	30900	400	Reconstruction	OPEN	TCS - 2
6	6150	7350	1200	New Construction	OPEN	TCS - 6	37	30900	32250	1350	Reconstruction	BUILT	TCS - 6
7	7350	8400	1050	Reconstruction	BUILT	TCS - 5	38	32250	32400	150	New Construction	BUILT	TCS - 6
8	8400	8950	450	New construction DFS	BUILT	TCS - 19	39	32400	32760	360	New Construction	OPEN	TCS - 3
9	8950	9750	800	New construction DFS	OPEN	TCS - 18	40	32760	33100	350	New Construction	BUILT	TCS - 6
10	9750	10200	450	New Construction	OPEN	TCS - 3	41	33100	33450	350	New Construction	OPEN	TCS - 3
11	10200	10900	700	Reconstruction	OPEN	TCS - 2	42	33450	33650	200	New construction DFS	OPEN	TCS - 18
12	10900	11600	700	New Construction	OPEN	TCS - 3	43	33650	34100	450	New construction DFS	BUILT	TCS - 19
13	11600	11900	300	Reconstruction	BUILT	TCS - 5	44	34100	34450	350	New construction DFS	OPEN	TCS - 18
14	11900	12650	750	Reconstruction	OPEN	TCS - 2	45	34450	35050	600	Reconstruction	OPEN	TCS - 2
15	12650	13300	650	New construction DFS	OPEN	TCS - 18	46	35050	35600	450	New Construction	BUILT	TCS - 6
16	13300	13650	350	New construction DFS	BUILT	TCS - 19	47	35600	36400	900	New Construction	OPEN	TCS - 3
17	13650	13950	200	Reconstruction	BUILT	TCS - 5	48	36400	36200	2800	New Construction	OPEN	TCS - 3
18	13950	16650	2800	Reconstruction	OPEN	TCS - 2	49	36200	36900	700	Reconstruction	OPEN	TCS - 2
19	16650	17100	450	New Construction	BUILT	TCS - 6	50	36900	40100	200	Reconstruction	BUILT	TCS - 5
20	17100	17620	420	New Construction	OPEN	TCS - 3	51	40100	40400	300	Reconstruction	OPEN	TCS - 2
21	17620	20550	3030	New Construction	BUILT	TCS - 6	52	40400	42300	1900	Reconstruction	BUILT	TCS - 5
22	20550	20700	150	New construction DFS	BUILT	TCS - 19	53	42300	44800	2300	New Construction	OPEN	TCS - 3
23	20700	21500	800	New construction DFS	OPEN	TCS - 18	54	44800	45400	800	New Construction	BUILT	TCS - 6
24	21500	23550	2050	New Construction	OPEN	TCS - 3	55	45400	45550	150	New construction DFS	BUILT	TCS - 19
25	23550	24000	450	New construction DFS	OPEN	TCS - 18	56	45550	46900	1250	New construction DFS	OPEN	TCS - 18
26	24000	24350	350	New construction DFS	BUILT	TCS - 19	57	46900	47100	300	New construction DFS	BUILT	TCS - 19
27	24350	24800	250	New construction DFS	OPEN	TCS - 18	58	47100	47400	300	New construction DFS	OPEN	TCS - 18
28	24800	25450	650	New Construction	OPEN	TCS - 3	59	47400	48150	750	New Construction	OPEN	TCS - 3
29	25450	25550	100	New Construction	BUILT	TCS - 6	60	48150	48450	300	New Construction	BUILT	TCS - 6
30	25550	26100	550	New construction DFS	BUILT	TCS - 19	61	48450	49450	1000	New Construction	OPEN	TCS - 3
31	26100	26600	500	New construction DFS	OPEN	TCS - 18				48250			

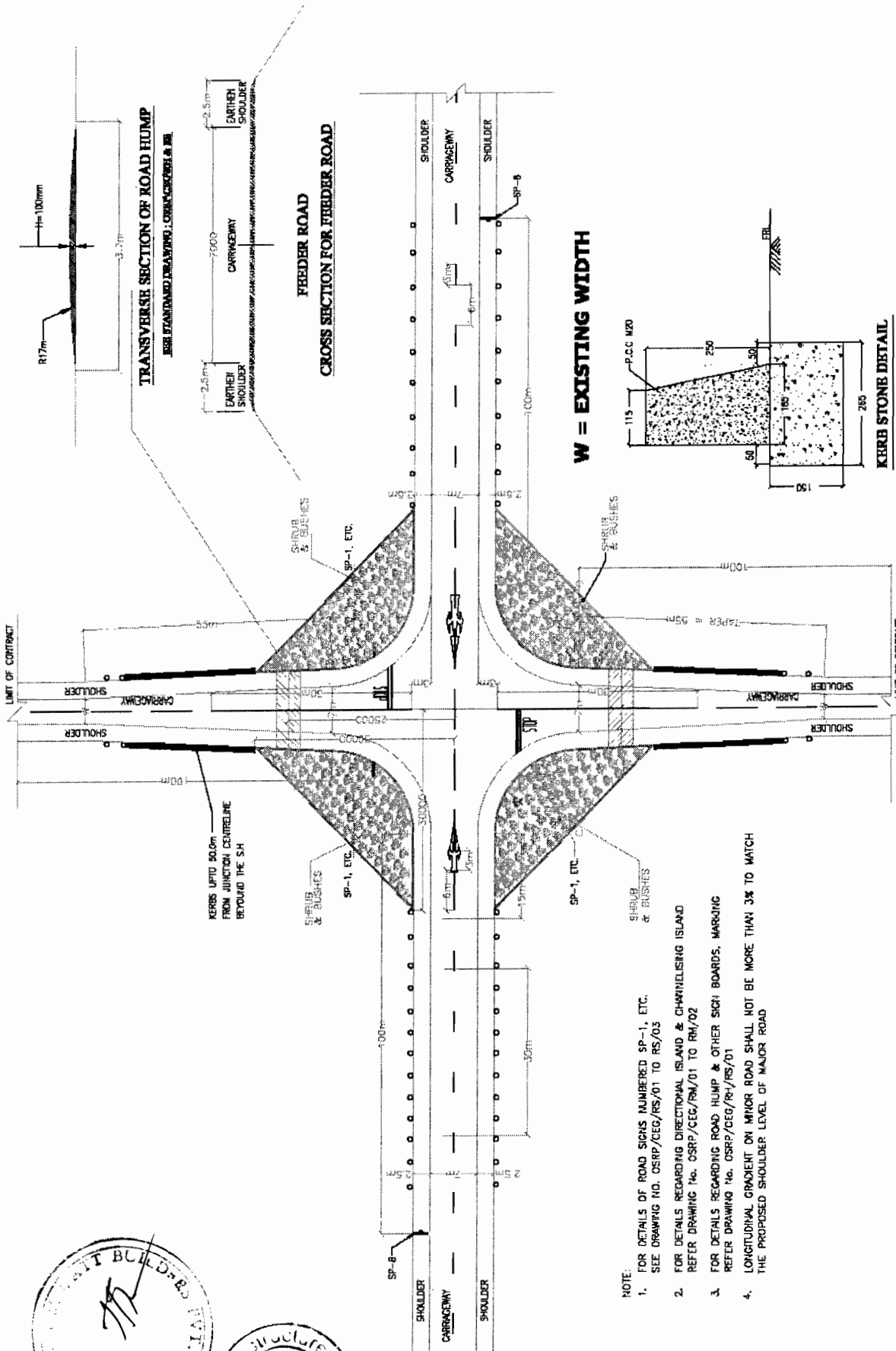



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PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION
 OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
 ASSISTANCE.

DETAILED PAVEMENT SCHEDULE & CROSS-SECTION TYPE
 BHADRAK TO ANANDPUR (SH-53, KM 0/00 TO 50/00)

DRG NO. 02/P/CE/SH-53/RSCH-09	DESIGNED (A) DRAWN (B)	CHECKED (C) APPROVED (D)
SH. NO. 61	DATE	REV. RD.
SCALE	NTS	
	K.S.R	R.B
	R.R.D.K	S.G



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



CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.

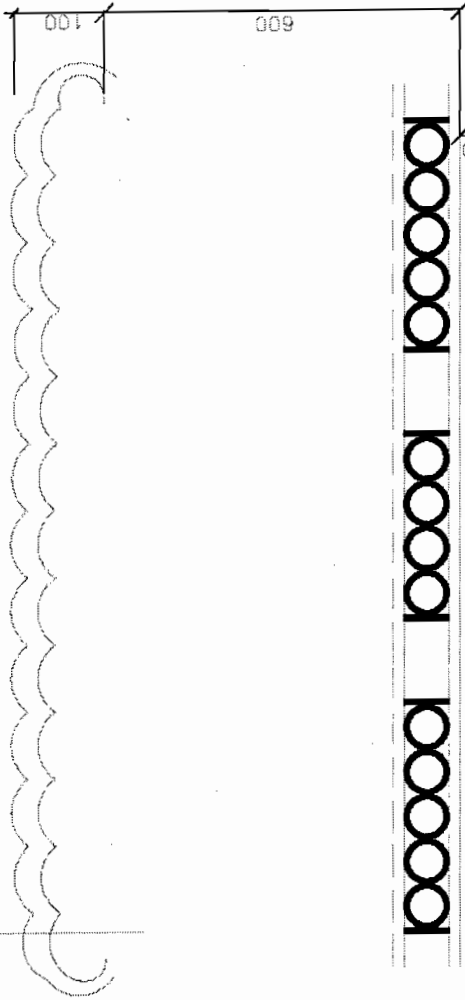
DRG NO. CSR/P/CEG/SH/ENV/01-A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 61	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

PROJECT:
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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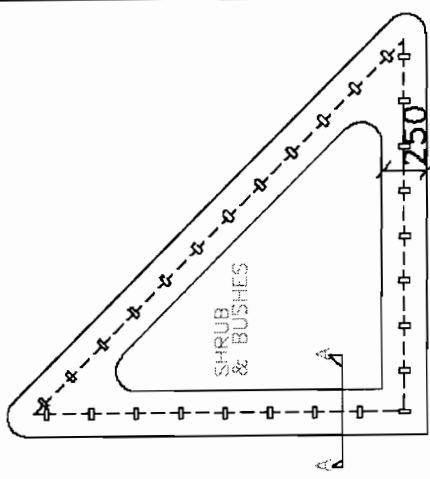
Chief Engineer
 World Bank Project

M.S FLAT 10mm x 2mm

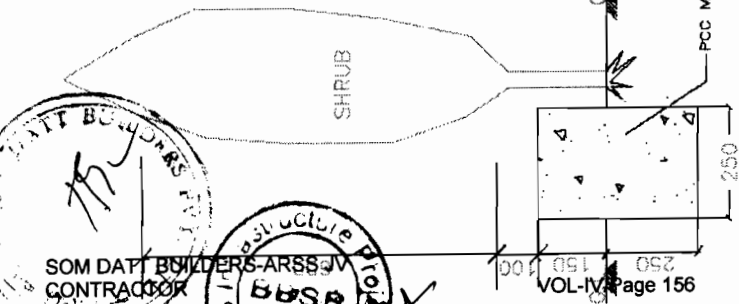


FRONT ELEVATION
MS GRILL FOR JUNCTION

(ALL DIMENSIONS ARE IN mm)



PLAN OF TS LAND AT JUNCTION



SECTION A-A

NOTE : SURFACE TO BE PAINTED WITH APPROVED ACRYLACK PAINT YELLOW & BLACK NOTE : SURFACE TO BE PAINTED WITH APPROVED ACRYLACK PAINT YELLOW & BLACK

CORNERS AS SITE ENHANCEMENT AND PREVENTION OF ENCREACHED COMMERCIAL ACTIVITY AND KIOSKS WITHIN 20m ON EITHER SIDE OF FEEDER ROAD & SH JUNCTION.ZEBRA CROSSINGS & SPEED ARRESTER RUMBLERS TO BE 10m AND 50m AWAY FROM THE JUNCTION.

**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

**TYPICAL DESIGN OF
MS GRILL FOR JUNCTION**

DIRG NO.	DSRP/CEG/SH/ENV/D1-B	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	62	DATE	REV	RD	
SCALE				NTS	
			M	JYOTI	G.P.M S.G

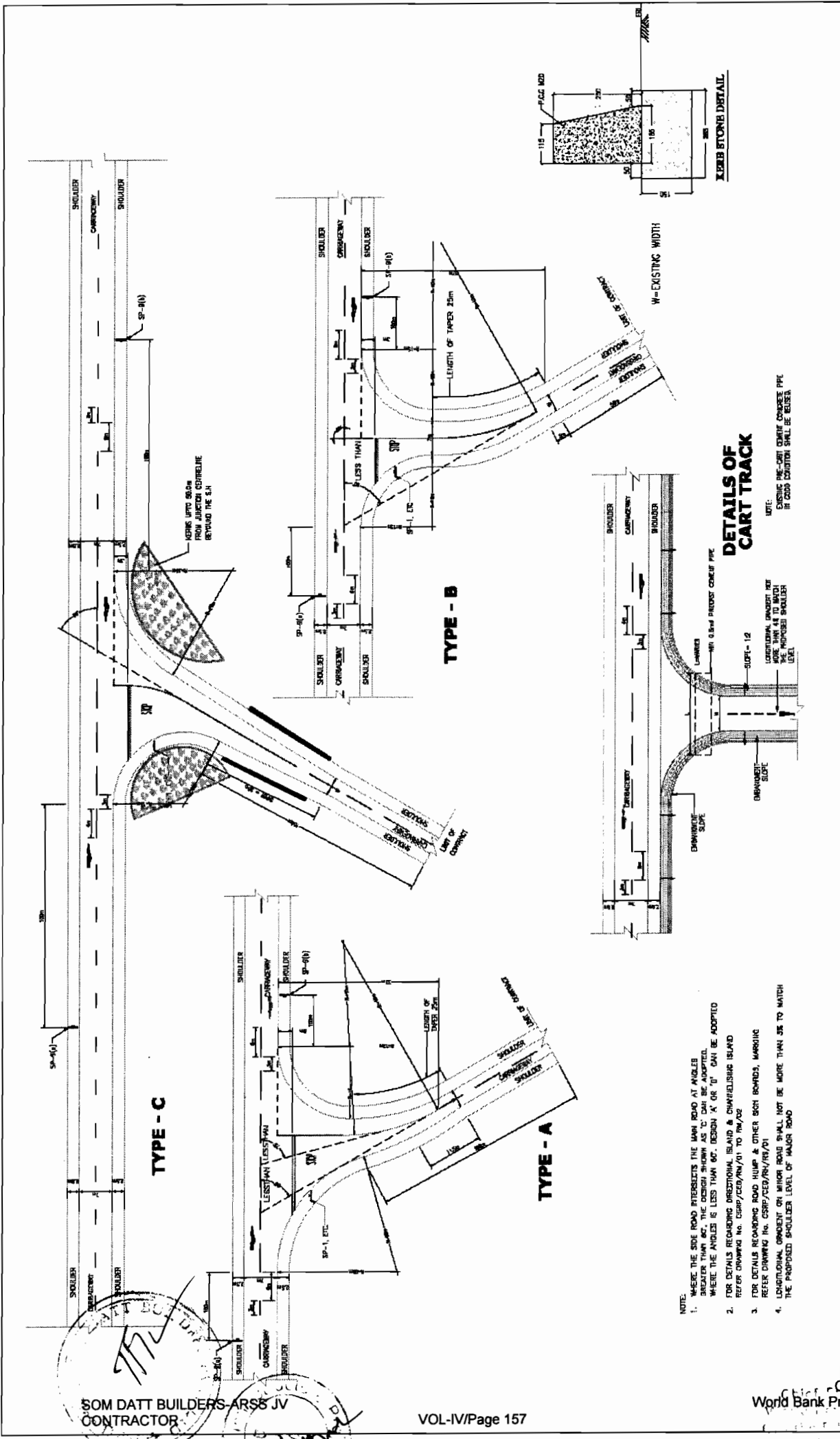
**CONSULTING
ENGINEERS GROUP LTD.**

E-12, Moji Colony, Malviya Nagar, Jaipur-17
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Chief Engineer
EMPLOYER





- NOTE:
1. MAKE THE SIDE ROAD PERPENDICULAR TO THE MAIN ROAD AT ANGLES GREATER THAN 60°. WHERE THE ANGLE IS LESS THAN 60°, THE ANGLE SHALL BE ADOPTED AS 60°.
 2. FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHYVHELISHAR ISLAND REFER DRAWING No. CSRP/CEG/SH/EM/01 TO R/W/02
 3. FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING No. CSRP/CEG/SH/RS/01
 4. LONGITUDINAL GRADIENT ON MAJOR ROAD SHALL NOT BE MORE THAN 0% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

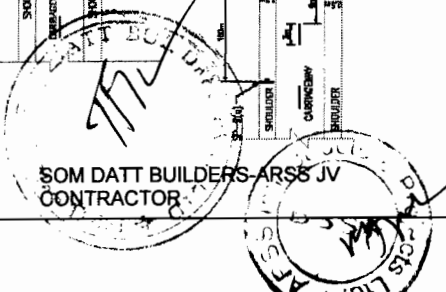
PROJECT:-
CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.

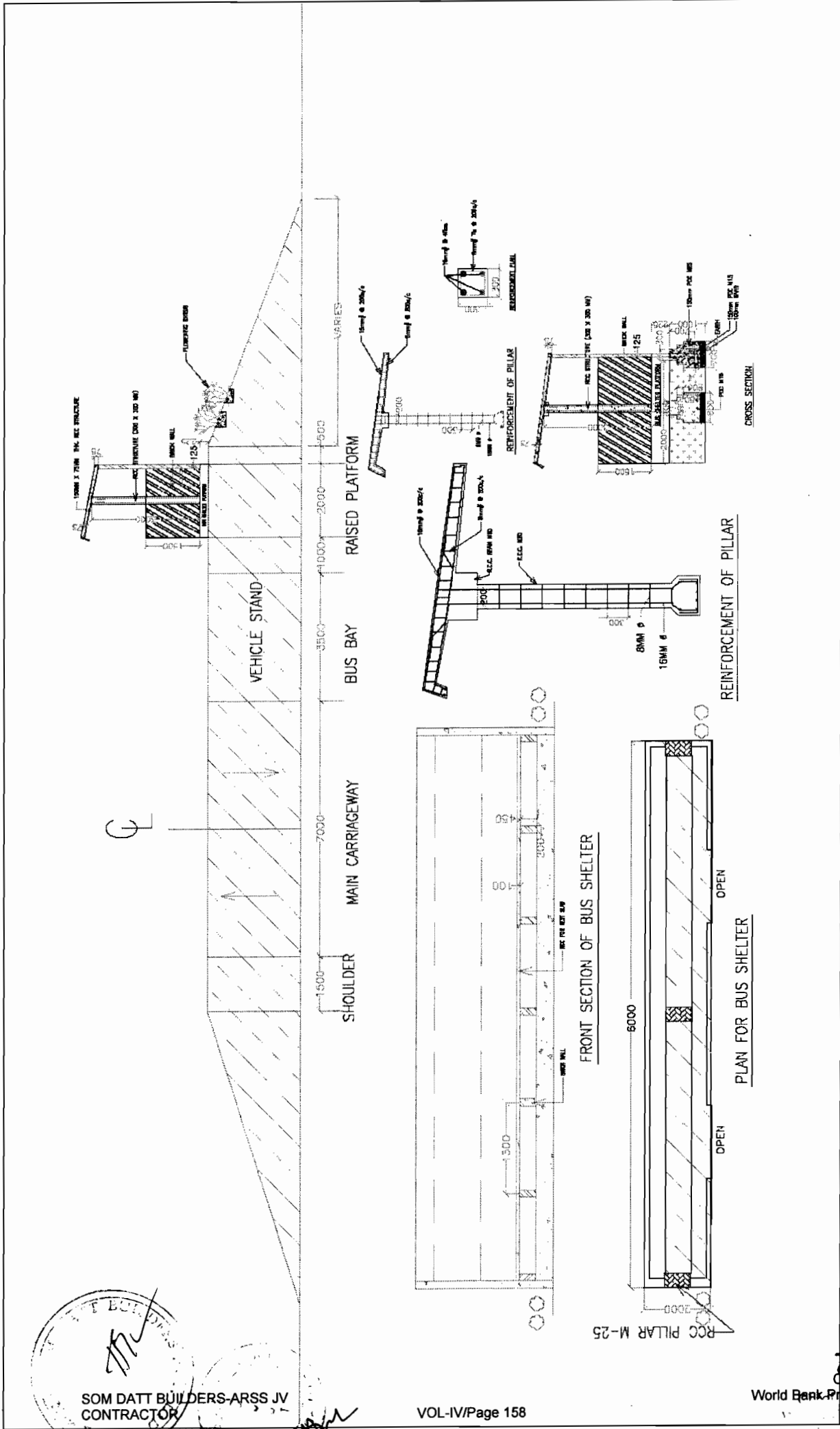
DRG NO.	CSRP/CEG/SH/EM/01-C	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	63	DATE	REV	RO	
SCALE	NTS			M	JYOTI
					G.P.M
					S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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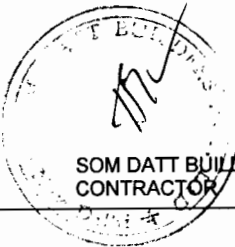


DESIGN OF PASSENGER SHED AT BUS BAY & BUS STOP

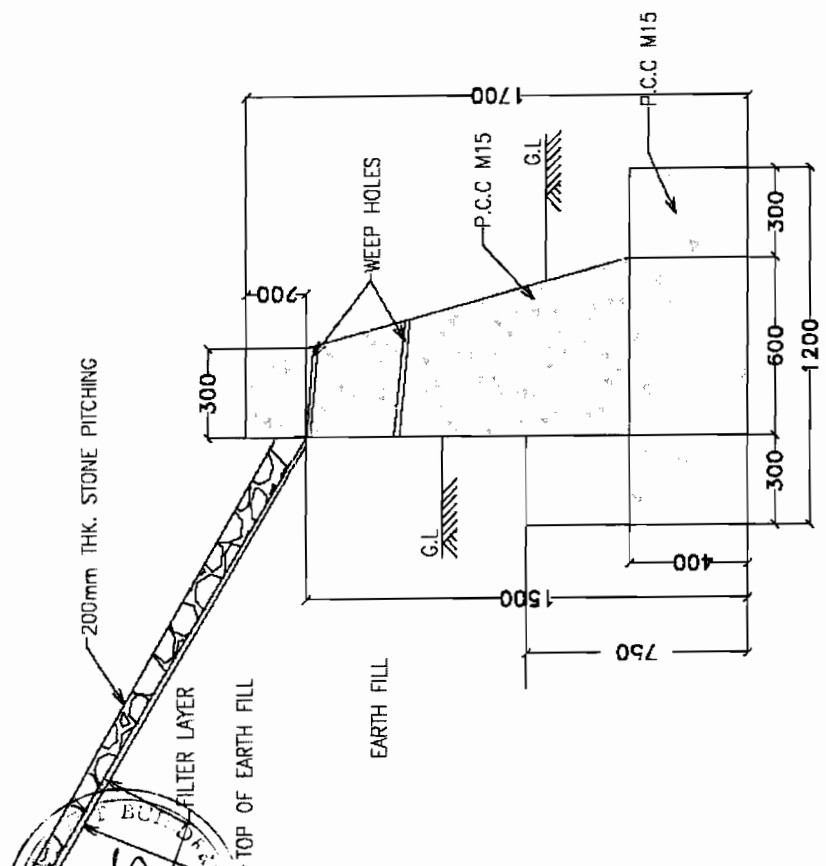
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

DRG. NO. OSRP/CEG/SH/ENV/02	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. B4	DATE	REV	RD	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

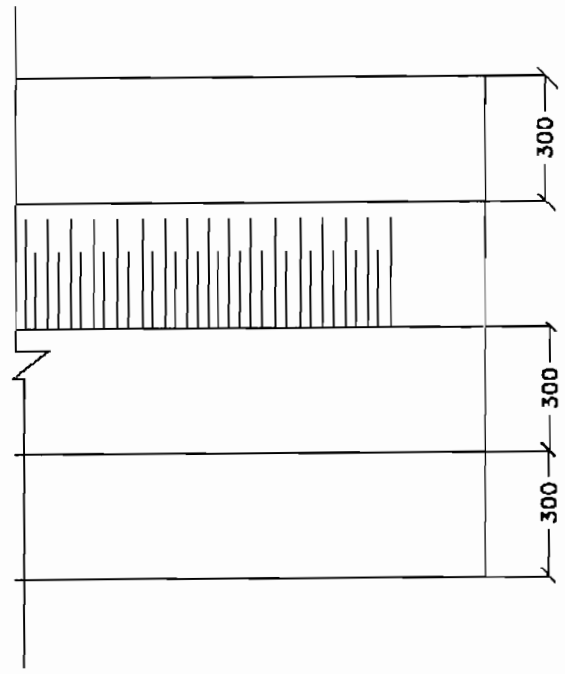
CONSULTING ENGINEERS GROUP LTD.
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SOM DATT BUILDERS-ARSS JV
CONTRACTOR



TOE WALL FOR POND
(CROSS SECTION)



PLAN OF TOE WALL FOR WATER BODY

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

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

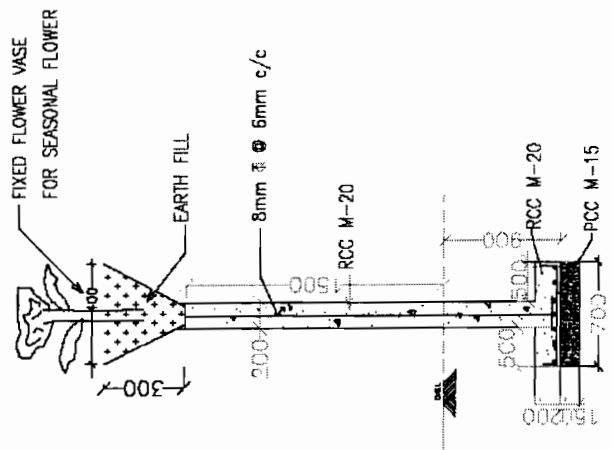
CONSULTING ENGINEERS GROUP LTD.
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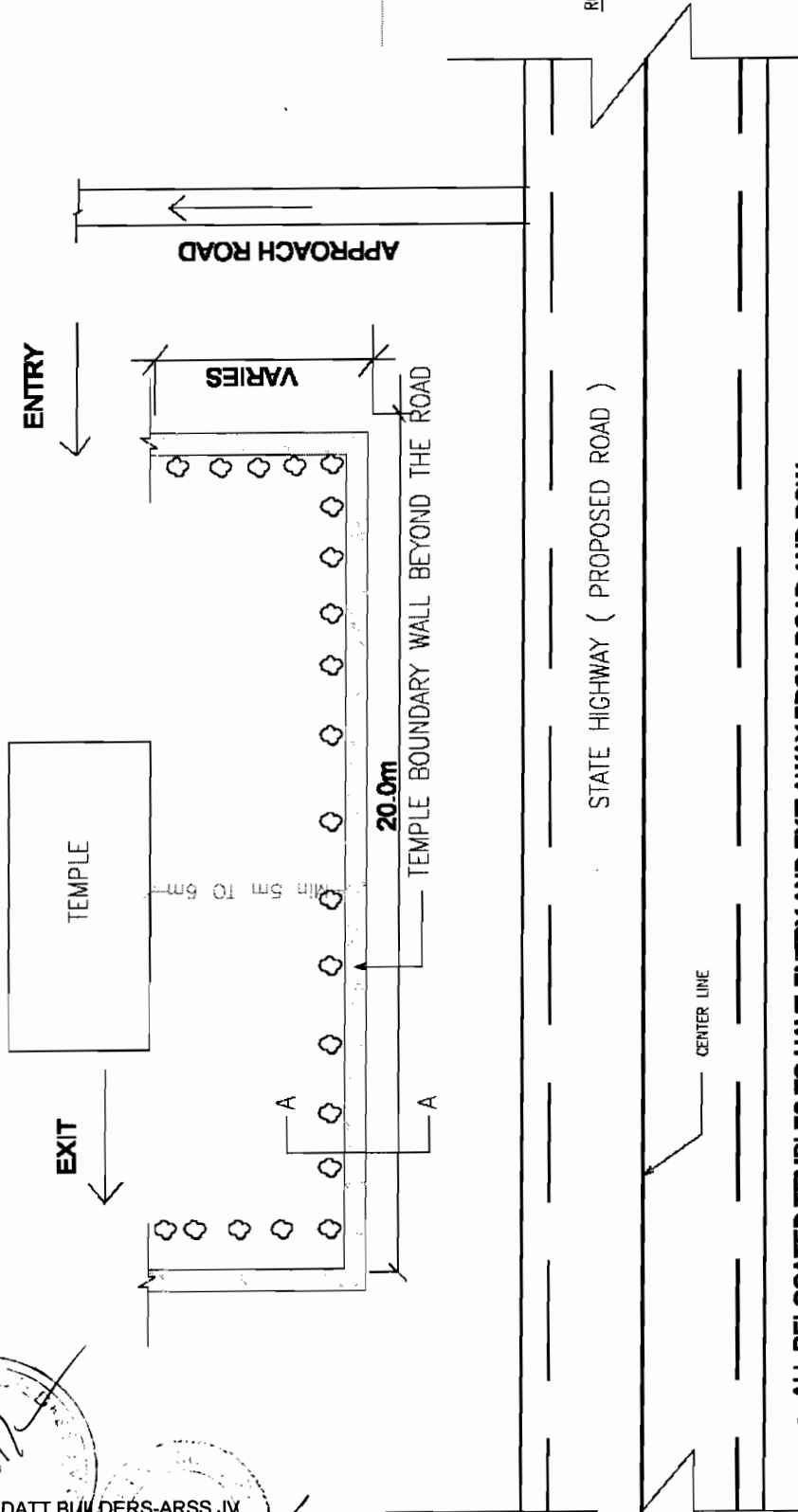
TYPICAL PCC TOE WALL FOR WATER BODIES AS ENVIRONMENTAL MITIGATION.

DRG. NO. GSRP/GEG/SH/EIW/03	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 85	DATE	REV	RO	
SCALE	NTS		M	JYOTI
				G.P.M
				S.G

SOM DATT BUILDERS ARSS JYOTI CONTRACTOR



RCC RETAINING WALL FOR TEMPLE
(CROSS SECTION A-A)



- ALL RELOCATED TEMPLES TO HAVE ENTRY AND EXIT AWAY FROM ROAD AND ROW
- EVERGREEN SHRUBS & MEDIUM TREES LIKE TAGAR, TARAT, MANDAR, PLUMERIA NICTANTHES, MALLIKA, JASHMINE, KUNDA, KANCHAN, KARABIRA, TULSI, BELA, SHAMI, ASHOK (saraca asoka), KAMINI, NAGESWAR AND CHAMPA (PLANT TO PLANT SPACE 1.5m TO 2.0m DEPENDING ON THE SPECIES)
- FIXED FLOWER VASE ON THE BOUNDARY WALL FOR SEASONAL FLOWER & TULSI.

CONCEPTUAL RCC BOUNDARY WALL OF TEMPLES, STATUES
RELIGIOUS TREES AS SITE ENHANCEMENT UNDER
ENVIRONMENT MITIGATION PLAN.

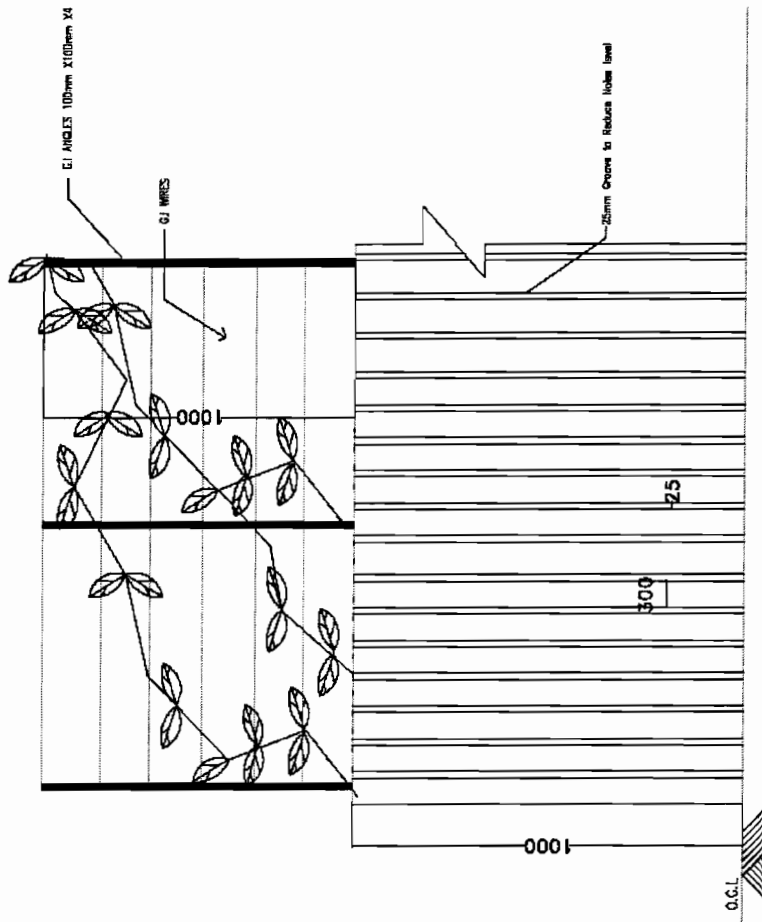
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

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Chief Engineer
EMPLOYER

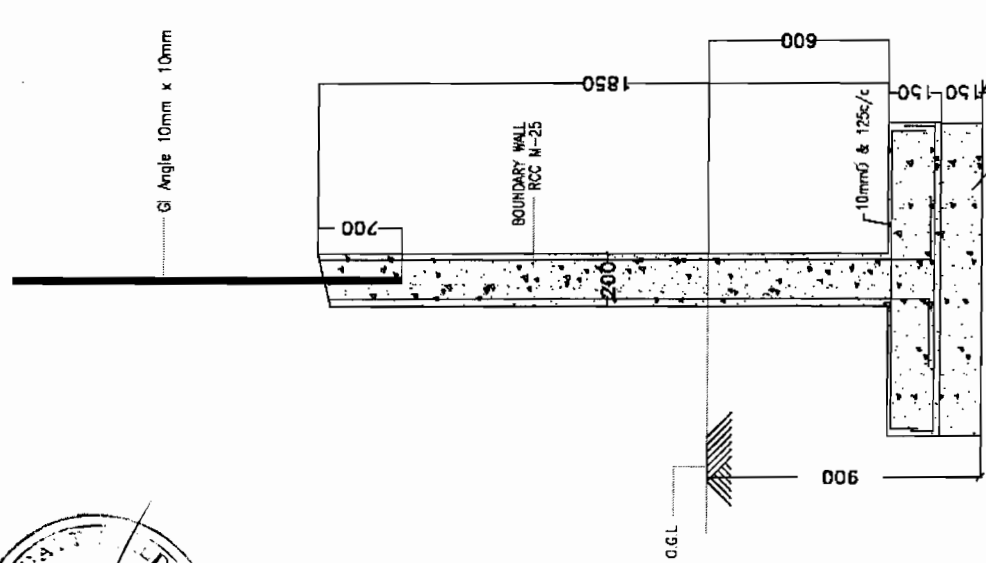
DRG NO. OSRP/CEG/SH/ENV/04-A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 66	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

SOM DATT BUILDERS-ARSS JV
CONTRACTOR

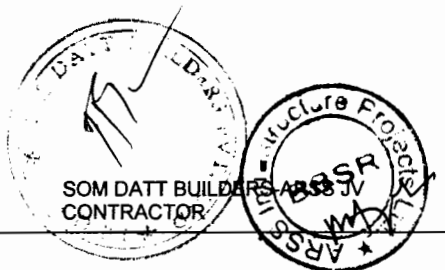


FRONT ELEVATION

RCC BOUNDARY WALL FOR SENSITIVE RECEPTORS WITH NOISE & DUST REDUCTION ARRANGEMENT



RCC BOUNDARY WALL FOR SCHOOL (GROSS SECTION)



TYPICAL NOISES & DUST BARRIER FOR ENVIRONMENTAL MITIGATION.

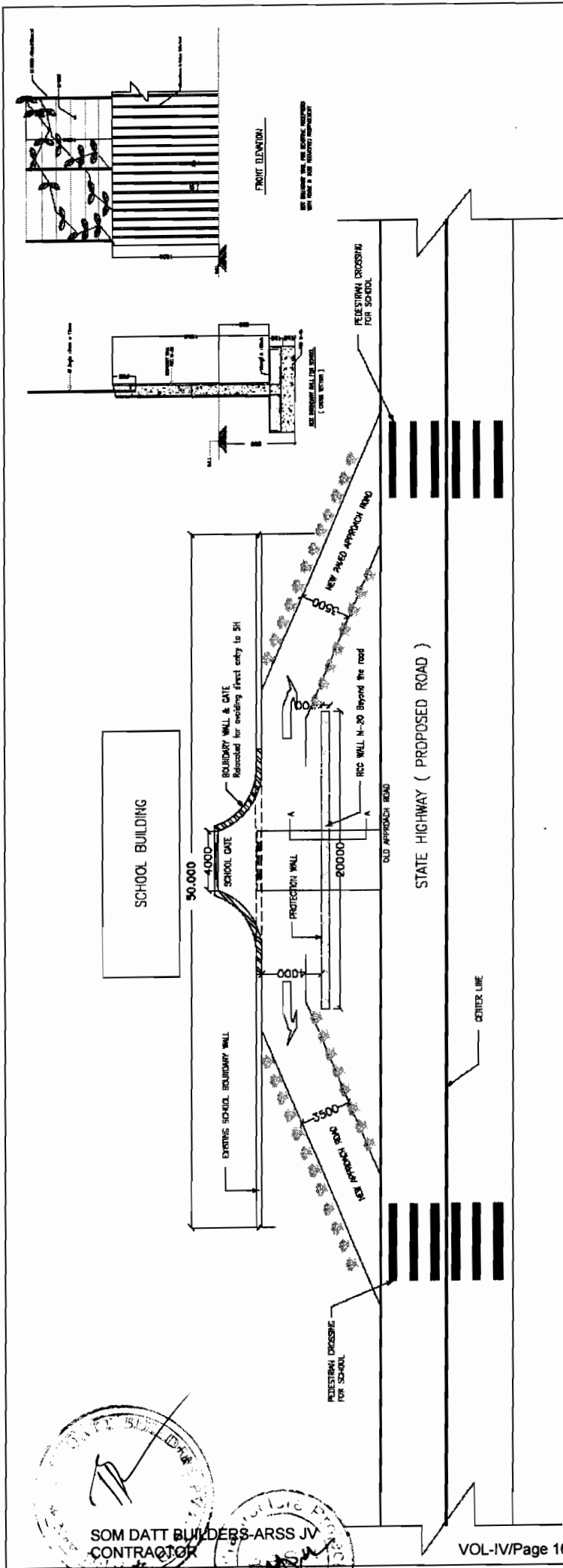
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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World Bank Project

DRG NO. OSRP/CEG/SH/ENV/04-B	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 67	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G



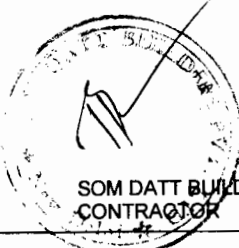
- THERE SHALL BE RUMBLER STRIPS & SPEED BREAKERS 150m & 10m AWAY FROM PEDESTRIAN CROSSINGS NEAR SCHOOLS, COLLEGES, HOSTELS, TEMPLES, HOSPITALS, DISPENSARIES AND OLD AGE HOMES, WEEKLY MARKET AREA, G.P MARKET COMPLEX ADJACENT TO THE ROAD WITHIN 25m TO 50m DISTANCE FROM CENTRE LINE. THE BOUNDARY WALL SHOULD HAVE G.I ANGLE POSTS WITH G.I WIRE MESH GRILL/ STRINGS FOR GROWING CREEPERS TO MUFFLE NOISE AND DUST.
- CREEPERS WITH SCENTED/COLOURFUL FLOWERS TO BE PLANTED WHICH HAVE TOMENTOSE LEAVES TO ABSORB MORE DUST AND NOISE.
- THE BOUNDARY WALL PLASTERING TO HAVE VERTICAL GROOVES TO DEFELECT NOISE TOWARDS THE ROAD WHICH WILL ACT AS A COUNTER NOISE SOURCE TO DAMPEN THE HIGH WAY NOISE LEVEL.
- VEGETATIVE SHRUBS AND BUSHES WHICH ARE NON BROWSABLE AND HAVING SCENTED FLOWERS TO BE PLANTED ON THE PERIPHERY OR EDGE OF THE APPROACH ROAD TO SUCH PLACES. THE BOUNDARY ENTRY POINT TO BE SHIFTED IN WORDS IN CASE OF CLOSE WITH NAME OF THE INSTITUTION ENGRAVED.
- PROXIMITY AND DIRECT ENTRY TO THE ROAD WITH AND A BARRICADE WALL SHALL BE ERRECTED 4m AWAY FROM THE ENTRY POINT INFRONT OF THE GATE

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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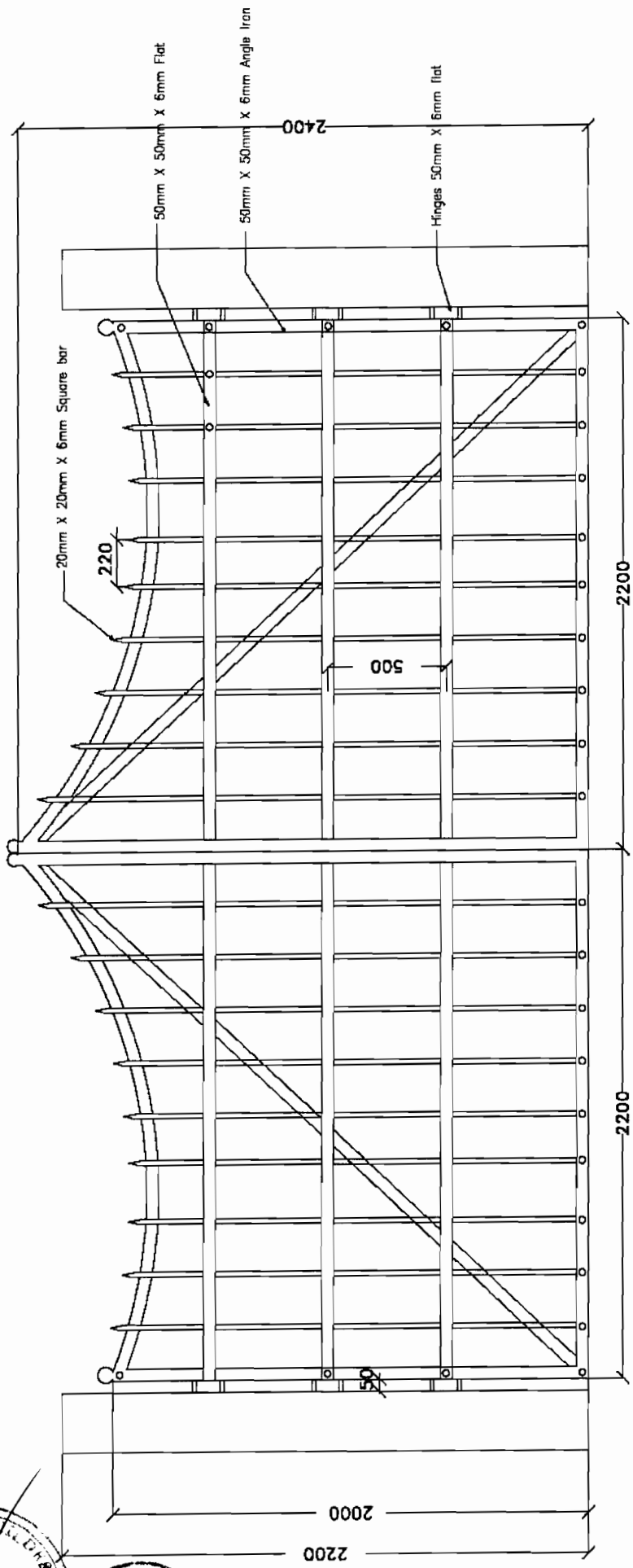
CONCEPTUAL APPROACH DESIGN FOR EDUCATIONAL AND MEDICAL INSTITUTIONAL APPROACHES AS ENVIRONMENTAL MITIGATION PLAN.

DRG. NO.	OSRP/CEG/SH/ENV/05	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	85	DATE	REV	RD	
SCALE	NTS		M	JYOTI	G.P.M
					S.G

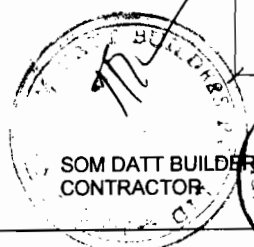


SOM DATT BUILDERS ARSS JV CONTRACTOR

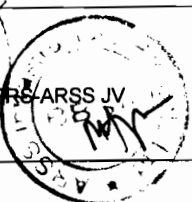




ORNAMENTAL GATE



SOM DATT BUILDERS/ARSS JV
CONTRACTOR



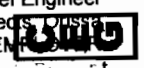
ORNAMENTAL GATE DESIGN FOR EDUCATIONAL AND MEDICAL INSTITUTIONAL APPROACHES AS ENVIRONMENTAL MITIGATION PLAN.

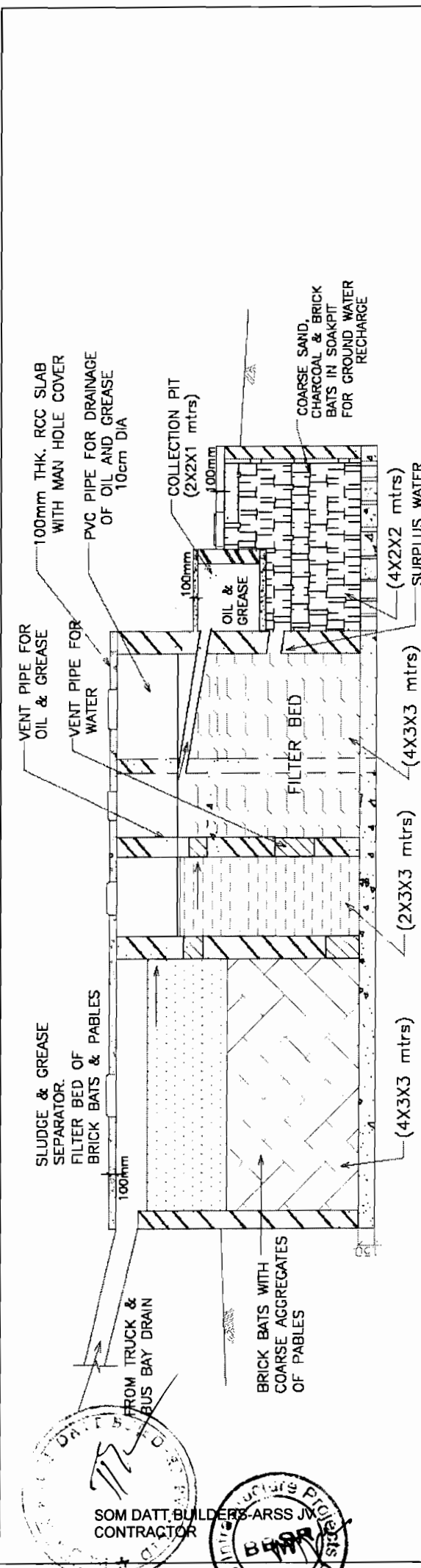
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SH. NO. 69	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

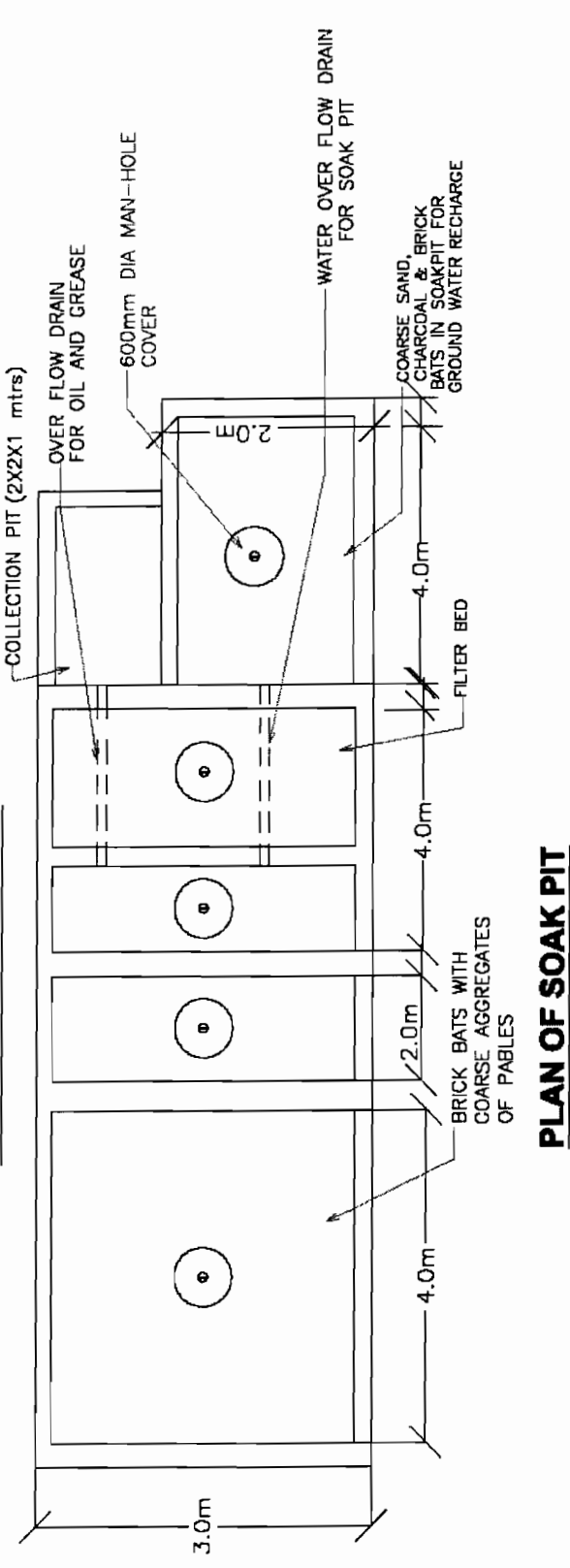
CONSULTING ENGINEERS GROUP LTD.
 E-12, MoJ Colony, Malviya Nagar Jaipur - 17
 Tel: +91-141-2520898, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegindia.com

World Bank Project
 Chief Engineer





SECTION OF SOAK PIT



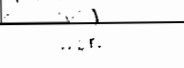
PLAN OF SOAK PIT

CONCEPTUAL DESIGN FOR SEPARATION OF OIL, GREASE AND SLUDGE OF TRUCK & BUS TERMINALS & BUS BAY

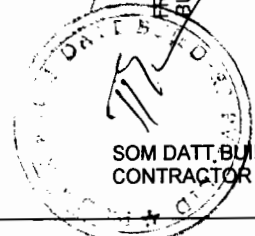
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

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ENGINEERS GROUP LTD.**
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Fax: 2521348, e-mail: ceg@cegindia.com

Chief Engineer
World Bank Project, Orissa
Chief Engineer

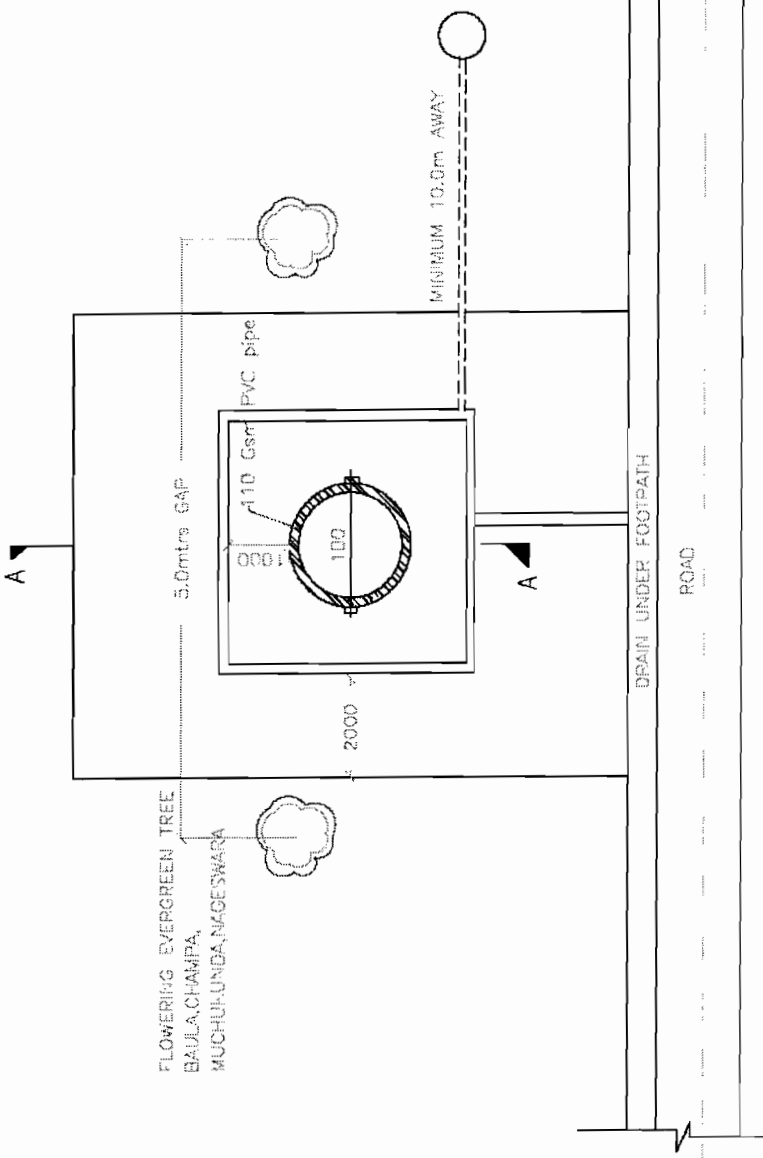


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SH. NO. 70	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

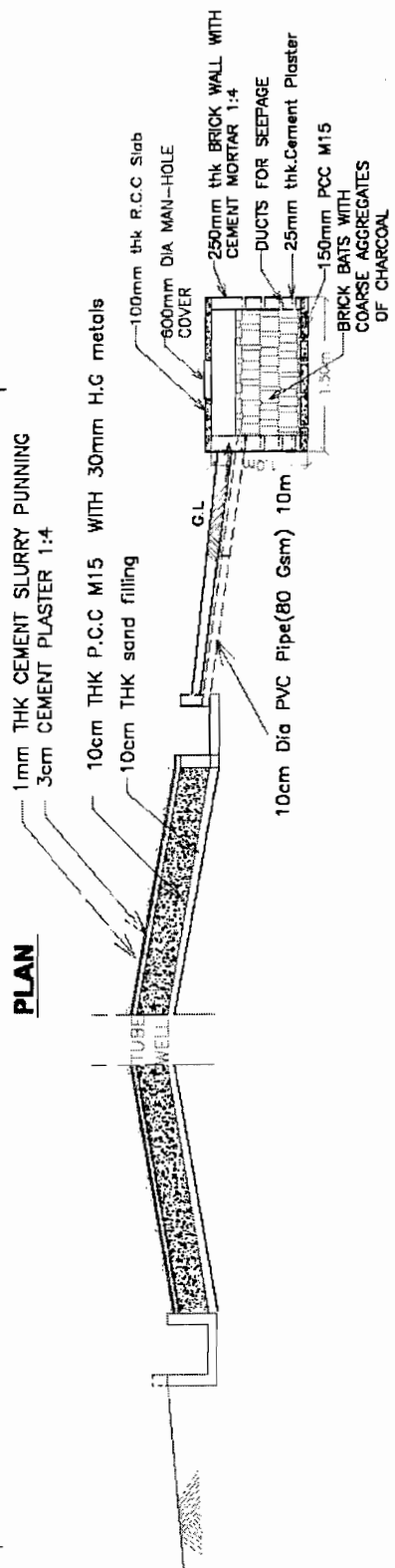


SOM DATT BUILDERS-ARSS JV
CONTRACTOR





PLAN



SECTION OF SOAK PIT

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
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CONCEPTUAL C.C. PLATFORM AND DRAINAGE DESIGN FOR HAND PUMPS AND TAPS.

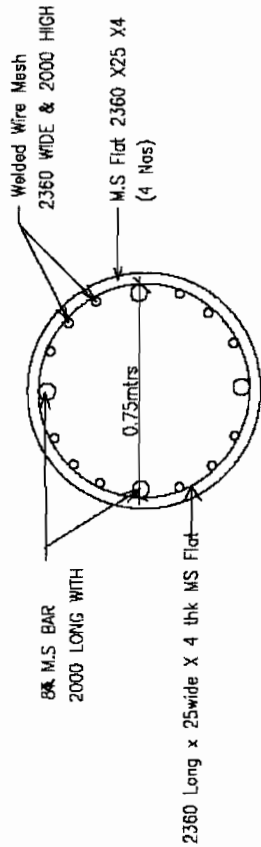
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SH. NO. 71	DATE	REV	RO	
SCALE	NTS			
	M	JYOTI	G.P.M	S.G

SOM DATTA BUILDERS-ARSS JV
CONTRACTOR

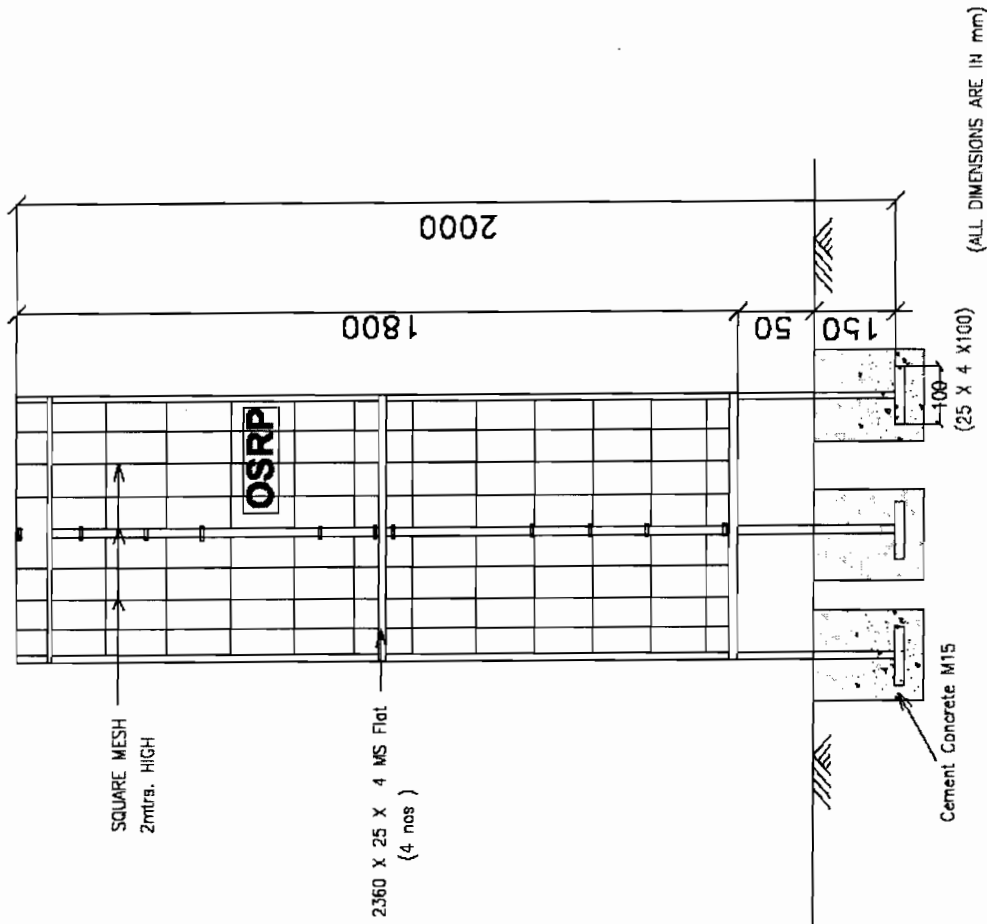
TREE GUARD



SOM DATT BUILDERS-ARSS JV
CONTRACTOR



PLAN



ELEVATION

TYPICAL PLAN OF TREE GUARD WITH MS BARS

PROJECT:-
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ASSISTANCE

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 Fax: 2521348, e-mail: ceg@cegroupindia.com

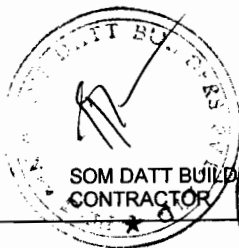
Chief Engineer
 Project Engineer
 Chief Surveyor

World Bank Project

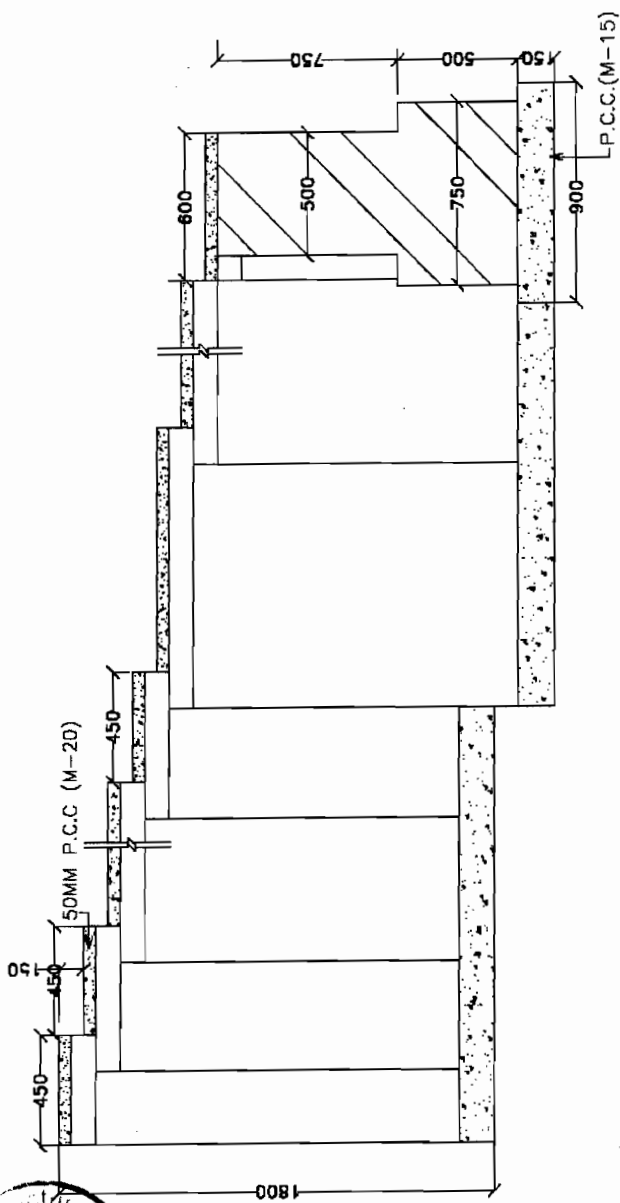
Chief Engineer
 Project Engineer
 Chief Surveyor

CONCEPTUAL DESIGN FOR TYPICAL TREE GUARD
WITH M.S BARS.

DRG NO. OSRP/CEG/SH/ENV/DB	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 72	DATE	REV	RO	
SCALE	NTS		M	JYOTI
				G.P.M.
				S.G



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SIDE AND
BOTTOM WALL

CONCEPTUAL DESIGN FOR BATHING GHAT

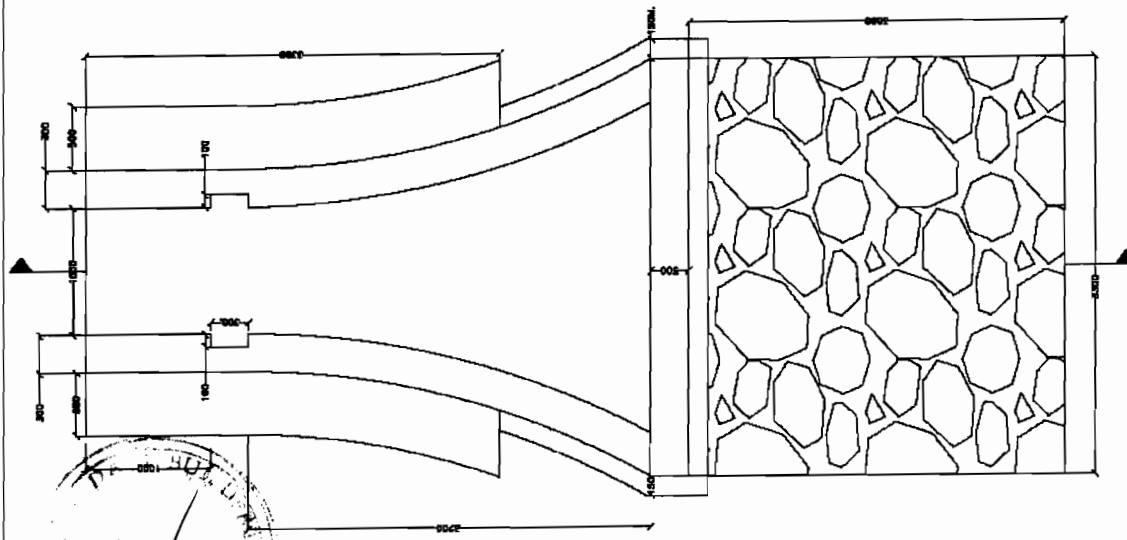
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

DRG NO.	DSRP/CEG/SH/ENR/09	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	73	DATE	REV	RO	
SCALE	NTS		M	JYOTI	G.P.M
					S.G

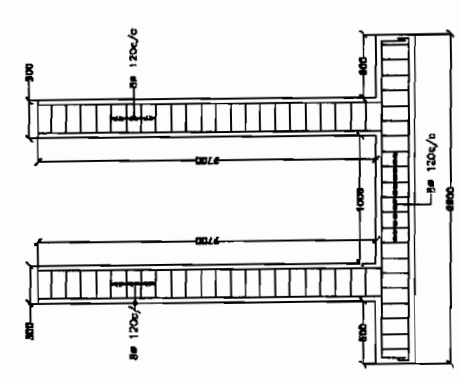
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Tel: +91-141-2520899, 2521898, 2520556
Fax: 2521348, e-mail: ceg@cegroupindia.com



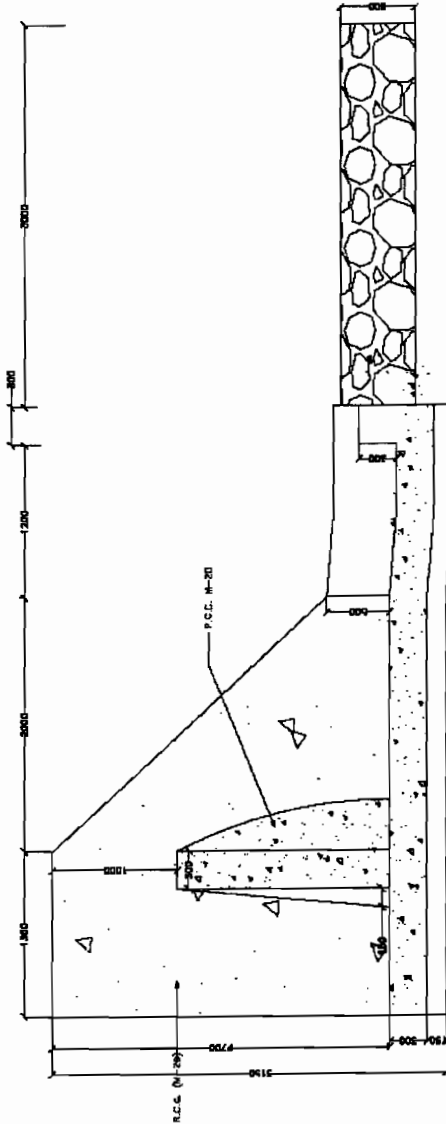
World Bank Project
EMPLOYER



PLAN



CROSS-SECTION AT B-B



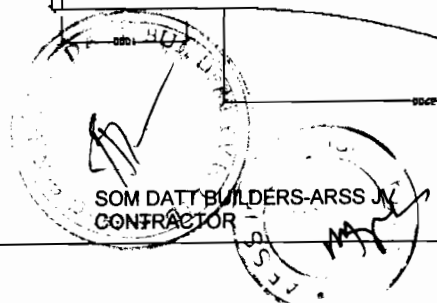
CROSS-SECTION AT A-A

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
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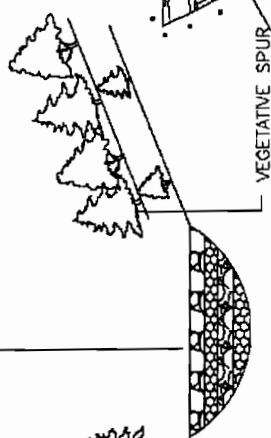
CONCEPTUAL DESIGN FOR SPILLWAY GATE

DRG NO.	OSRF/CEG/SH/EMV/10	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	74	DATE	REV	RO	
SCALE	NTS		M	JYOTI	G.P.M
					S.G



SOM DATT BUILDERS-ARSS IN
 CONTRACTOR

GULLY/NALABED WITH SOILFILL GUNNYBAG CHECK DAM



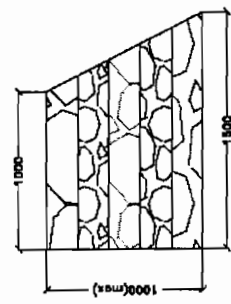
C.S. OF GULLY CONTROL

Gunny Bag Filled with sand and Gravel to Form Check Dam of 0.5 to 1Mtr. High/1Mtr Wide - Length $1\frac{1}{2}$ times the width of the Nala/Gully.

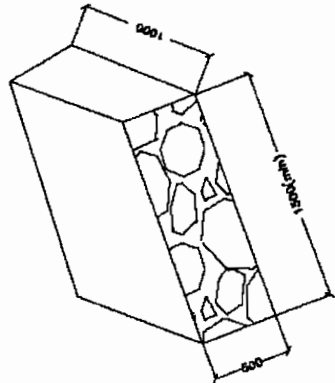
APPROXIMATE DISTANCE OF SPIURS WILL BE ON THE NUMBER OF TURNS/ BENDS ON THE WATER FLOW AND GRADIENT STEEPER THE GRADIENT MORE THE NUMBER OF SPIUR & DAM.

Rooted Cuttings

Random Stone Check Dam
(On Top & Bottom there should be larger stones)
 $L \times W \times h$
 $2.5 \times 1 \times 0.5$ to $1m$
Prope to Stabilise the Dam

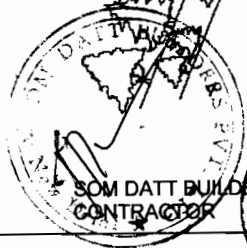


SECTION ON A-A



SECTION ON B-B

PLAN OF NALLA/ GULLY CONTROL

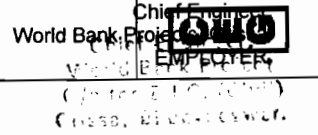


SOIL AND WATER CONSERVATION MEASURES
(GULLY PLUGGING AND CHECK DAMING)

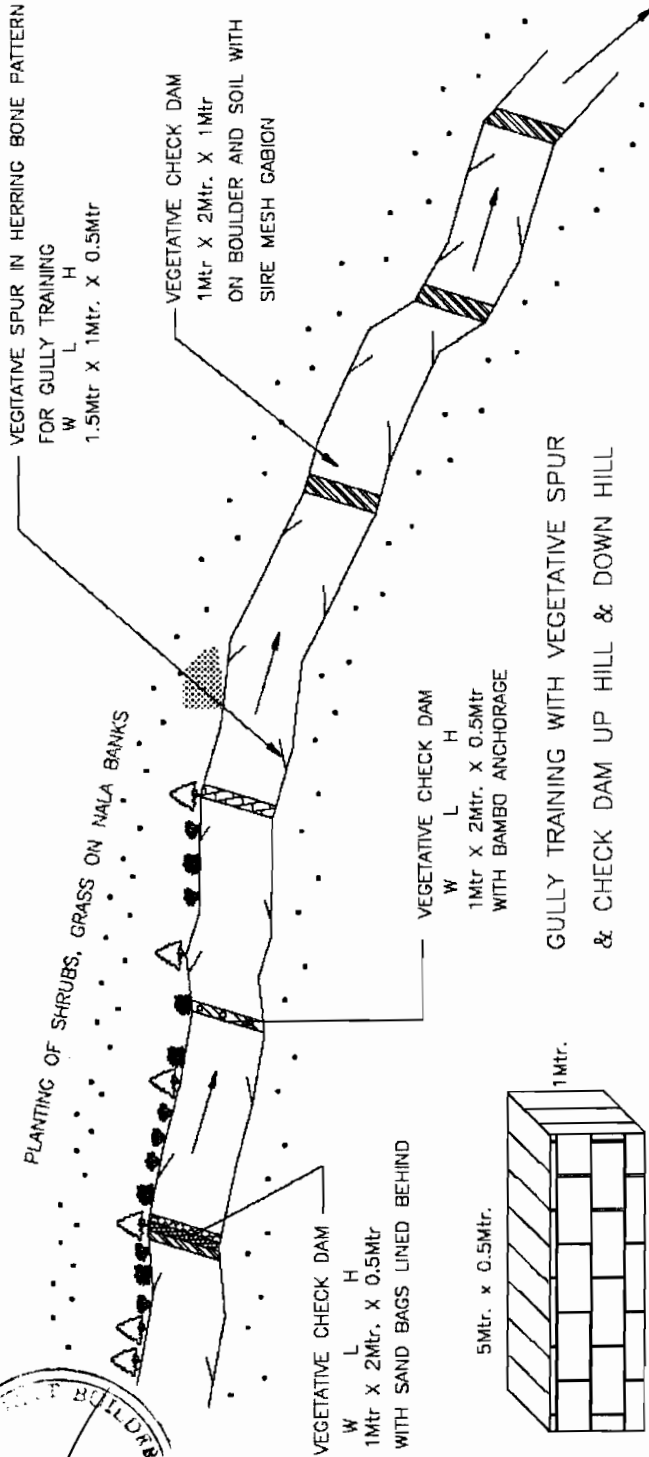
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
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Fax: 2521348, e-mail: ceg@cegroupindia.com

DRG. NO.	DSRP/CEG/SH/EN/11 A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	75	DATE	REV	RO	
SCALE	NTS				
		M	JYOTI	G.P.M	S.G



EROSION CONTROL AND HABITAT DEVELOPMENT MEASURES



MAXIMUM HIGHT OF THE SPUR SHOULD NOT BE EXCEEDING LENGTH 1.5Mtr. WIDTH 1Mtr. HEIGHT 0.5Mtrs

GULLY TRAINING WITH VEGETATIVE SPUR & CHECK DAM UP HILL & DOWN HILL

G. 1 WIRE MESH/GABION TO ACT AS MINI SPURS & CHECK DAM BARRIER. DOWNSTREAM FILLED WITH RANDOM STONES & BOULDERS FROM NALA BED.

THE TREES/ GRASSES/ SHRUBS/HERBS (ROOTED CUTTINGS) TOBE PLANED AT 1 Mtr. INTERIOR LENGTH AS PER LOCAL CONDITION.

AROUND 5 nala on Bramhapur Bangi Jrn. to be Gully Plugged and Check dams done.

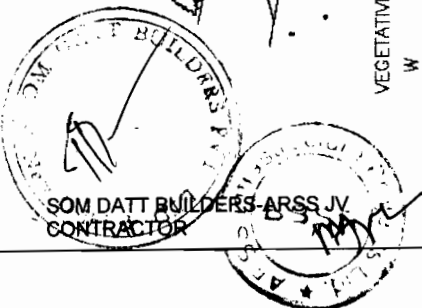
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

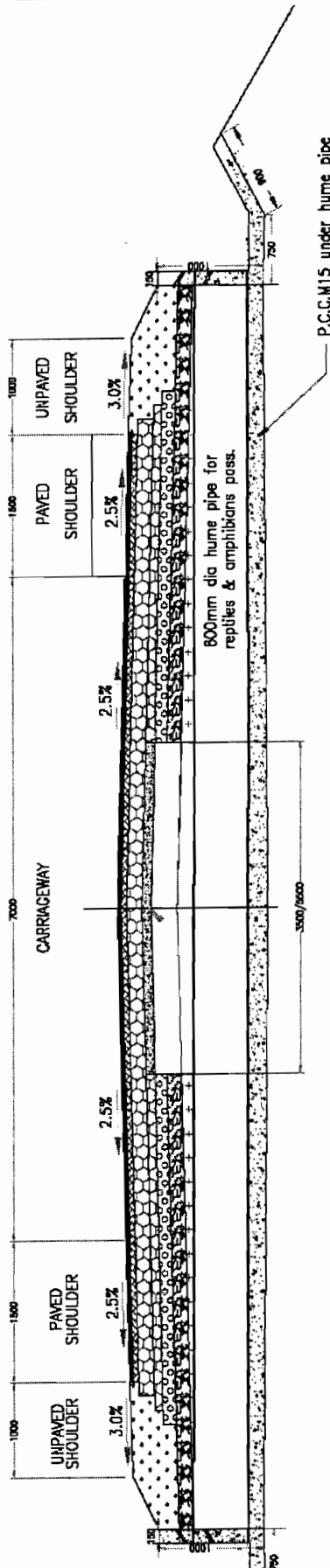
CONSULTING ENGINEERS GROUP LTD.
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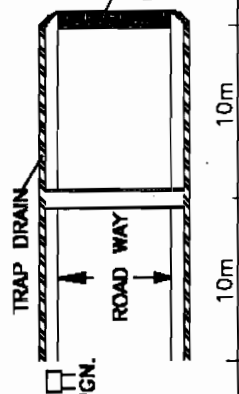
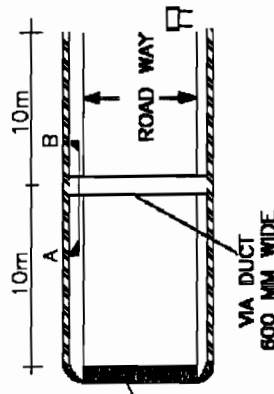
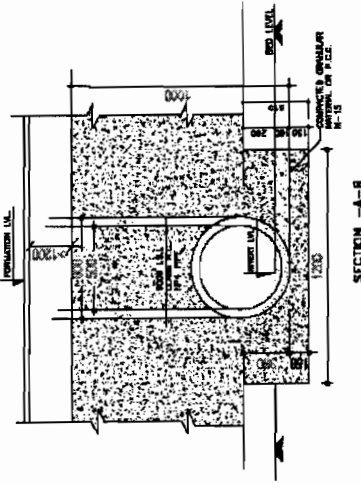
World Bank Project

DRG. NO. DSRP/CEG/SH/ERY/11 B	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 76	DATE	REV	RO	
SCALE	NTS		JYOTI	G.P.M
			M	S.G





CROSS SECTION OF REPTILES & AMPHIBIANS UNDERPASS WITH TRAP DRAINS AT WET LANDS



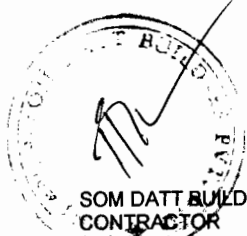
PLAN OF REPTILES & AMPHIBIANS UNDERPASS WITH TRAP DRAINS

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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Chief Engineer
 Project
 EMPLOYER

DRG NO. DSRP/CEG/SH/ENV/12	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 77	DATE	REV	RO	
SCALE	NTS		M	JYOTI G.P.M S.G



SOM DATT BUILDERS-ARSS JV
 CONTRACTOR



SCHEDULE OF NOISE BARRIERS

SI No.	STRUCTURE	CHAINAGE AT Km	LOCATION
1	Irrigation Office	0.880	Right
2	Temple	3.480	Right
3	Temple	3.750	Right
4	Temple	3.790	left
5	Temple	3.837	left
6	College	8.320	left
7	School	13.120	Right
8	Temple	17.100	Right
9	School	17.580	left
10	School	18.080	left
11	Temple	19.300	Right
12	Health Centre	19.880	Right
13	Temple	19.900	Right
14	School	19.980	Right
15	Temple	20.000	Right
16	School	20.000	Right
17	Temple	24.250	Right
18	Temple	25.870	left
19	Hospital	29.250	left
20	School	29.300	Right
21	Temple	29.710	left
22	College	30.300	Right
23	School	34.900	left
24	School	35.150	Right
25	School	36.250	left
26	Temple	40.580	Right
27	Temple	41.840	left
28	School	41.800	left
29	Temple	42.300	left
30	College	42.700	Right
31	School	43.800	left
32	School	43.900	left
33	School	44.600	Right
34	School	45.100	Right
35	School	45.150	left
36	School	46.150	left

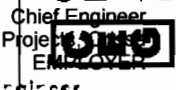
SCHEDULE OF PCC TOEWALL, SPILLWAY AND BATHING GHAT

SI No.	Items	Chainage at km	Location left/right	PCC Toe Wall	Spillway	Bathing Ghat
1	POND	2.448	C	Yes	-	-
2	POND	2.8	R	Yes	-	-
3	POND	6.6	L	Yes	-	-
4	POND	8.915	R	Yes	-	-
5	POND	13.713	L	Yes	-	-
6	POND	13.737	L	Yes	-	-
7	POND	17.1	C	Yes	-	-
8	POND	17.7	L	Yes	-	-
9	POND	17.74	R	Yes	-	-
10	POND	19.614	R	Yes	-	-
11	POND	19.665	L	Yes	-	-
12	POND	20.27	L	Yes	Yes	Yes
13	POND	20.868	L	Yes	Yes	Yes
14	POND	22.29	L	Yes	-	-
15	POND	26.59	R	Yes	-	-
16	POND	31.484	L	Yes	-	-
17	POND	36.723	L	Yes	-	-
18	POND	37.35	L	Yes	-	-



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CONTRACTOR

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World Bank Project

Chief Engineer

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

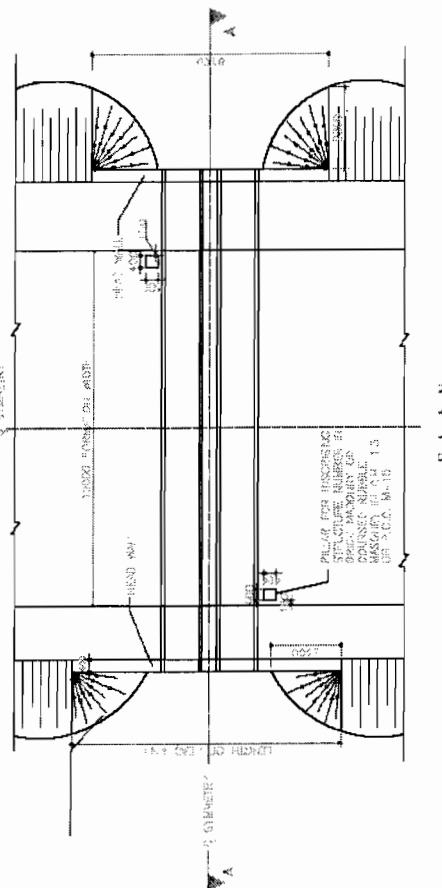
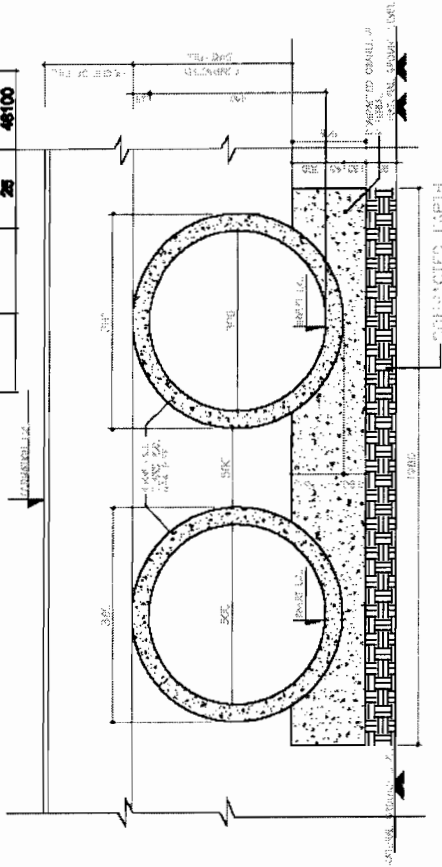
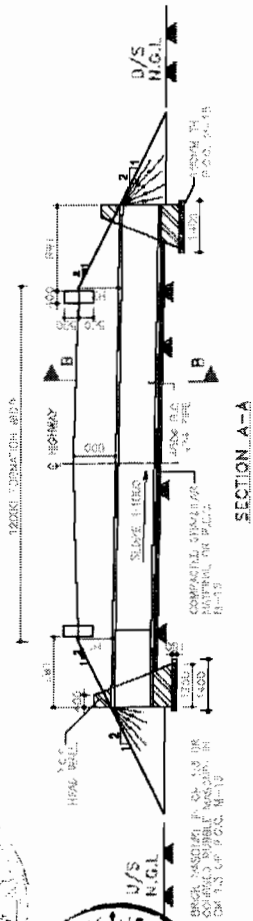
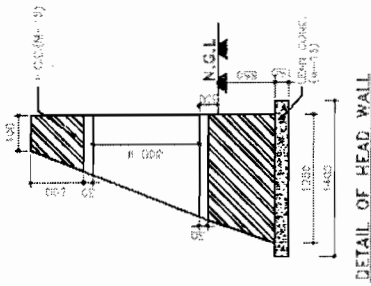
SCHEDULE FOR ENVIRONMENTAL ASPECTS

DRG. NO.	OSRF/CEG/SH/ENV/13	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	82	DATE	REV	RD	
SCALE	NTS			M	JYOTI
				G.P.M	S.G

NOTES:

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METR.
2. ONLY WHETHER DIMENSIONS ARE TO BE FOLLOWED.
3. EROSION / INSTABILITY AND DESIGN DUCT IS TO BE TAKEN INTO CONSIDERATION.
4. UNDESIRABLE SLOPE OF NEEL BEHAR AT 1:1 TO 1:1.5.
5. THE FLOODING LONG LEVEL SHALL BE KEPT AS PER ALIGNMENT BENCHMARK & CHECKED LEVEL IN THE FLOODING BEFORE CONSTRUCTION.
6. HEIGHT OF NEEL BEHAR LEFT BE POSITION 444.

Sl.No.	Chainage	Sl.No.	Chainage
1	1740	13	30060
2	4200	14	32720
3	7500	15	35150
4	8600	16	38450
5	11000	17	38200
6	13240	18	39650
7	16800	19	40160
8	20810	20	42060
9	23920	21	44650
10	25450	22	46570
11	26200	23	46700
12	27000	24	47120
		25	48100



TYPICAL ARRANGEMENT FOR UTILITY DUCT

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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DRG NO. OSRP/CEG/SH/JD/01	DESIGNED (A)	DRAWN (B)	CHECKED (C) APPROVED (D)
SH. NO. 63	DATE	REV	RO
SCALE	NTS		
	M	JYOTI	G.P.M
			S.G



GOVERNMENT OF ORISSA
WORKS DEPARTMENT

ORISSA STATE ROAD PROJECT

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE - (D) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

FINAL DETAIL ENGINEERING REPORT FOR PHASE - I ROADS
(BHADRAK TO CHANDBALI, SH-9) (0 TO 45 KM)
(BHADRAK TO ANANDPUR, SH-53) (0 TO 50 KM)
DRAWING OF BRIDGES & CULVERTS

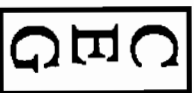
APRIL 2007



Chief Engineer
World Bank Projects, Orissa
EMPLOYER

World Bank Project
(Contract No.)
Contract Administrator

SOM DATT BUILDERS ARSS JV
CONTRACTOR



CONSULTING
Engineers Group Ltd.

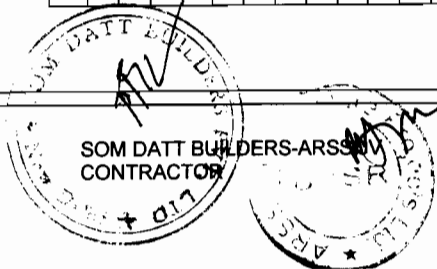
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Tel.: +91-141 2520899, 2521899, 2520556
Fax: 2521346, E-Mail: ceg@ceginidia.com
Website: www.ceginidia.com

TABLE OF CONTENTS

(BHADRAK TO CHANDBALI, SH-9) (0 TO 45 KM)

S.NO.	DRAWING TITLE	DRAWING NO.
1.	BRIDGE AT KM 1+005	OBHPCSCG088-9/88/1+005/01
2.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/1+005/02
	SITE PLAN	OBHPCSCG088-9/88/1+005/03
3.	BRIDGE AT KM 1+800	OBHPCSCG088-9/88/1+800/01
4.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/1+800/02
	SITE PLAN	OBHPCSCG088-9/88/1+800/03
5.	BRIDGE AT KM 3+200	OBHPCSCG088-9/88/3+200/01
6.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/3+200/02
7.	DIMENSION AND REINFORCEMENT DETAILS	OBHPCSCG088-9/88/3+200/03
	SITE PLAN	OBHPCSCG088-9/88/3+200/04
8.	BRIDGE AT KM 3+900	OBHPCSCG088-9/88/3+900/01
9.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/3+900/02
10.	DIMENSION AND REINFORCEMENT DETAILS	OBHPCSCG088-9/88/3+900/03
	SITE PLAN	OBHPCSCG088-9/88/3+900/04
11.	BRIDGE AT KM 6+050	OBHPCSCG088-9/88/6+050/01
12.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/6+050/02
13.	DIMENSION AND REINFORCEMENT DETAILS	OBHPCSCG088-9/88/6+050/03
	SITE PLAN	OBHPCSCG088-9/88/6+050/04
14.	BRIDGE AT KM 9+200	OBHPCSCG088-9/88/9+200/01
15.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/9+200/02
	SITE PLAN	OBHPCSCG088-9/88/9+200/03
16.	BRIDGE AT KM 13+600	OBHPCSCG088-9/88/13+600/01
17.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/13+600/02
	SITE PLAN	OBHPCSCG088-9/88/13+600/03
18.	BRIDGE AT KM 28+100	OBHPCSCG088-9/88/28+100/01
19.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/28+100/02
	SITE PLAN	OBHPCSCG088-9/88/28+100/03
20.	BRIDGE AT KM 28+800	OBHPCSCG088-9/88/28+800/01
21.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/28+800/02
22.	DIMENSION AND REINFORCEMENT DETAILS	OBHPCSCG088-9/88/28+800/03
	SITE PLAN	OBHPCSCG088-9/88/28+800/04
23.	BRIDGE AT KM 30+050	OBHPCSCG088-9/88/30+050/01
24.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/30+050/02
	SITE PLAN	OBHPCSCG088-9/88/30+050/03
25.	BRIDGE AT KM 33+100	OBHPCSCG088-9/88/33+100/01
26.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/33+100/02
	SITE PLAN	OBHPCSCG088-9/88/33+100/03
27.	BRIDGE AT KM 33+500	OBHPCSCG088-9/88/33+500/01
28.	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/33+500/02
	SITE PLAN	OBHPCSCG088-9/88/33+500/03

S.NO.	DRAWING TITLE	DRAWING NO.
29.	BRIDGE AT KM 33+900	OBHPCSCG088-9/88/33+900/01
	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/33+900/02
	SITE PLAN	OBHPCSCG088-9/88/33+900/03
30.	BRIDGE AT KM 36+005	OBHPCSCG088-9/88/36+005/01
	GENERAL ARRANGEMENT DRAWING (REBERT 1 OF 2) & (REBERT 2 OF 2)	OBHPCSCG088-9/88/36+005/02
	SITE PLAN	OBHPCSCG088-9/88/36+005/03
31.	BRIDGE AT KM 42+400	OBHPCSCG088-9/88/42+400/01
	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/42+400/02
	SITE PLAN	OBHPCSCG088-9/88/42+400/03
32.	BRIDGE AT KM 43+500	OBHPCSCG088-9/88/43+500/01
	GENERAL ARRANGEMENT DRAWING	OBHPCSCG088-9/88/43+500/02
	SITE PLAN	OBHPCSCG088-9/88/43+500/03
33.	REHABILITATION BRIDGES	OBHPCSCG088-9/88/43+500/04
34.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/05
35.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/06
36.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/07
37.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/08
38.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/09
39.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/10
40.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/11
41.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/12
42.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/13
43.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/14
44.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/15
45.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/16
46.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/17
47.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/18
48.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/19
49.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/20
50.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/21
51.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/22
52.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/23
53.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/24
54.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/25
55.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/26
56.	REHABILITATION BRIDGE DETAILS	OBHPCSCG088-9/88/43+500/27



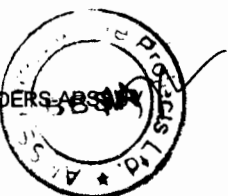
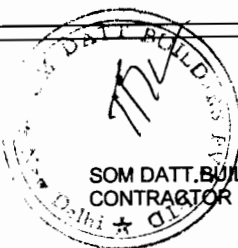
Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER

TABLE OF CONTENTS

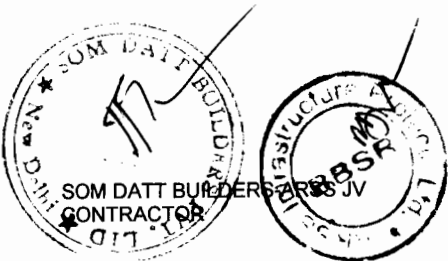
(BHADRAK TO ANANDPUR, SH-53) (0 TO 50 KM)


S.NO.	DRAWING TITLE	DRAWING NO.
1.	GENERAL NOTES FOR MCC & AB BUILDINGS	QBR/PC/008-53/00/11+00/01
	BRIDGE AT KM. 9+800	
2.	GENERAL ARRANGEMENT DRAWING	QBR/PC/008-53/00/11+00/01
	SEE PLAN	QBR/PC/008-53/00/11+00/02
3.	BRIDGE AT KM. 11+600	
4.	GENERAL ARRANGEMENT DRAWING	QBR/PC/008-53/00/11+00/01
5.	FOUNDATION AND REINFORCEMENT DETAILS	QBR/PC/008-53/00/11+00/02
	SEE PLAN	QBR/PC/008-53/00/11+00/03
6.	BRIDGE AT KM. 17+700	
7.	GENERAL ARRANGEMENT DRAWING	QBR/PC/008-53/00/11+00/01
8.	FOUNDATION AND REINFORCEMENT DETAILS	QBR/PC/008-53/00/11+00/02
	SEE PLAN	QBR/PC/008-53/00/11+00/03
9.	BRIDGE AT KM. 18+400	
10.	GENERAL ARRANGEMENT DRAWING	QBR/PC/008-53/00/11+00/01
11.	SEE PLAN	QBR/PC/008-53/00/11+00/02
12.	BRIDGE AT KM. 39+200	
13.	FOUNDATION AND REINFORCEMENT DETAILS	QBR/PC/008-53/00/11+00/02
14.	SEE PLAN	QBR/PC/008-53/00/11+00/03
	REHABILITATION BRIDGES	
	BRIDGE AT KM. 19+300	
15.	REHABILITATION BRIDGES DETAILS	QBR/PC/008-53/00/11+00/01
	BRIDGE AT KM. 30+950	
16.	REHABILITATION BRIDGES DETAILS	QBR/PC/008-53/00/11+00/01
	BRIDGE AT KM. 37+600	
17.	REHABILITATION BRIDGES DETAILS	QBR/PC/008-53/00/11+00/01
	BRIDGE AT KM. 37+700	
18.	REHABILITATION BRIDGES DETAILS	QBR/PC/008-53/00/11+00/01

S.NO.	DRAWING TITLE	DRAWING NO.
	BRIDGE AT KM. 37+850	
19.	REHABILITATION BRIDGES DETAILS	QBR/PC/008-53/00/11+00/01
	BRIDGE AT KM. 38+010	
20.	REHABILITATION BRIDGES DETAILS	QBR/PC/008-53/00/11+00/01
	COL. VENTS DRAWING	
21.	FOR R.C.C. SINGLE PIER COL. VENTS (1.0m DIA) EMBEDDING OR FULL VARYING FROM 0.6 TO 4.0 M	QBR/PC/008-53/00/11+00/01
22.	FOR R.C.C. DOUBLE & PIER COL. VENTS (1.0m DIA) EMBEDDING OR FULL VARYING FROM 0.6 TO 4.0 M	QBR/PC/008-53/00/11+00/01
23.	TYPICAL WOODENING ARRANGEMENT FOR R.C.C. SINGLE PIER COL. VENTS (1.0m DIA)	QBR/PC/008-53/00/11+00/01
24.	GENERAL ARRANGEMENT DRAWING FOR R.C.C. BOX CULVERT	QBR/PC/008-53/00/11+00/01
25.	FOUNDATION & REINFORCEMENT DETAILS FOR SINGLE BOX R.C.C. BOX CULVERT	QBR/PC/008-53/00/11+00/01
	MISC DRAWING	
26.	FOUNDATION & REINFORCEMENT DETAILS FOR RETAIN WALL	QBR/PC/008-53/00/11+00/01
27.	FOUNDATION & REINFORCEMENT DETAILS FOR RETAIN WALL	QBR/PC/008-53/00/11+00/01
28.	TYPICAL DETAILS OF FLOOR PROTECTION WORKS	QBR/PC/008-53/00/11+00/01
29.	TYPICAL SECTION OF CURB AND WALL	QBR/PC/008-53/00/11+00/01
30.	TYPICAL DETAILS OF ROAD PROTECTION WORKS	QBR/PC/008-53/00/11+00/01
31.	DETAILS OF CHAIN BARBERS, RETAINMENT WALL, APPROACH SLAB & DRAWING POINT	QBR/PC/008-53/00/11+00/01



(BHADRAK TO CHANDBALI, SH-9) (0 TO 45 KM)




Chief Engineer
World Bank Projects, Orissa,
EMPLOYER,
World Bank Project
O/o the E.I.C. (Civil)
Crista, Ehubaneswar.

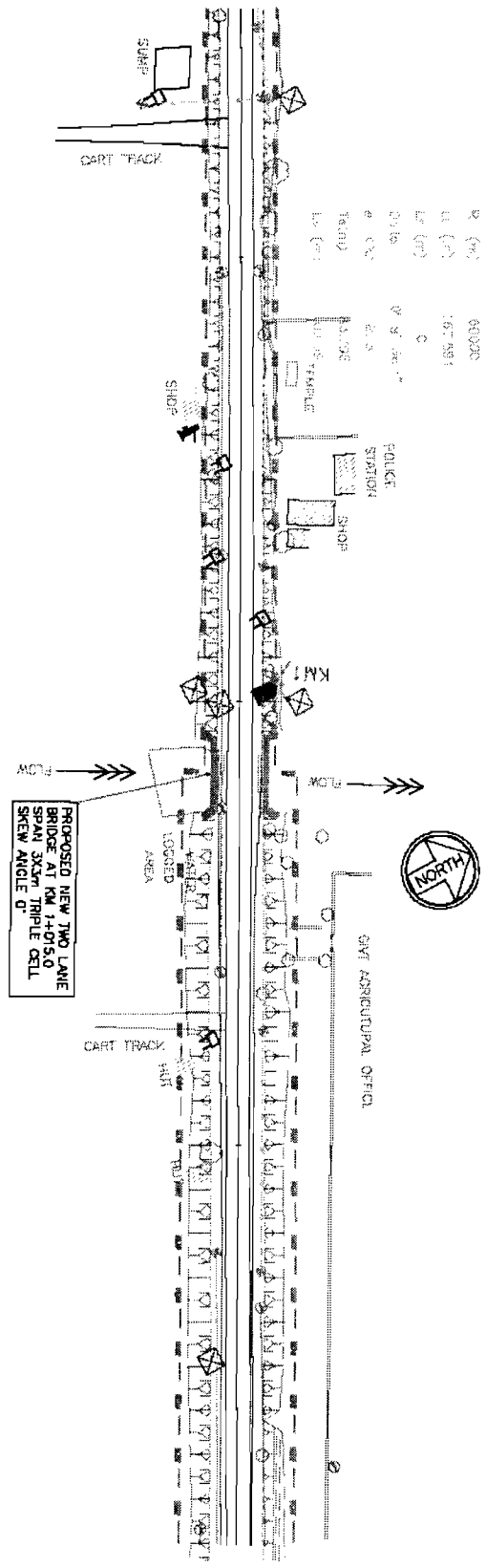
TO HEADARK

TO CHANDBALI

DURAE DETAILS

REV.	0-912-456
DATE	10/2
BY	6/0/2016
CH	6/1/2016
DATE	6/1/2016
BY	6/1/2016
CH	6/1/2016
DATE	6/1/2016
BY	6/1/2016
CH	6/1/2016

SITE PLAN



NOTES:-

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 to the E.T.C. (Civil)
 Colera, Ehubanswer.

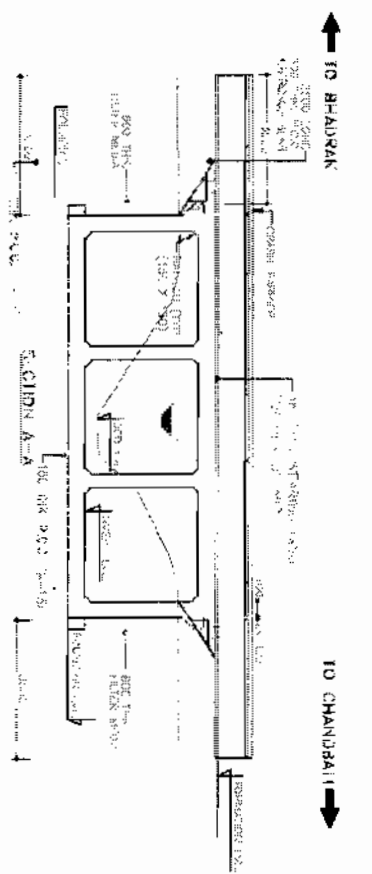
SOM DATT BUILDERS ARSS JV
 CONTRACTORS

CONSULTING
 ENGINEERING GROUP LTD.
 E-1, Rajaji Colony, Indraprastha Nagar, Sector-17
 New Delhi-110028

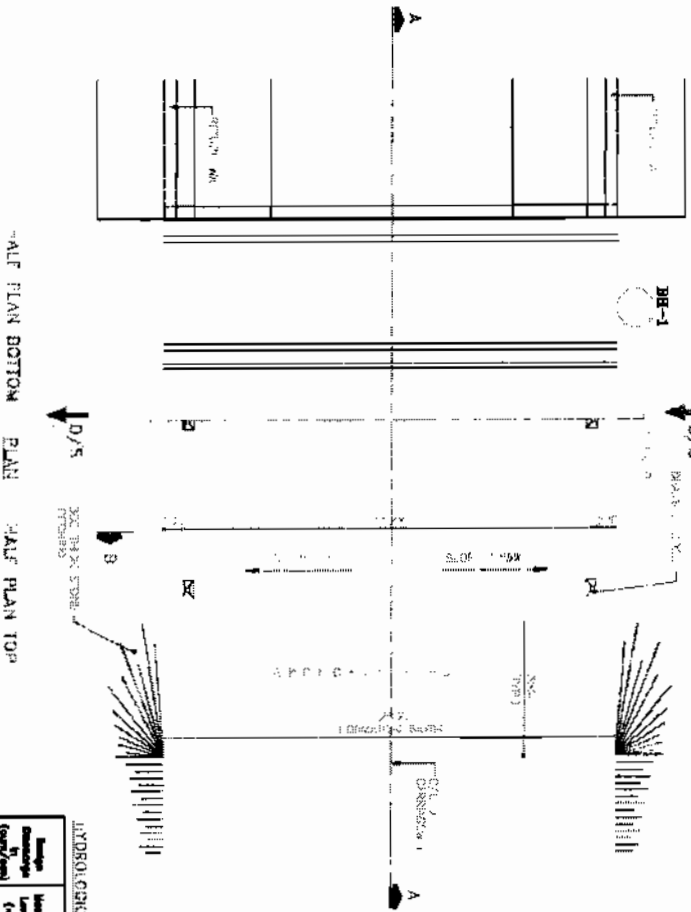
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - 01 ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
 BRIDGE AT PROPOSED CH. 1+075.0
 (2 NO HOLO BALANCE SYSTEM)

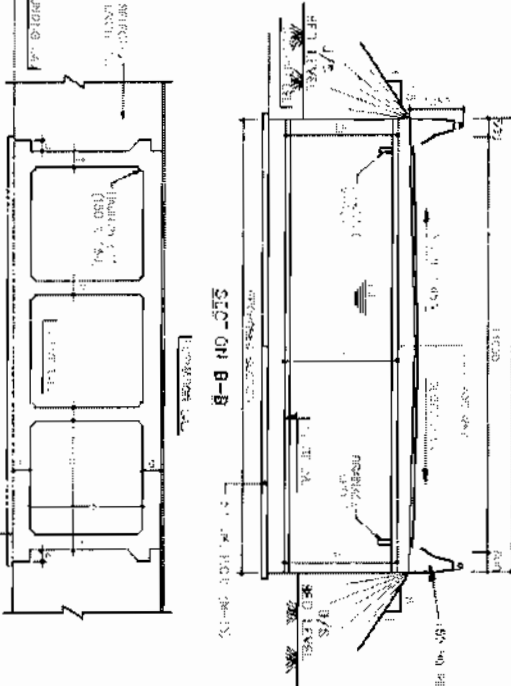
NO.	DATE	REVISION



FOUNDRY LEVEL (m)	17.200	17.200	17.200
4th LEVEL (m)	17.287	14.700	17.200
Deck level (m)	17.788	14.700	17.200



HYDROLOGICAL DATA		Length of catchment area of Road length of Road length of Road			
Area (km ²)	Runoff (mm/day)	Area (km ²)	Runoff (mm/day)	Area (km ²)	Runoff (mm/day)
1.2	11.7	1.2	11.7	1.2	11.7



NOTE:
 1. ALL DIMENSIONS ARE IN METERS.
 2. ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR.
 3. ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR.
 4. ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR.
 5. ALL DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR.

REFERENCES:
 1. IS: 800-1984
 2. IS: 800-2009
 3. IS: 800-2009
 4. IS: 800-2009
 5. IS: 800-2009
 6. IS: 800-2009
 7. IS: 800-2009
 8. IS: 800-2009
 9. IS: 800-2009
 10. IS: 800-2009
 11. IS: 800-2009
 12. IS: 800-2009

LEVEL	DESCRIPTION	LEVEL	DESCRIPTION
17.200	FOUNDRY LEVEL	14.700	4th LEVEL
17.287	4th LEVEL	17.200	FOUNDRY LEVEL
17.788	DECK LEVEL	17.200	FOUNDRY LEVEL

CONTRACTOR:
SOM DATT BUILDERS
CONTRACTOR

Chief Engineer
World Bank Projects, Orissa
Employer
 O/o the E.I.C. (Civil)
 Orissa, Bhubaneswar.

TO BHADARK



TO GIADACK MCHOLLA

HUT

PROPOSED NEW TWO LANE BRIDGE AT KM 1+765.0 SPAN 3X3M TRIPLE CELL SKEW ANGLE 0°

SITE PLAN

CART TRACK

TO CHANDIBALI

CURVE DETAILS

Sta.	3
Chp	1+761.971
V (m)	80
W (m)	200
Ld (m)	85.587
Lc (m)	30
Curve	1° 48' 38.8"
e (1%)	3 m=29
Tan(p)	122.511
Ca (m)	61.255

NOTES:-

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

SOM DATT BUILDERS ASS JV
CONTRACTOR

CONSULTING ENGINEERS GROUP LTD.
17, Chandrasekhara Bazar, Cuttack-751002
Ph: 2531234, 2531235, 2531236

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH. 1+765.0 (IND. ROAD)

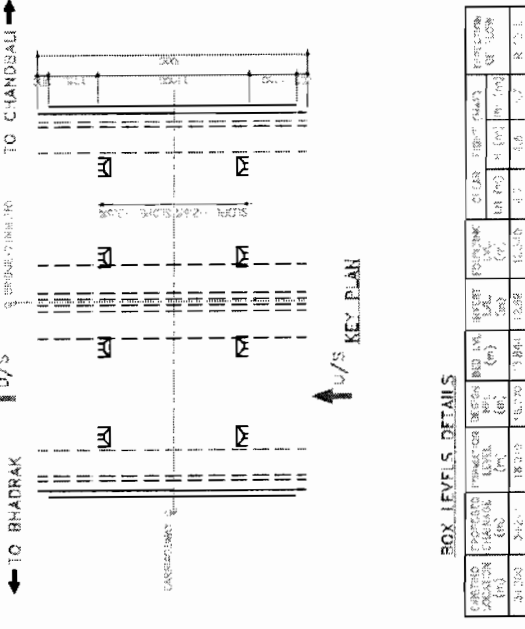
DATE	BY	CHKD	APPD

NOTES:

1. ALL DRAWINGS TO BE ON THE STANDARD A3/B4 PAPER.
2. ONLY AS PER THE SPECIFICATIONS ARE TO BE FOLLOWED. DO NOT SCALE THE DRAWINGS.
3. CHECKING BY THE ARCHITECT ON THE PROPOSED ROAD.
4. LEASE / AVAILABLE FOR BELOW WORK SPECIFICATIONS AS APPROVED BY THE ARCHITECT FOR BANK/STATE OFFICIAL.
5. FOUNDATION UNDER THE BRIDGE SHALL BE AS PER THE PROPOSED AT THE END OF THE ROAD TO BE PROVIDED BY THE ARCHITECT AS PER APPROVED PLAN, ELEVATION & SECTION.
6. AS PER APPROVED PLAN, ELEVATION & SECTION.
7. FOUNDATION SHALL BE AS PER APPROVED PLAN, ELEVATION & SECTION.
8. ALL WORK SHALL BE AS PER APPROVED PLAN, ELEVATION & SECTION.
9. FOR FURTHER INFORMATION REFER TO THE OTHER SEPARATE DRAWINGS.

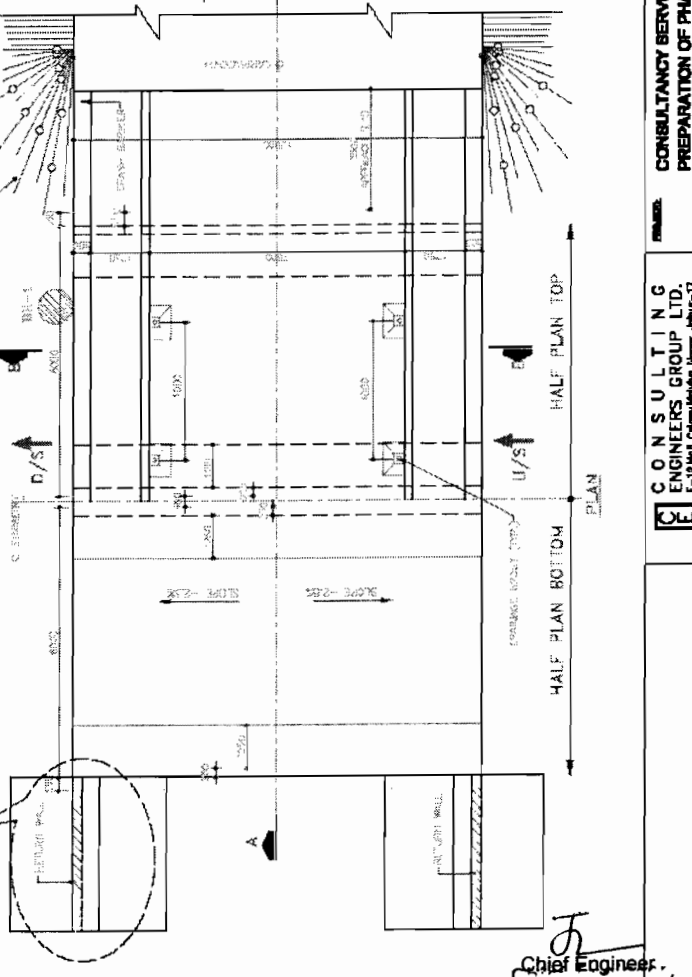
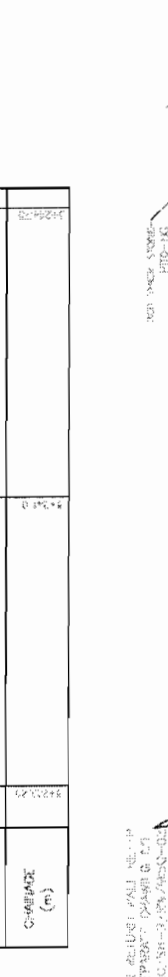
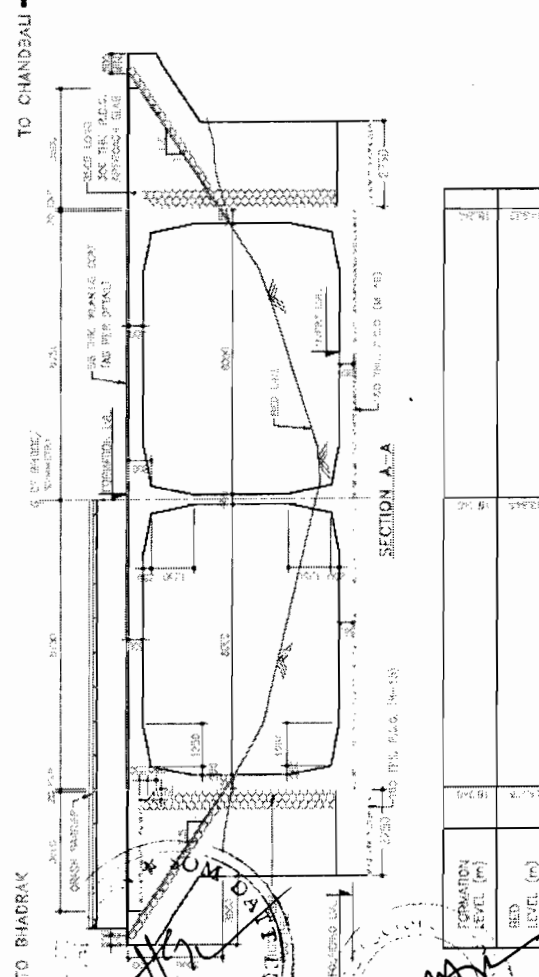
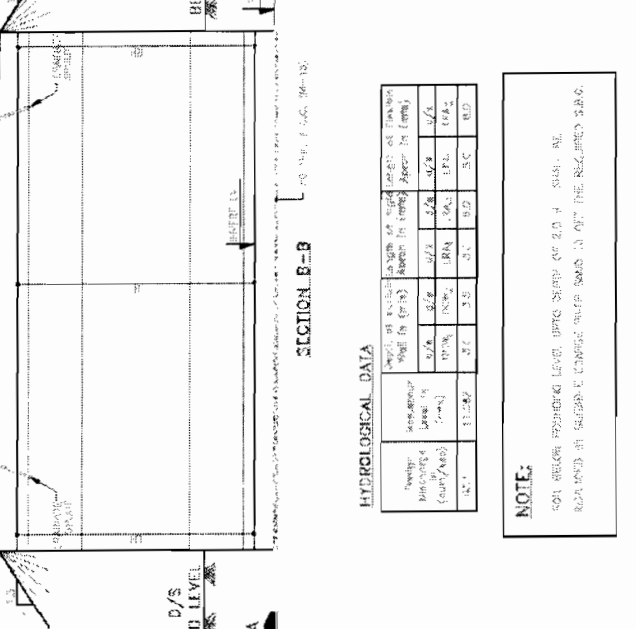
REFERENCE DRAWINGS

1. G.P.P. PART 101, 102, 103, 104, 105
2. IS: 2063 (PART 1 & 2)
3. IS: 2063 (PART 1 & 2)
4. IS: 2063 (PART 1 & 2)
5. IS: 2063 (PART 1 & 2)
6. IS: 2063 (PART 1 & 2)



BOX LEVELS DETAILS

SECTION	PROPOSED ROAD WIDE (M)	EXISTING ROAD WIDE (M)	PROPOSED ROAD GRADE (M)	EXISTING ROAD GRADE (M)	PROPOSED ROAD CLEARANCE (M)	EXISTING ROAD CLEARANCE (M)	PROPOSED ROAD FINISH (M)	EXISTING ROAD FINISH (M)
S-1	18.00	18.00	2.88	2.88	4.50	4.50	2.88	2.88
S-2	18.00	18.00	3.00	3.00	4.50	4.50	3.00	3.00



HYDROLOGICAL DATA

Parameter	Value
Design Flood	100 YRS
Return Period	100 YRS
Design Flood Height	3.50 M
Design Flood Velocity	1.50 M/S
Design Flood Discharge	150 M ³ /S

NOTE:

FOR FURTHER INFORMATION REFER TO THE OTHER SEPARATE DRAWINGS.

GENERAL ARRANGEMENT DRAWING

BRIDGE AT PROPOSED CH. 8+241.0 (MIRJAPUR VILLAGE)

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.

World Bank Projects, Orissa

Chief Engineer, Orissa

EMPLOYER

Chief Engineer, Orissa

EMPLOYER

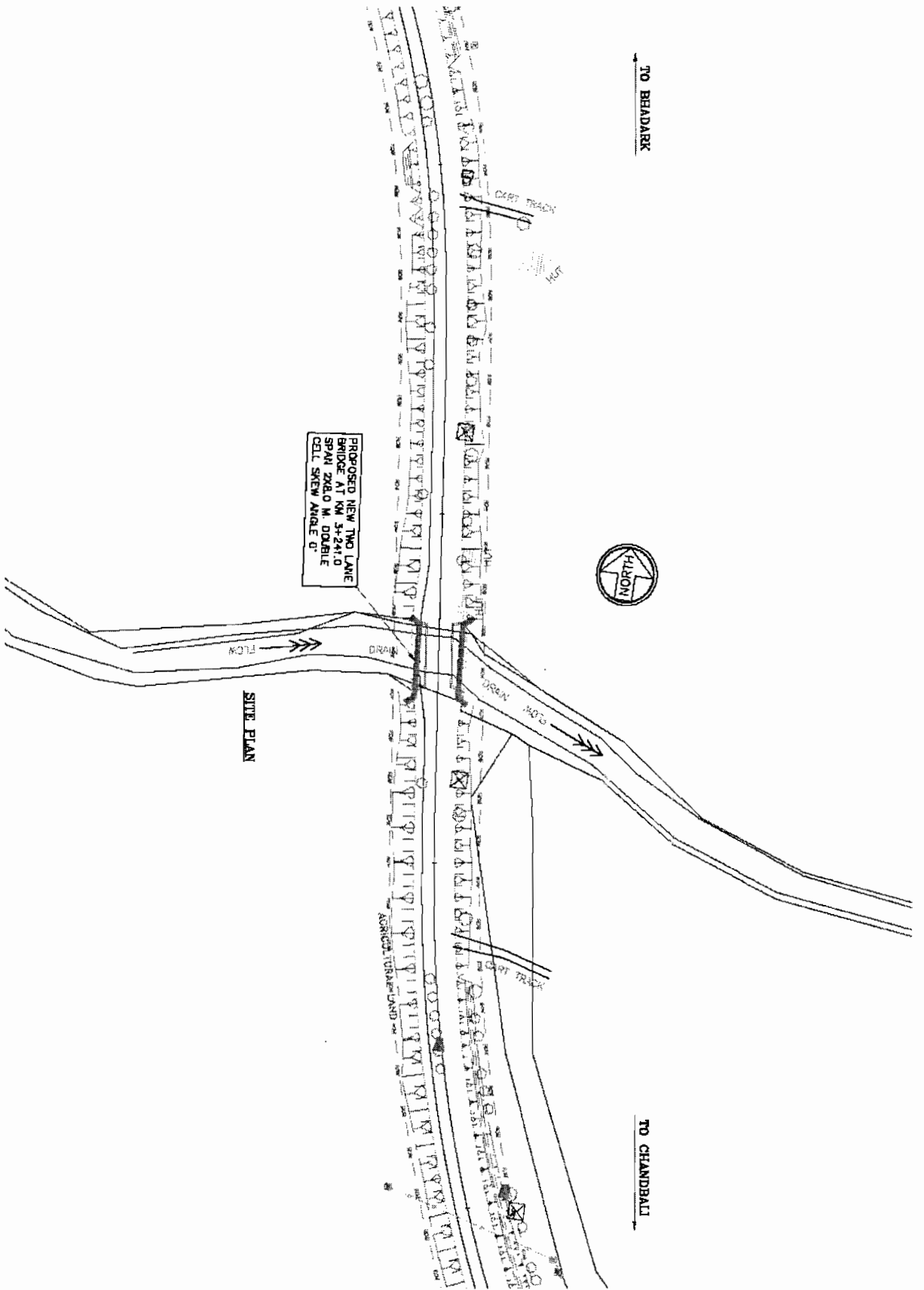
Orissa, Bhubaneswar.

SOM DATT BUILDERS-ARSSA CONTRACTOR

TO BHADARK



TO CHANDBALI



PROPOSED NEW TWO LANE
BRIDGE AT KM 34+241.0
SPAN 2X80 M. DOUBLE
CELL SKEW ANGLE 0°

SITE PLAN

CONSULTING
ENGINEERING GROUP LTD.
E-13, Ling Convent, New Market, Cuttack-753004
Ph: 2532111, 2532112, 2532113, 2532114

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH. 34+241.0
(NARAYAN VILLAGE)

DATE	REVISION	BY	CHKD

SOM DATT BUILDERS & CONTRACTORS



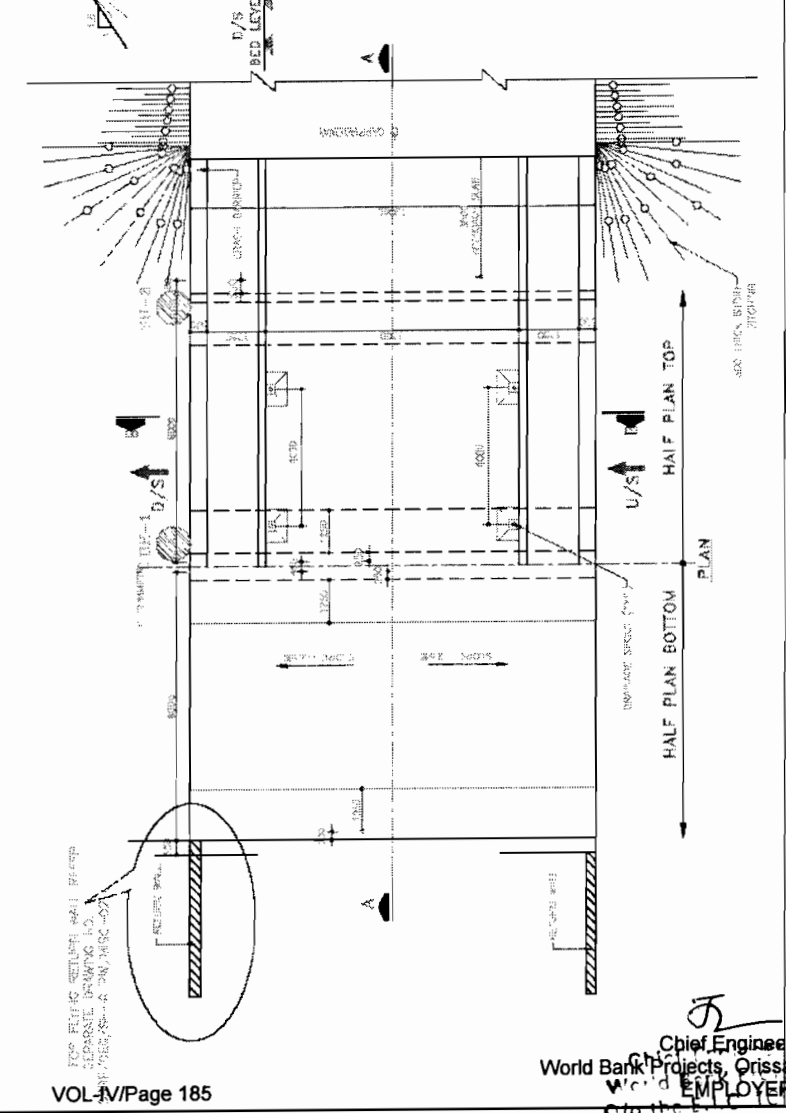
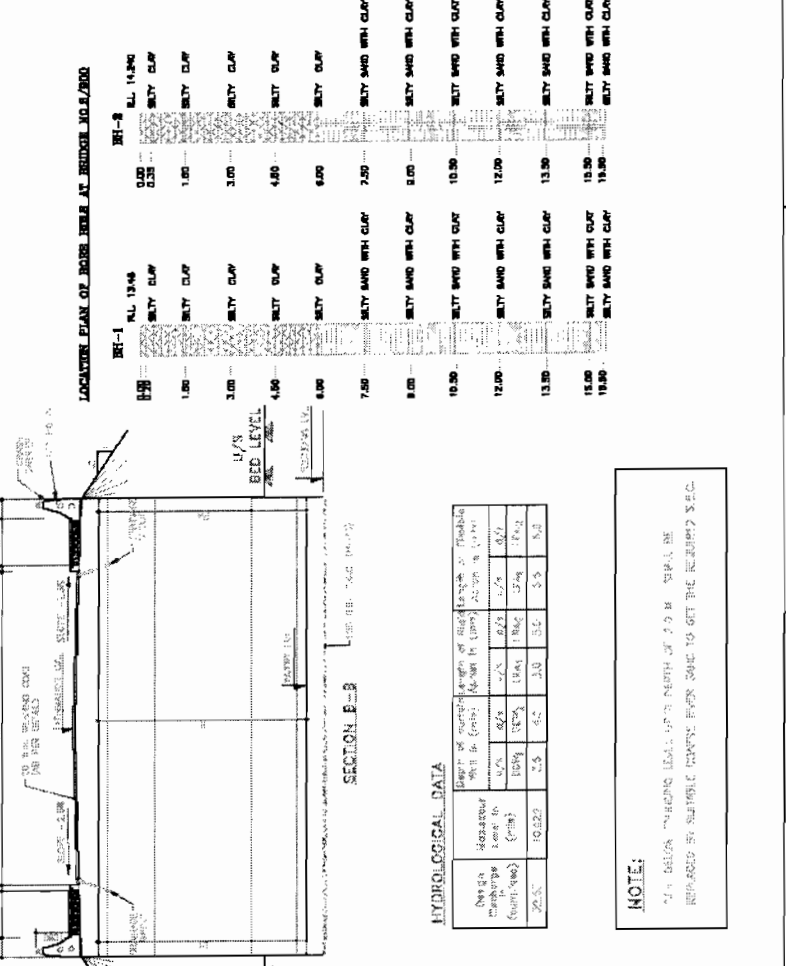
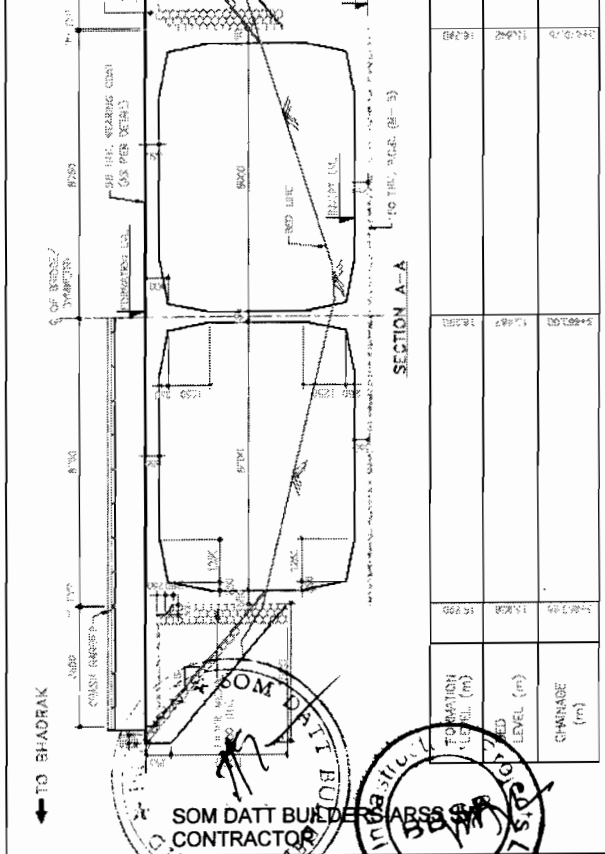
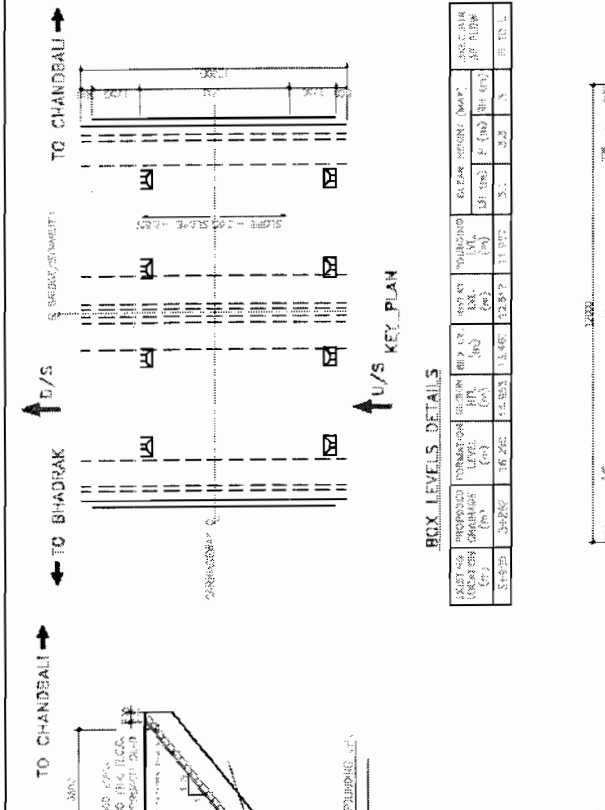
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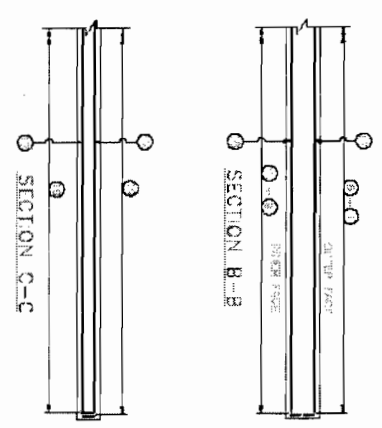
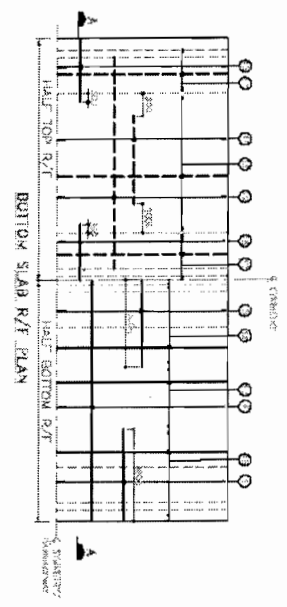
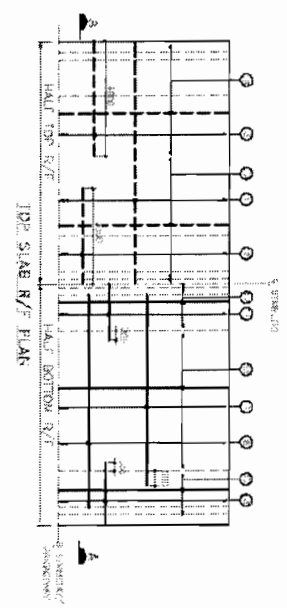
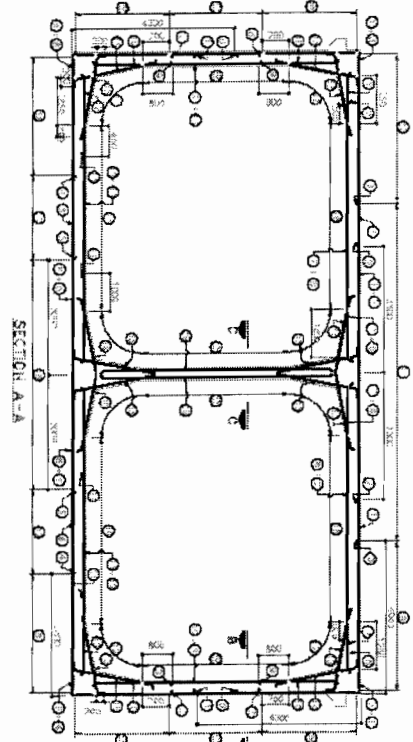
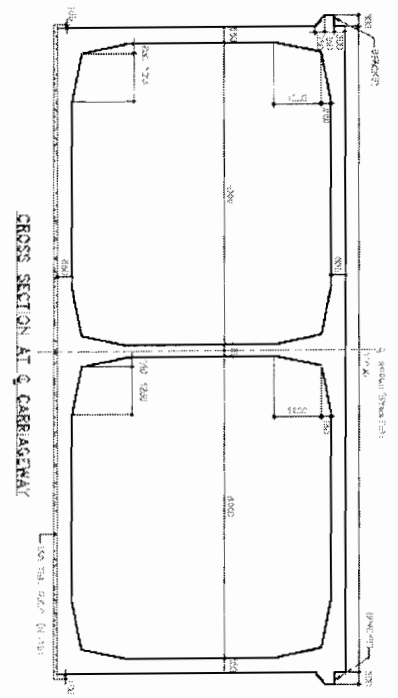
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Sd/-
Chief Engineer
Orissa Electric Corporation

NOTES:

1. ALL DIMENSIONS ARE TO BE IN METERS UNLESS OTHERWISE STATED.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS FROM THE CONCERNED AGENCIES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS FROM THE CONCERNED AGENCIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS FROM THE CONCERNED AGENCIES.
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9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS FROM THE CONCERNED AGENCIES.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMISSIONS FROM THE CONCERNED AGENCIES.

- REFERENCE DRAWINGS:**
1. ROAD DESIGN MANUAL, 1980
 2. ROAD DESIGN MANUAL, 1980
 3. ROAD DESIGN MANUAL, 1980
 4. ROAD DESIGN MANUAL, 1980
 5. ROAD DESIGN MANUAL, 1980





REIN. DETAILS

BAR NO.	BAR DIA.	SPACING	SHAPE
1	20	100	□
2	20	100	□
3	20	100	□
4	20	100	□
5	20	100	□
6	20	100	□
7	20	100	□
8	20	100	□
9	20	100	□
10	20	100	□
11	20	100	□
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13	20	100	□
14	20	100	□
15	20	100	□
16	20	100	□
17	20	100	□
18	20	100	□
19	20	100	□
20	20	100	□



NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. SEE THE DRAWING FOR DIMENSIONS OF THE BRIDGE.
3. ALL REINFORCEMENT SHALL BE AS PER THE DRAWING.
4. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.
5. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.
6. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.
7. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.
8. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.
9. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.
10. ALL REINFORCEMENT SHALL BE DEVELOPED AS PER THE DRAWING.

REFERENCE DRAWINGS:

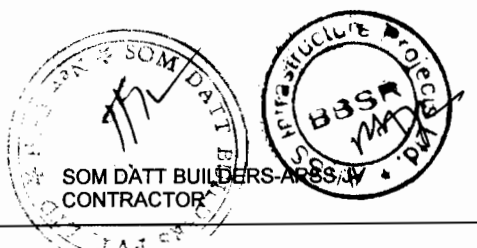
(1) DRAWING NO. 1/2007/100/02
(2) DRAWING NO. 1/2007/100/02

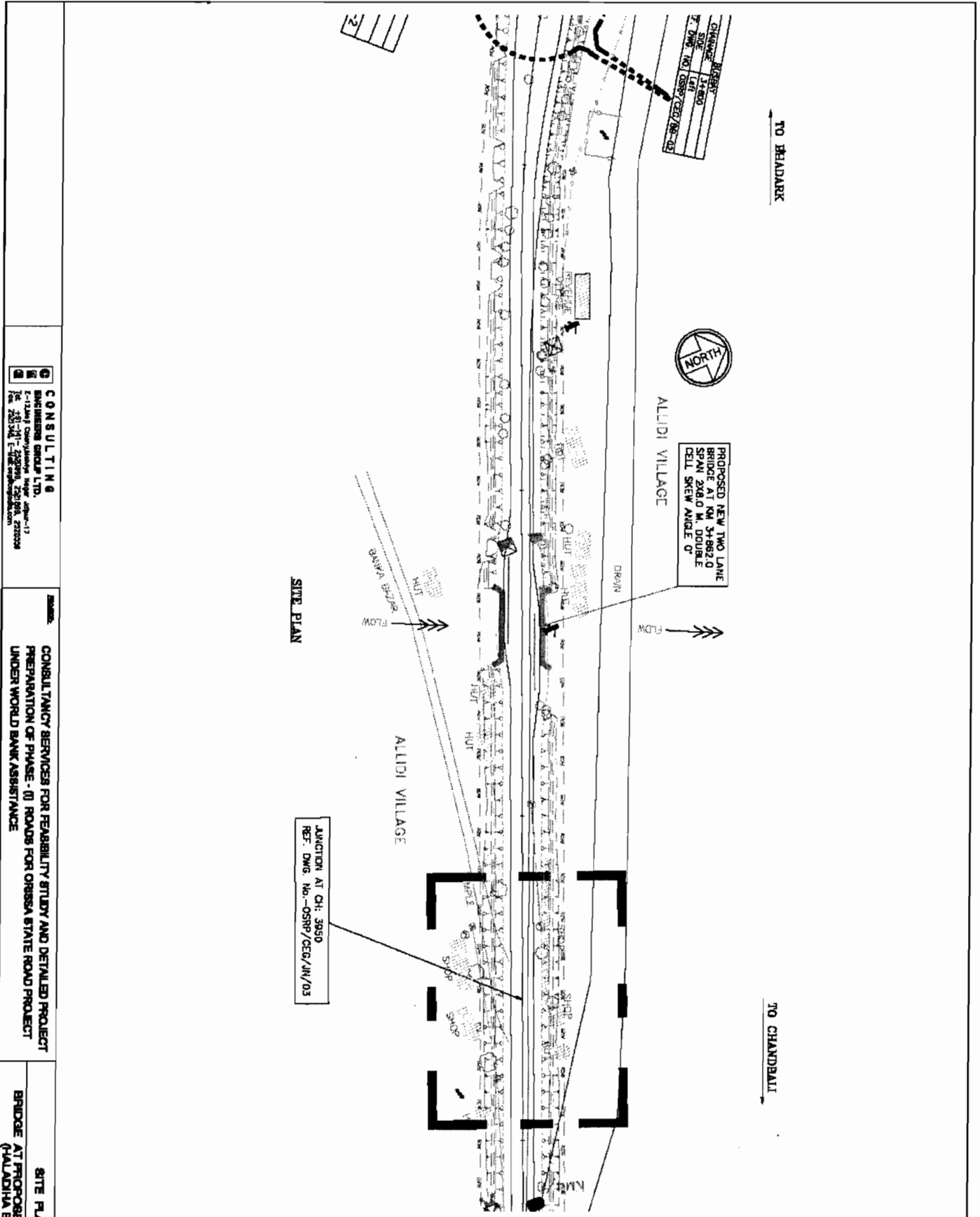
Chief Engineer
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CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION AND REINFORCEMENT DETAILS
BRIDGE AT PROPOSED CH. 3+982
(HALADHA BYPASS)





CONSULTING
 BATHINGEN CONSULTANTS LTD.
 11-12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

NOTES:-

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 O/o the E.T.C. (Civil)
 Orissa, Bhubaneswar.

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NOTES:

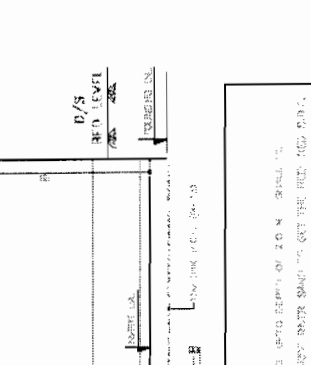
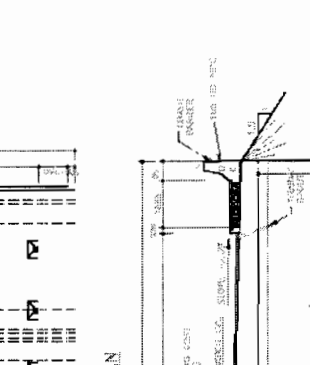
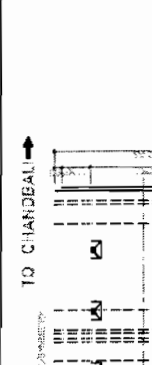
1. ALL DIMENSIONS TO BE AS SHOWN UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS TO BE IN METERS UNLESS OTHERWISE SPECIFIED.
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9. ALL DIMENSIONS TO BE IN METERS UNLESS OTHERWISE SPECIFIED.
10. ALL DIMENSIONS TO BE IN METERS UNLESS OTHERWISE SPECIFIED.

REFERENCE DRAWINGS:

1. ROAD PLAN (Scale: 1:1000)
2. CROSS SECTION (Scale: 1:100)
3. ELEVATION (Scale: 1:100)
4. PLAN (Scale: 1:1000)
5. SECTION (Scale: 1:100)
6. SECTION (Scale: 1:100)

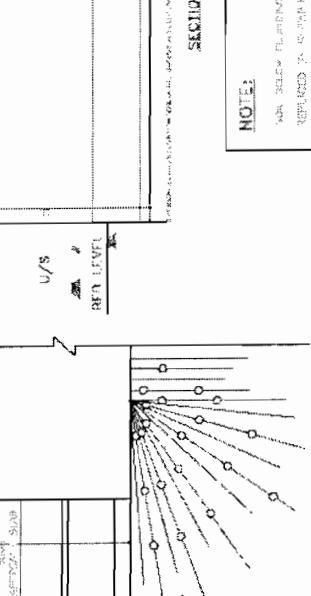
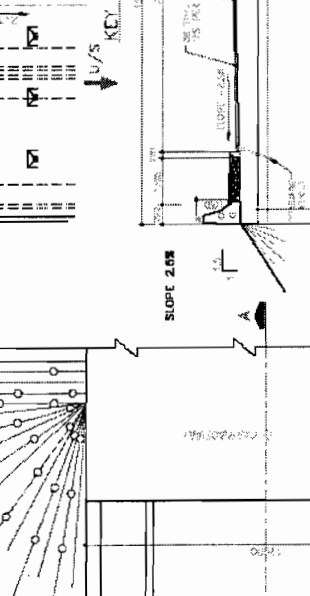
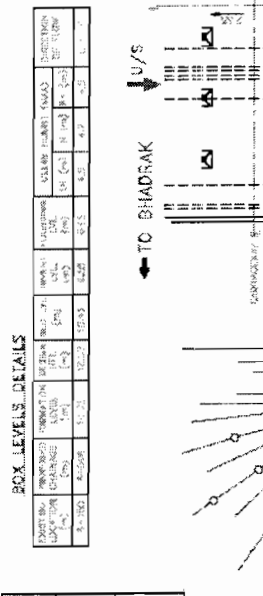
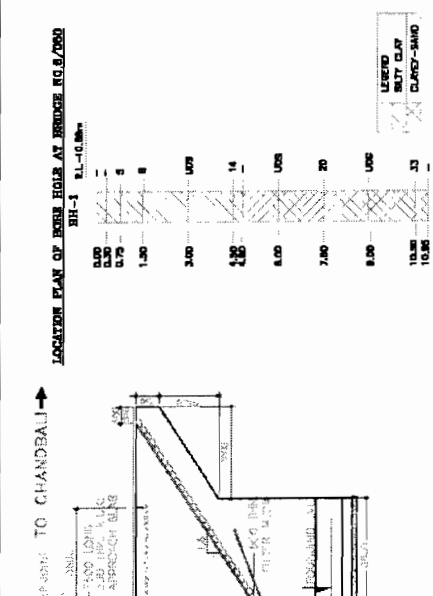
BOX LEVELS DETAILS

NO.	DESCRIPTION	LEVEL (m)	CHANGE (m)
1	FOUNDATION LEVEL	1.00	0.00
2	GROUND LEVEL	1.00	0.00
3	FINISHED ROAD LEVEL	1.00	0.00
4	FINISHED ROAD LEVEL	1.00	0.00
5	FINISHED ROAD LEVEL	1.00	0.00
6	FINISHED ROAD LEVEL	1.00	0.00
7	FINISHED ROAD LEVEL	1.00	0.00
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9	FINISHED ROAD LEVEL	1.00	0.00
10	FINISHED ROAD LEVEL	1.00	0.00



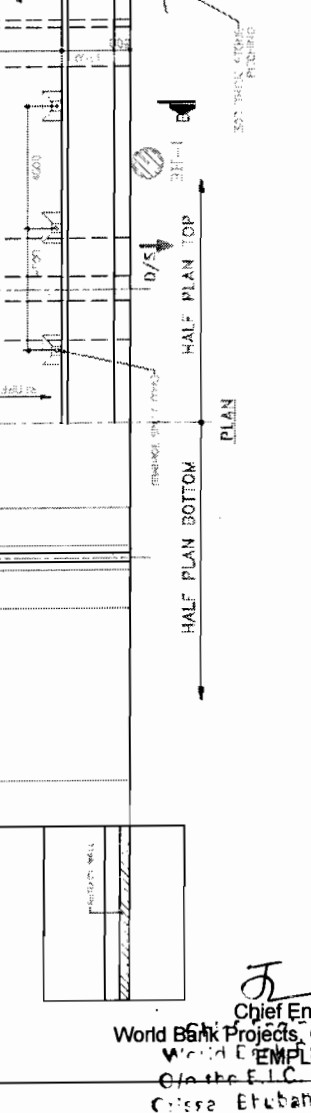
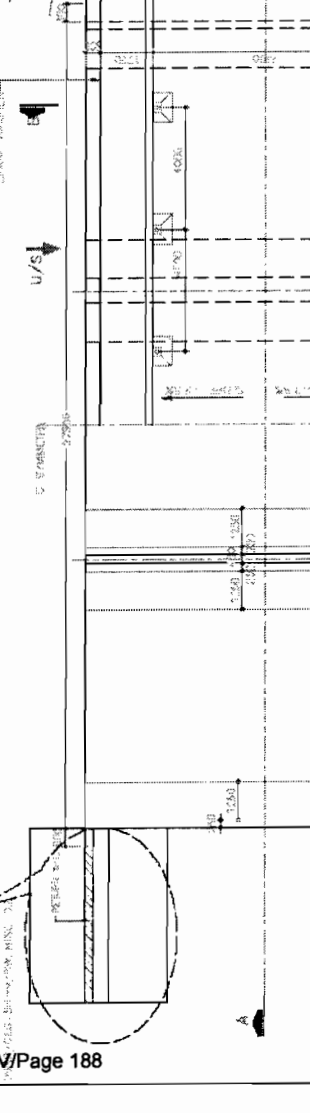
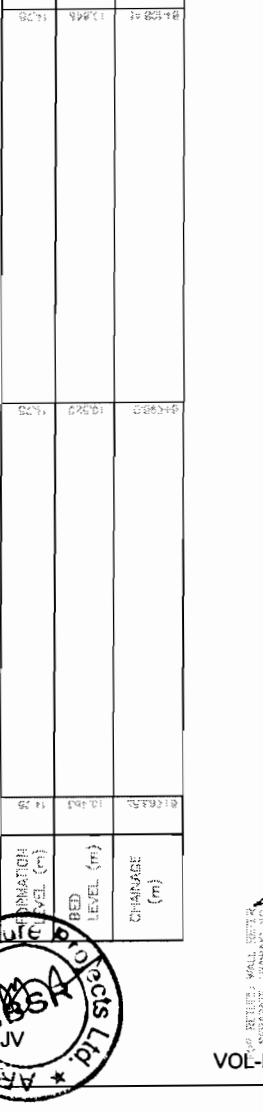
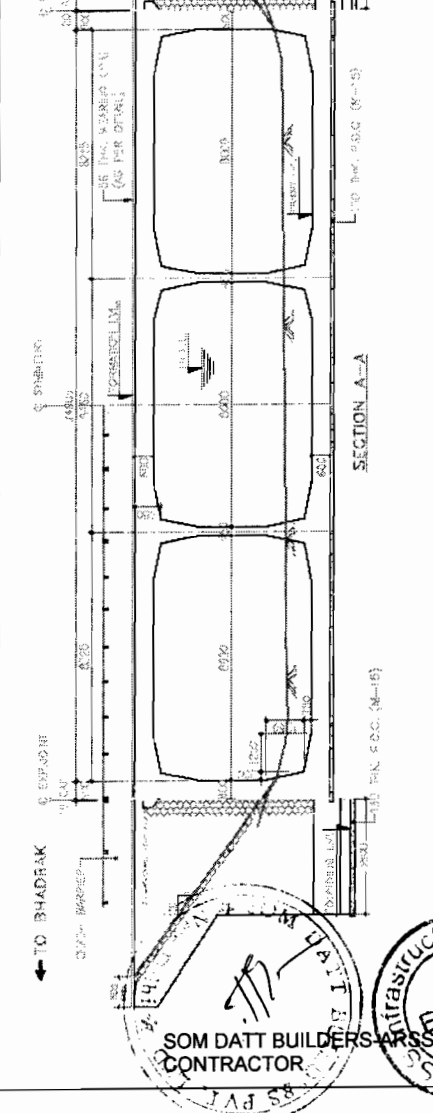
NOTE:

ALL DIMENSIONS TO BE AS SHOWN UNLESS OTHERWISE SPECIFIED.



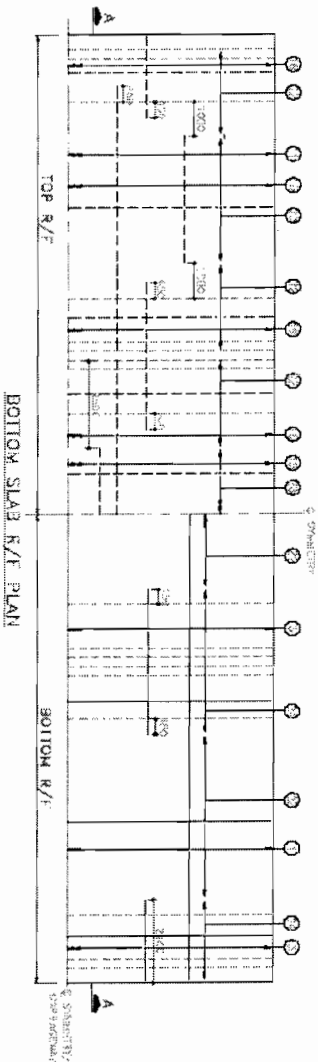
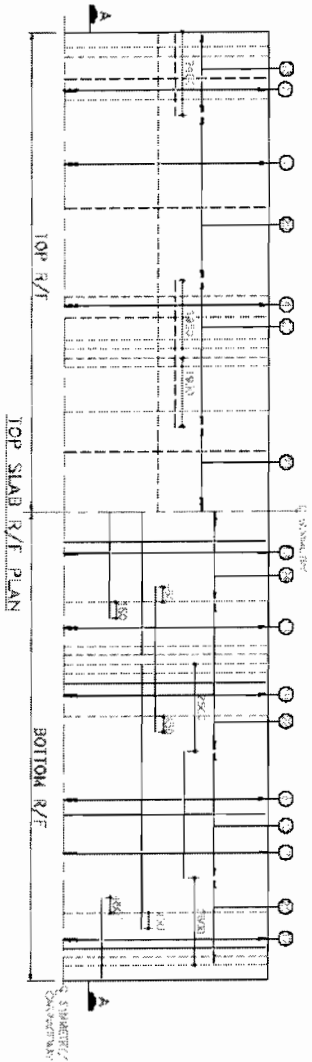
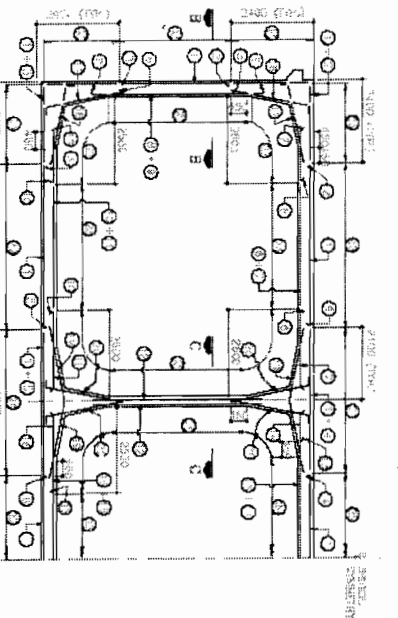
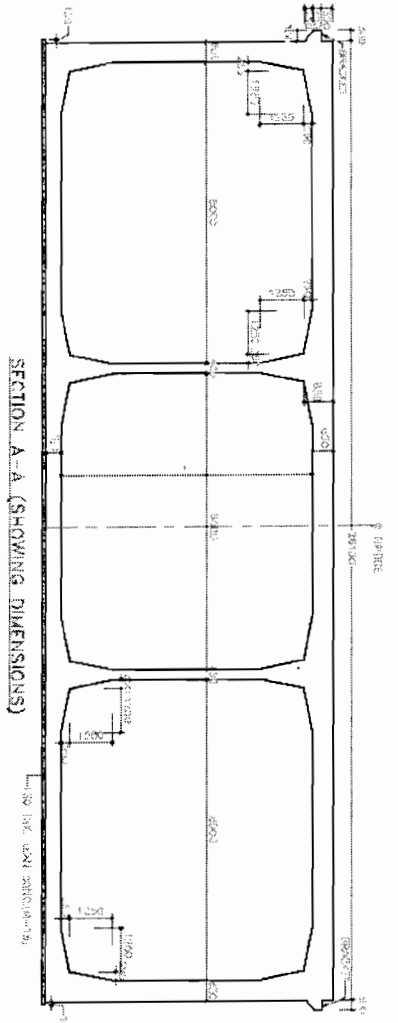
NOTE:

ALL DIMENSIONS TO BE AS SHOWN UNLESS OTHERWISE SPECIFIED.



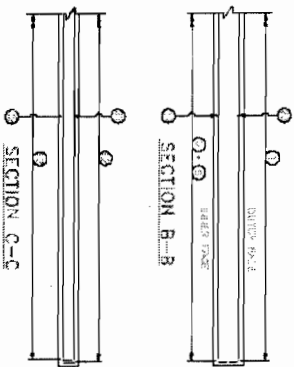
NOTE:

ALL DIMENSIONS TO BE AS SHOWN UNLESS OTHERWISE SPECIFIED.



LEGEND:

- BY DE BOTTOM DECK
- BY DE TOP DECK
- BY DE TOP DECK
- BY DE TOP DECK



REINF. DETAILS

BAR NO.	BAR DIA.	SPACING	SHAPE
1	12	150 C/C	100
2	12	150 C/C	100
3	12	150 C/C	100
4	12	150 C/C	100
5	12	150 C/C	100
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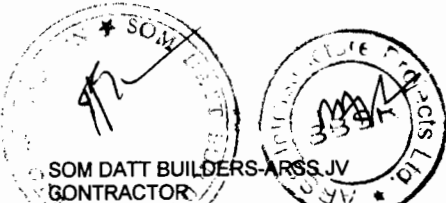
NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. IN NO SCALE THE DIMENSIONS AND WEIGHTS ARE TO BE TAKEN AS INDICATED.
3. CONCRETE TO BE OF GRADE M20.
4. REINFORCEMENT TO BE OF GRADE Fe 415.
5. ALL CORNERS AND REINFORCEMENT ARE TO BE PROVIDED AS SHOWN.
6. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
7. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
8. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
9. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
10. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.

REFERENCE DRAWINGS:

- 1. IS 8000-1983 FOR REINFORCEMENT.
- 2. IS 456-1978 FOR CONCRETE.
- 3. IS 10262-1982 FOR DIMENSIONS.

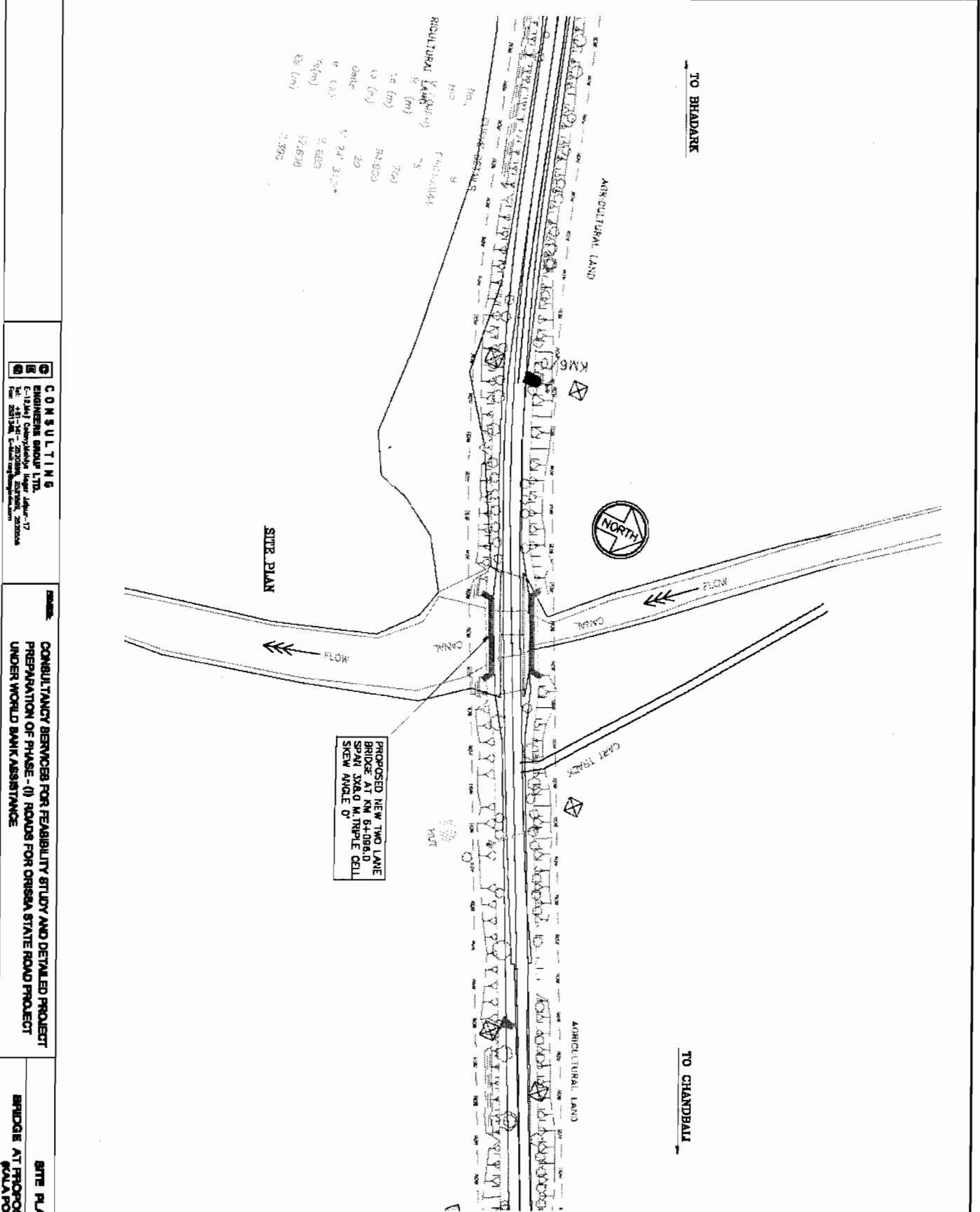
Chief Engineer
World Bank Projects, Orissa
EMPLOYER!
SOM DATT BUILDERS-ARSS JV
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CONSULTING ENGINEERS GROUP LTD.
E-7/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION AND REINFORCEMENT DETAILS BRIDGE AT PROPOSED CH 6+006 (KALA POLY)



PROPOSED NEW TWO LANE
BRIDGE AT KM 64+086.0
SPAN 54.876 M, TRIPLE CELL
SKEW ANGLE 25°

CONSULTING
ENGINEERS GROUP LTD.
E-13/147 Conchajunha Nagar, Jharkhand
Patna-800 014
Tel: 2031734, 2031735
Fax: 2031736

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CHL 64+086 (WALAPOLI)

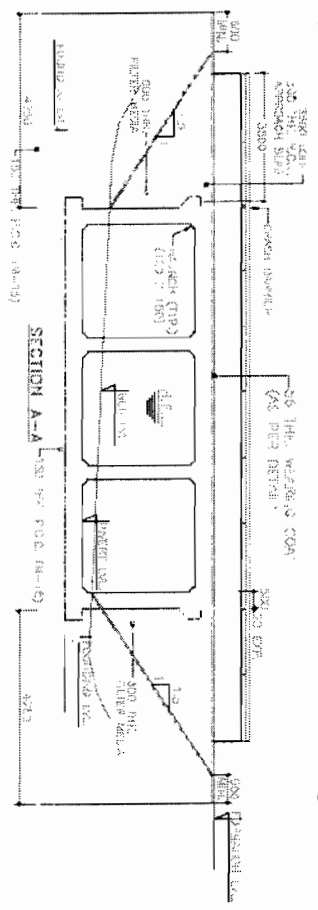
NO.	DATE	REVISION	BY	CHKD.	APPVED.

SOM DATT BUILDERS AND CONTRACTORS
Infrastructure Engineers Ltd.
BBSR

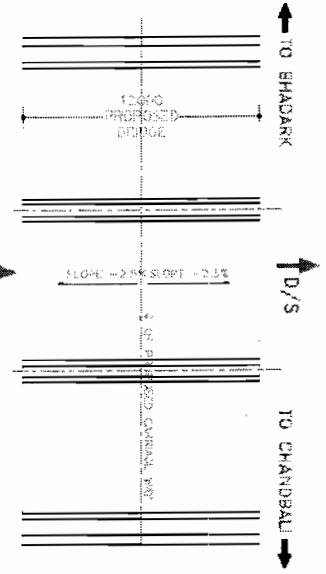
NOTES:-
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Pr. Chief Engineer
Orissa E. & C. Dept.
Pr. Chief Engineer

TO BHADRAK

TO CHANDBALI



FORMATION LEVEL (m)	11.000	11.000	11.000
BED LEVEL (m)	10.000	10.700	11.000
CHANNELS (m)	9+134.37	9+134.37	9+134.37



NOTES:

1. ALL DIMENSIONS ARE IN METERS AND EXCEPT AS NOTED.
2. ONLY AFTER APPROVAL AND TO BE FOLLOWED, DO NOT SCALE FOR CONSTRUCTION.
3. LOWER OR UNDESIRABLE SOIL SHALL BE REMOVED AND REPLACED WITH STABLE GRANULAR MATERIAL.
4. QUANTITY OF CONCRETE:

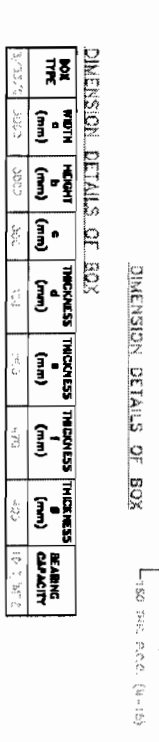
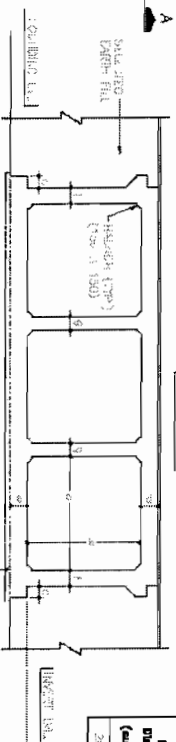
CONCRETE	4-17
REINFORCING STEEL	4-21
FORMWORK	4-21
PAINT	4-21
5. CHANNEL / FORMWORK SHALL BE PROVIDED AS PER APPROVED PLAN & MATERIAL SPECIFICATION.
6. THE FILLER SHALL BE RITE OR WELL SIFTED SANDSTONE.
7. IN CASES WHERE EXCESS LEVEL IS FOUND FROM QUOTED LEVEL AT ANY OF THE POINTS OF THE BRIDGE, THE SAME IS TO BE REDUCED BY OPERATOR'S FIELD PRESENCE. QUOTED LEVELS ARE SUBJECT TO FIELD CORRECTIONS TO MATCH SOAKAGE PROFILES.
8. APPROXIMATE FILL TYPE & APPROXIMATE QUANTITIES TO BE PROVIDED AS PER QUOTED QUANTITIES/PROFILES OR AS PER APPROVED PLAN.
9. GIVE MARK ON SEPARATE SHEET.
10. TAKE NECESSARY MEASUREMENTS AT ALL POINTS & REPORT IMMEDIATELY.

REFERENCE DRAWING:-

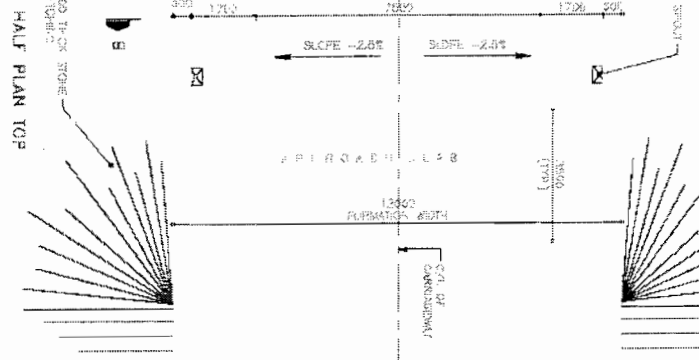
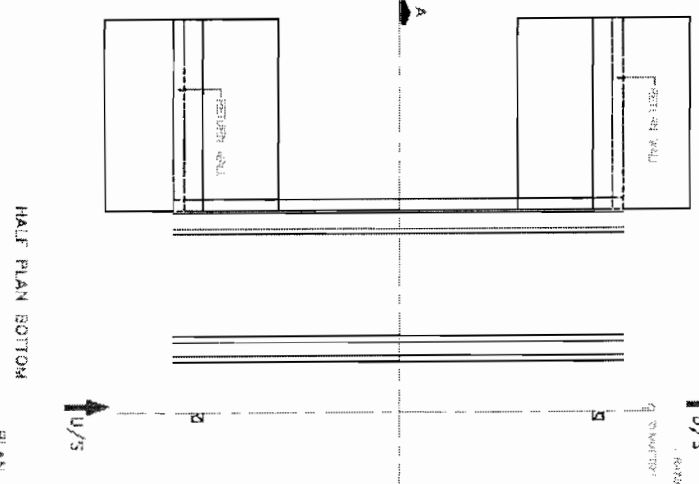
1. FOR DRAWING IN THE PROPOSED & EXISTING BRIDGE DRAWING DRAWING OF CHANNELS PER. 809/100, 10/12, 10/11, 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.
2. FOR DESIGN, HYDROLOGICAL DATA AS PER APPROVED & EXISTING BRIDGE DRAWING DRAWING OF CHANNELS PER. 809/100, 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.
3. GATE: 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.
4. GATE: 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.
5. GATE: 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.
6. GATE: 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.
7. GATE: 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20.

HYDROLOGICAL DATA

Discharge (cumecs)	Maximum Discharge (cumecs)	Depth of water/length of Bridge/Length of Filling (m)	Depth of water/length of Bridge/Length of Filling (m)
20.00	30.00	1.5	1.5
30.00	40.00	2.0	2.0
40.00	50.00	2.5	2.5
50.00	60.00	3.0	3.0
60.00	70.00	3.5	3.5
70.00	80.00	4.0	4.0
80.00	90.00	4.5	4.5
90.00	100.00	5.0	5.0



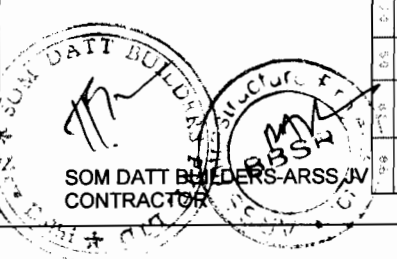
BOX TYPE	EXISTING LOCATION/CHANGING (m)	PROPOSED LOCATION/CHANGING (m)	FORMATION LEVEL (m)	DESIGN W/L (m)	BED W/L (m)	PIVOT LEVEL (m)	FOUNDING LVL (m)	CLEAR HEIGHT (mm)	BEARING CAPACITY (mm)
1	98.500	98.500	11.000	10.000	10.000	10.000	10.000	10.000	10.000
2	98.500	98.500	11.000	10.000	10.000	10.000	10.000	10.000	10.000
3	98.500	98.500	11.000	10.000	10.000	10.000	10.000	10.000	10.000



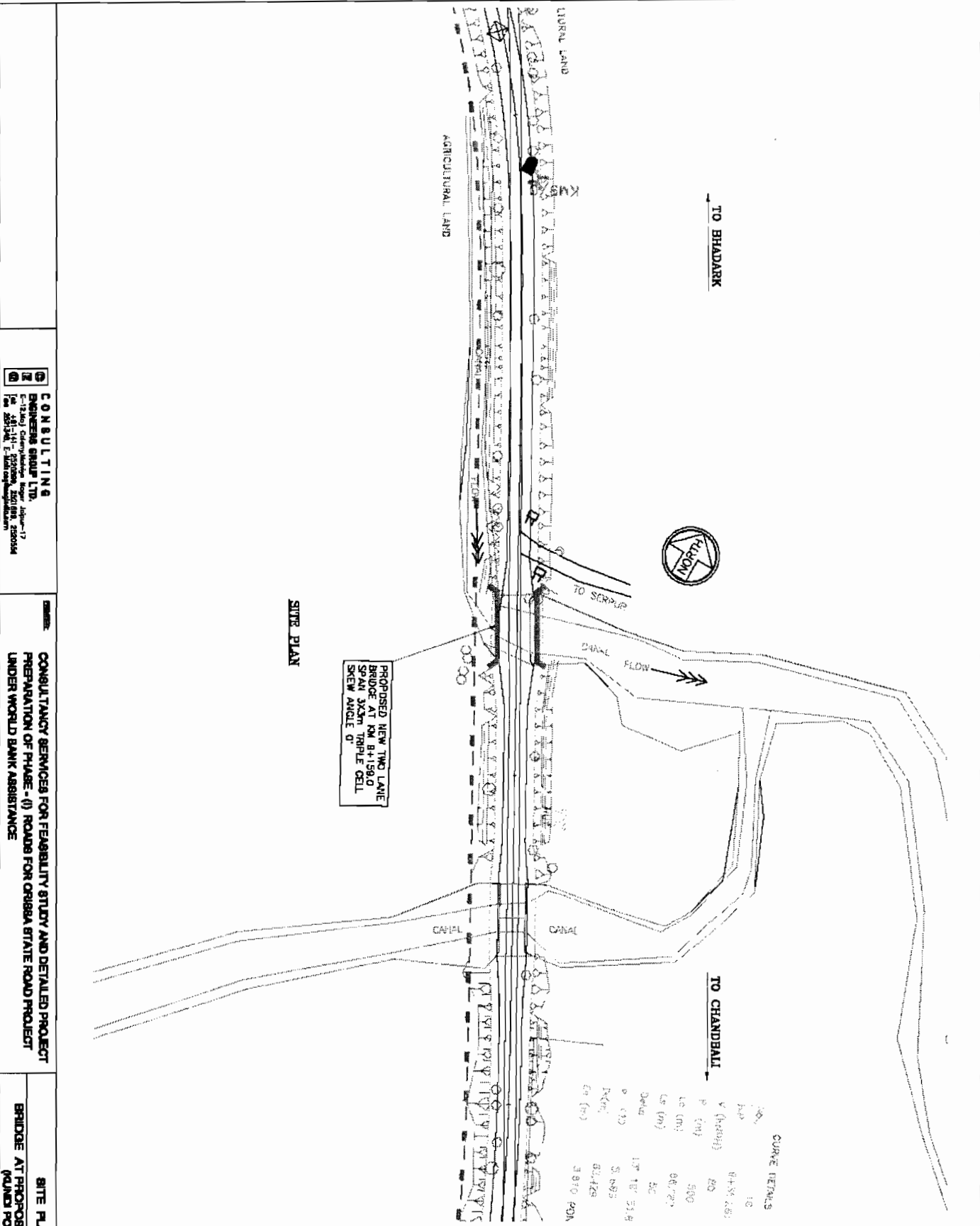
CONSULTING ENGINEERS GROUP LTD.
 CONSULTING ENGINEERS GROUP LTD.
 CONSULTING ENGINEERS GROUP LTD.
 CONSULTING ENGINEERS GROUP LTD.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 8+150 (ROUND P.O.L.-1)



Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 P.O. Box 10, Bhubaneswar-751 013

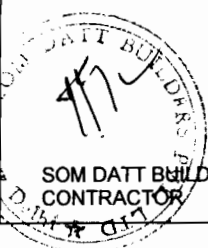


CONSULTING ENGINEERS GROUP LTD.
 6-12/30, Chatterjee Nagar, New Delhi-110028
 Tel: 26114411, 26114422, 26114433, 26114444

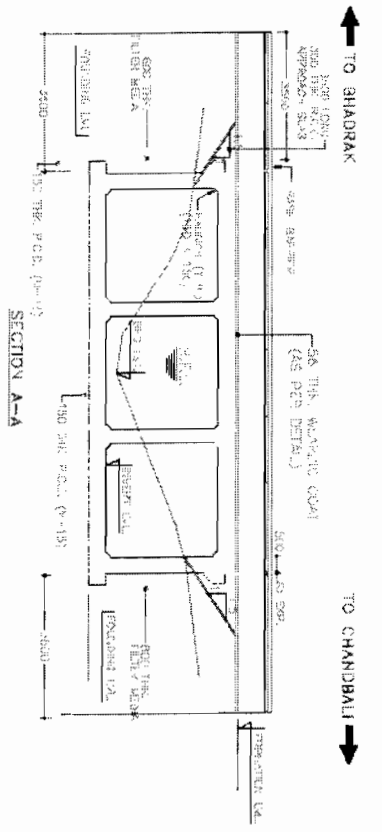
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN BRIDGE AT PROPOSED CH. 8+159 (KUNDI POLO-1)

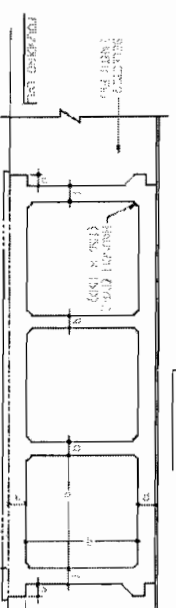
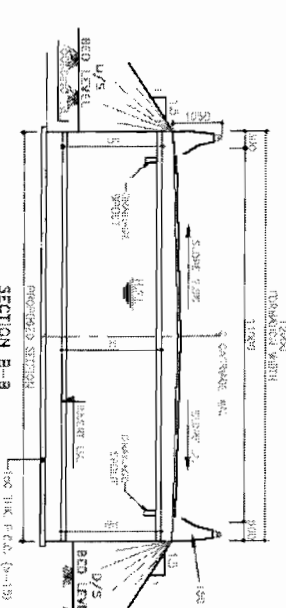
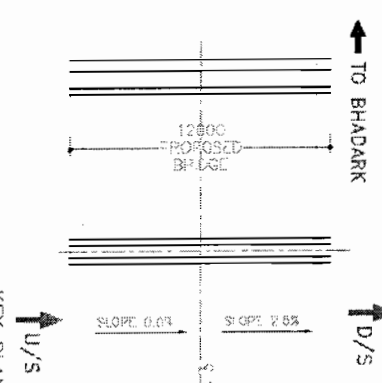
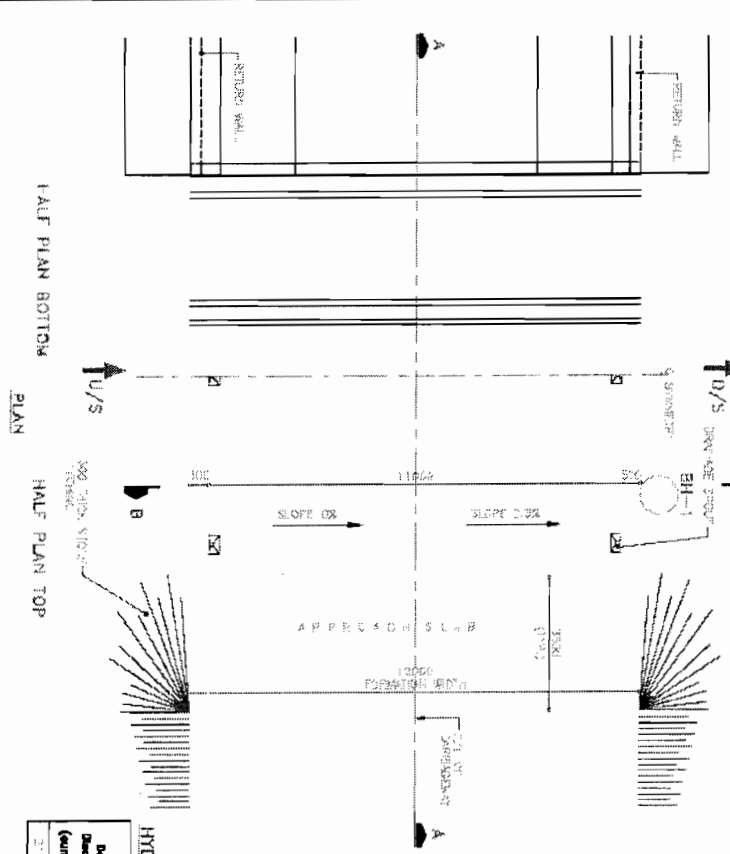
DATE	REVISION	BY	CHKD



NOTES:-
 Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 C/O the E.T.C. to
 Office Bhubaneswar.



OPERATION LEVEL (m)	8.700	8.700	8.700
BLD. LEVEL (m)	8.263	8.313	8.700
CHANNEL CHAMBER (m)	13+846.63	13+846.0	13+851.37



DIMENSION DETAILS OF BOX

BOX TYPE	WIDTH (mm)	HEIGHT (mm)	THICKNESS (mm)	SLAB THICKNESS (mm)	REINFORCING THICKNESS (mm)	BOARDING CAPACITY (%)
TYPE 1	3000	1800	120	100	10	10.00%

HYDROLOGICAL DATA

BOX TYPE	EXISTING PROPOSED LOCATION CHANGE (m)	PROPOSED LENGTH (m)	DESIGN H/L (m)	BED LVL (m)	PIER LVL (m)	FOUNDING LVL (m)	CLEAR HEIGHT (mm)	HEIGHT OF FIRM (m)
TYPE 1	3000	8.200	2.200	8.350	6.300	8.800	2.000	2.200

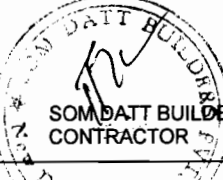
NOTE:
 1. ALL THE FOUNDING LEVELS ARE TO BE PROVIDED BY THE CONTRACTOR.
 2. THE FOUNDING LEVEL IS TO BE PROVIDED BY THE CONTRACTOR.
 3. THE FOUNDING LEVEL IS TO BE PROVIDED BY THE CONTRACTOR.
 4. THE FOUNDING LEVEL IS TO BE PROVIDED BY THE CONTRACTOR.

NOTES:
 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
 2. QUANTITY TAKE-OFF IS TO BE BASED ON THE DRAWINGS AND SPECIFICATIONS.
 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL NECESSARY MATERIALS AND LABOR.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL NECESSARY MATERIALS AND LABOR.
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL NECESSARY MATERIALS AND LABOR.

REFERENCE DRAWING:-
 1. FOR DIMENSIONS OF THE STRUCTURE, REFER TO THE ARCHITECTURAL DRAWINGS.
 2. FOR DIMENSIONS OF THE FOUNDATION, REFER TO THE FOUNDATION DRAWINGS.
 3. FOR DIMENSIONS OF THE DECK, REFER TO THE DECK DRAWINGS.
 4. FOR DIMENSIONS OF THE GIRDERS, REFER TO THE GIRDER DRAWINGS.
 5. FOR DIMENSIONS OF THE CHAMBERS, REFER TO THE CHAMBER DRAWINGS.
 6. FOR DIMENSIONS OF THE PIER, REFER TO THE PIER DRAWINGS.
 7. FOR DIMENSIONS OF THE ABUTMENT, REFER TO THE ABUTMENT DRAWINGS.
 8. FOR DIMENSIONS OF THE ROAD, REFER TO THE ROAD DRAWINGS.
 9. FOR DIMENSIONS OF THE LANDSCAPE, REFER TO THE LANDSCAPE DRAWINGS.
 10. FOR DIMENSIONS OF THE UTILITY, REFER TO THE UTILITY DRAWINGS.

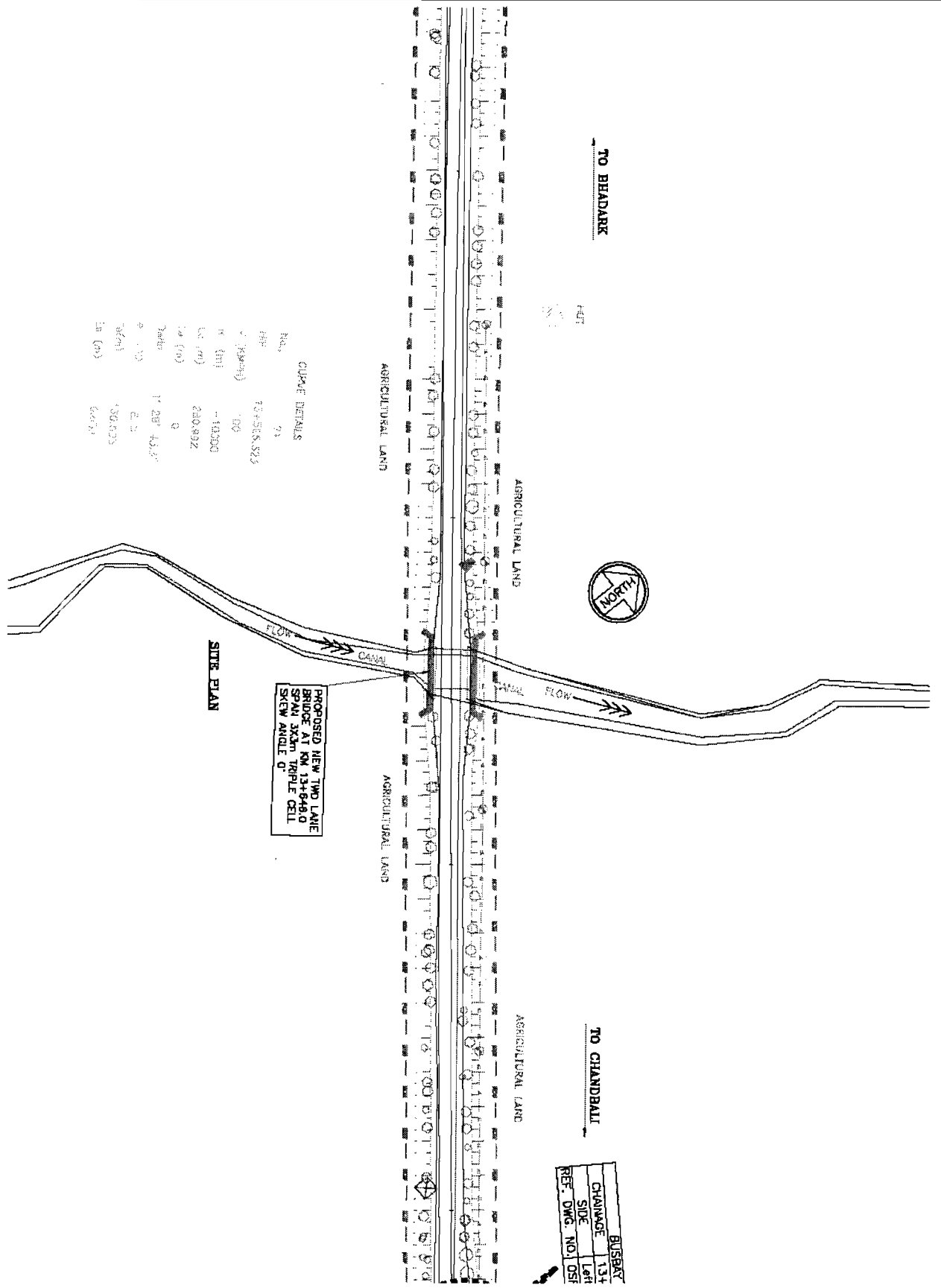
LOCATION PLAN OF MORE HOLES AT BRIDGE NO.18/1900

HOLE NO.	DEPTH (m)	DIAMETER (mm)	LOCATION
101	1.50	150	CHAMBER 1
102	1.50	150	CHAMBER 1
103	1.50	150	CHAMBER 2
104	1.50	150	CHAMBER 2
105	1.50	150	CHAMBER 3
106	1.50	150	CHAMBER 3
107	1.50	150	PIER
108	1.50	150	PIER
109	1.50	150	ABUTMENT
110	1.50	150	ABUTMENT



NOTES:-

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the E.C.C.
Orissa Bhubaneswar.



PROPOSED NEW TWO LANE
BRIDGE AT KM 13+940.0
SPAN 3x10m TRIPLE CELL
SKEW ANGLE 0°

SITE PLAN

CUAKE DETAILS

No.	71
HRP	73+568.523
V (30M/20)	1.00
R (m)	10000
LC (m)	280.892
LC (m)	0
Center	17.287 45.57
Δ	2.5
36241	30.625
36	6.653

BUSBY	13+
CHAINAGE	Left
SIDE	Left
REF. DWG. NO.	DSF

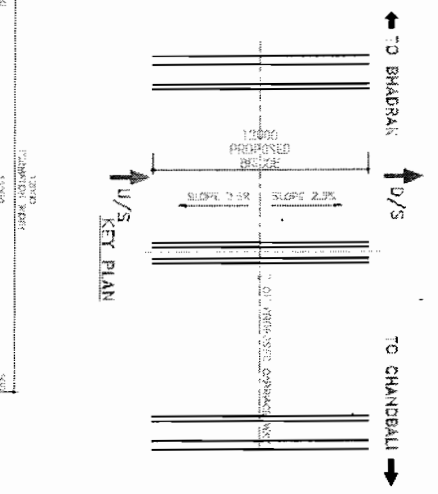
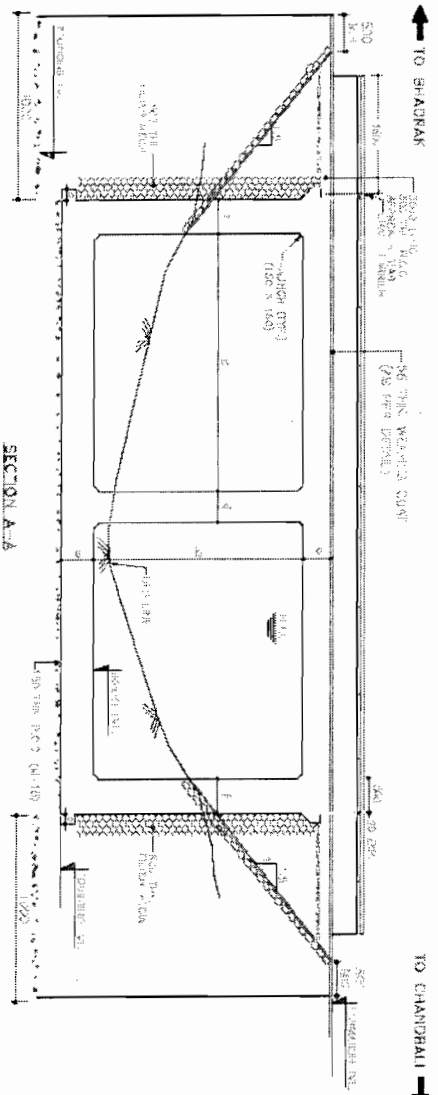
CONSULTING ENGINEERING GROUP LTD.
E-14, Ling Con, Madhya Nagar, Alipur-17
P.O. 201014, E-mail: cegroup@rediffmail.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - 0) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

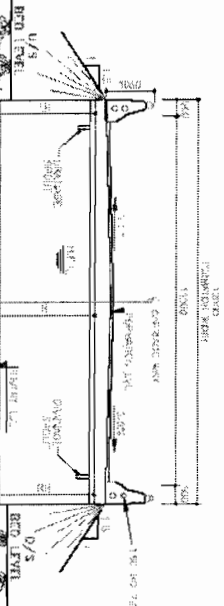
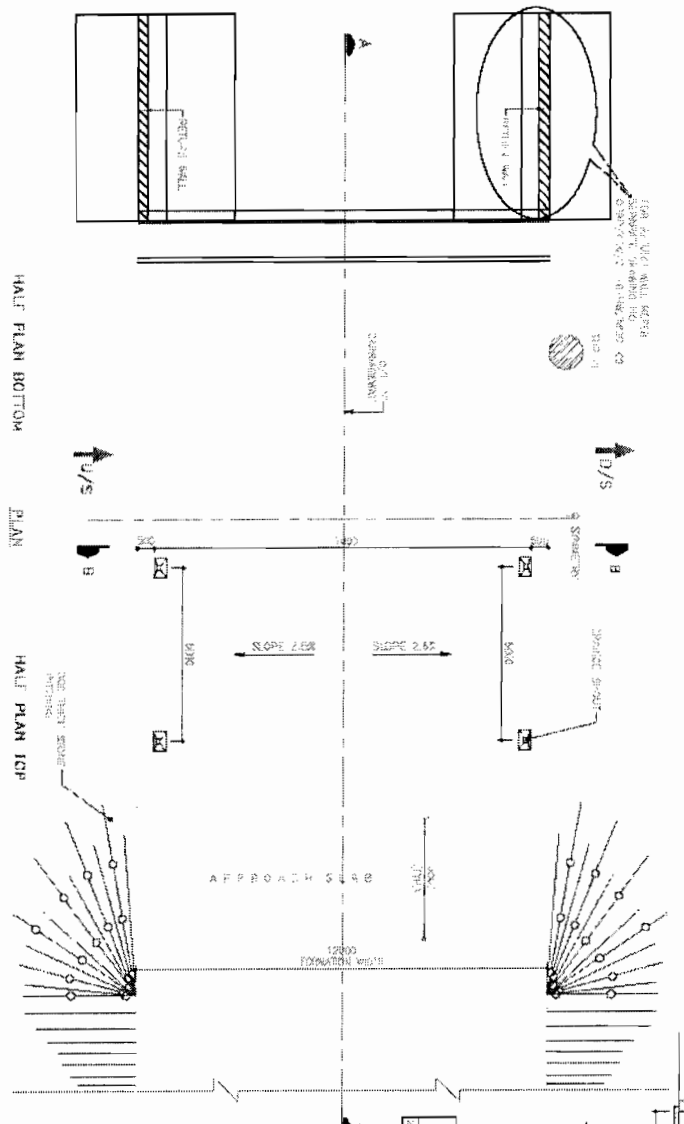
INDEX PLAN
BRIDGE AT PROPOSED CH. 13+940
(NANDAPUR POLY)

SOM DATT BUILDERS & CONTRACTORS PVT. LTD.
CONTRACTOR

Structure Projects Ltd.
BBSR



FORMATION LEVEL (+ve)	BTD LEVEL (-ve)	DRAINAGE (-ve)
100.75	100.75	100.75
100.75	100.75	100.75
100.75	100.75	100.75



DIMENSION DETAILS OF BOX

LINE TYPE	HEIGHT (mm)	WIDTH (mm)	THICKNESS (mm)	CONCRETE STRENGTH	FINISH
1	2000	2000	150	M25	1:2:4
2	1000	1000	150	M25	1:2:4
3	500	500	150	M25	1:2:4

HYDROLOGICAL DATA

Station	Area (ha)	Runoff Coefficient	Peak Discharge (cumec)
1	100	0.5	100
2	200	0.5	200
3	300	0.5	300

NOTE:
Soil bearing capacity level shall be 100 kN/m².
Bearing capacity shall be 100 kN/m².
The soil shall be 100 kN/m².

NOTES:
1. All other works are in line & levels are as per notes.
2. All the works shall be done as per the notes.
3. All the works shall be done as per the notes.
4. All the works shall be done as per the notes.
5. All the works shall be done as per the notes.
6. All the works shall be done as per the notes.
7. All the works shall be done as per the notes.
8. All the works shall be done as per the notes.
9. All the works shall be done as per the notes.
10. All the works shall be done as per the notes.

REFERENCE DRAWING:-
1. ORR APPROVAL & BUDGET FOR THE YEAR 2011-12.
2. ORR APPROVAL & BUDGET FOR THE YEAR 2012-13.
3. ORR APPROVAL & BUDGET FOR THE YEAR 2013-14.
4. ORR APPROVAL & BUDGET FOR THE YEAR 2014-15.
5. ORR APPROVAL & BUDGET FOR THE YEAR 2015-16.
6. ORR APPROVAL & BUDGET FOR THE YEAR 2016-17.
7. ORR APPROVAL & BUDGET FOR THE YEAR 2017-18.
8. ORR APPROVAL & BUDGET FOR THE YEAR 2018-19.
9. ORR APPROVAL & BUDGET FOR THE YEAR 2019-20.
10. ORR APPROVAL & BUDGET FOR THE YEAR 2020-21.

Chief Engineer
World Bank Projects, Orissa
E.M.C. (L)
C/o the E.M.C. (L)
C/o the E.M.C. (L)

CONSULTING ENGINEERS GROUP LTD.
E-12/11, Chandrabhaga, Bhubaneswar-751013
Tel: 91-674-2530691, 2530692, 2530693
Fax: 91-674-2530694, 2530695
www.consultingengineersgroup.com

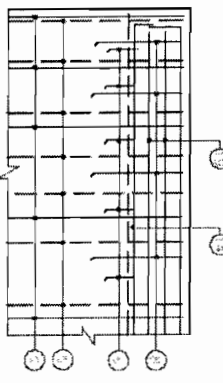
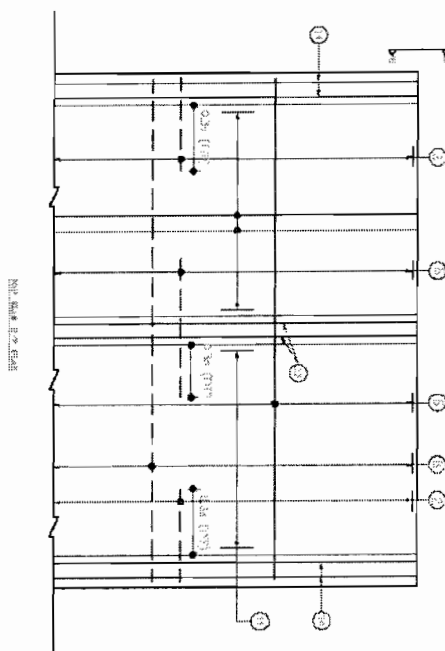
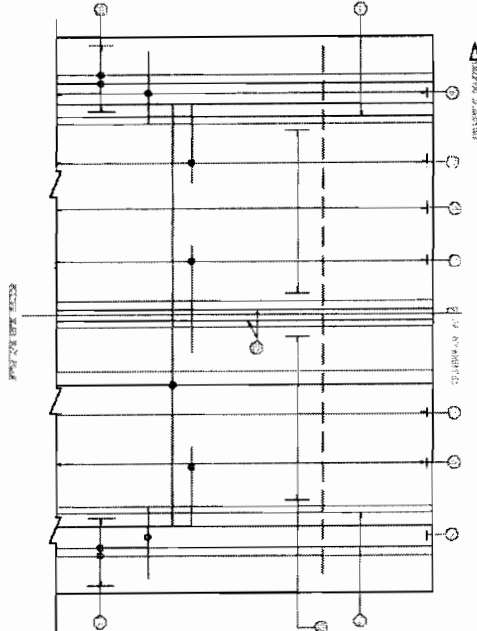
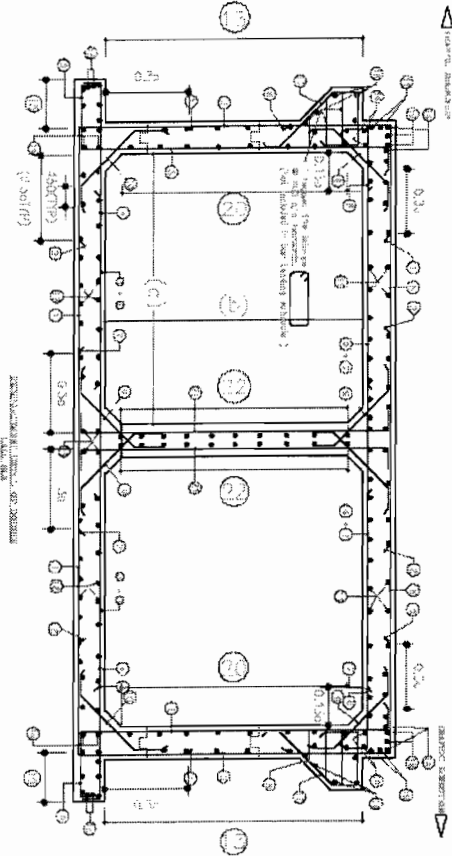
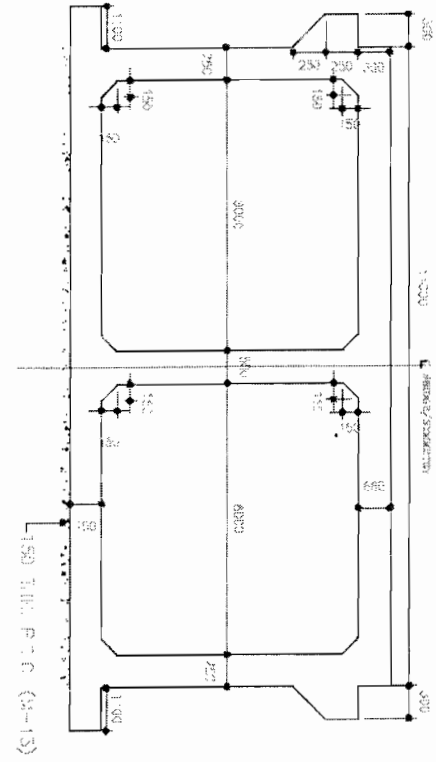
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
BRIDGE AT PROPOSED CH. 28+189

NO.	DATE	BY	CHKD.	APPD.
1	10/10/2020	...	...	...
2	10/10/2020	...	...	...

SOM DATT BUILDERS & ARCHITECTS
CONTRACTOR

M. S. D. & P. S. D.



REINFORCEMENT DETAIL
DOUBLE CELL BOX

BAR NO.	BAR SIZE	BAR DIA.	BAR L.	BAR W.	BAR T.	BAR B.	BAR C.	BAR D.	BAR E.	BAR F.	BAR G.	BAR H.	BAR I.	BAR J.	BAR K.	BAR L.	BAR M.	BAR N.	BAR O.	BAR P.	BAR Q.	BAR R.	BAR S.	BAR T.	BAR U.	BAR V.	BAR W.	BAR X.	BAR Y.	BAR Z.
1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
2	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
3	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
4	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
6	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
7	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
8	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
9	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
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SOM DATT BUILDERS ARCHT. & ENGRS. PRIVATE LIMITED
CONTRACTOR

REFERENCE DRAWINGS:-
SOM DATT BUILDERS ARCHT. & ENGRS. PRIVATE LIMITED
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the E.O.C. (Orissa)
Orissa Bhubaneswar.

CONSULTING ENGINEERS GROUP LTD.
17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

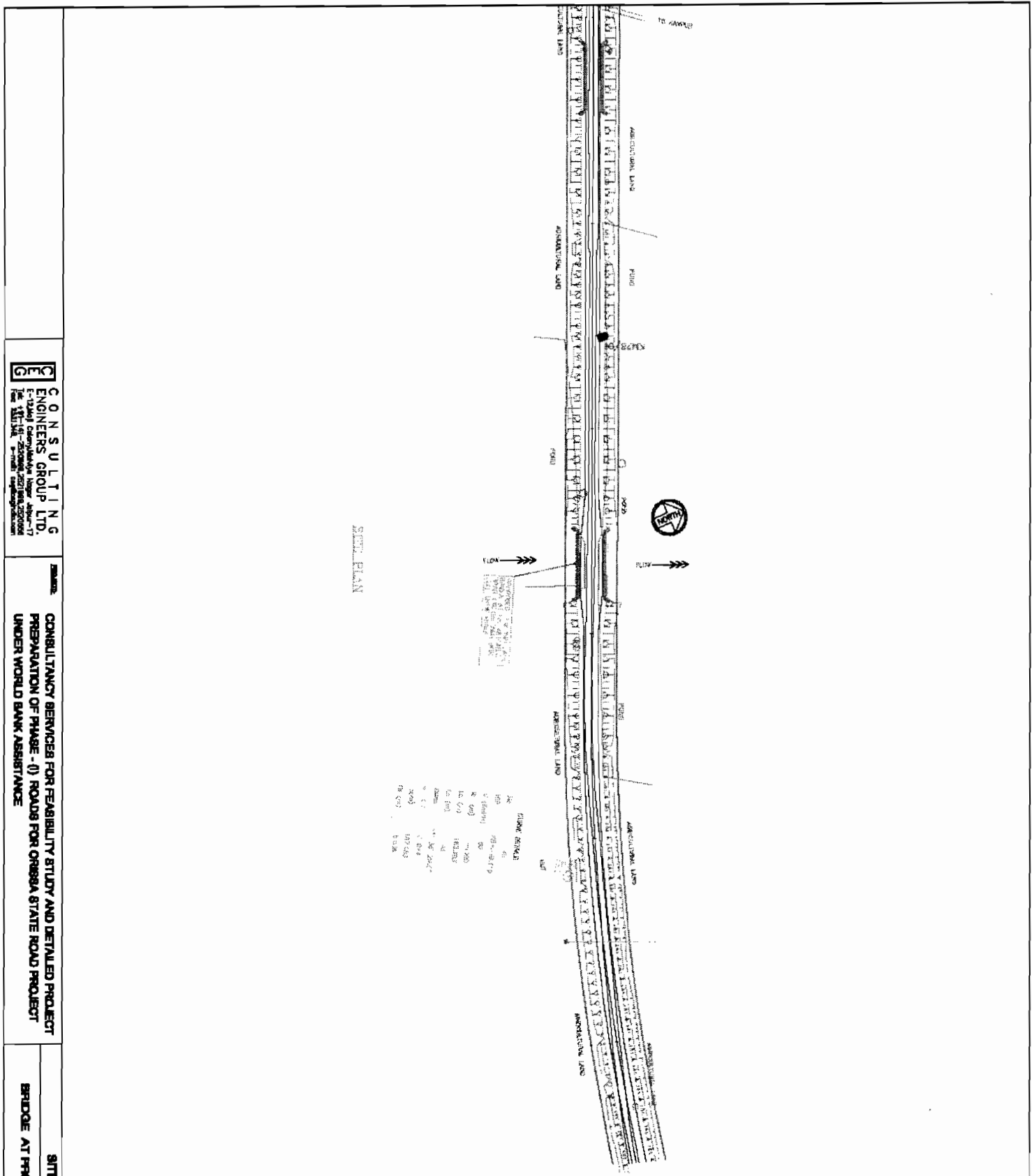
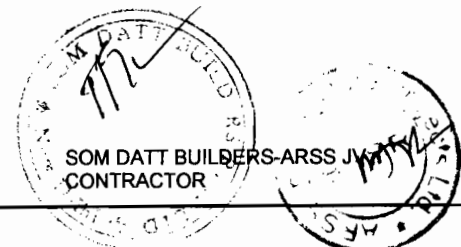
REINFORCEMENT DETAIL OF DOUBLE CELL BOX BRIDGE AT PROPOSED CH. 28+188

DATE: 10/11/2011
DRAWN BY: S. K. SINGH
CHECKED BY: S. K. SINGH
APPROVED BY: S. K. SINGH

NOTES:

J
Chief Engineer
World Bank Projects Orissa
EMPLOYER
Crisse, Bhubaneswar.

SOM DATT BUILDERS-ARSS JV
CONTRACTOR



SCALE

1:100	1:100
1:200	1:200
1:300	1:300
1:400	1:400
1:500	1:500
1:600	1:600
1:700	1:700
1:800	1:800
1:900	1:900
1:1000	1:1000

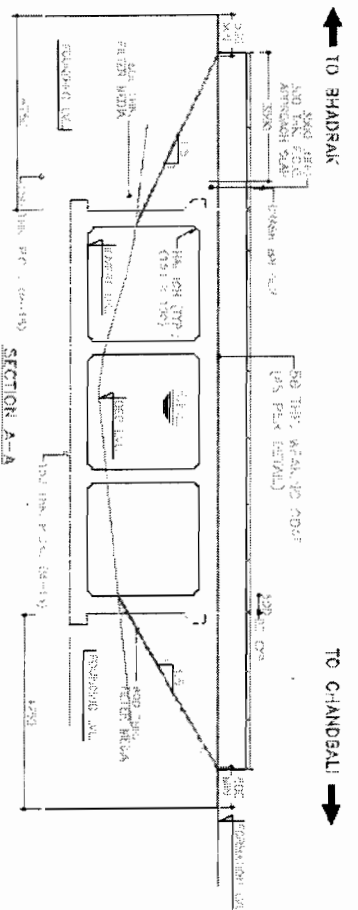
SITE PLAN

CONSULTING ENGINEERS GROUP LTD.
12th Floor, 20th Mile, Bhubaneswar, Orissa
Ph: 11-11-20000, 2021111, 202000
Fax: 11-11-20000, 2021111, 202000
www.consultingengineersgroup.com

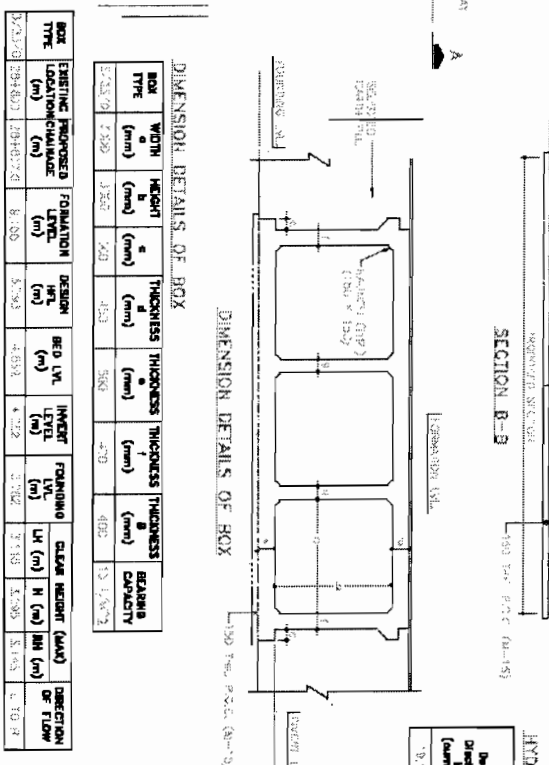
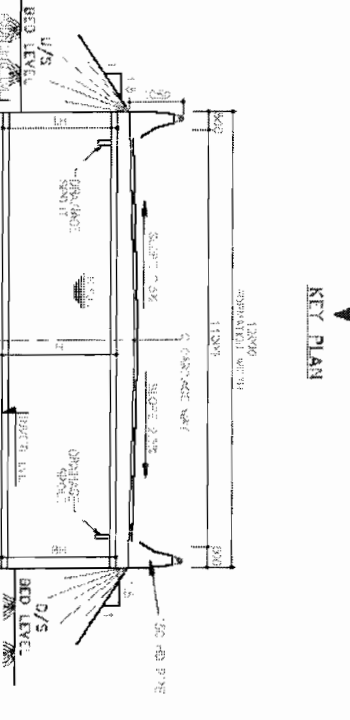
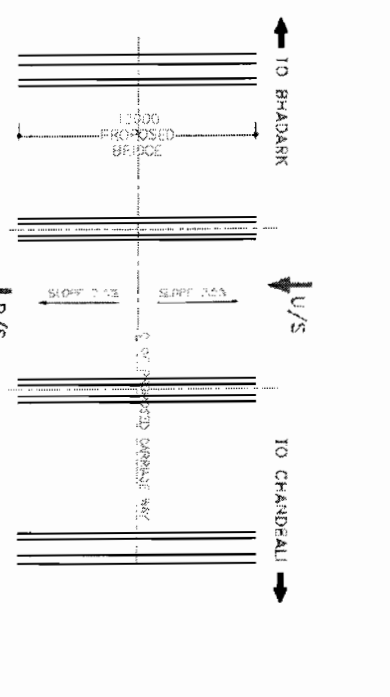
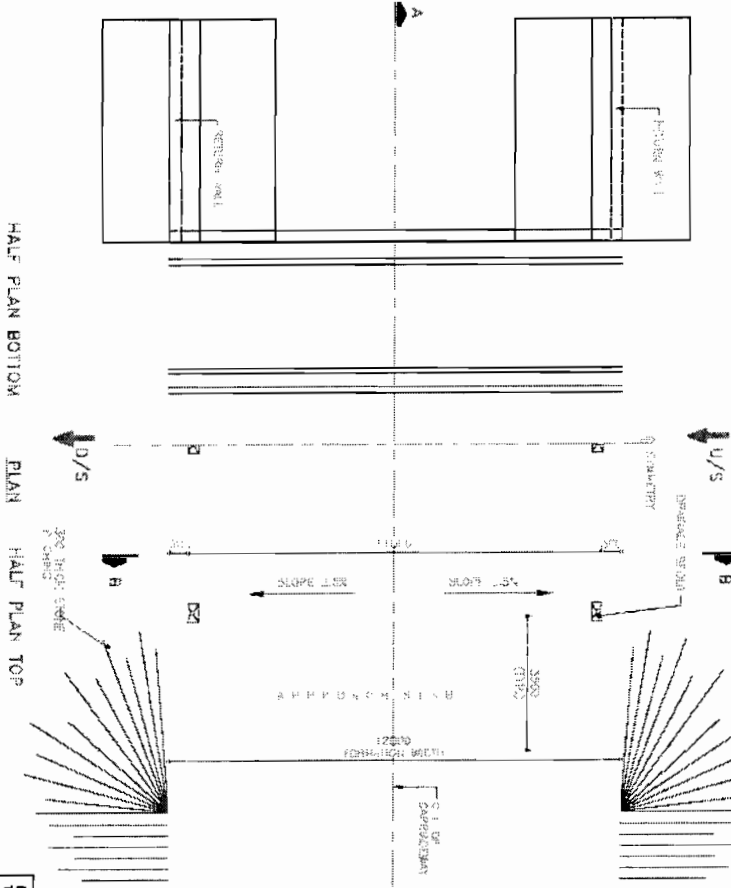
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH. 28+1.188

DATE	SCALE	BY	CHECKED	DATE
11/11/11	1:100	J	J	11/11/11



PROPOSED Level (m)	8.053
ROAD LEVEL (m)	5.484
CHANGAL Level (m)	8.053
CHANGAL Level (m)	5.224
CHANGAL Level (m)	28+842.37
CHANGAL Level (m)	28+831.63



BOX TYPE	EXISTING PROPOSED LOCATION/CHANGAL (m)	FOUNDATION LEVEL (m)	DESIGN HGT. (m)	DESIGN BED LVL. (m)	INVERT LEVEL (m)	FORMING LVL. (m)	CLEAR HEIGHT (mm)	DIRECTION OF FLOW
D2A120	28+842.37	28+842.37	8.100	5.224	4.854	4.422	3.702	10.100
D2A120	28+831.63	28+831.63	8.100	5.224	4.854	4.422	3.702	10.100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 28+837 (KALAPAVADA GHATSIWA)

NOTES:

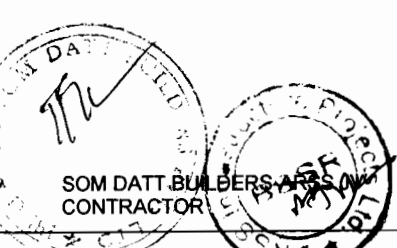
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE AS PER THE SPECIFICATIONS.
3. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
4. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
5. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
6. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
7. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
8. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
9. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.
10. THE ROAD SHALL BE CONSTRUCTED TO THE STANDARD WIDTH AND GRADE.

REFERENCE DRAWING:-

1. ROAD DESIGN & CONSTRUCTION MANUAL, ROAD DESIGN & CONSTRUCTION MANUAL, ROAD DESIGN & CONSTRUCTION MANUAL.
2. ROAD DESIGN & CONSTRUCTION MANUAL, ROAD DESIGN & CONSTRUCTION MANUAL, ROAD DESIGN & CONSTRUCTION MANUAL.
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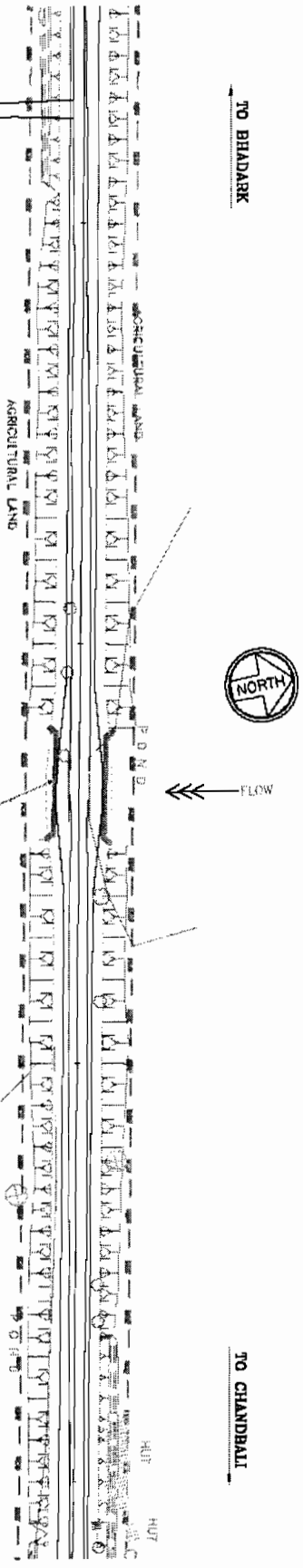
HYDROLOGICAL DATA

Design Discharge (Cumec)	Maximum Level (m)	Depth of overfall/length of Road/length of Road/length of Road (m)	u/s	d/s	u/s	d/s	u/s	d/s
0.14	2.800	1.25	3.9	3.0	4.0	4.0	4.0	4.0



NOTES:-

J
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the E.P.C.
Orissa, Bhubaneswar.



SITE PLAN

PROPOSED NEW TWO LANE
BRIDGE AT KM 28+87.0
SPAN 3X3M TRIPLE CELL
SKEW ANGLE 0°

CONSULTING ENGINEERS GROUP LTD.
F-12/14 Outer Market Road New-17
Delhi 110054
Tel. 26311111 Fax 26311111

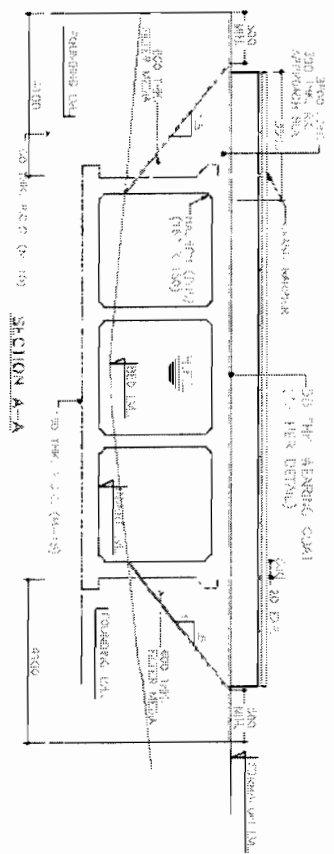
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH 28+87.7
(KALAPAHADA GHURUR)

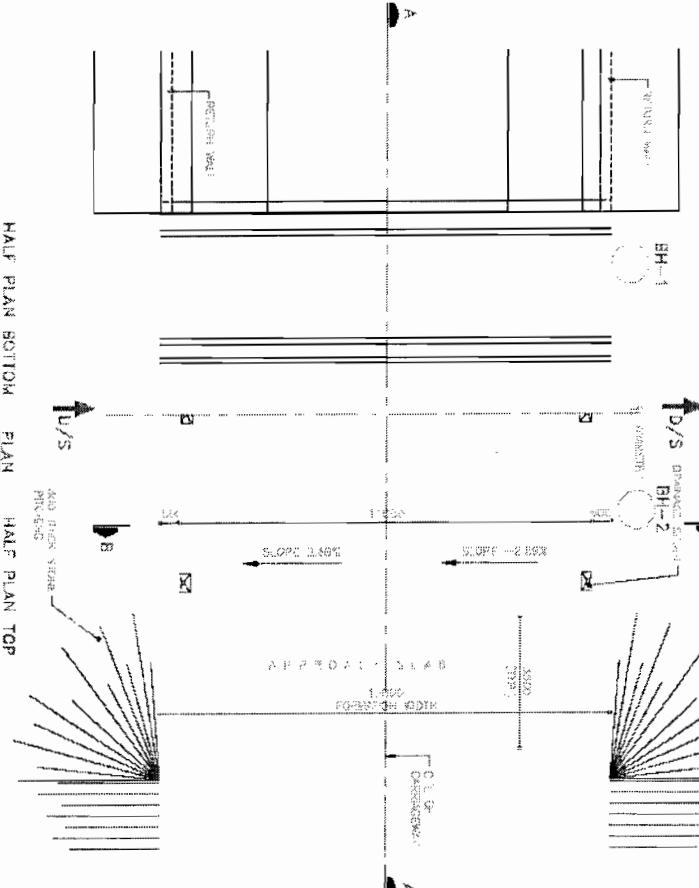
SOM DATT BUILDERS-ARSS
CONTRACTOR
ARSS BUILDERS CONTRACTORS PVT. LTD.

TO BHADRAK

TO CHANDBALLI

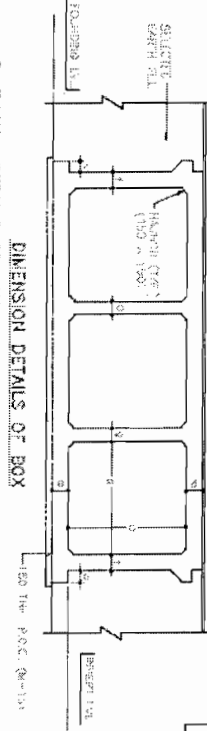
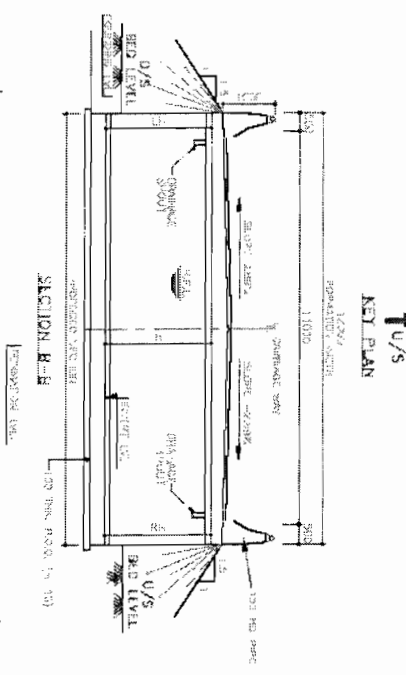
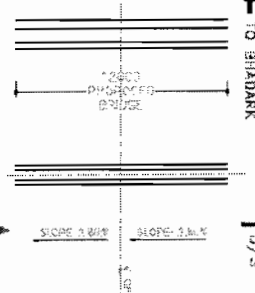


FORWARDER LEVEL (m)	MDL LEVEL (m)	7.700	7.700	7.700
30+146.63	5.330			
30+154.0	4.763			
30+158.17	5.433			



TO BHADRAK

TO CHANDBALLI



BOX TYPE	WIDTH (mm)	HEIGHT (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	BEARING CAPACITY
30x30	3000	3000	450	300	450	19.7/17.2

BOX TYPE	EXISTING LOCATION (m)	PROPOSED LOCATION CHANGE (m)	FORMATION LEVEL (m)	DESIGN HTL (m)	MDL LVL (m)	INVERT LVL (m)	FOAMING LVL (m)	CLEAR HEIGHT (mm)	DIRECTION OF FLOW	
30x30	10.000	10.000	7.735	6.999	1.736	6.433	2.083	2.241	2.266	R to L

Design Discharge (cumecs)	Maximum Level in (m)	u/a BCM	d/a BCM	u/a U/A	d/a U/A	u/a U/A	d/a U/A
38.64	2.725	3.0	1.5	3.0	5.0	3.5	6.0

NOTE:
 1. THE ABOVE DIMENSIONS (EXT. UP TO 1000 mm) SHALL BE MAINTAINED BY SUITABLE COVER REEF SAND TO GET THE REQUIRED S.B.C.

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS ARE TO BE MAINTAINED AS PER THE DRAWING.
3. ALL DIMENSIONS ARE TO BE MAINTAINED AS PER THE DRAWING.
4. ALL DIMENSIONS ARE TO BE MAINTAINED AS PER THE DRAWING.
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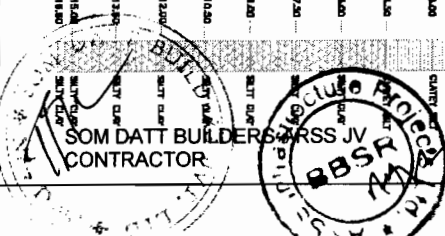
1. FOR DIMENSIONS & REINFORCEMENT DETAILS REFER TO THE DRAWING.
2. FOR DIMENSIONS & REINFORCEMENT DETAILS REFER TO THE DRAWING.
3. FOR DIMENSIONS & REINFORCEMENT DETAILS REFER TO THE DRAWING.
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9. FOR DIMENSIONS & REINFORCEMENT DETAILS REFER TO THE DRAWING.
10. FOR DIMENSIONS & REINFORCEMENT DETAILS REFER TO THE DRAWING.

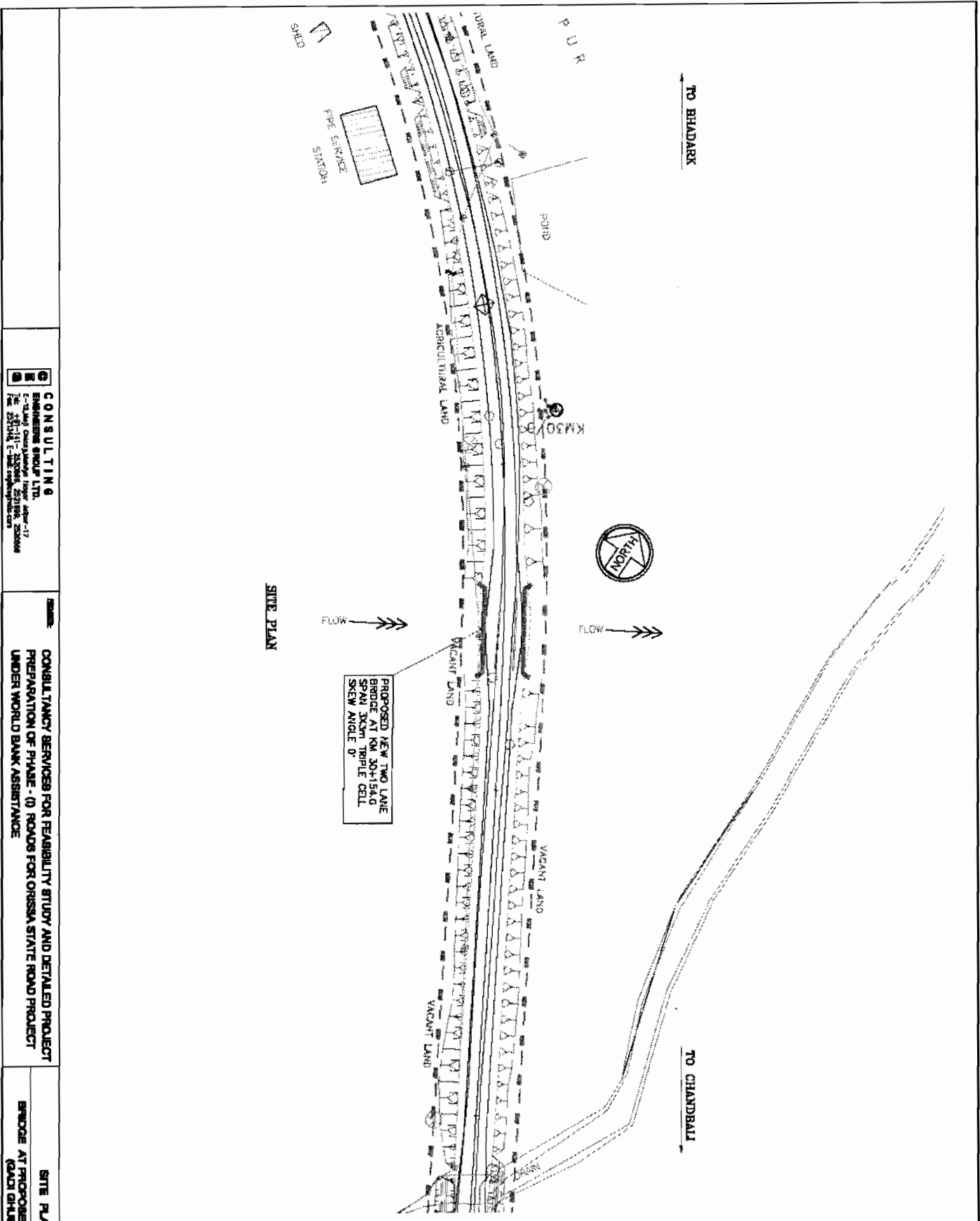
CONSULTING ENGINEERS GROUP LTD.
 B-1/1st Floor, Ganga Nagar, Amravati
 Tel: 020-2664200, 2664201, 2664202
 Fax: 020-2664203, 2664204, 2664205
 Email: info@cegroup.com, ce@cegroup.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
 BRIDGE AT PROPOSED CH. 30+154
 (GADH GAHUSUNA)

NO.	REVISION	DATE	BY	CHECKED
1				
2				
3				
4				
5				





CONSULTING
ENGINEERS GROUP LTD.
 E-14/1, Connaught Place, New Delhi - 110048
 Tel: 2610141-142, 2610143, 2610144, 2610145
 Fax: 2610146 E-mail: enginfo@egpltd.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH. 30+154 (ROAD BUREAU)

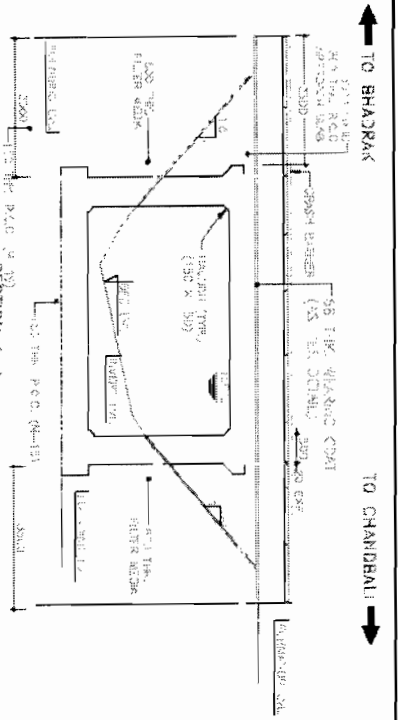
DATE	BY	REVISION

SOM DATT BUILDERS-ARCHITECTS
CONTRACTOR

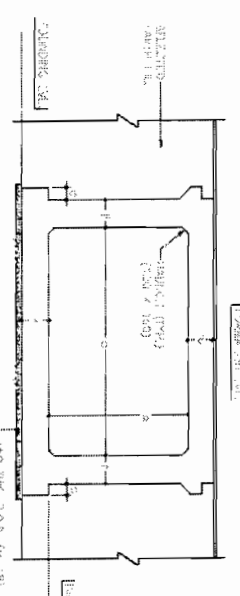
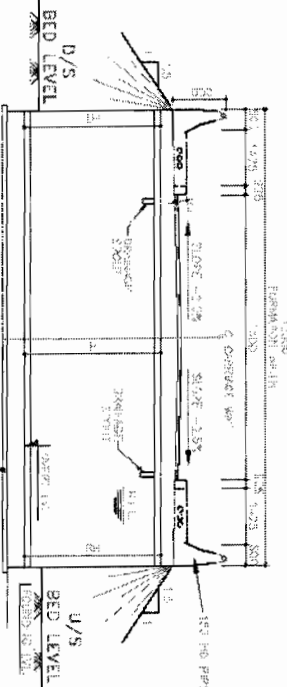
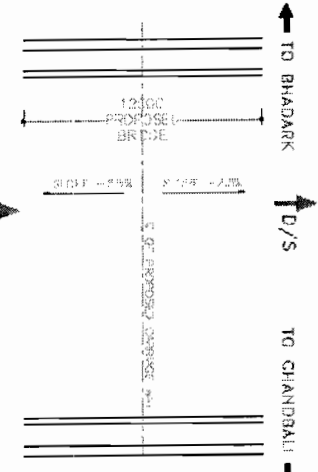
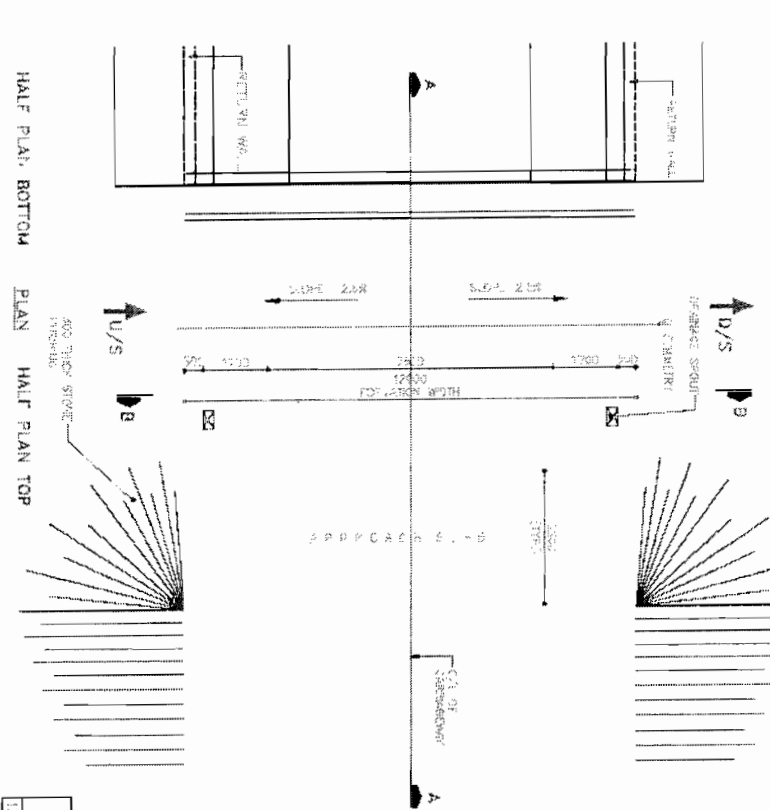
33SP

Chief Engineer
World Bank Projects, Orissa
(EMPLOYER)

NOTES:-



PROPOSED LEVEL (m)	7.800	7.800	7.800
BED LEVEL (m)	B.415	B.000	B.466
Change (m)	32+098.25	32+100.0	32+102.75



EXISTING PROPOSED FOUNDATION HEIGHT	WIDTH	HEIGHT	THICKNESS	THICKNESS	THICKNESS	THICKNESS	THICKNESS	THICKNESS	THICKNESS
12.75	600	400	330	330	330	330	330	330	330
17.42	1250	2750	1050	675	410	410	410	410	410
17.42	3250	1300	330	330	330	330	330	330	330

Design Discharge (cum/Sec)	Hourly mean level (m)	Depth of outfall/Length of Rigid/Length of Flexible			u/s
		DCM	DCM2	UCM	
4.975	2.2	2.5	3.0	5.0	1.0
5.675	2.0	2.5	3.0	5.0	1.0

NOTE:
 1. THE BRIDGE PROPOSED LEVEL WITH 20% TO 25% TO THE PROPOSED GRADE.
 2. THE BRIDGE PROPOSED GRADE SHALL BE 25% TO 30% TO THE PROPOSED GRADE.

NOTES:

- ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.
- SCALE: THE DIMENSIONS SHALL BE AS SHOWN ON THE DRAWING.
- THE BRIDGE SHALL BE CONSTRUCTED WITH 15% OVERLAP WITH THE NEAREST BRIDGE.
- GRADE OF CONCRETE: ...
- REINFORCEMENT: ...
- THE BRIDGE SHALL BE CONSTRUCTED WITH 15% OVERLAP WITH THE NEAREST BRIDGE.
- THE BRIDGE SHALL BE CONSTRUCTED WITH 15% OVERLAP WITH THE NEAREST BRIDGE.
- THE BRIDGE SHALL BE CONSTRUCTED WITH 15% OVERLAP WITH THE NEAREST BRIDGE.
- THE BRIDGE SHALL BE CONSTRUCTED WITH 15% OVERLAP WITH THE NEAREST BRIDGE.
- THE BRIDGE SHALL BE CONSTRUCTED WITH 15% OVERLAP WITH THE NEAREST BRIDGE.

REFERENCE DRAWING:

GENERAL ARRANGEMENT DRAWING
 BRIDGE AT PROPOSED CH. 32+100

EMPLOYER:
 World Bank Projects, Orissa
 Chief Engineer


CONTRACTOR:
 SOM DATT BUILDERS & RSSS

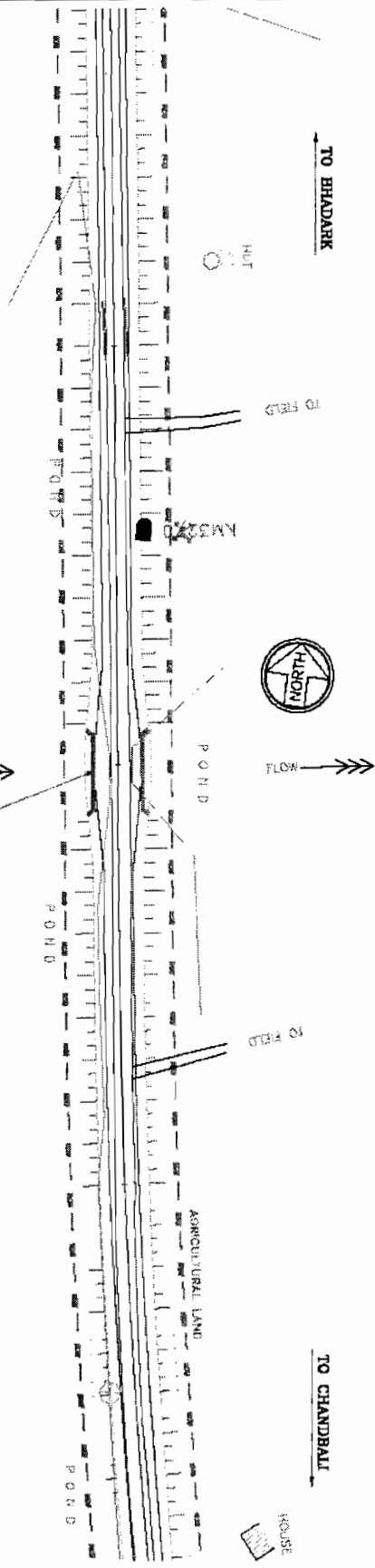
ENGINEERS GROUP LTD.
 CONSULTANTS
 1/12, MAIN CAMPUS, INDIA

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) BRIDGE FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DATE	BY	REVISION

NOTES:-


 Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Of the E.L.C. (O.O.)
 Orissa, Bhubaneswar.



PROPOSED NEW TWO LANE
 BRIDGE AT KM 32+100
 SHOWN IN YELLOW SINGLE CELL
 SKEN ANGLE 0°

SITE PLAN

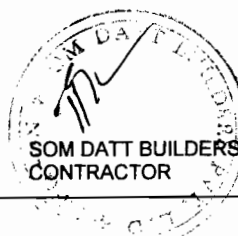
CURVE DETAILS

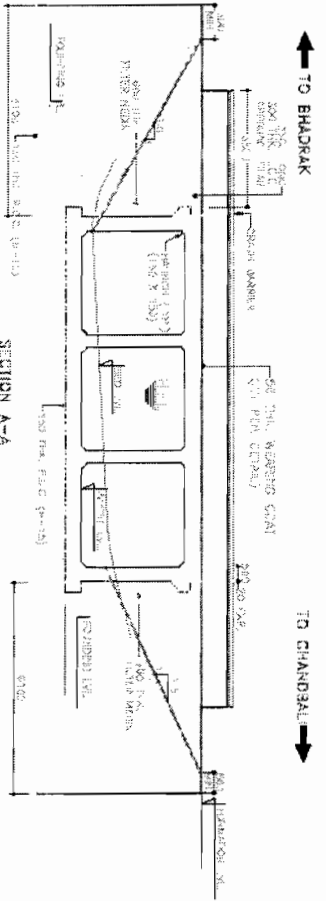
Sta.	30+47.801
Y (Meters)	90
R (m)	1000
Lc (m)	201.963
La (m)	0
Delta	0.24° 33.1"
E (m)	22.5
E (m)	100.796
E (m)	2.274

CONSULTING ENGINEERS GROUP LTD.
 12/12/01, Chhatrapati Maharaj Marg, Bhubaneswar-751005, Orissa
 Ph. 2531511, 2531512, 2531513, 2531514

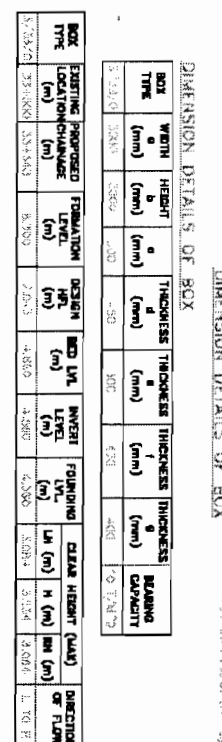
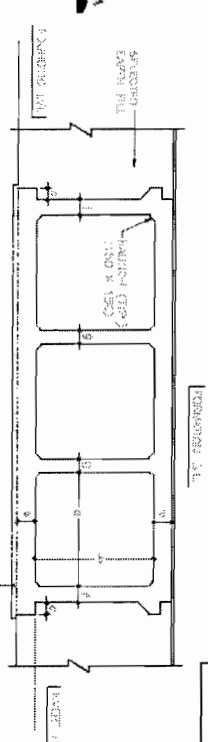
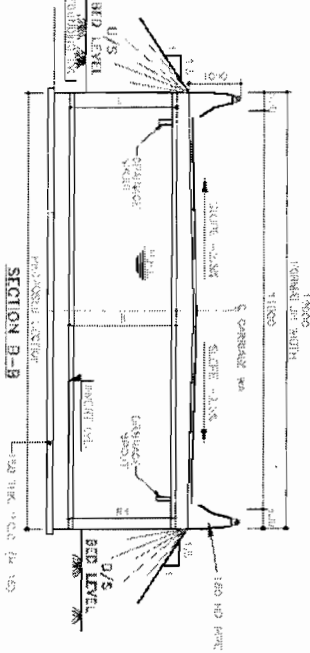
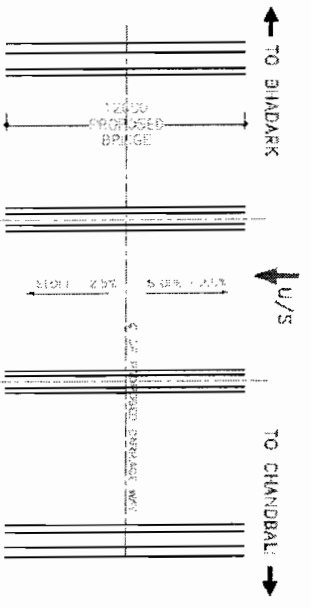
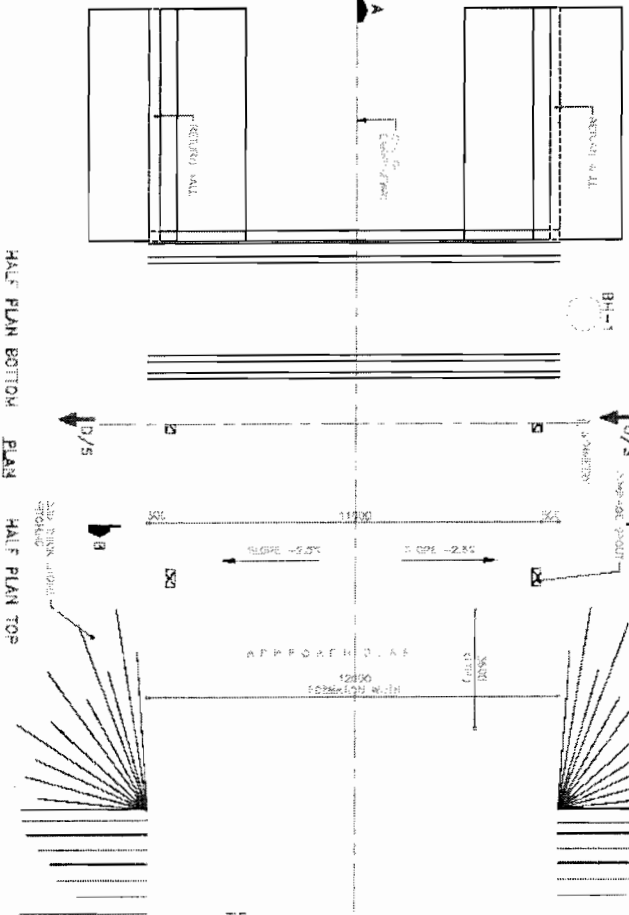
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - 0) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

BRIDGE AT PROPOSED CH. 32+100


SOM DATT BUILDERS ARSS & CO. PVT. LTD.
 CONTRACTOR



FORMATION LEVEL (m)	8.300	8.300
BED LEVEL (m)	4.570	8.300
DEPTH (%)	35+537.43	35+546.57



HYDROLOGICAL DATA

Box Type	ESTIMATED PROPOSED SECTION CHANGE	FORMATION LEVEL (m)	DESIGN HT. (m)	BED LVL. (m)	INVERT LEVEL (m)	FOUNDING LVL. (m)	CLASH HEIGHT (m)	BRIDGE HEIGHT (m)	DIRECTION OF FLOW
BOX TYPE	33+537.43	8.300	2.053	4.860	3.980	4.000	3.000	3.000	E TO B
ESTIMATED PROPOSED SECTION CHANGE	33+546.57	8.300	2.053	4.860	3.980	4.000	3.000	3.000	E TO B

NOTE:
 ALL DIMENSIONS ARE IN METERS.
 ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.
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 ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.
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NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.
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10. ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Orissa, Bhubaneswar.

CONSULTING ENGINEERS GROUP LTD.
 10/1, State Road, Cuttack - 753001, Orissa
 Tel: 0674-2545101, 2545102, 2545103, 2545104

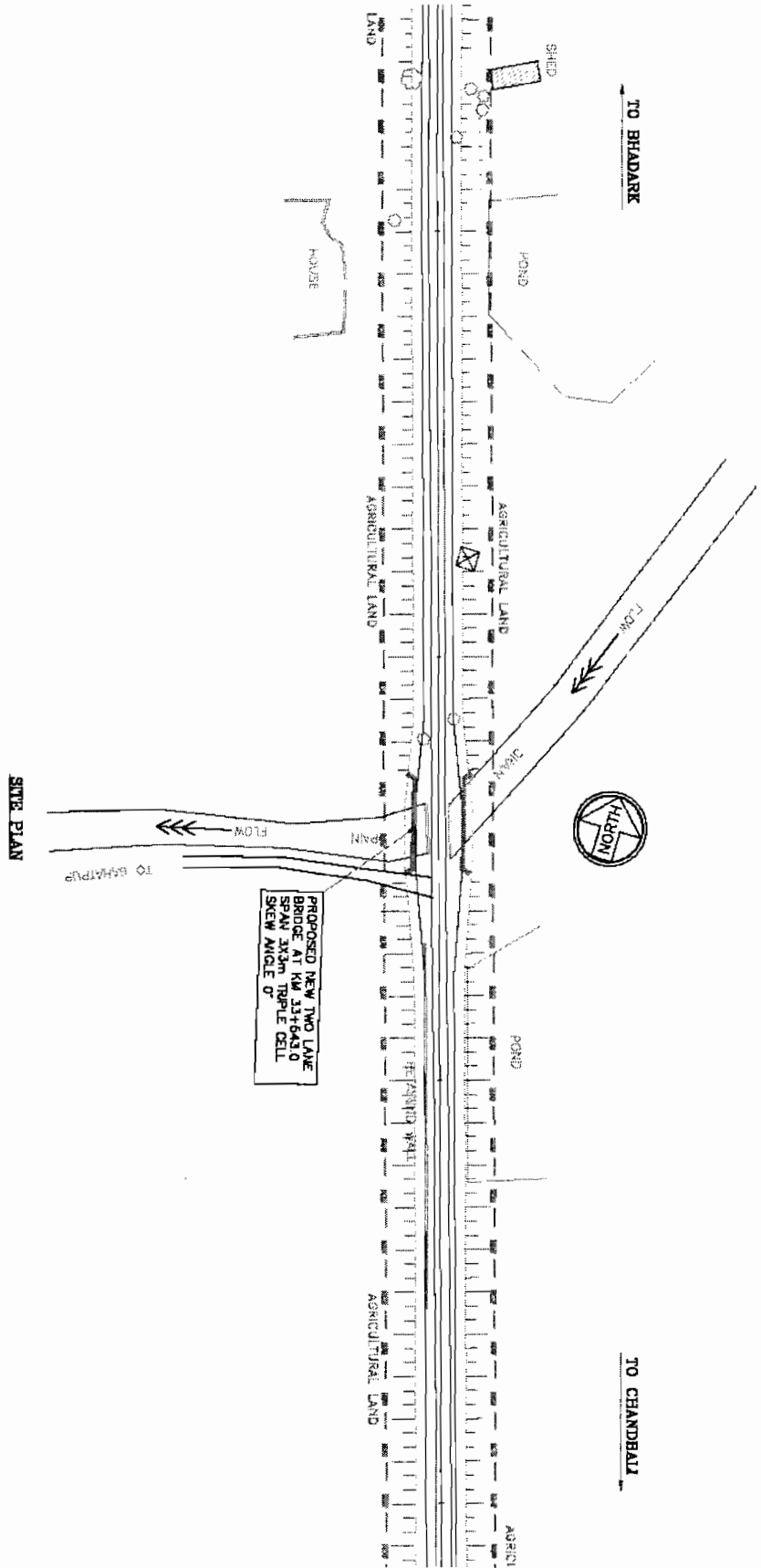
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
 BRIDGE AT PROPOSED CH. 88+548

REV.	DATE	BY	CHECKED	APPROVED
1/20				
2/20				
3/20				

SOM DATT BUILDERS ARSS CONTRACTOR

NOTES:-



PROPOSED NEW TWO LANE BRIDGE AT KM 23+643.0 SKEW ANGLE 0°

SITE PLAN

CONSULTING ENGINEERS GROUP LTD.
 B-11/10/3, Chaudhury Nagar, Ashok-17
 New Delhi-110 014, India
 Tel: 2611141-2, 2611142, 2611143
 Fax: 2611144, E-mail: ceg@cegroup.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
 BRIDGE AT PROPOSED CH. 23+643

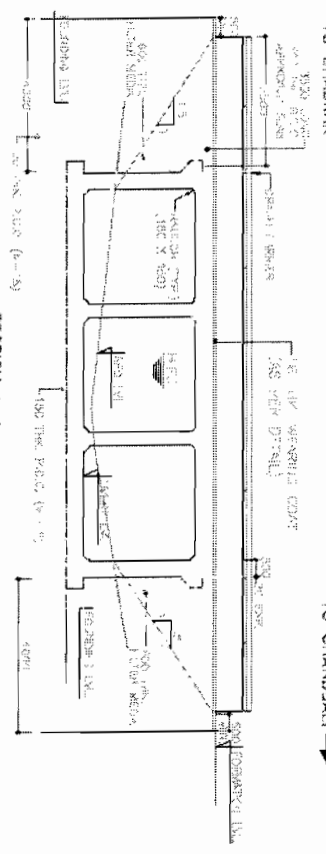
DATE	REVISION	BY	APP'D

SOM DATT BUILDERS
 CONTRACTOR

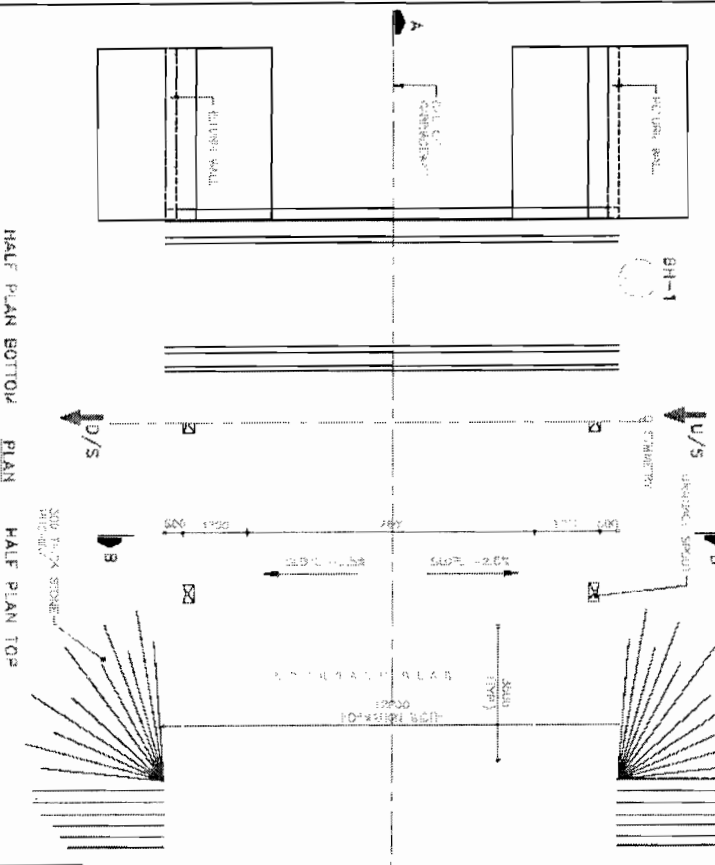
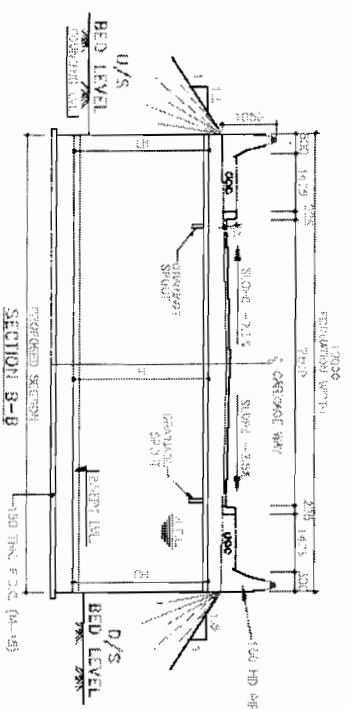
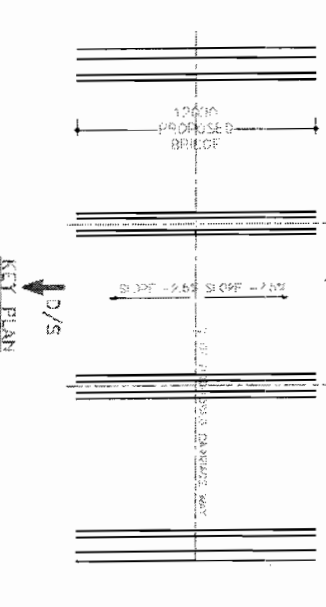
RRS
 Infrastructure Projects
 BBSR

Chief Engineer
 World Bank Projects, Orissa
 Employer
 Orissa, Bhubaneswar.

TO BHADRAK ← → TO CHANDBALI



FORMATION LEVEL (m)	8.300
BED LEVEL (m)	8.085
DRAINAGE (m)	8.021
	8.300



HYDROLOGICAL DATA

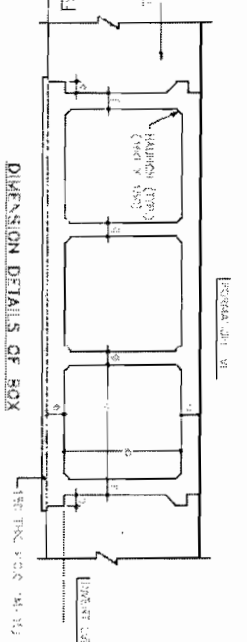
Design Discharge (cumecs)	14.65
Location Level (m) <td>14.340</td>	14.340
Depth of surface length of Right length of Flooded	1.20
Depth of surface length of Right length of Flooded	1.20
Depth of surface length of Right length of Flooded	1.20

NOTE:

No. 1:1000 contours level upto 14.340 m. (14.340 m)

PREPARED BY CONSULTANT ENGINEER (P&E) TO GET THE REQUIRED S.D.C.

NO.	DESCRIPTION	QTY	UNIT	AMOUNT
1.00	CONCRETE	1000	CU M	1000
2.00	STEEL	1000	KG	1000
3.00	BRICK	1000	NO	1000
4.00	CEMENT	1000	MT	1000
5.00	SAND	1000	CU M	1000
6.00	GRAVEL	1000	CU M	1000
7.00	CRUSHED STONE	1000	CU M	1000
8.00	CLAY	1000	CU M	1000
9.00	BRICK	1000	NO	1000
10.00	CEMENT	1000	MT	1000
11.00	SAND	1000	CU M	1000
12.00	GRAVEL	1000	CU M	1000
13.00	CRUSHED STONE	1000	CU M	1000
14.00	CLAY	1000	CU M	1000



GENERAL ARRANGEMENT DRAWING

BRIDGE AT PROPOSED CH. 83+807

CONSULTANT ENGINEER (P&E) TO GET THE REQUIRED S.D.C.

BRIDGE AT PROPOSED CH. 83+807

NOTES:

1. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
2. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
3. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
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8. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
9. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.
10. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN.

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

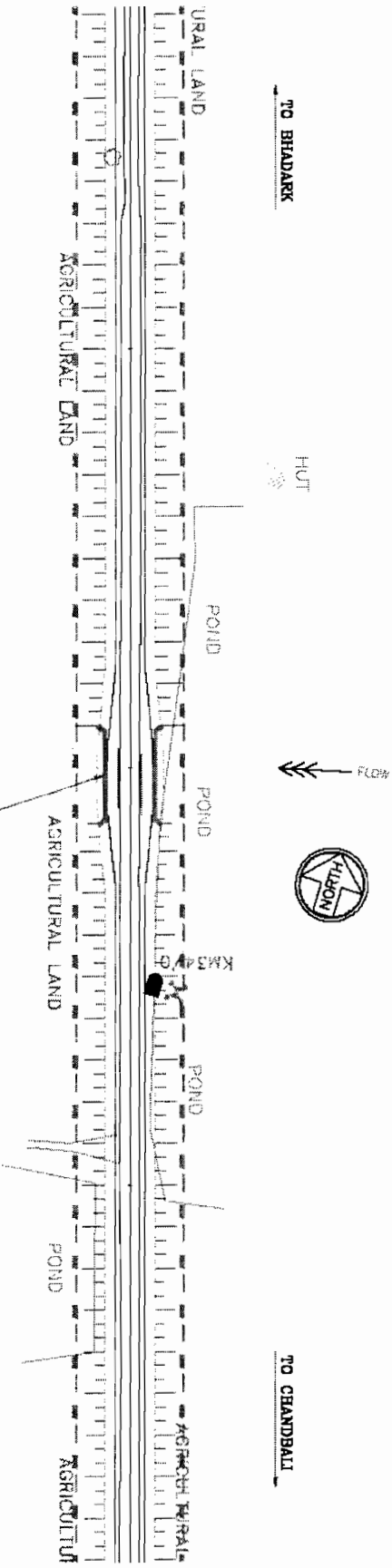
SOM DANT BUILDERS ARSS JV
CONTRACTOR



CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
BRIDGE AT PROPOSED CH. 83+807

NOTES:-



SITE PLAN

CONSULTING
ENGINEERING GROUP LTD.
 5-C/2nd Floor, National Institute of Technology, Bhubaneswar
 Tel. 2531241, Fax: 2531242, E-mail: engg@nitbbs.ac.in

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
 BRIDGE AT PROPOSED CH. 32+907

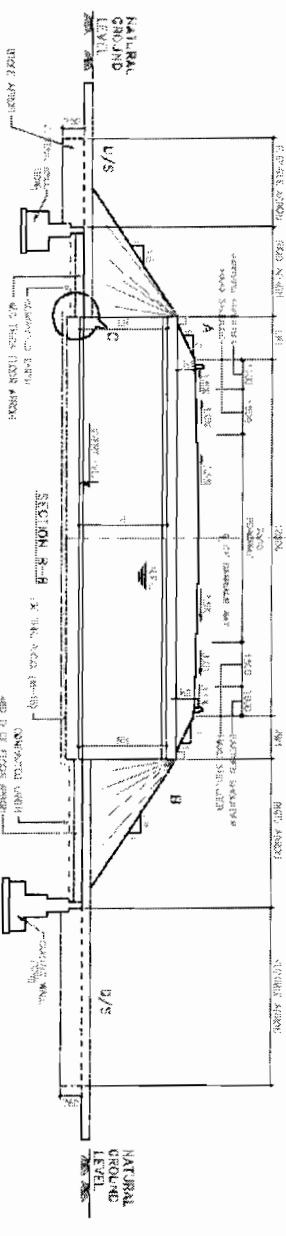
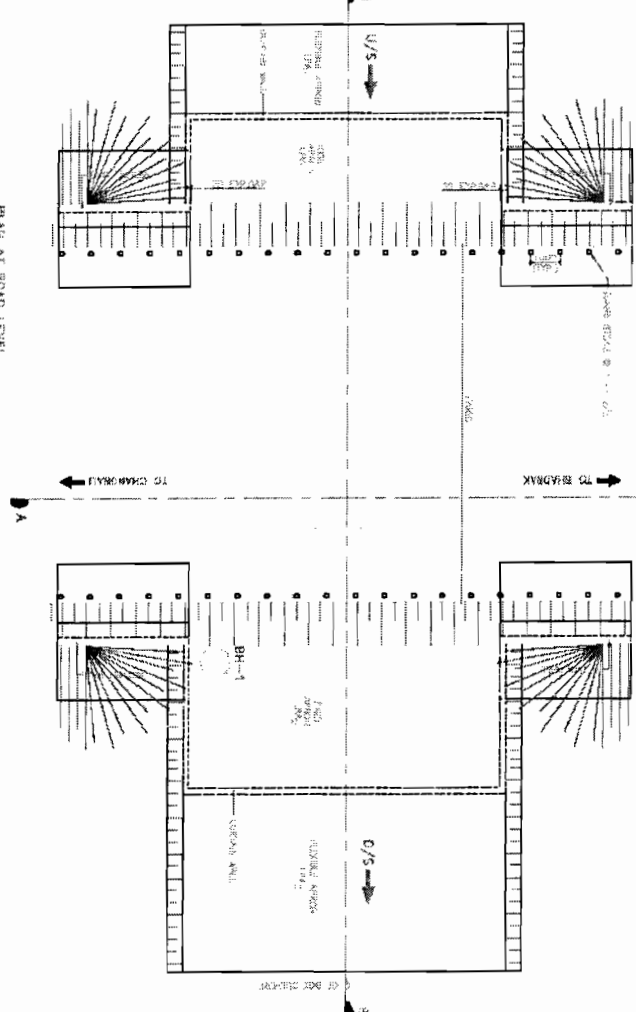
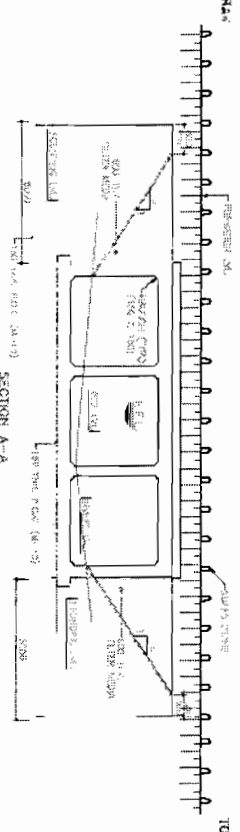
DATE	REVISION	BY	CHKD	PRVTD

SOM DATT BUILDERS AND CONTRACTORS

Construction Projects

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 O/o the E.L.C. (Civil)
 Orissa, Bhubaneswar.

TO BHADRAK ← → TO CHANDRABALI

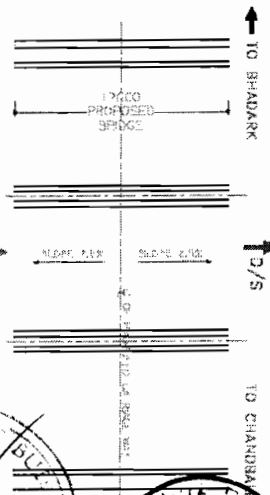


NOTES:

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS
2. ALL DIMENSIONS PERTAINING TO THE BRIDGE DECK DO NOT SCALE THE DRAWING.
3. THE BRIDGE DECK SHALL BE CONCRETE GRADE WITH FINISH AS PER THE REQUIREMENTS OF THE BRIDGE DECK DESIGN.
4. THE BRIDGE DECK SHALL BE CONCRETE GRADE WITH FINISH AS PER THE REQUIREMENTS OF THE BRIDGE DECK DESIGN.
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REFERENCE DRAWING:-

1. THE BRIDGE DECK SHALL BE CONCRETE GRADE WITH FINISH AS PER THE REQUIREMENTS OF THE BRIDGE DECK DESIGN.
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10. THE BRIDGE DECK SHALL BE CONCRETE GRADE WITH FINISH AS PER THE REQUIREMENTS OF THE BRIDGE DECK DESIGN.



SOM DATTA BUILDERS & ARCHITECTS
CONTRACTOR

BBSK

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

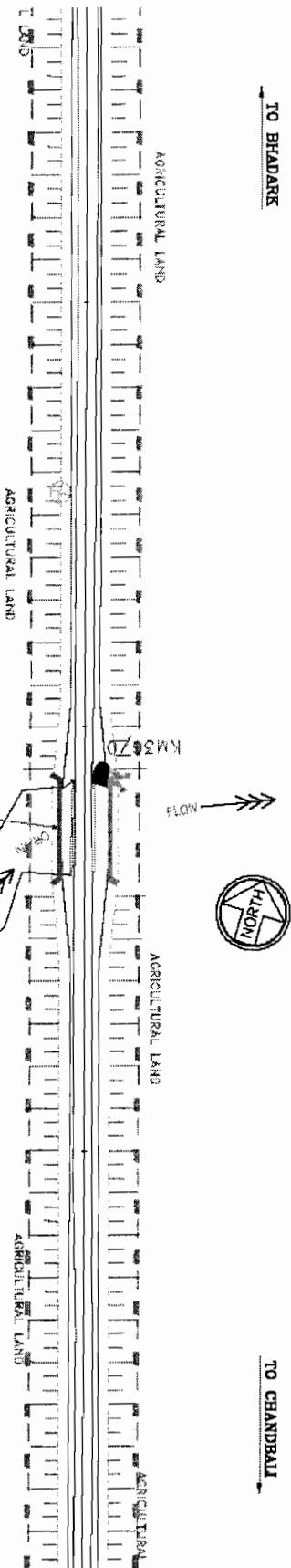
CONSULTING ENGINEERS GROUP LTD.
BRIDGE AT KM 38+005 (NALGANDHA GHUSURA)

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING

NOTES:-

Chief Engineer
 World Bank Projects, Orissa
 World Bank EMPLOYER
 C/O THE E.I.C. (Civil)
 Cuttack, Bhubaneswar.



SITE PLAN

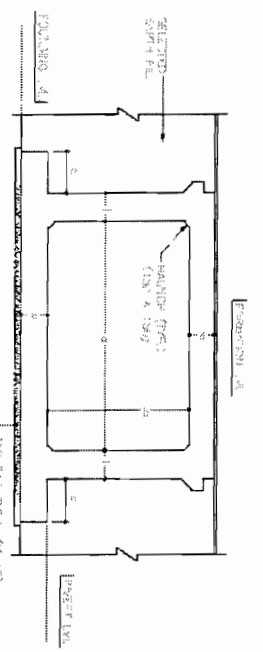
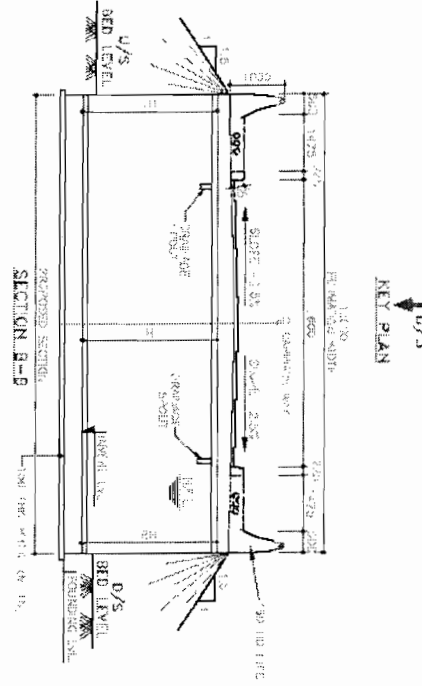
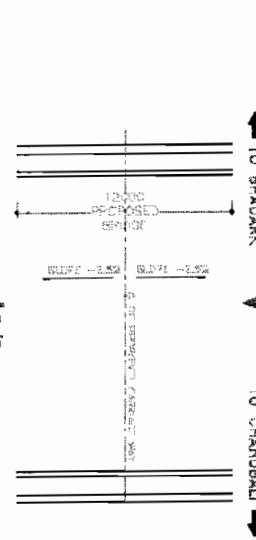
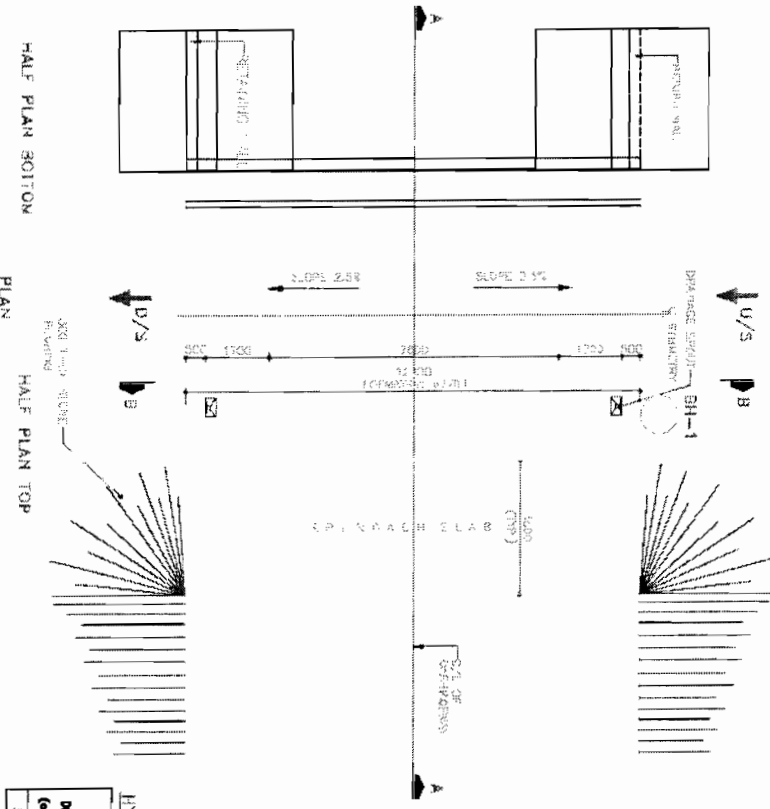
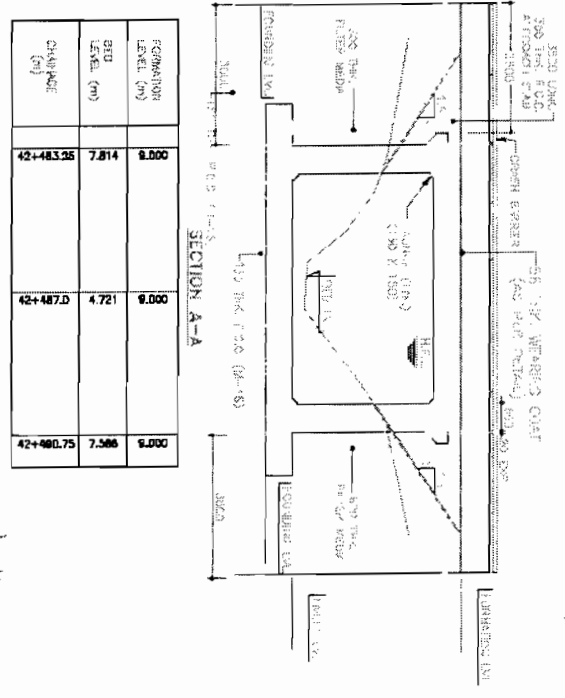
PROPOSED NEW TWO LANE BRIDGE AT KM 35+825.0 SPAN 3x30m TRIPLE CELL SKEW ANGLE 0°

<p>CONSULTING ENGINEERS GROUP LTD. C-13/2nd Colony, Madhya Nagar, Adampur-17 Ph. 251 347 - 251 348 - 251 349 Fax. 251 347 - 251 348 - 251 349</p>	<p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>	<p>SITE PLAN BRIDGE AT KM 35+825.0 PALAJANDIYA (GHUSURA)</p>	<table border="1"> <tr> <td>DATE</td> <td>REVISION</td> <td>BY</td> <td>CHKD</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	REVISION	BY	CHKD												
DATE	REVISION	BY	CHKD																

SOM DATT BUILDERS ARS
 CONTRACTOR

ARSS
 BBSR
 MA

TO BHADRAK TO CHANDRABALLI TO BHADRAK TO CHANDRABALLI



DIMENSION DETAILS OF BOX

BOX TYPE	WIDTH (mm)	HEIGHT (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	BEARING CAPACITY
1	4000	1400	100	100	100	100	100
2	4000	1400	100	100	100	100	100
3	4000	1400	100	100	100	100	100
4	4000	1400	100	100	100	100	100
5	4000	1400	100	100	100	100	100
6	4000	1400	100	100	100	100	100
7	4000	1400	100	100	100	100	100
8	4000	1400	100	100	100	100	100
9	4000	1400	100	100	100	100	100
10	4000	1400	100	100	100	100	100

HYDROLOGICAL DATA

Design Discharge (cum/Sec)	Maximum Level in (m)	Minimum Level in (m)	Depth of water/length of rigid length of bridge	Depth of water/length of flexible
1.25	6.225	3.2	2.8	3.0

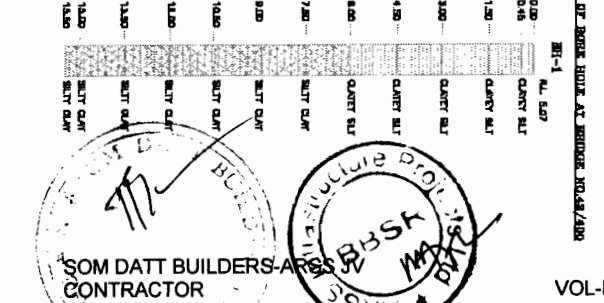
NOTE:
 SOIL BELOW PROPOSED LEVEL UP TO 10 M SHALL BE EXAMINED BY RETAINING COMPANY REVD. TO SET THE ROAD SET 5.1.0

NOTES:

- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CONCERNED AUTHORITIES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES DURING THE CONSTRUCTION OF THE BRIDGE.
- THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AND ROADS AT ALL TIMES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE ENVIRONMENT AND THE SAFETY OF THE WORKERS.
- THE CONTRACTOR SHALL MAINTAIN THE BRIDGE CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE BRIDGE FROM COLLISION AND DAMAGE.
- THE CONTRACTOR SHALL MAINTAIN THE BRIDGE IN GOOD REPAIR AT ALL TIMES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE BRIDGE FROM FIRE AND OTHER DISASTERS.
- THE CONTRACTOR SHALL MAINTAIN THE BRIDGE CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES.

REFERENCE DRAWINGS:

- PLAN OF BRIDGE AND APPROACHES.
- CROSS SECTION OF BRIDGE.
- SECTION A-A.
- SECTION B-B.
- KEY PLAN.
- GENERAL ARRANGEMENT DRAWING.
- FOUNDATION DETAILS.
- PARAPET DETAILS.
- DECK DETAILS.
- ABUTMENT DETAILS.
- APPROACH ROAD DETAILS.



CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

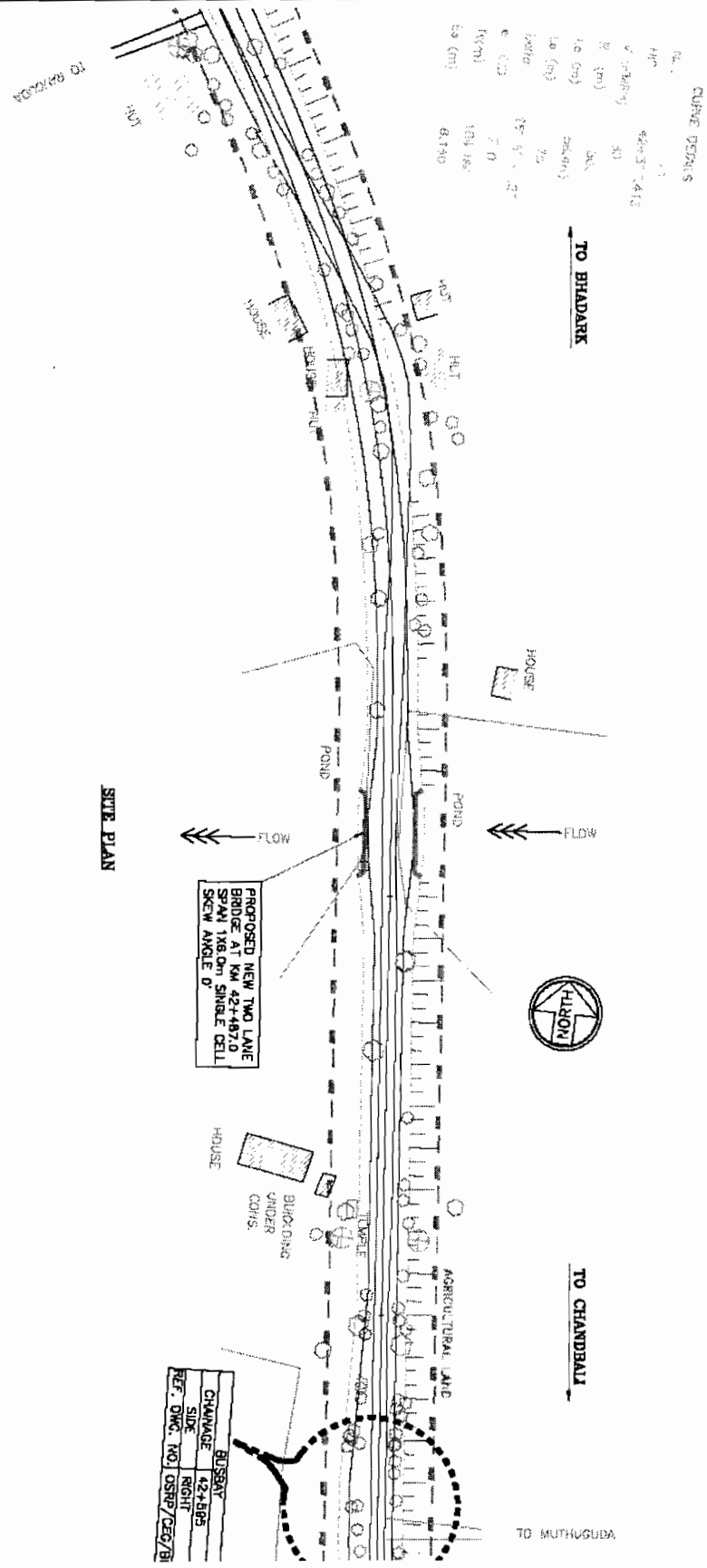
CONSULTING ENGINEERS GROUP LTD.

GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 42+487.0

SOM DATT BUILDERS-ARCHITECTS-CONTRACTOR

Chief Engineer World Bank Projects, Orissa EMPLOYER

VOL-IV/Page 211



SITE PLAN

PROPOSED NEW TWO LANE BRIDGE AT KM 42+487.0 SPAN 18.0m SINGLE CELL SKEW ANGLE 0°

BUSWAY	
CHANNEL	42+489
SIDE	RIGHT
REF. DNG. NO.	OSRP/CEG/BI

CONSULTING ENGINEERS GROUP LTD.
 E-12, 1st Floor, Chhatrapati Rajguru Marg, Shivajinagar,
 Pune - 411 004, Maharashtra
 Tel: 020-26114411, 26114412, 26114413, 26114414
 Fax: 020-26114415, 26114416, 26114417, 26114418

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN BRIDGE AT PROPOSED CH. 42+487.0



SOM DATT BUILDERS-ARSS JV CONTRACTOR



Chief Engineer
 World Bank Projects, Orissa
 Employer
 Chief Engineer
 Orissa, Bhubaneswar.

NOTES:-

10 BIHARAL

10 CHANDRAL

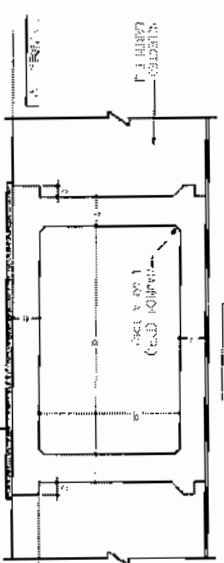
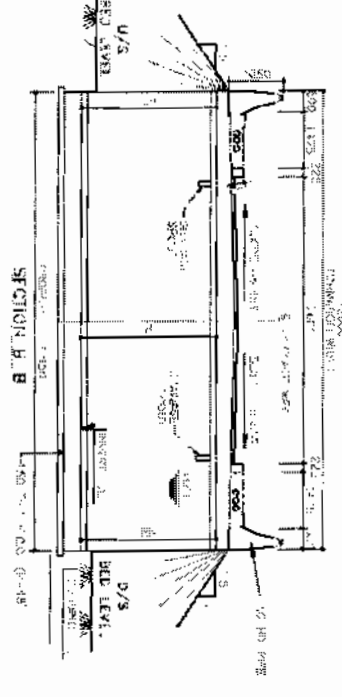
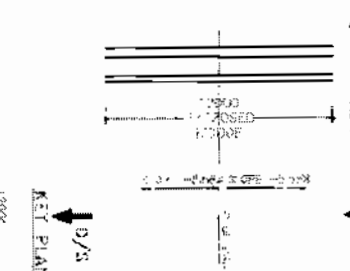
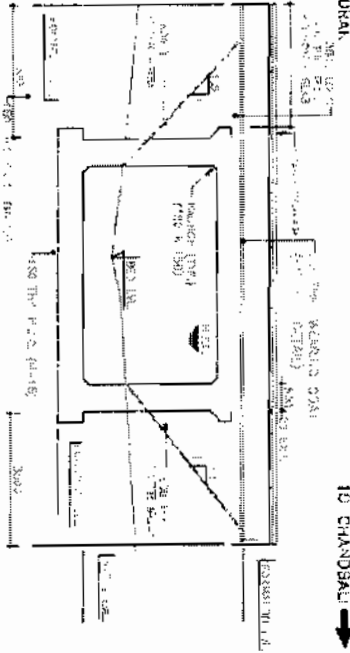
10 SHADRAL

U/S

10 GADRAL

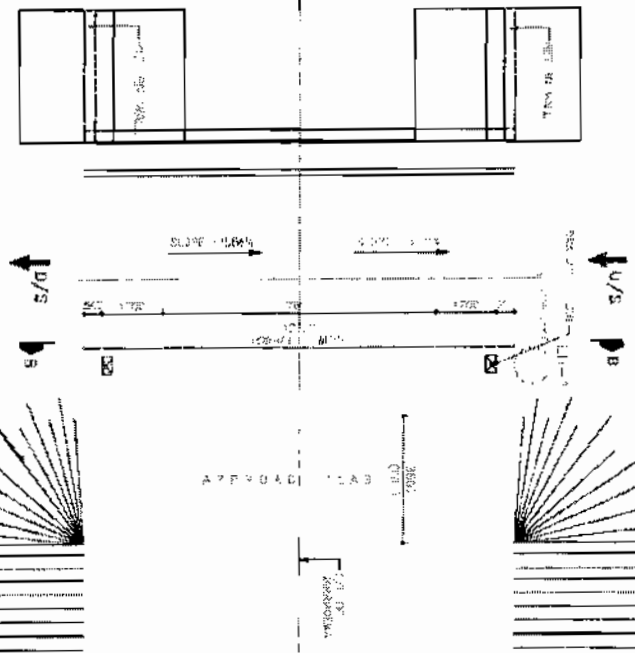
SECTION A-A

Pavement Level (m)	9.300	9.300	9.300
Subgrade Level (m)	8.850	8.850	8.850
Base Course Level (m)	8.313	8.313	8.300
Subgrade Level (m)	7.775	7.775	7.775



DIMENSION DETAILS OF BOX

BOX TYPE	WIDTH (mm)	HEIGHT A (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)
1000mm	1000	1000	100	100	100	100
2000mm	2000	2000	100	100	100	100
3000mm	3000	3000	100	100	100	100



HYDROLOGICAL DATA

Box Type	Proposed Foundation Level (m)	Design HL (m)	Design H/L (m)	Design H/L (m)	Design H/L (m)	Design H/L (m)	Design H/L (m)	Design H/L (m)	Design H/L (m)
1000	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
2000	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
3000	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10

NOTE:
1. All dimensions are in meters unless otherwise specified.
2. All levels are in meters above mean sea level unless otherwise specified.
3. The design flow shall be as per the hydrological data.
4. The bridge shall be constructed as per the specifications of the Orissa State Road Project.

NOTES:

1. All dimensions are in meters unless otherwise specified.
2. All levels are in meters above mean sea level unless otherwise specified.
3. The design flow shall be as per the hydrological data.
4. The bridge shall be constructed as per the specifications of the Orissa State Road Project.

REFERENCE DRAWING:-

1. ORISSA STATE ROAD PROJECT - ROADWAY DRAWINGS
2. ORISSA STATE ROAD PROJECT - BRIDGE DRAWINGS
3. ORISSA STATE ROAD PROJECT - CHANNEL DRAWINGS
4. ORISSA STATE ROAD PROJECT - ENVIRONMENTAL DRAWINGS
5. ORISSA STATE ROAD PROJECT - ELECTRICAL DRAWINGS
6. ORISSA STATE ROAD PROJECT - SANITARY DRAWINGS
7. ORISSA STATE ROAD PROJECT - WATER SUPPLY DRAWINGS
8. ORISSA STATE ROAD PROJECT - LANDSCAPE ARCHITECTURE DRAWINGS
9. ORISSA STATE ROAD PROJECT - TRAFFIC DRAWINGS
10. ORISSA STATE ROAD PROJECT - SIGNAL DRAWINGS
11. ORISSA STATE ROAD PROJECT - ROADWAY MARKINGS
12. ORISSA STATE ROAD PROJECT - ROADWAY SIGNS

Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
Chitra. Eshwathwar.

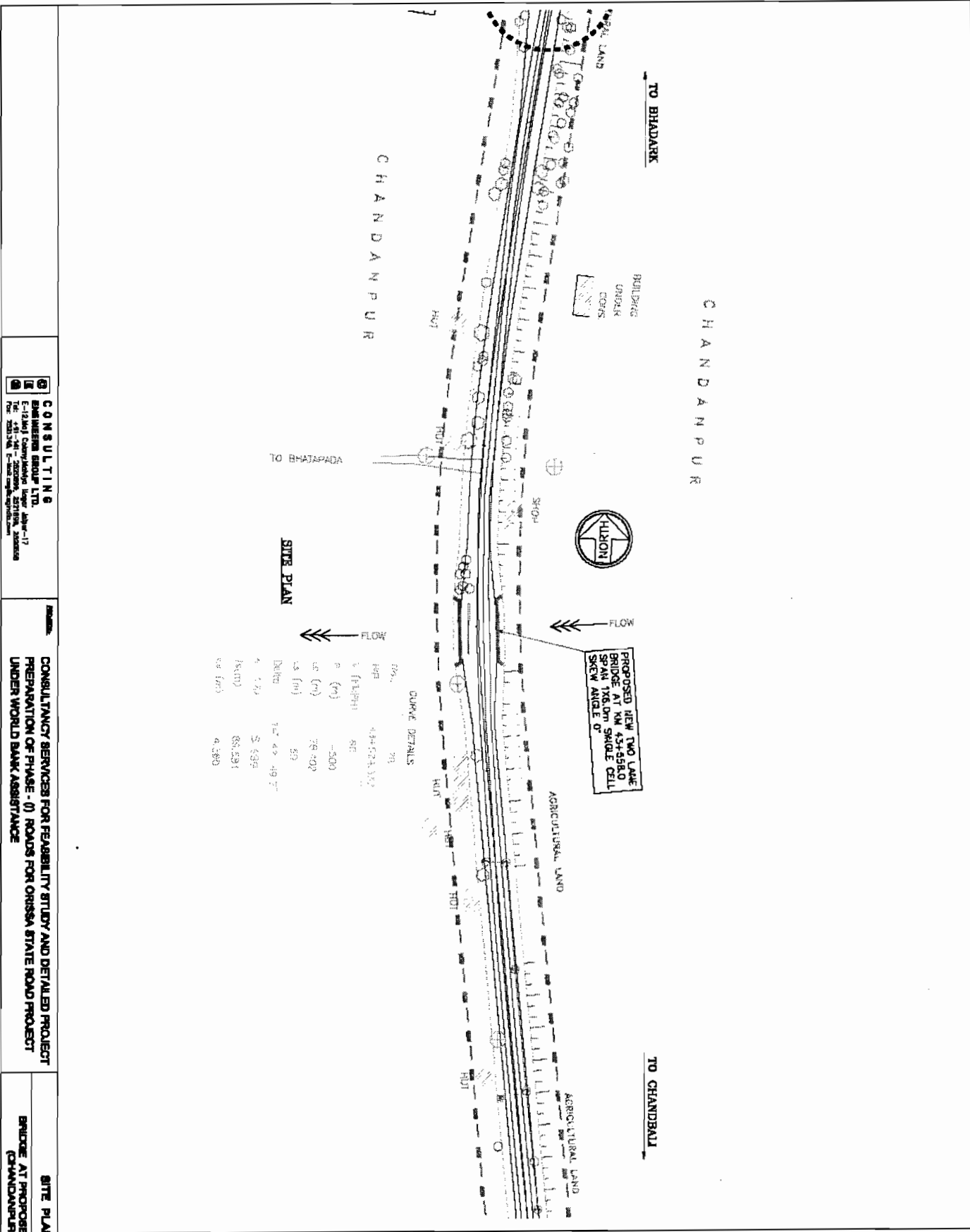
CONSULTING ENGINEERS GROUP LTD.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH 48+820 (CHANDRAPUR POLO)

NO.	REVISION	DATE
1		
2		

SOM DATTA BUILDERS & ARCHITECTS CONTRACTOR



CONSULTING
ENGINEERS GROUP LTD.
 E-12/301 Connaught Place, New Delhi-110028
 Tel: 26103161, 26103162, 26103163, 26103164

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
 BRIDGE AT PROPOSED CH. 48+580
 (CHANDANPUR FOLD)

DATE	REVISION	BY	CHKD	APPD

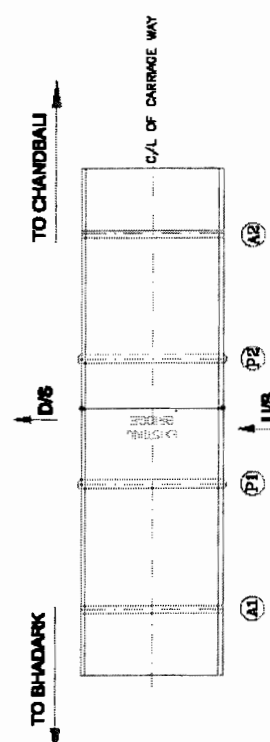
SOM DATT BUILDERS ARSS JV
CONTRACTOR

ARSS INFRASTRUCTURE PRIVATE LTD.

NOTES:-

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Chief Engineer
 Orissa State Road Development Corporation

EXISTING BRIDGE DETAILS			
1	Challenge	9500	
2	Name of the subh	Rural yolo	
3	Year of construction	1901 - 60	
4	Type of bridge	High level bridge	
5	Spanning over	3 x 7.8	
6	Spanning over	7.3 m	
7	Thickness of superstructure	0.55 m	
8	Type of foundation	Open foundation	
9	Type of abutments	Block masonry wall type	
10	Type of supports	RCC mild slab	
11	Existing Foundation Level	11.9 m	
12	Final Foundation Level	11.9 m	
13	Bed Level	0.054 m	
14	Thickness of P.C.C. over R.C.C.	0.05 m thick	
REHABILITATION MEASURES SUGGESTED			
S. No.	Item	Substitution Measure	Reference Drawings
1	Including	Including with dowels is suggested in joint and drainage	ORP/CH/08/77-01
1	Superstructure	Thrust up repair to be done in the edge of slab (I.D repair)	-
3	Expansion joints	Expansion joint material due to swelling of RTT and shall be replaced by synthetic plug type	ORP/CH/08/08/03
4	Wearing Coat	Existing thickness over top shall be removed	ORP/CH/08/08/03
5	Approach slab	Approach slab to be reconstructed	ORP/CH/08/08/03
6	Bed protection	Bed protection and curbs will shall be provided	ORP/CH/08/08/08/02
7	Vegetation growth	Vegetation to be removed from the structure	-



KEY PLAN

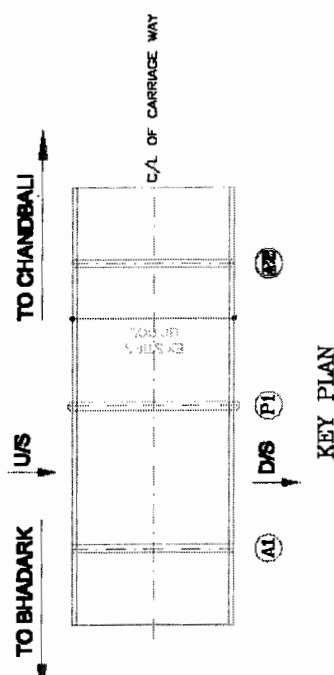
HYDROLOGICAL DATA

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	
53.74	6.037	DCW ₁	DCW ₂	LFA ₁	LFA ₂	3.0	6.0
		2.0	2.5	6.1			



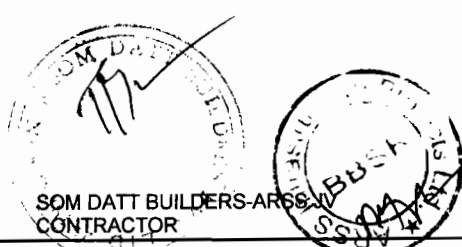
NOTES:

EXISTING BRIDGE DETAILS			
1	Challenge	3W/20	
2	Name of the work	Kadappa Canal	
3	Year of construction	1978	
4	Type of bridge	High level Bridge	
5	Spanning over arrangement	2 x 6.7m	
6	Spanning average span width	7.35 m	
7	Thickness of superstructure	0.5 m	
8	Type of foundation	raft foundation	
9	Type of substructure	RCC Box cul	
10	Type of superstructure	RCC solid slab	
11	Existing Foundation Level	7.7 m	
12	Final Foundation Level	7.7 m	
13	Bed Level	4.263 m	
14	Thickness of PCC, w.t. P.C.L.	0.3 m L&L	
REHABILITATION MEASURES SUGGESTED			
S. no.	Items	Rehabilitation Measures	Reference Drawings
1	Expansion Joints	Expansion joints shall be replaced by neoprene type with approach slab	OSM/C/CO/081/498/2/10/01
2	Roofing	Roofing settings to be dismantled and roof slab shall be provided	OSM/C/CO/081/498/2/10/01
3	Bed Protection	Bed protection shall be provided	OSM/C/CO/081/498/2/10/01
4	Vegetation growth	Vegetations to be removed from the structure	-



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
13.84	2.755	DCW ₁	DCW ₂	DCW ₁	DCW ₂	LFA ₁	LFA ₂
		2.5	3.0	3.0	5.0	3.5	6.0



Chief Engineer
World Bank Projects, Orissa
(to the EMPLOYER)
Orissa, Bhubaneswar.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS

BRIDGE AT KM. 30+300

DATE: 20/11/2010

PROJECT NO. 1 (WB/2007/20-4/10/10/01)

DATE: 20/11/2010

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

APPROVED BY: [Signature]

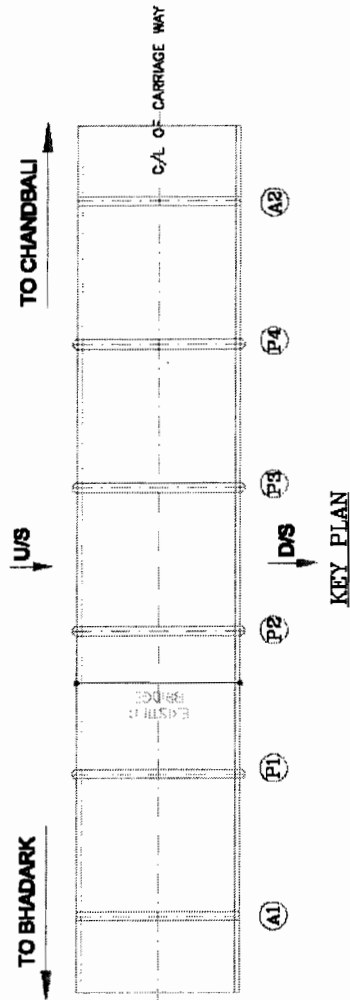
SCALE: AS SHOWN

DATE: 20/11/2010

NOTES:

EXISTING BRIDGE DETAILS			
1	Challenge		
2	Name of the work		
3	Year of construction		
4	Type of bridge		
5	Spanning span arrangement		
6	Building carrying way width		
7	Thickness of superstructure		
8	Type of foundation		
9	Type of substructure		
10	Type of superstructure		
11	Existing Formation Level		
12	Final Formation Level		
13	Bed Level		
14	Distance of P.C.L. w.r.t. B.C.L.		
Sl. no.	Items	Rehabilitation Measures	Reference Drawings
1	Expansion joint	Expansion joint shall be replaced by neoprene plug type (6 nos)	OMR/PC/3000/A/B/C-02
2	Bracing	This superstructure shall be fixed from the support at bed level and Neoprene bearing (Size: 400 x 250 x 48) shall be placed	WEST STANDARD MECL. NO. 82004
3	Heavy casting	Heavy casting observed on diaphragm and girders, shall be taken care by polymer modified concrete	-
4	Bed Protection	Bed protection to be done newly	OMR/PC/3000/A/B/C-01
5	Approach Pavement	Approach pavement to be replaced	OMR/PC/3000/A/B/C-02
6	Approach Slab	Approach slab to be reconstructed	OMR/PC/3000/A/B/C-02

REHABILITATION MEASURES SUGGESTED

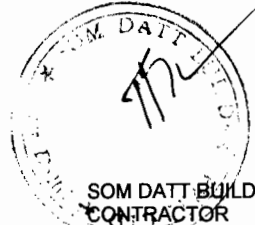


KEY PLAN

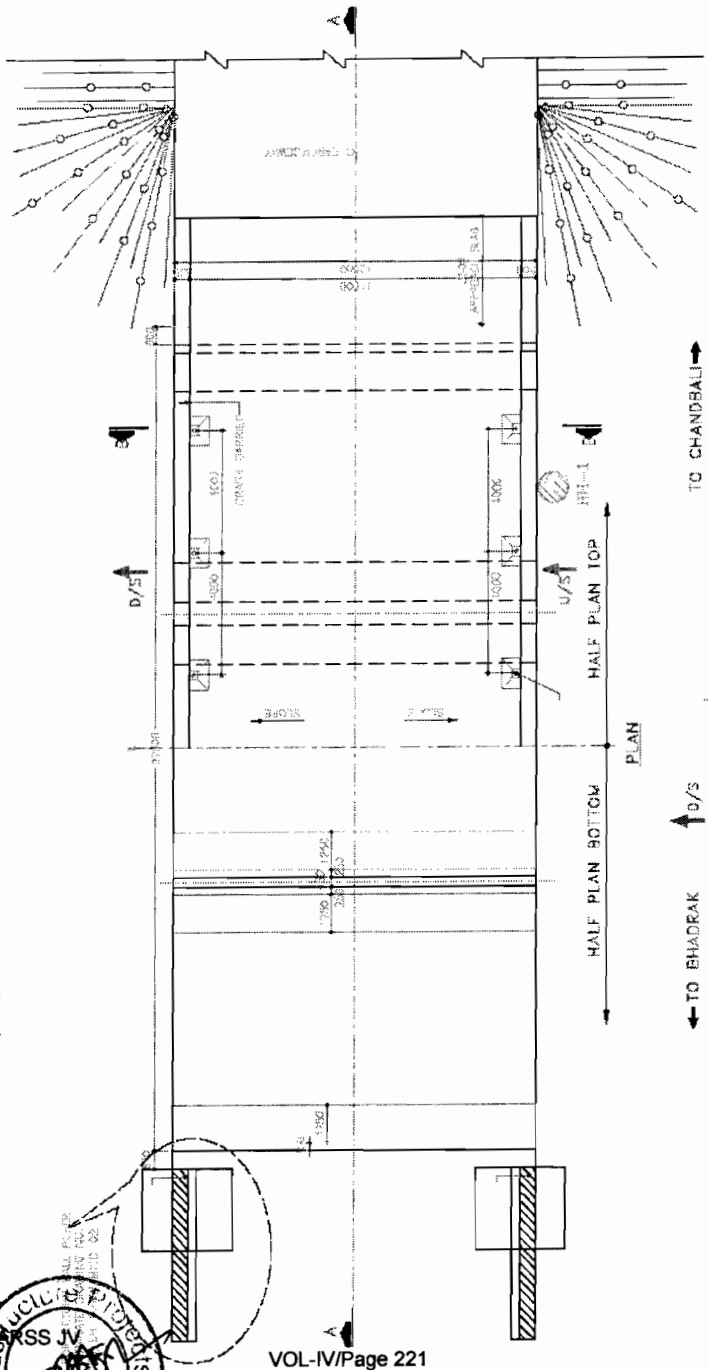
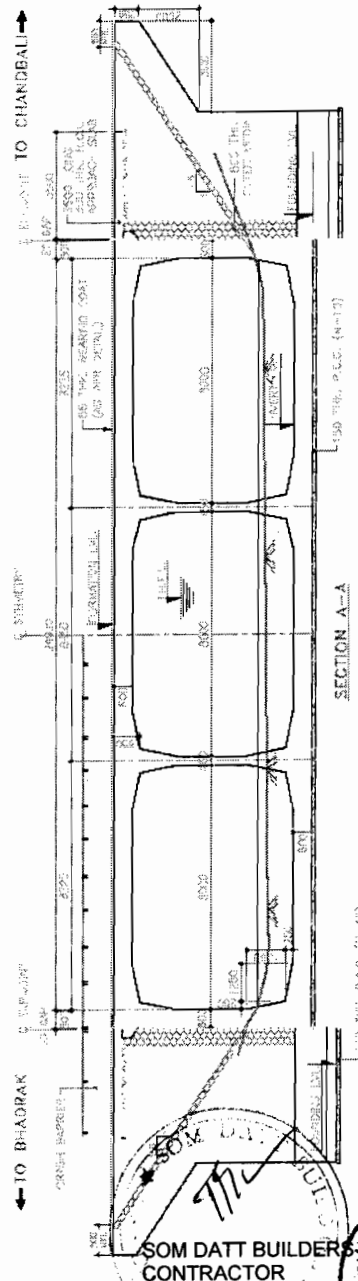
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS
BRIDGE AT KM. 38+100

NO.	DATE	BY	CHKD.	APPD.

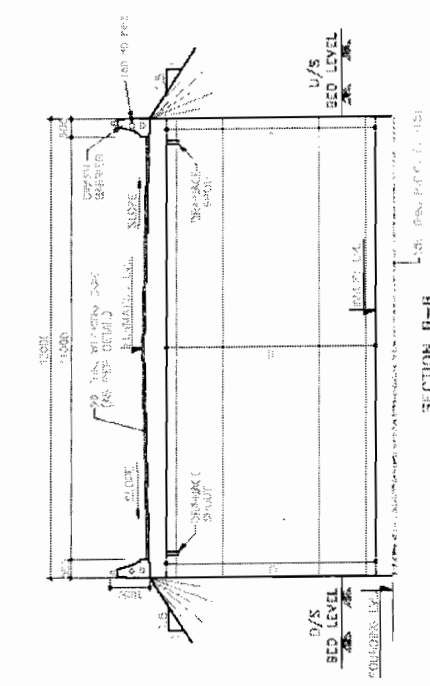


Chief Engineer
World Bank Projects, Orissa
EMPLOYER
In the E.T.C. (Civil)
Orissa, Bhubaneswar.



BOX LEVELS DETAILS

PROPOSED ELEVATION CHANNEL CHANTRY (m)	RHS (m)	LHS (m)	SUPER ELEVATION / SLOPE		COLOR (to left / right)		DIRECTION OF FLOW
			PERCENT	PERCENT	(mm)	(mm)	
10.00	10.00	10.00	0.50	0.50	0.50	0.50	R
10.50	10.50	10.50	0.50	0.50	0.50	0.50	R
11.00	11.00	11.00	0.50	0.50	0.50	0.50	R
11.50	11.50	11.50	0.50	0.50	0.50	0.50	R
12.00	12.00	12.00	0.50	0.50	0.50	0.50	R
12.50	12.50	12.50	0.50	0.50	0.50	0.50	R
13.00	13.00	13.00	0.50	0.50	0.50	0.50	R
13.50	13.50	13.50	0.50	0.50	0.50	0.50	R
14.00	14.00	14.00	0.50	0.50	0.50	0.50	R
14.50	14.50	14.50	0.50	0.50	0.50	0.50	R
15.00	15.00	15.00	0.50	0.50	0.50	0.50	R
15.50	15.50	15.50	0.50	0.50	0.50	0.50	R
16.00	16.00	16.00	0.50	0.50	0.50	0.50	R
16.50	16.50	16.50	0.50	0.50	0.50	0.50	R
17.00	17.00	17.00	0.50	0.50	0.50	0.50	R
17.50	17.50	17.50	0.50	0.50	0.50	0.50	R
18.00	18.00	18.00	0.50	0.50	0.50	0.50	R
18.50	18.50	18.50	0.50	0.50	0.50	0.50	R
19.00	19.00	19.00	0.50	0.50	0.50	0.50	R
19.50	19.50	19.50	0.50	0.50	0.50	0.50	R
20.00	20.00	20.00	0.50	0.50	0.50	0.50	R



NOTES:

1. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
3. CONCRETE SHALL BE OF GRADE C-30.
4. REINFORCEMENT SHALL BE AS PER DRAWING.
5. FINISHES SHALL BE AS PER DRAWING.
6. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
7. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
8. FOR COLOR SPECIFICATIONS REFER APPROPRIATE STANDARDS.

REFERENCE DRAWINGS:

1. ROADWAY DESIGN.
2. BRIDGE DESIGN.
3. STRUCTURAL DESIGN.
4. ELECTRICAL DESIGN.
5. MECHANICAL DESIGN.
6. CIVIL DESIGN.
7. ENVIRONMENTAL DESIGN.
8. OTHER DESIGN DRAWINGS.

GENERAL ARRANGEMENT DRAWING

TRIPLE CELL R.O.O. BOX BRIDGE

8m x 8m (WITH OUT EARTH CURBION)

DATE: 10/10/2010

SCALE: 1:100

PROJECT: ROADWAY DESIGN

DESIGNER: [Name]

CHECKER: [Name]

APPROVED: [Name]

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

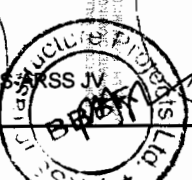
C.O.N.S.U.L.T.I.N.G. ENGINEERS GROUP LTD.

10/10/2010

10/10/2010

10/10/2010

SOM DATT BUILDERS & CONTRACTORS



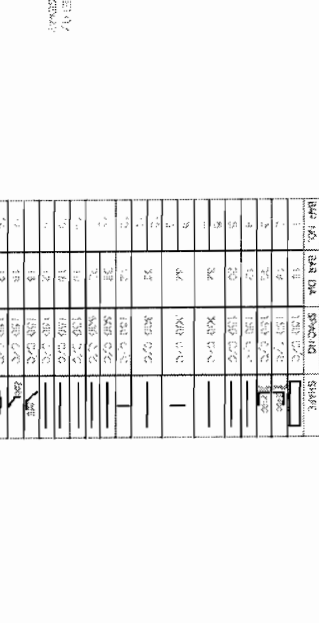
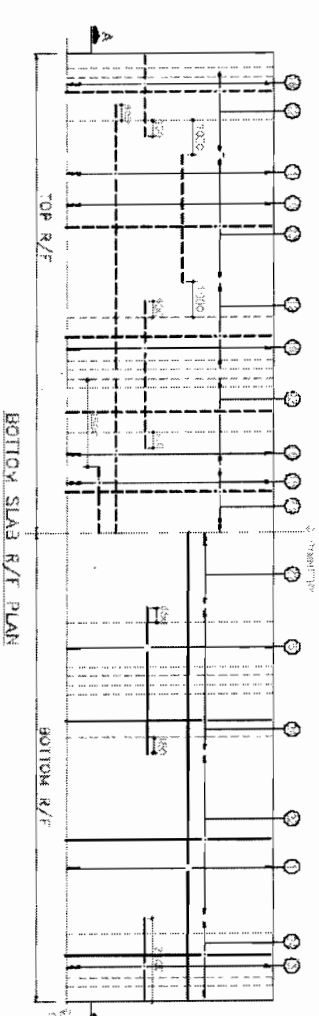
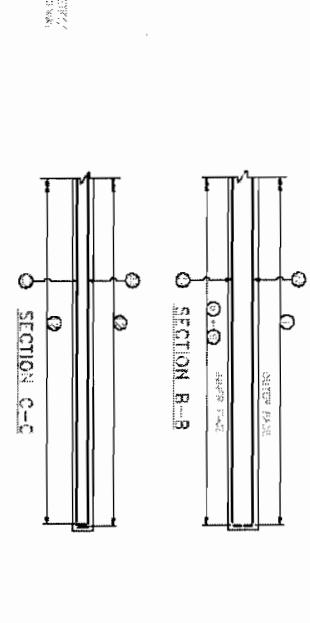
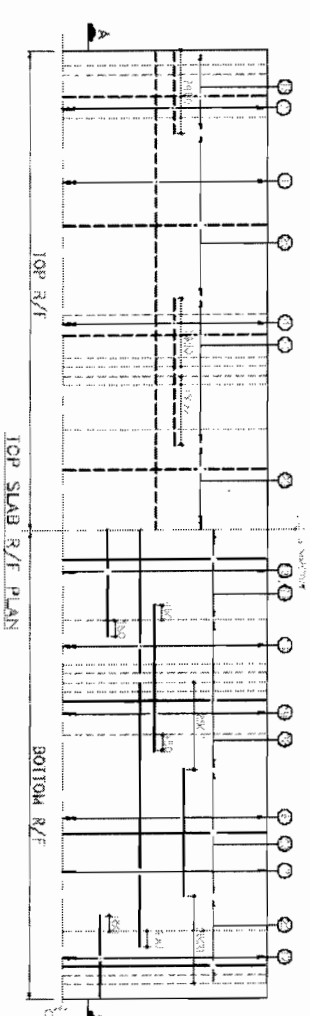
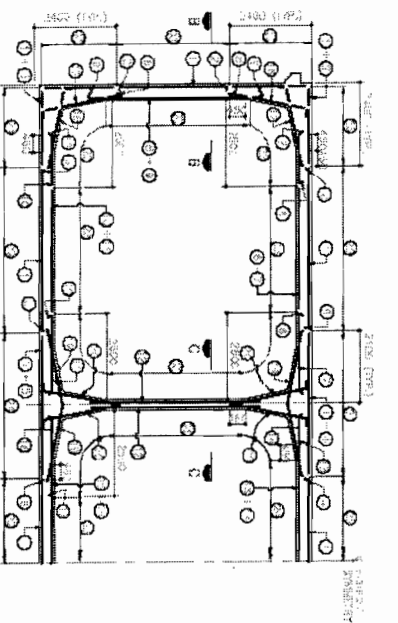
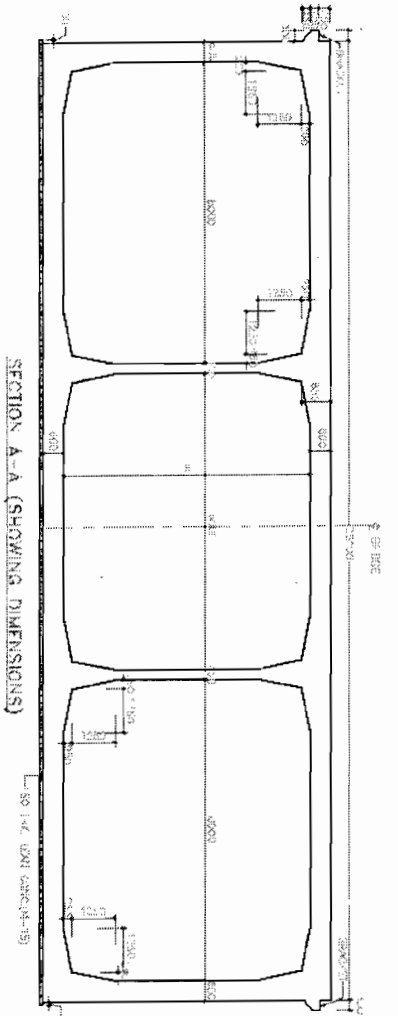
Chief Engineer

World Bank Projects, Orissa

World EEMPLOYER

C/O The E.T.C. (INDIA)

Orissa Bhubaneswar



LEGEND:
 --- ON BOTTOM FACE
 --- ON TOP FACE
 --- REINFORCEMENT

REINF. DETAILS

BAR NO.	BAR DIA.	SPEACING	SHAPE
1	12	150	150
2	12	150	150
3	12	150	150
4	12	150	150
5	12	150	150
6	12	150	150
7	12	150	150
8	12	150	150
9	12	150	150
10	12	150	150
11	12	150	150
12	12	150	150
13	12	150	150
14	12	150	150
15	12	150	150
16	12	150	150
17	12	150	150
18	12	150	150
19	12	150	150
20	12	150	150
21	12	150	150
22	12	150	150
23	12	150	150
24	12	150	150
25	12	150	150
26	12	150	150
27	12	150	150
28	12	150	150
29	12	150	150
30	12	150	150
31	12	150	150
32	12	150	150
33	12	150	150
34	12	150	150
35	12	150	150
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38	12	150	150
39	12	150	150
40	12	150	150
41	12	150	150
42	12	150	150
43	12	150	150
44	12	150	150
45	12	150	150
46	12	150	150
47	12	150	150
48	12	150	150
49	12	150	150
50	12	150	150

NOTES:

1. ALL DIMENSIONS ARE IN METERS AND DECIMAL PARTS TO BE IN MILLIMETERS.
2. DO NOT SCALE THE DRAWING FOR DIMENSIONS.
3. CHECK FOR CORRECTION OF DIMENSIONS.
4. REINFORCEMENT IS CONFORMED TO IS 456:2000.
5. ALL DIMENSIONS ARE TO BE PROVIDED AS SHOWN.
6. ALL DIMENSIONS ARE TO BE PROVIDED AS SHOWN.
7. ALL DIMENSIONS ARE TO BE PROVIDED AS SHOWN.
8. ALL DIMENSIONS ARE TO BE PROVIDED AS SHOWN.
9. ALL DIMENSIONS ARE TO BE PROVIDED AS SHOWN.
10. ALL DIMENSIONS ARE TO BE PROVIDED AS SHOWN.

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

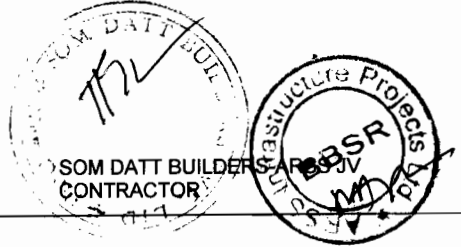
REFERENCE DRAWINGS:

IS 456:2000 - Code of Practice for Plain Concrete and Reinforced Concrete Structures
 IS 800:2008 - Specification for Structural Steel Code of Practice
 IS 1786:1969 - Specification for Reinforcing Bars of Mild Steel

CONSULTING ENGINEERS GROUP LTD.
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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

DATE: 10/01/2011
 DRAWN BY: S. K. SINGH
 CHECKED BY: S. K. SINGH
 APPROVED BY: S. K. SINGH



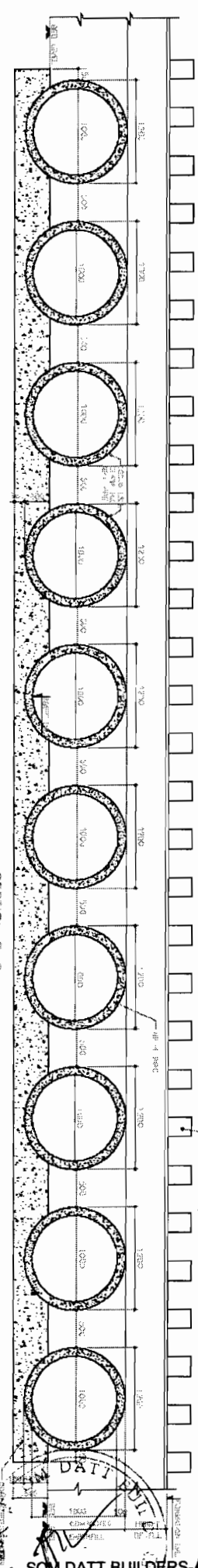
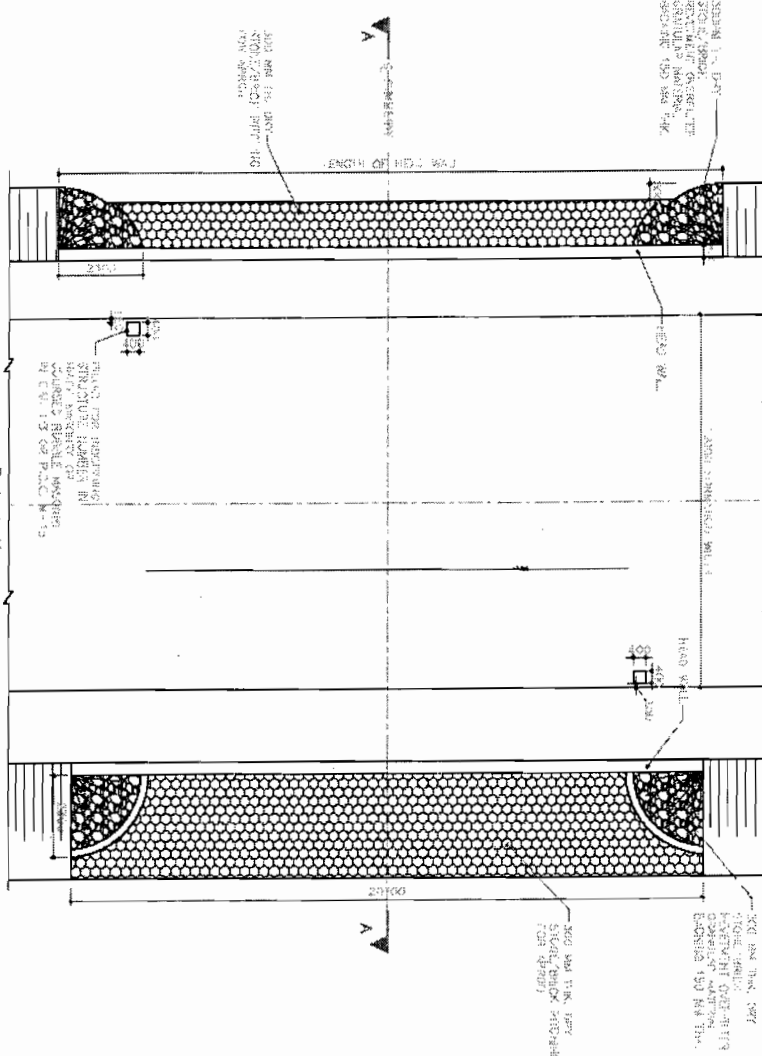
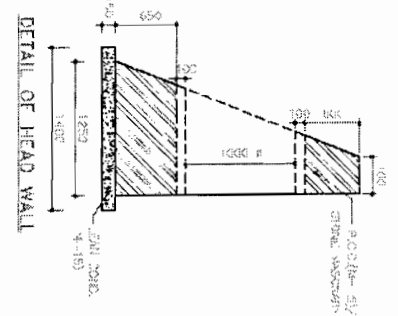
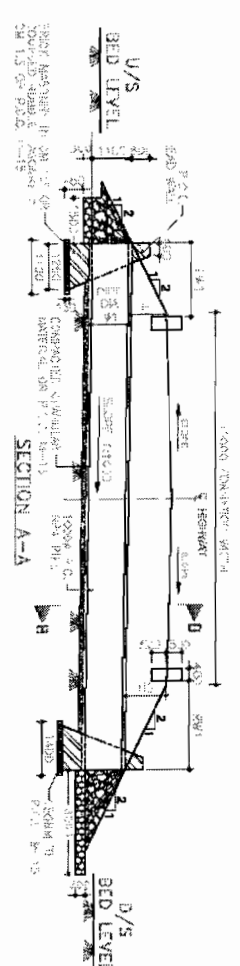


Table with 10 columns: S.No, Proposed Length, Proposed Level, Bed Level, Proposed Height, Height of Pipe, LWT, SPT, Total Depth, No. of Pipes. It lists data for 10 different pipe sections.

NOTES:

1. ALL DIMENSIONS ARE IN MM & L.V.S ARE IN METRE.
2. ONLY WATERTIGHT BRIDGES ARE TO BE PROVIDED. NO HOT SPOTS ARE ALLOWED.
3. ROOF / ANCHORAGE FOR BED OF THE BRIDGE IS PROVIDED WITH SUITABLE CHAINLITE MATERIAL.
4. DRAINAGE / SPILLWAY SHALL BE PROVIDED AS PER APPROVED PLAN & SPECIFIC.
5. PIPE COLUMNS SHALL TO BE PROVIDED WITH 10% EXTRA LENGTH TO BE PROVIDED TO PROVIDE PROPER CONNECTION.
6. EXISTING SLOPE OF PIPE SHALL BE 1 IN 1000.
7. FIRST CLASS BRIDGE SHALL BE USED FOR EXHAUSTION.
8. THE FINISHED ROAD LEVEL SHALL BE PROVIDED WITH SUITABLE DRAINAGE & SURFACE LEVEL WITH SILL CHECKERS BEHIND EXHAUSTION.

J
Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Orissa, Bhubaneswar

CONSULTING ENGINEERS GROUP LTD.
 E-13/14/15, 1st Floor, Sector-17
 Phase-1, Gurgaon, Haryana-122002
 Tel: +91-12-2711441, 2711442, 2711443
 Fax: +91-12-2711444, 2711445
 Email: info@cegindia.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

TYPICAL ARRANGEMENT FOR R.C.C TEN PIPE BRIDGES (1.0M DIA) HEIGHT OF FILL VARYING FROM 0.8 TO 4.0 M

DATE	REVISION	BY	CHKD

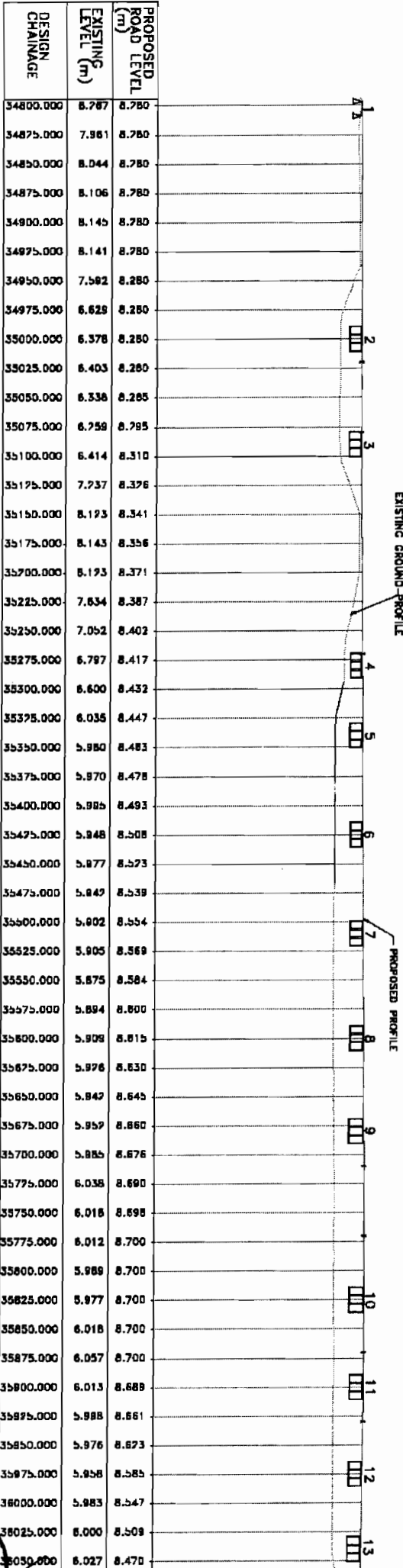
SOM DATT BUILDERS & CONTRACTORS
 PVT. LTD.

Structure Projects And Services Pvt. Ltd.

↑ TO BHADRAK

LINE DIAGRAM OF C.D. WORKS FROM 34/800 TO 36/000

TO CHANDBALI ↓



SLNO	DESIGN CHAINAGE	TYPE OF BRIDGE WITH SPAN ARRANGEMENT
1	34+80.3	EXISTING BRIDGE 1 x 10.3 M SOLID SLAB
2	35+00.0	ADDITIONAL BRIDGE 3 x 3.0 M RCC BOX
3	35+09.0	ADDITIONAL BRIDGE 3 x 3.0 M RCC BOX
4	35+28.0	ADDITIONAL BRIDGE 3 x 3.0 M RCC BOX
5	35+34.0	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
6	35+42.5	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
7	35+51.0	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
8	35+60.0	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
9	35+68.0	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
10	35+82.5	EXISTING BRIDGE 3 x 3.0 M RCC BOX
11	35+90.0	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
12	35+97.5	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX
13	36+04.0	ADDITIONAL BRIDGE 3 x 8.0 M RCC BOX

C O N S U L T I N G
ENGINEERS GROUP LTD.
 5-12/34/1/1 - 250008, 250108, 250004
 Ph. 250104, 250105, 250106, 250107, 250108

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

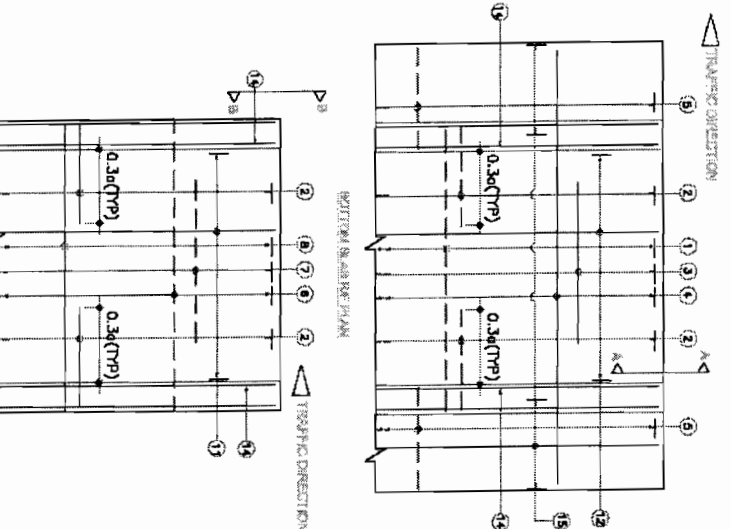
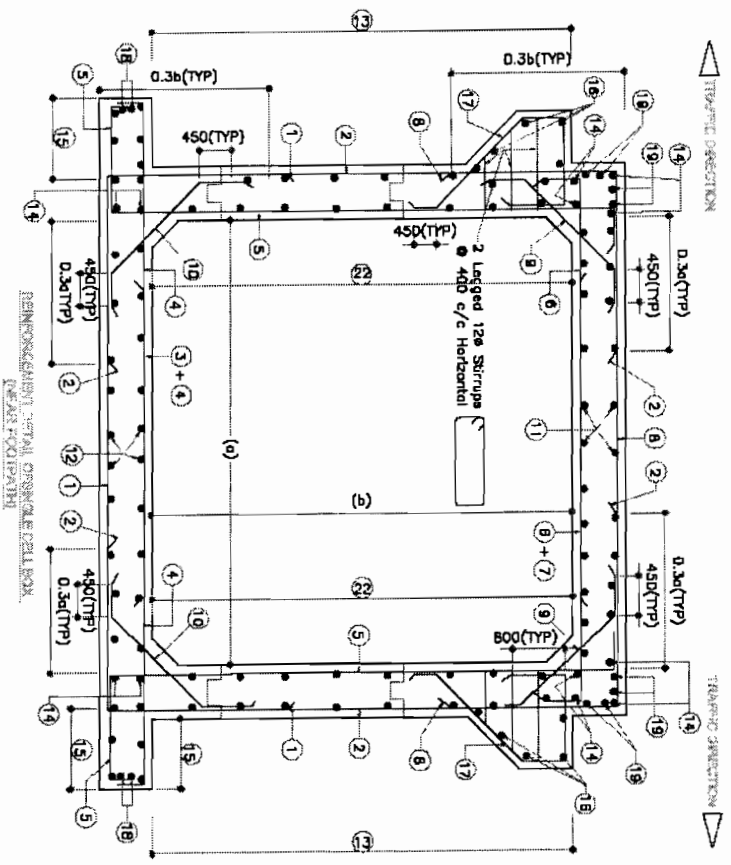
LINE DIAGRAM

DATE: 10/01/2012
 TIME: 10:30 AM
 SCALE: 1:1000
 SHEET NO: 10/01/2012/10/01/2012

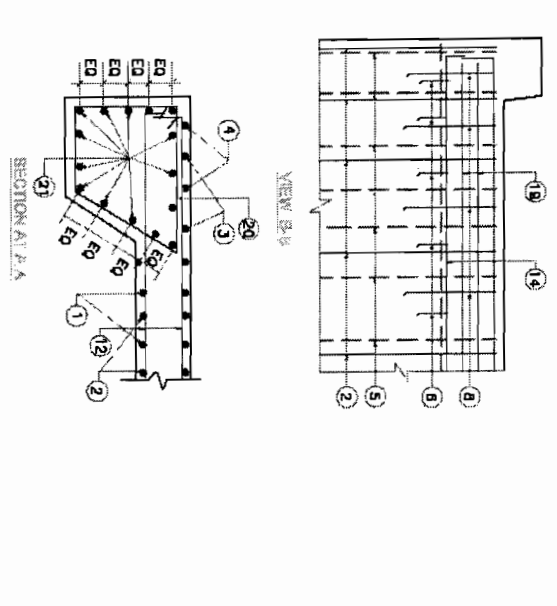
SOM DATTA BUILDERS ARCH JV
 CONTRACTOR

PROJ. NO. 10/01/2012/10/01/2012

Chief Engineer
 World Bank Projects, Orissa
 World Bank EMPLOYER
 C/o the E.P.C. Co. Ltd.
 Orissa, Bhubaneswar



- NOTES :-**
1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS
 2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING/COMP/232/24-14/ BOX CIL-01
 3. MINIMAL CLEAR COVER TO MAIN REINFORCEMENT SHALL BE GIVEN.
 4. MINIMAL LAP LENGTH OF REINFORCEMENT SHALL BE GIVEN AS PER IS 456:2000.
 5. ALL REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE RA 415 (CORRELATIVE TO S1770S-1983) WITH A MINIMUM YIELD STRENGTH OF 415 N/MM².
 6. JOINT OR LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 30.4.6 OF IS:456-2000.
 7. MAXIMUM SIZE OF AGGREGATE TO BE USED IN RCC IS 20mm.
 8. GRADE OF CONCRETE M-20.
 9. ALL REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE RA 415 (CORRELATIVE TO S1770S-1983) WITH A MINIMUM YIELD STRENGTH OF 415 N/MM².
 10. JOINT OR LAPPING OF BARS SHALL BE SUITABLY STAGGERED AS PER CLAUSE 30.4.6 OF IS:456-2000.
- REFERENCE DRAWING:-**
 COMP/232/24-14/ BOX CIL-01



REINFORCEMENT DETAIL OF SINGLE CELL BOX

BAR MARK	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	BAR DIA	SPACING
1	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
2	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
3	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
4	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
5	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
6	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
7	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
8	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
9	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
10	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
11	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
12	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
13	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
14	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
15	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
16	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
17	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
18	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
19	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
20	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
21	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
22	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250
23	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250	10	250

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

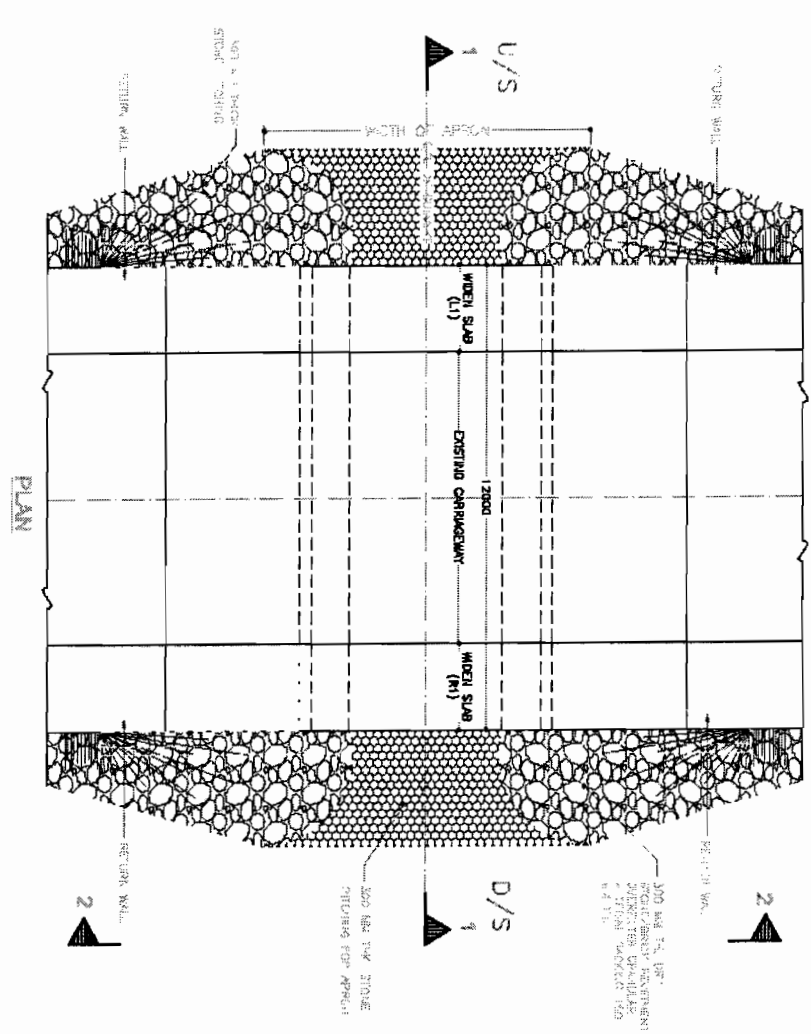
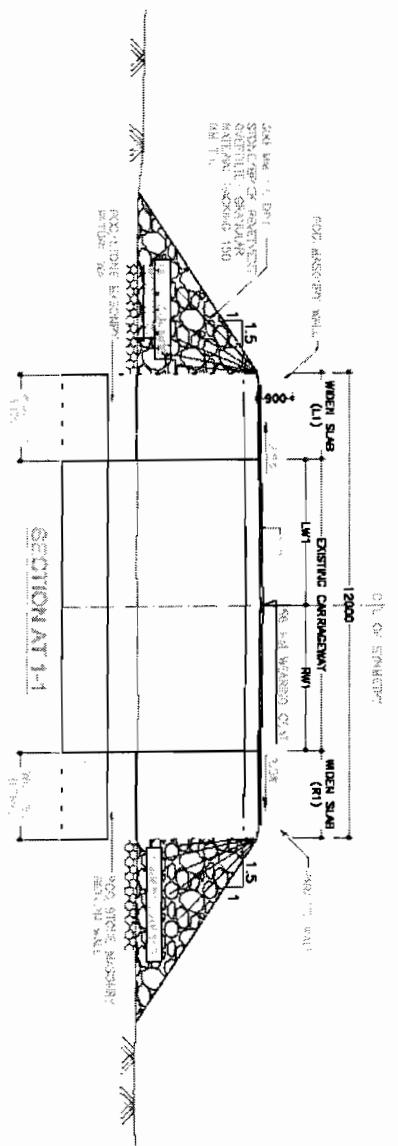
CONSULTING ENGINEERS GROUP LTD.
 C-132nd, Cambridge Nagar, 4th Floor-17
 Tel. 431-141-3870/3881/3207/3883/3885
 Fax. 431-141-3870/3881/3207/3883/3885
 www.consultingengineers.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (0) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REINFORCEMENT DETAIL OF SINGLE CELL BOX

NO.	REVISION	DATE	BY	CHKD.





CONSULTING ENGINEERS GROUP LTD.
 E-112/12 Chhatrapati Shivaji Maharaj -17
 Tel: +91-11-26000600, 26000601
 Fax: 2601314, e-mail: info@cegroup.com

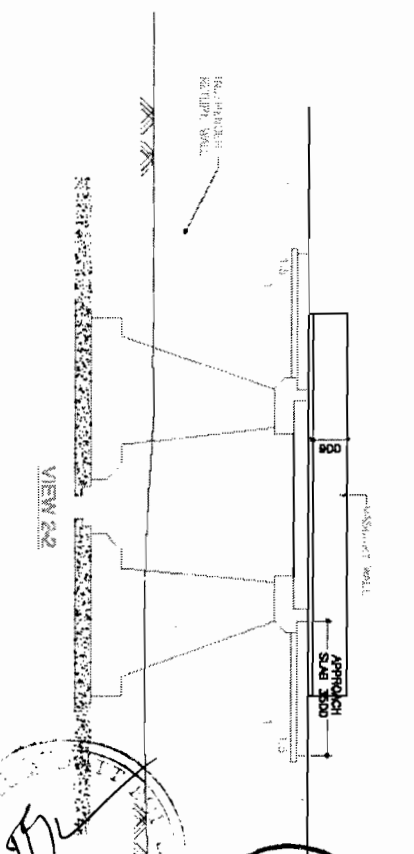
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
 TYPICAL WIDENING FOR EXISTING SLAB CULVERTS

Drawn by: S. K. SINGH
 Checked by: S. K. SINGH
 Approved by: S. K. SINGH

SLAB IN DIMENSIONS

Sl. No.	Proposed Slab Length (m)	Proposed Slab Width (m)	Bed Level		Chamber Level		Clear Height (m)	Span (m)	Diameter of Bar (mm)	Length of Slab (m)	
			Left	Right	Left	Right				Left	Right
1	20.00	12.00	18.87	18.87	2.70	2.70	2.8	12.00	12.00	2.8	2.8
2	20.00	12.00	18.87	18.87	2.70	2.70	2.8	12.00	12.00	2.8	2.8
3	18.00	12.00	18.87	18.87	2.70	2.70	2.8	12.00	12.00	2.8	2.8



NOTES:-

- 1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- 2 DIMENSIONS ARE NOT TO BE SCALED. ONLY DIMENSIONS ARE TO BE FOLLOWED.
- 3 CONCRETE GRADE IN SUPER STRUCTURE SHALL BE M-25.
- 4 SLAB STRUCTURE SHALL BE IN CONCRETE GRADE M-25 WITH SURFACE REINFORCEMENT #8 @200/C BOTH TOP & BOTTOM.
- 5 GRADE OF CONC. RCC SLAB - M-15

REFERENCE DRAWING:-
 1. OSR/CE/SH-9/SLAB CU/M-02

SOM DATT BUILDERS & ARCHITECTS
 CONTRACTOR

BBSA
 ARCHITECTS

Chief Engineer
 Projects, Orissa
 Employer
 O/o the E.I.C. (Civil)
 Cuttack, Bhubaneswar.

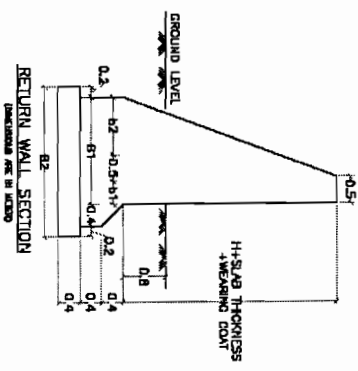
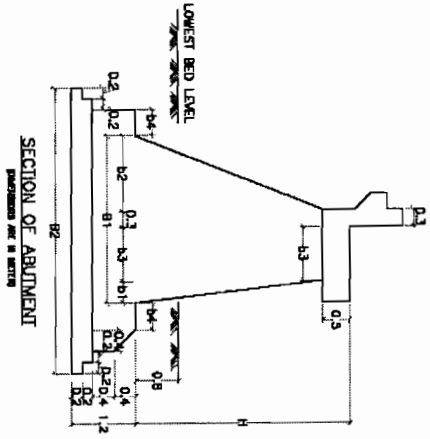
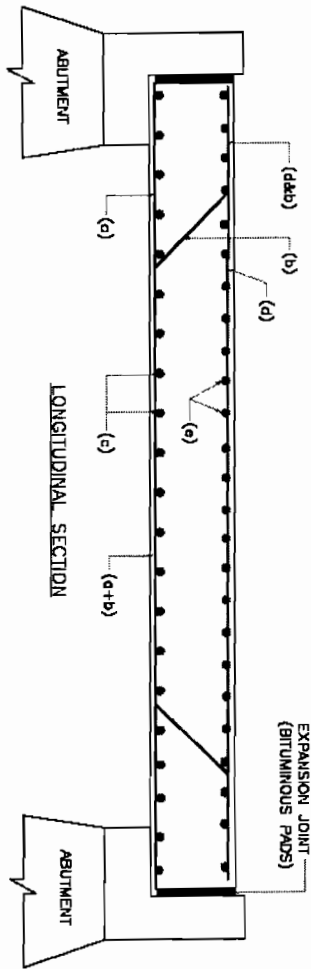
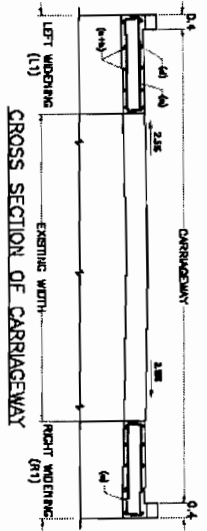


TABLE OF DIMENSIONS FOR RETURN WALL

SPAN	UP TO 2 METRES			3 METRES			4 METRES		
	H	b1	b2	H	b1	b2	H	b1	b2
1.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
2.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
2.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
3.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
3.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
4.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
4.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
5.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
5.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
6.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
6.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
7.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
7.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
8.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
8.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
9.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
9.50	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00
10.00	2.20	2.20	2.20	3.00	3.50	4.00	4.00	4.50	5.00

TABLE OF DIMENSIONS FOR ABUTMENT

Effective Span	Bin end 5m									
	2.0m	2.5m	3.0m	3.5m	4.0m	4.5m	5.0m	5.5m	6.0m	6.5m
H	2.0m	2.5m	3.0m	3.5m	4.0m	4.5m	5.0m	5.5m	6.0m	6.5m
b1	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65
b2	0.8	0.85	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4
b3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
b4	-	0.1	0.2	0.4	0.5	-	0.1	0.2	0.3	0.5
b1	2.1	2.4	2.8	3.1	3.45	3.8	4.15	4.5	4.85	5.2
b2	3.3	3.8	4.2	4.85	5.3	5.85	6.4	7.0	7.55	8.1

REINFORCEMENT TABLE FOR SLAB CARRIAGES

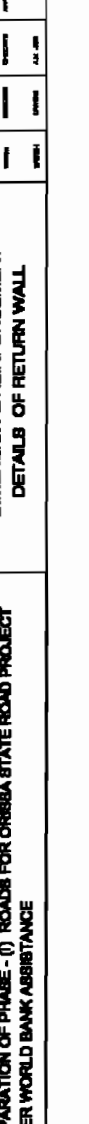
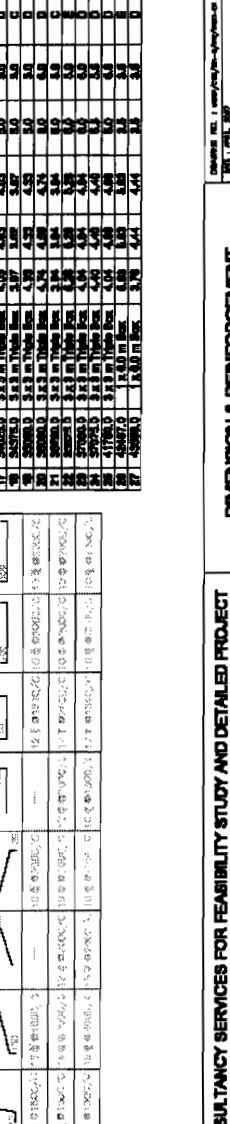
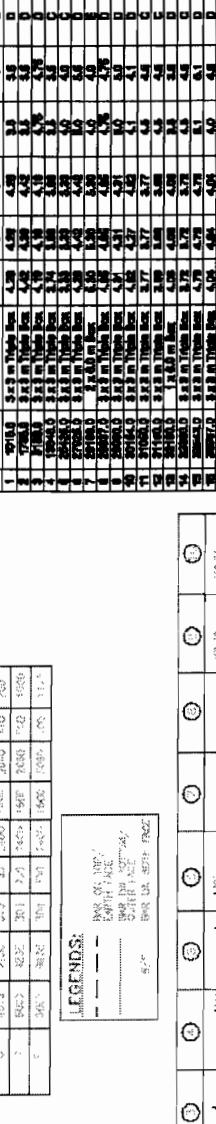
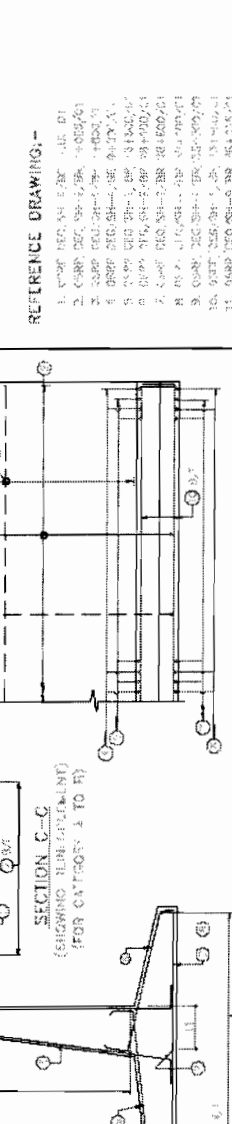
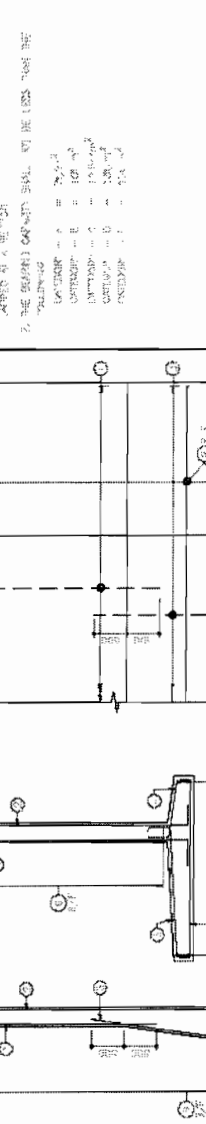
Clear Span depth	M.A.I.N.										S.L.A.B										
	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	
1.0	210	18	200	18	200	18	200	18	200	18	300	1700	10	180	10	300	480	370	18	-	-
2.0	260	16	260	2700	16	240	-	310	3700	16	300	3700	10	180	10	300	480	370	18	-	-
3.0	320	16	240	3700	18	240	-	280	3700	10	300	3700	10	180	10	300	440	370	18	-	-
4.0	380	20	280	4700	20	280	820	447	2800	10	300	4700	10	180	10	300	800	370	20	-	-
5.0	430	20	240	5700	20	240	750	443	3500	10	300	5700	10	110	10	300	850	370	20	-	-
6.0	480	20	220	6700	20	220	810	823	4500	10	300	6700	10	100	10	300	710	370	20	-	-

NOTES:-
 1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 2 DIMENSIONS ARE NOT TO BE SCALED ONLY DIMENSIONS ARE TO BE FOLLOWED.
 3 CONCRETE GRADE IN SUPER STRUCTURE IS STEEL GRADE IS FA 415.
 4 SUB STRUCTURE SHALL BE IN CONCRETE GRADE M 20 WITH SURFACE REINFORCEMENT AS 8200/C 80.
 REFERENCE DRAWING:-
 1 OSR/103/21-9/5/04 CUL/4-01

SOM DATT BROS. CONTRACTOR
 Chief Engineer
 World Bank Project - Orissa
 EMPLOYER
 G. S. B. S. (C. S.)
 G. S. B. S. (C. S.)

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
3. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
4. ALL DIMENSIONS ARE TO SURFACE UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
6. ALL DIMENSIONS ARE TO SURFACE UNLESS OTHERWISE SPECIFIED.
7. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
8. ALL DIMENSIONS ARE TO SURFACE UNLESS OTHERWISE SPECIFIED.
9. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED.
10. ALL DIMENSIONS ARE TO SURFACE UNLESS OTHERWISE SPECIFIED.



LENGTH OF CURTAINMENT

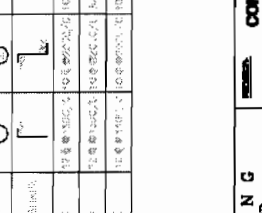
CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
MIN	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100
MAX	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150

REINFORCEMENT DETAILS

CATEGORY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
MIN	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100
MAX	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150

LEGENDS:

- 100% REINFORCEMENT
- 75% REINFORCEMENT
- 50% REINFORCEMENT
- 25% REINFORCEMENT



REFERENCE DRAWING:-

1. ROAD AND BRIDGE ENGINEERING
2. ROAD AND BRIDGE ENGINEERING
3. ROAD AND BRIDGE ENGINEERING
4. ROAD AND BRIDGE ENGINEERING
5. ROAD AND BRIDGE ENGINEERING
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17. ROAD AND BRIDGE ENGINEERING
18. ROAD AND BRIDGE ENGINEERING
19. ROAD AND BRIDGE ENGINEERING
20. ROAD AND BRIDGE ENGINEERING

REINFORCEMENT - CIRCUMFERENTIAL

No.	Circumferential Reinforcement	Height of Reinforcement		Length of Reinforcement		Quantity
		Left	Right	Left	Right	
1	100% in 100% concrete	4.5	4.5	3.0	3.0	0
2	75% in 100% concrete	4.5	4.5	3.0	3.0	0
3	50% in 100% concrete	4.5	4.5	3.0	3.0	0
4	25% in 100% concrete	4.5	4.5	3.0	3.0	0
5	100% in 75% concrete	4.5	4.5	3.0	3.0	0
6	75% in 75% concrete	4.5	4.5	3.0	3.0	0
7	50% in 75% concrete	4.5	4.5	3.0	3.0	0
8	25% in 75% concrete	4.5	4.5	3.0	3.0	0
9	100% in 50% concrete	4.5	4.5	3.0	3.0	0
10	75% in 50% concrete	4.5	4.5	3.0	3.0	0
11	50% in 50% concrete	4.5	4.5	3.0	3.0	0
12	25% in 50% concrete	4.5	4.5	3.0	3.0	0
13	100% in 25% concrete	4.5	4.5	3.0	3.0	0
14	75% in 25% concrete	4.5	4.5	3.0	3.0	0
15	50% in 25% concrete	4.5	4.5	3.0	3.0	0
16	25% in 25% concrete	4.5	4.5	3.0	3.0	0
17	100% in 0% concrete	4.5	4.5	3.0	3.0	0
18	75% in 0% concrete	4.5	4.5	3.0	3.0	0
19	50% in 0% concrete	4.5	4.5	3.0	3.0	0
20	25% in 0% concrete	4.5	4.5	3.0	3.0	0

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD ASSISTANCE UNDER WORLD BANK ASSISTANCE

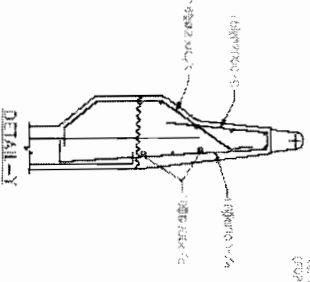
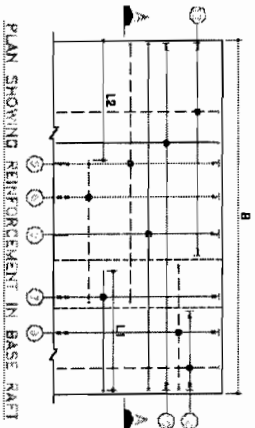
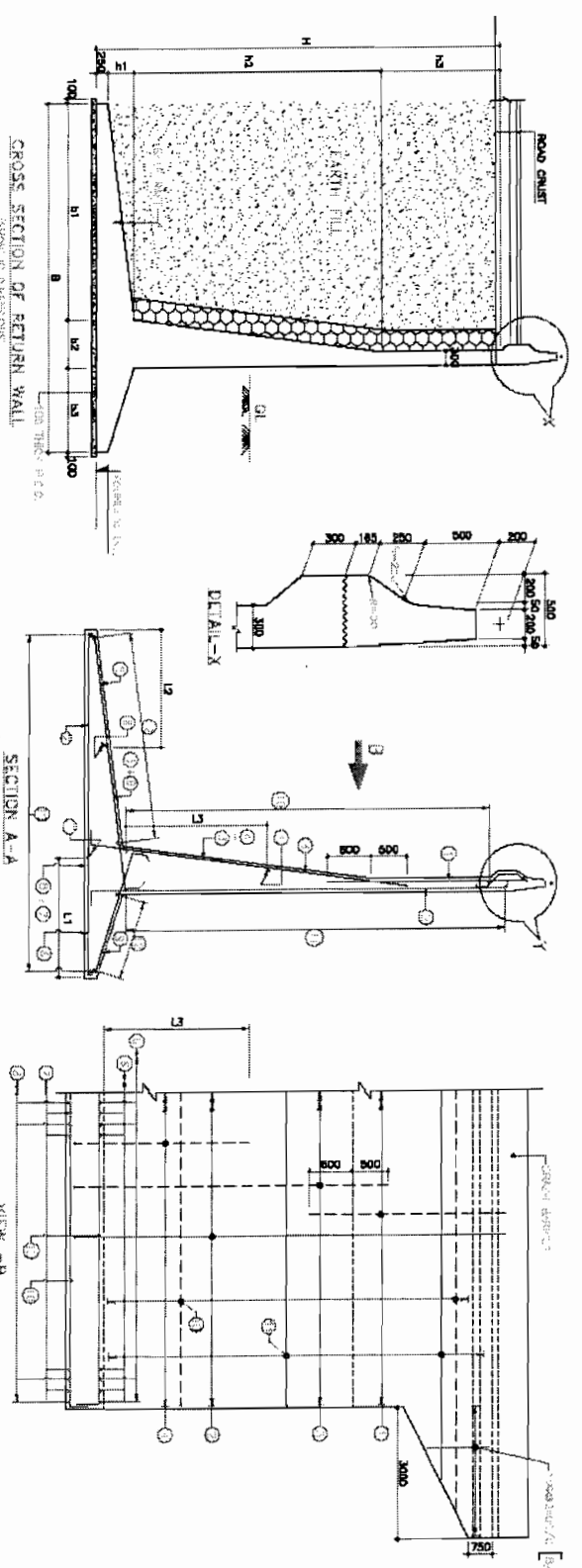
CONSULTING ENGINEERS GROUP LTD.
 10/10, Chhatrapati Shivaji Maharaj Marg, Bhubaneswar-751005
 Tel: 2531341, 2531342, 2531343, 2531344, 2531345, 2531346, 2531347, 2531348, 2531349, 2531350
 Fax: 2531351, 2531352, 2531353, 2531354, 2531355, 2531356, 2531357, 2531358, 2531359, 2531360
 E-mail: info@cegltd.com

SOM DATT BUILDERS-ARSS JV CONTRACTOR

Chief Engineer World Bank Projects, Orissa EMPLOYER

ORISSA STATE ROAD ASSISTANCE

DIMENSION & REINFORCEMENT DETAILS OF RETURN WALL



CATEGORY	L1	L2	L3
A	060	17.25	29.50
B	120	16.00	16.00
D	080	1.00	35.00

CATEGORY	h max	B	D1	H2	H3	D1	D2	D3
A	4200	507	156	1120	2300	1500	500	1900
B	6100	600	200	3000	2400	2100	500	2000
D	2100	600	400	4100	2600	1300	800	2200

Bar No	Proposed	Length of Bar	Weight	Volume	Weight
1	3000	1.17	0.17	0.17	0.17
2	3000	1.17	0.17	0.17	0.17
3	3000	1.17	0.17	0.17	0.17
4	3000	1.17	0.17	0.17	0.17
5	3000	1.17	0.17	0.17	0.17
6	3000	1.17	0.17	0.17	0.17
7	3000	1.17	0.17	0.17	0.17
8	3000	1.17	0.17	0.17	0.17
9	3000	1.17	0.17	0.17	0.17
10	3000	1.17	0.17	0.17	0.17
11	3000	1.17	0.17	0.17	0.17
12	3000	1.17	0.17	0.17	0.17
13	3000	1.17	0.17	0.17	0.17
14	3000	1.17	0.17	0.17	0.17
15	3000	1.17	0.17	0.17	0.17
16	3000	1.17	0.17	0.17	0.17
17	3000	1.17	0.17	0.17	0.17
18	3000	1.17	0.17	0.17	0.17
19	3000	1.17	0.17	0.17	0.17
20	3000	1.17	0.17	0.17	0.17
21	3000	1.17	0.17	0.17	0.17
22	3000	1.17	0.17	0.17	0.17
23	3000	1.17	0.17	0.17	0.17
24	3000	1.17	0.17	0.17	0.17
25	3000	1.17	0.17	0.17	0.17
26	3000	1.17	0.17	0.17	0.17
27	3000	1.17	0.17	0.17	0.17
28	3000	1.17	0.17	0.17	0.17
29	3000	1.17	0.17	0.17	0.17
30	3000	1.17	0.17	0.17	0.17

---	BAR 8mm
---	BAR 10mm
---	BAR 12mm
---	BAR 16mm
---	BAR 20mm
---	BAR 25mm

Bar No	Bar Size	Length	Weight	Volume	Weight
A	8mm	100	0.00	17.25	29.50
B	12mm	120	1.60	16.00	16.00
D	8mm	80	0.00	1.00	35.00

NOTES

1. ALL DIMENSIONS ARE IN MM & LEGS ARE IN METERS.
2. DO NOT SCALE DIMENSIONS. USE DIMENSIONS GIVEN IN THIS DRAWING.
3. CHECK THE DIMENSIONS OF THE STRUCTURE AGAINST THE ARCHITECTURAL DRAWINGS.
4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
5. CHECK THE DIMENSIONS OF THE STRUCTURE AGAINST THE ARCHITECTURAL DRAWINGS.
6. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
7. THE DESIGNER'S SEAL SHALL NOT BE LESS THAN THE FOLLOWING:
 - CATEGORY - A = 150x75
 - CATEGORY - B = 120x60
 - CATEGORY - C = 100x50
 - CATEGORY - D = 100x50

REFERENCE DRAWING:-

1. STRUCTURAL DESIGN OF ROAD BRIDGE
2. DESIGN OF ROAD BRIDGE
3. DESIGN OF ROAD BRIDGE
4. DESIGN OF ROAD BRIDGE
5. DESIGN OF ROAD BRIDGE

CONSULTING ENGINEERS GROUP LTD.
 10/10, 11/11, 12/12, 13/13, 14/14, 15/15, 16/16, 17/17, 18/18, 19/19, 20/20, 21/21, 22/22, 23/23, 24/24, 25/25, 26/26, 27/27, 28/28, 29/29, 30/30, 31/31, 32/32, 33/33, 34/34, 35/35, 36/36, 37/37, 38/38, 39/39, 40/40, 41/41, 42/42, 43/43, 44/44, 45/45, 46/46, 47/47, 48/48, 49/49, 50/50, 51/51, 52/52, 53/53, 54/54, 55/55, 56/56, 57/57, 58/58, 59/59, 60/60, 61/61, 62/62, 63/63, 64/64, 65/65, 66/66, 67/67, 68/68, 69/69, 70/70, 71/71, 72/72, 73/73, 74/74, 75/75, 76/76, 77/77, 78/78, 79/79, 80/80, 81/81, 82/82, 83/83, 84/84, 85/85, 86/86, 87/87, 88/88, 89/89, 90/90, 91/91, 92/92, 93/93, 94/94, 95/95, 96/96, 97/97, 98/98, 99/99, 100/100.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION & REINFORCEMENT DETAILS OF RETURN WALL

SQM DATT BUILDERS ARSS JV
 CONTRACTOR

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

NOTES:

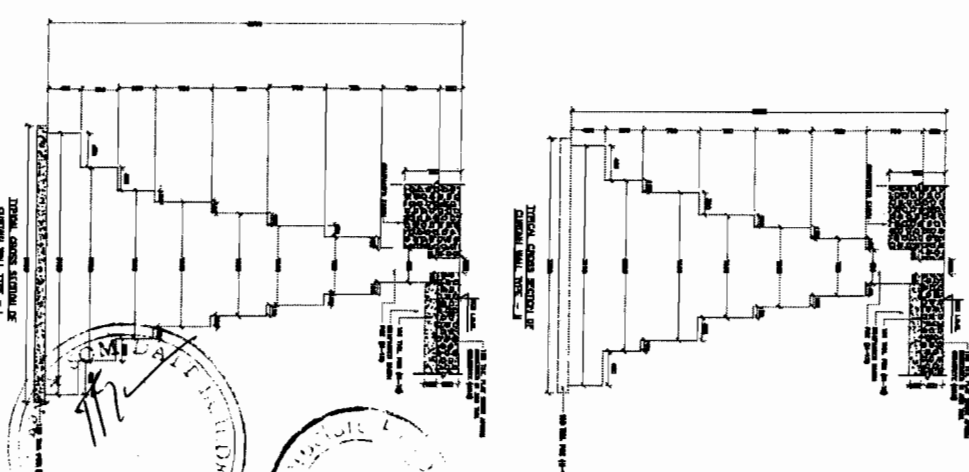
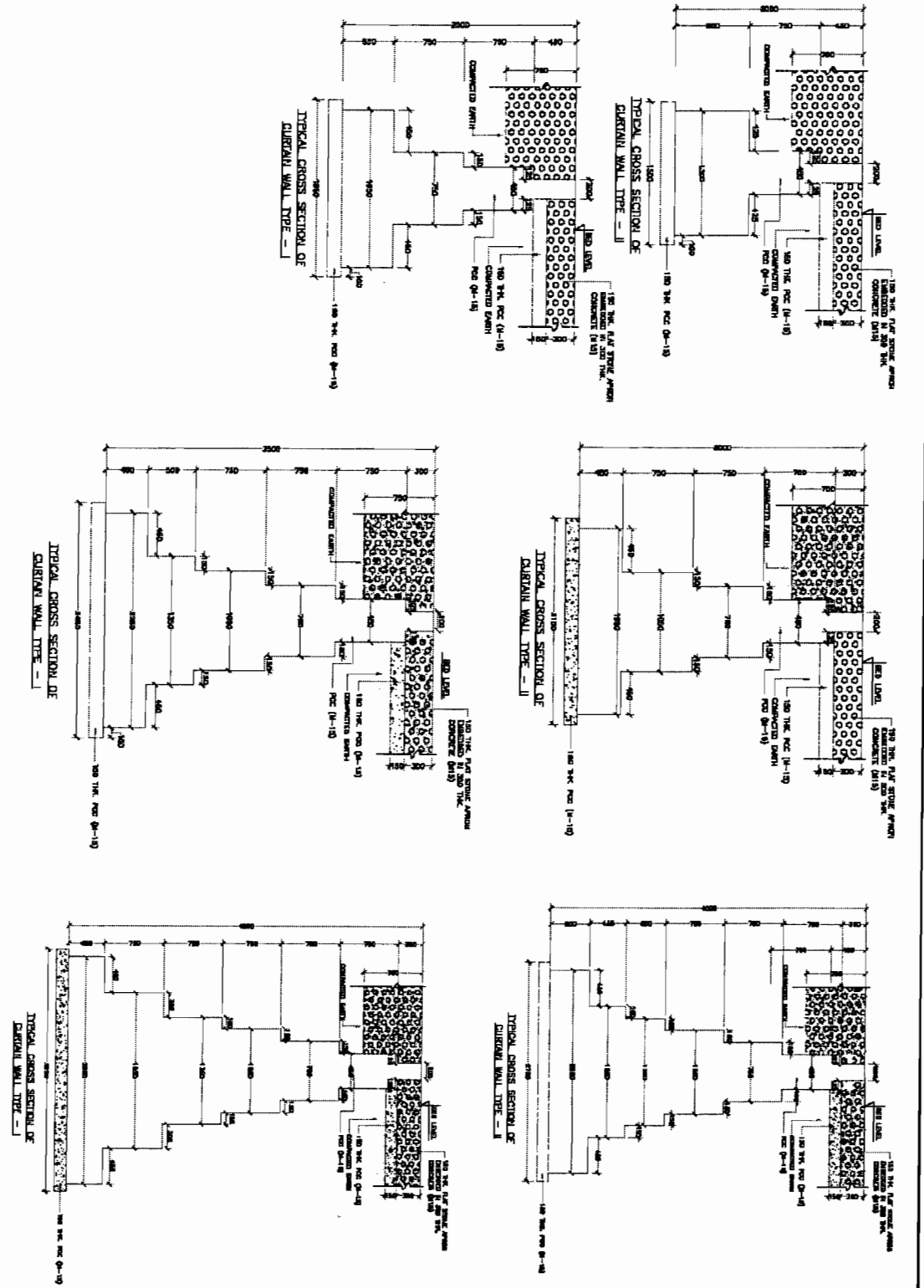
1. ALL DIMENSIONS ARE IN MM.
2. ONLY APPLICABLE DIMENSIONS ARE TO BE FOLLOWED, ALL OTHER SHALL BE DISREGARDED.

REFERENCE DRAWINGS:-

1. GEP/02/02/01/01/01/01/01
2. GEP/02/02/01/01/01/01/01
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Chief Engineer
World Bank Projects, Orissa
EMPLOYER

Price: Rs. 25000/-

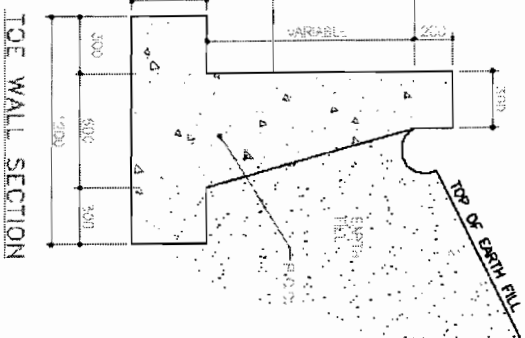
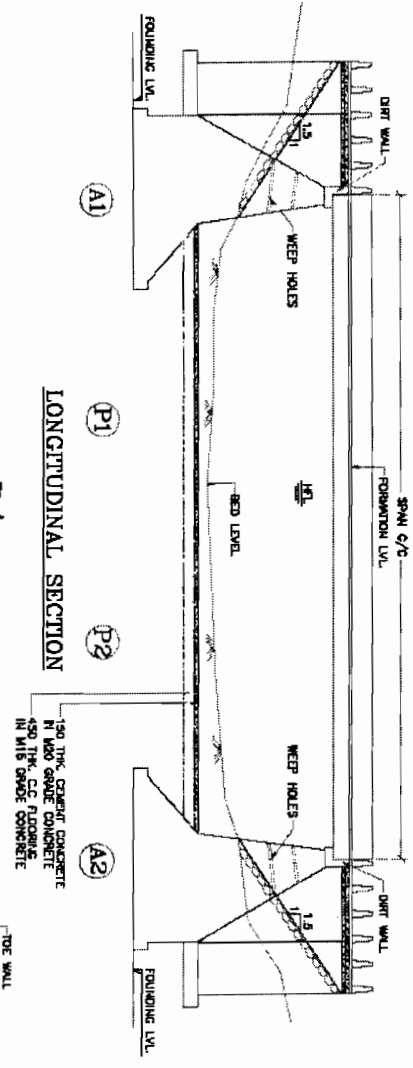


SOM DATT BUILDERS ASSOCIATION
CONTRACTOR

ARSS JVS
ARSS JVS

TO BHADARK

TO CHANDBALL



NOTES:

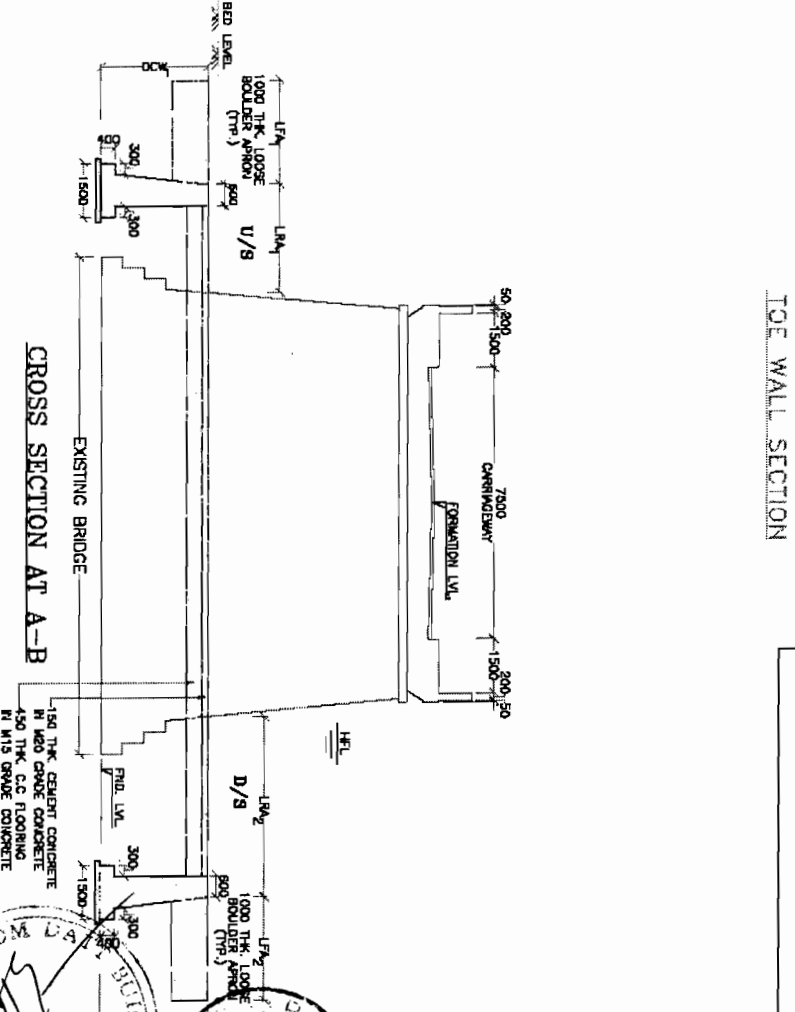
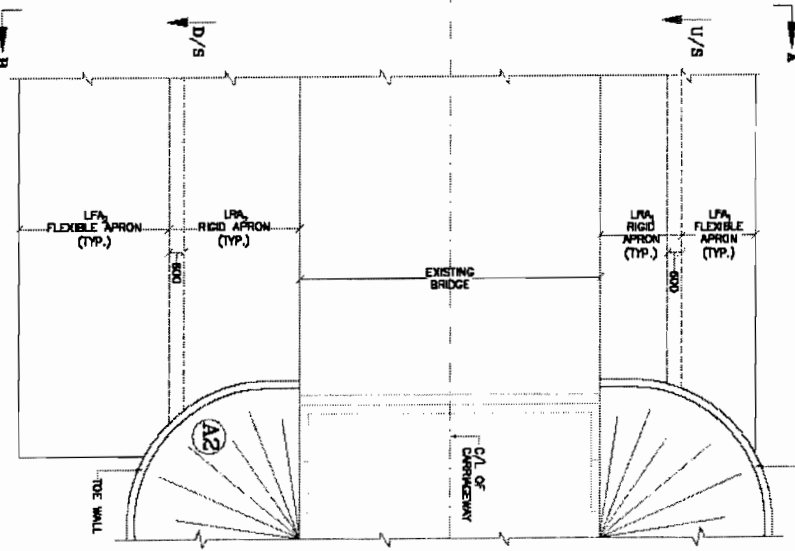
1. ALL DIMENSIONS ARE IN MM.
2. ONLY DIMENSIONED DIMENSIONS ARE TO BE FOLLOWED.
3. SCALE LINE DIMENSION IS.

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
SOM DATT BUILDERS PVT. LTD.
CONTRACTOR

HALF BOTTOM PLAN

PLAN

HALF TOP PLAN



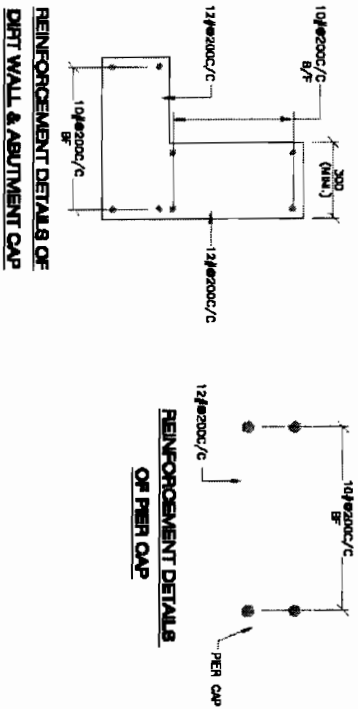
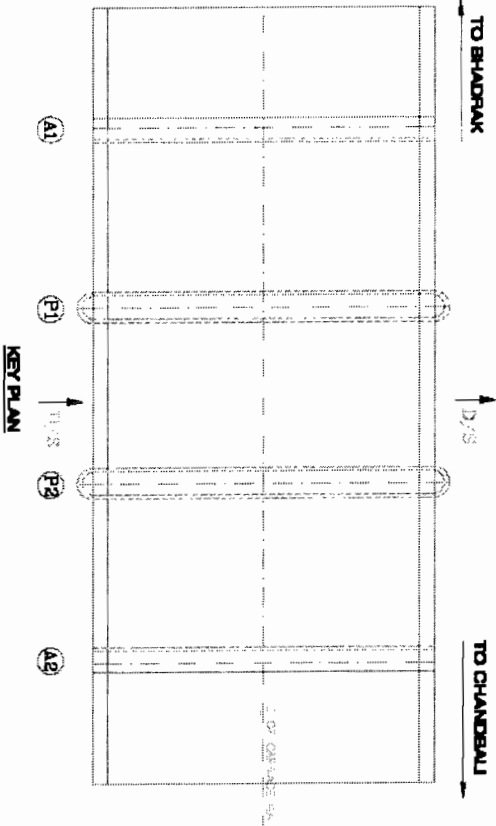
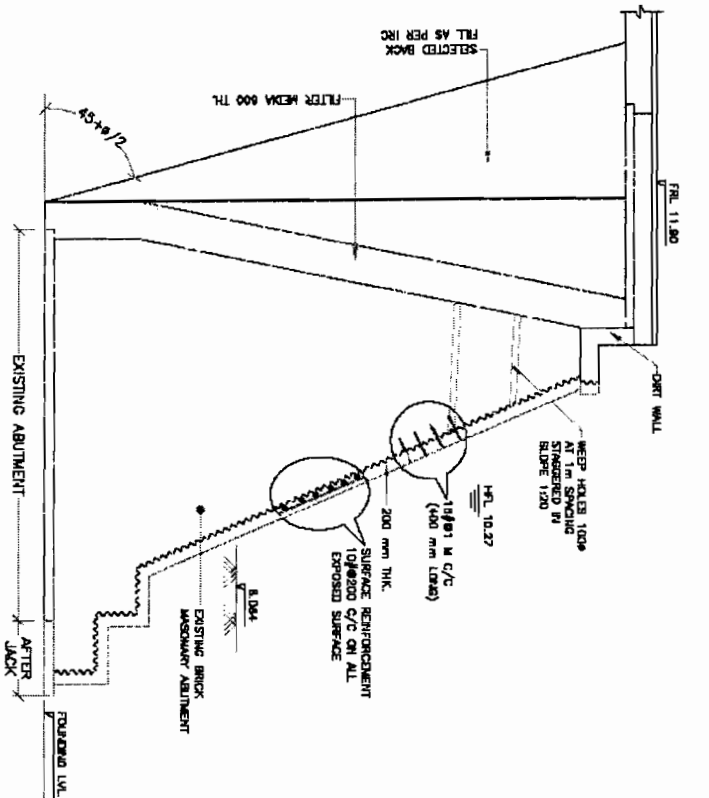
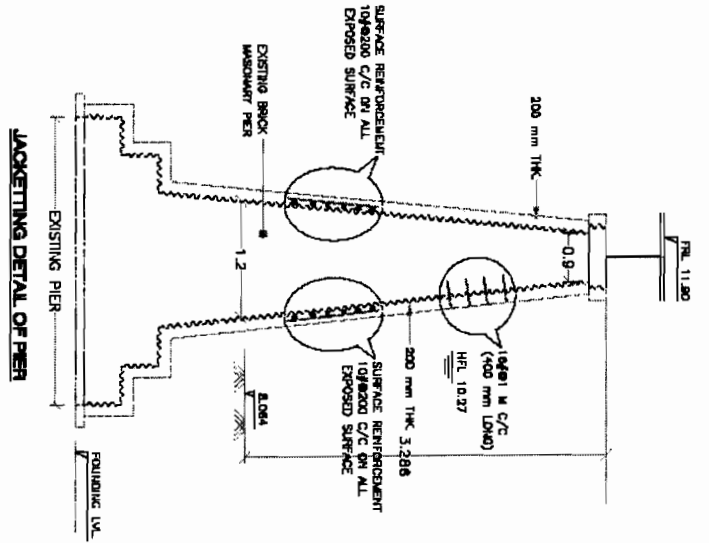
SOM DATT BUILDERS PVT. LTD.
CONTRACTOR

CONSULTING ENGINEERS GROUP LTD.
Engineers' Group Ltd., 200, Market Street, Bhubaneswar - 751002.
Phone: 2333333, 2333334, 2333335, 2333336, 2333337, 2333338, 2333339, 2333340, 2333341, 2333342, 2333343, 2333344, 2333345, 2333346, 2333347, 2333348, 2333349, 2333350, 2333351, 2333352, 2333353, 2333354, 2333355, 2333356, 2333357, 2333358, 2333359, 2333360, 2333361, 2333362, 2333363, 2333364, 2333365, 2333366, 2333367, 2333368, 2333369, 2333370, 2333371, 2333372, 2333373, 2333374, 2333375, 2333376, 2333377, 2333378, 2333379, 2333380, 2333381, 2333382, 2333383, 2333384, 2333385, 2333386, 2333387, 2333388, 2333389, 2333390, 2333391, 2333392, 2333393, 2333394, 2333395, 2333396, 2333397, 2333398, 2333399, 2333400.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
TYPICAL DETAIL B OF FLOOR PROTECTION WORKS

NO.	DATE	BY	CHKD BY	APPROVED BY
1	10/10/2011	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...



NOTES :-

- 1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METERS.
- 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 @ 250C/250M HAS TO BE PROVIDED ON ALL EXPOSED SURFACE HORIZONTALLY AND VERTICALLY.
- 4 GRADE OF CONCRETE :
 PIER ABUTMENT - M-15
 ABUTMENT - M-20
 PIER CAP - M-25
 APPROACH SLAB - M-20
 SOLID SLAB - M-25
- 5 GRADE OF STEEL - Fe-415.

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Sd/-
 For the P.T.C. (Civil)
 Sd/-, Bhabhankar.

CONSULTING ENGINEERS GROUP LTD.
 E-12/1st Cross, Madhya Nagar, Ashok - 17
 Tel: 487-141-250000, 250100, 250100
 Fax: 2571304, 2500000, 2500000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

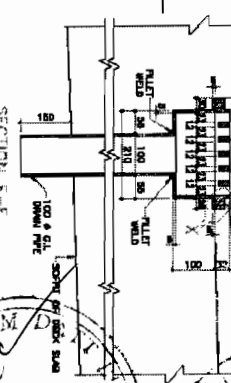
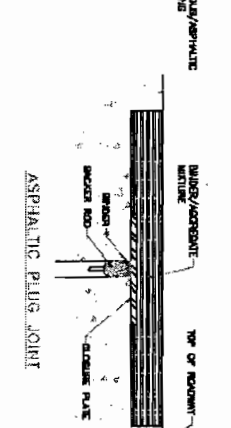
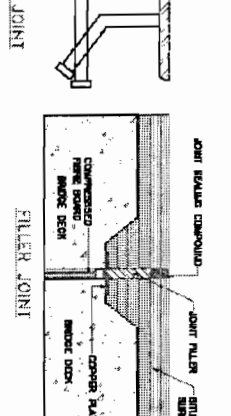
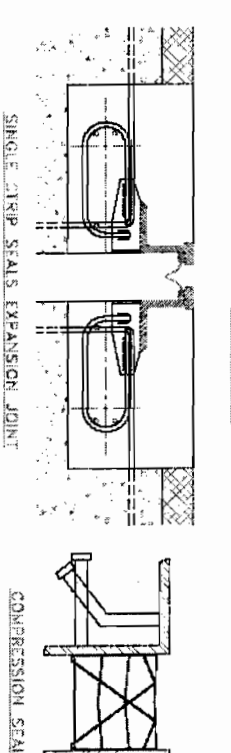
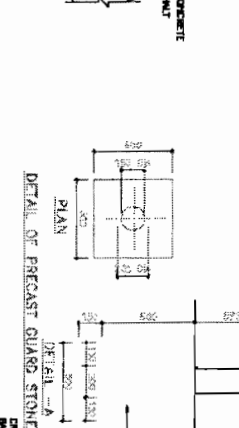
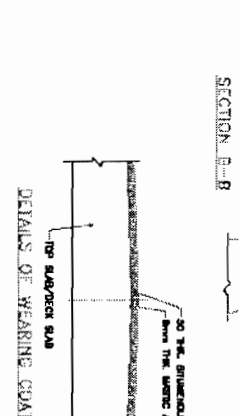
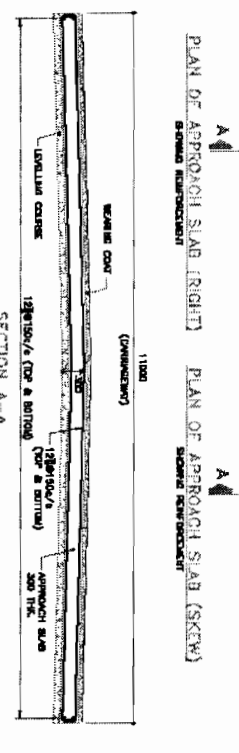
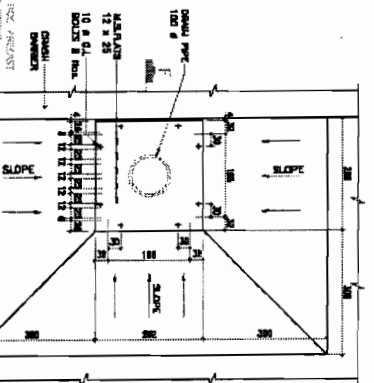
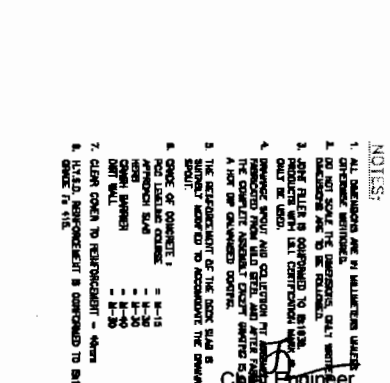
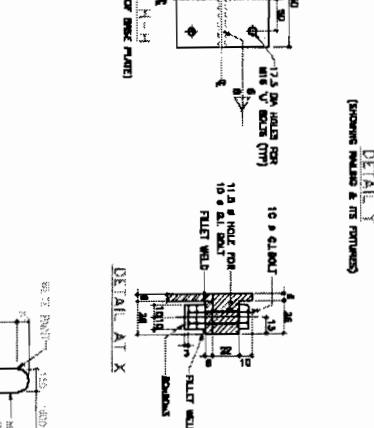
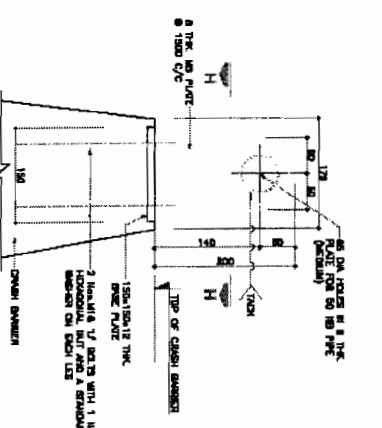
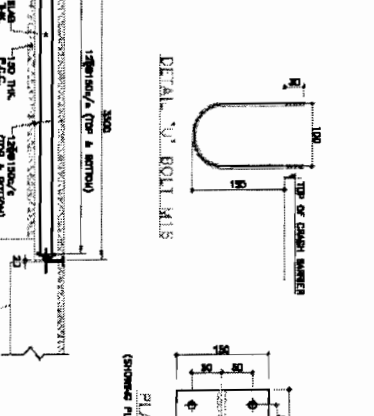
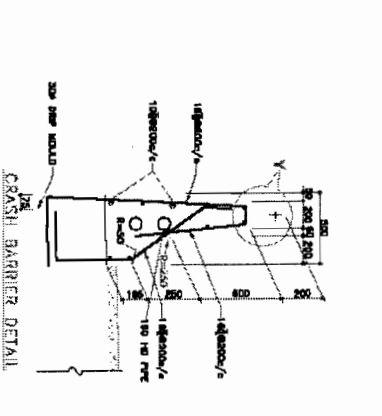
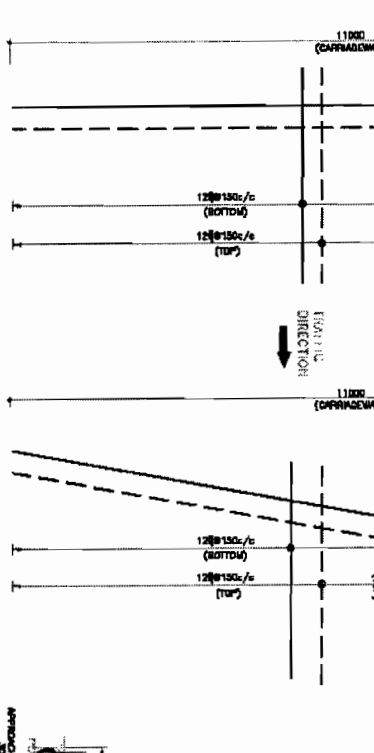
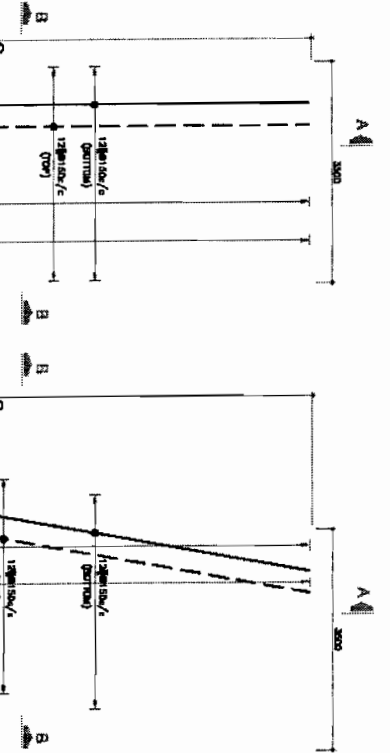
JACKETING DETAIL OF ABUTMENT & PIER

NO.	DATE	REVISION

SOM DATT BUILDERS-ARSS
 CONTRACTOR

ARSS

VOL-IV/Page 234



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 2. DO NOT SCALE THE DIMENSIONS, QUALITY WORK IS REQUIRED TO BE MAINTAINED.
 3. JOINT FILLER IS CONFORMED TO BRISAS.
 4. DIMENSIONS SHOULD BE CHECKED AT THE TIME OF THE CONSTRUCTION OF THE JOINT.
 5. THE REINFORCEMENT OF THE JOINT SLAB IS TO BE MAINTAINED AS SHOWN.
 6. JOINT FILLER IS TO BE MAINTAINED AS SHOWN.
 7. CLEAR COVER TO REINFORCEMENT - When given in this.
 8. H.P.D. REINFORCEMENT IS CONFORMED TO BRISAS.

CONSULTING ENGINEERS GROUP LTD.
 E-11th Floor, Connaught Place, New Delhi-17
 Tel: +91-11-26102000, 26102001, 26102002
 Fax: +91-11-26102016, 26102017, 26102018, 26102019

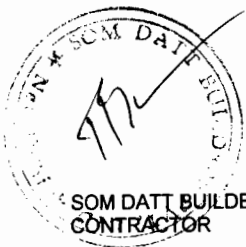
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DETAILS OF CRASH BARRIER, EXPANSION JOINT, APPROACH SLAB & DRAINAGE SPOUT

SOM DATT BUILDERS ARSS V CONTRACTOR

DATE: 10/10/2011
 TIME: 11:00 AM
 PROJECT: ORISSA STATE ROAD PROJECT
 DRAWING NO.: ORISSA/STATE ROAD/17
 SHEET NO.: 17/11

(BHADRAK TO ANANDPUR, SH-53) (0 TO 50 KM)



GENERAL

1. THESE NOTES ARE APPLICABLE FOR RCC SLAB BRIDGES.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED. NO DRAWING SHALL BE SCALED.
3. DESIGN CRITERIA:
 - I THE DESIGN IS ACCORDING TO FOLLOWING CODES:
 - (a) IRC : 5-1998
 - (b) IRC : 6-2000
 - (c) IRC : 21-2000
 - (d) IRC : 78-2000
 - II THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:
 - (a) IRC 70R TRACKED & ONE LANE OF CLASS A
 - (b) IRC 70R WHEELED & ONE LANE OF CLASS A
 - (c) THREE LANE OF CLASS A
 - (d) WEARING COAT LOAD OF 2.20 KN/sq. M.
 - (e) TEMPERATURE VARIATION = $\pm 25^{\circ}$
 - III THE DESIGN ARE APPLICABLE FOR 'MODERATE' CONDITIONS OF EXPOSURE.
 - IV WEARING COAT SHALL CONSIST OF THE FOLLOWING
 1. A COAT OF MASTIC ASPHALT 12mm THICK, WITH A PRIME COAT OVER THE TOP OF DECK IS TO BE PROVIDED BEFORE THE WEARING COAT IS LAID.
 2. 50mm THICK ASPHALT CONCRETE WEARING COAT AS PER CLAUSE 512 OF MOST'S SPECIFICATIONS FOR ROADS AND BRIDGE WORKS (THIRD REV-1995).
 3. WEARING COAT SHALL BE DISCONTINUED AT EXPANSION JOINT LOCATION.
 4. JOINT FILLERS SHALL EXTEND UP TO THE TOP OF WEARING COAT.
 5. WIDTH OF EXPANSION JOINT HAS BEEN KEPT 20 MM ONLY WHICH DOES NOT CATER FOR ANY ALLOWANCE FOR POSSIBLE TITLING OF ABOUTMENT.
 6. SUPPORT FOR THE DECK SLAB SHALL PROVIDE A BEARING WIDTH OF 400 MM MEASURED IN A DIRECTION PERPENDICULAR TO SUPPORT.
 7. NO PUBLIC UTILITY SERVICES SHALL BE CARRIED OUT OVER THE BRIDGE.

CONCRETE

1. CONCRETE SHALL BE DESIGN MIX AND SHALL HAVE MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150MM CUBES FOR ALL ELEMENTS OF STRUCTURES AS INDICATED IN DRAWING FOR MODERATE CONDITIONS OF EXPOSURE.
 2. HIGH STRENGTH ORDINARY PORTLAND CEMENT CONFORMING TO IS:8112 OR ORDINARY PORTLAND CEMENT CONFORMING TO IS:2858 CAPABLE OF ACHIEVING THE REQUIRED DESIGN STRENGTH SHALL ONLY BE USED.
 3. THE MINIMUM CEMENT CONCRETE AND WATER CEMENT RATIO IN THE CONCRETE DESIGN MIX SHALL BE 310 KG PER CUM AND 0.45 RESPECTIVELY FOR 'MODERATE' CONDITIONS OF EXPOSURE.
 4. TO IMPROVE WORKABILITY OF CONCRETE USE OF ADMIXTURES CONFORMING TO IS:9103 MAY BE MADE WITH APPROVAL OF ENGINEER INCHARGE.
 5. AGGREGATE SHALL CONFORM TO CL 302.3 OF IRC:21-2000
- REINFORCEMENT**
- ALL REINFORCEMENT SHALL BE HIGH YIELD STRENGTH DEFORMED BARS (GRADE DESIGNATION S 415) CONFORMING TO IS:1786
- CONFIGURATION IS SHOWN AS :
- TOR BAR
 #10 @200c/c
 SPACINGS OF BARS

EARTH FILL/EMBANKMENT

1. SPACING GIVEN FOR ALL REINFORCEMENT IS PERPENDICULAR TO BARS UNLESS OTHERWISE SHOWN ON DRAWINGS.
2. BACK FILLING MATERIAL SHOULD CONFORM TO CL 302.2 OF MOST'S SPECIFICATION (FOURTH REVISION 2001).

WATER

1. WATER TO BE USED IN CONCRETING AND CURING SHALL BE CONFORMING TO CLAUSE 302.4 OF IRC 21-2000.
2. WORKMANSHIP/DETAILING
 1. MINIMUM CLEAR COVER TO ANY REINFORCEMENT INCLUDING STIRRUPS SHALL BE 50 MM UNLESS OTHERWISE SHOWN IN THE DRAWINGS.
 2. FOR ENSURING PROPER COVER OF CONCRETE TO REINFORCEMENT SPECIALLY MADE POLYMER COVER BLOCKS SHALL BE USED.

CONSTRUCTION JOINTS:

1. THE LOCATION PROVISION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY ENGINEER-IN-CHARGE. THE CONSTRUCTION OPERATION SHALL BE CARRIED OUT CONTINUOUSLY UP TO THE CONSTRUCTION JOINT.
- II THE CONCRETE SURFACE AT THE JOINT SHALL BE BRUSHED WITH A STIFF BRUSH AFTER CASTING WHILE THE CONCRETE IS STILL FRESH AND IT HAS ONLY SLIGHTLY HARDENED.
- III BEFORE NEW CONCRETE IS POURED THE SURFACE OF OLD CONCRETE SHALL BE PREPARED AS UNDER:
 - (a) FOR HARDENED CONCRETE, THE SURFACE SHALL BE THOROUGHLY CLEANED TO REMOVED DERRIS/LANTAGE AND MADE ROUGH SO THAT 1/4 OF THE SIZE OF THE AGGREGATE IS EXPOSED.
 - (b) FOR PARTIALLY HARDENED CONCRETE, THE SURFACE SHALL BE TREATED BY WIRE BRUSH FOLLOWED BY AN AIR JET.
 - (c) THE OLD SURFACE SHALL BE SMOOTH WITH WATER WITHOUT LEAVING PUDDLES IMMEDIATELY, BEFORE STARTING CONCRETING TO PREVENT THE ABSORPTION OF WATER FROM NEW CONCRETE.
- IV NEW CONCRETE SHALL BE THOROUGHLY COMPACTED IN THE REGION OF THE JOINT.
- V WELDING OF REINFORCEMENT BARS SHALL NOT BE PERMITTED.
- VI LAPS IN REINFORCEMENT:
 1. MINIMUM LAP LENGTH OF REINFORCEMENT SHALL BE DECIDED AS PER THE REINFORCEMENT ARRANGEMENT BASED ON THE CLAUSE - 304.6.8 OF IRC:21-2000.
 - II NOT MORE THAN 50 % OF REINFORCEMENT SHALL BE LAPPED AT ANY ONE LOCATION

5. BENDING OF REINFORCEMENT BARS SHALL BE AS PER IS:2502
6. SUPPORTING CHAIRS OF 12 MM DIAMETER SHALL BE PROVIDED AT SURFACE INTERVALS AS PER IS:2502.
7. CONCRETE SHALL BE PRODUCED IN A MECHANICAL MIXER OF CAPACITY NOT LESS THAN 200 LTRS. HAVING INTEGRAL WEIGH-BATCHING FACILITY AND AUTOMATIC WATER MEASURING AND DISPENSING DEVICE.
8. PROPER COMPACTION OF CONCRETE SHALL BE ENSURED BY USE OF FORM AND/OR REEDEL VIBRATORS. USE OF FULL WIDTH SCREED VIBRATORS FOR COMPACTION OF CONCRETE IN DECK SLAB SHALL BE ENSURED.
9. PROPERLY BRACED STEEL PLATES SHALL BE USED AS SHUTTERING.
10. SHARP EDGES OF CONCRETE SHALL BE CHAMFERED.

FOUNDATION:-

1. FOR OPEN FOUNDATIONS RESTINGS ON ROCKS THE MINIMUM DEPTH OF EMBEDMENT SHALL BE 0.8 M FOR HARD ROCK WITH ULTIMATE CRUSHING STRENGTH OF 10 MPa OR ABOVE AND 1.5 M FOR OTHER TYPE ROCKS.
2. IN CASE OF EXCAVATION IN ROCK, THE TRENCHES AROUND THE FOOTING SHALL BE FILLED UP WITH CEMENT CONCRETE OF M-15 GRADE UP TO THE TOP OF THE ROCK. DEPTH OF FILL IN EXCESS OF 1.5 M IN SOFT ROCK OR 0.6 M IN HARD ROCK MAY BE FILL BY CONCRETE OR BY Boulders GROUTED WITH CEMENT.

GENERAL SPECIFICATIONS:

11. FILTER MEDIA SHOULD BE PROVIDED IN ACCORDANCE TO CLAUSE 2001.1 OF MOST SPECIFICATIONS (FOURTH REV. 2001).
12. IN PRESENCE OF SOIL WITH AGGRESSIVE SOIL CONDITION, THE CONCRETE FACES IN CONTACT WITH EARTH SHALL BE PROTECTED WITH APPROVED BITUMINOUS PAINT OR COATING AS DECIDED BY THE ENGINEER-IN-CHARGE.

FOUNDATION:-

1. FOR OPEN FOUNDATIONS RESTINGS ON ROCKS THE MINIMUM DEPTH OF EMBEDMENT SHALL BE 0.8 M FOR HARD ROCK WITH ULTIMATE CRUSHING STRENGTH OF 10 MPa OR ABOVE AND 1.5 M FOR OTHER TYPE ROCKS.
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CONSULTING ENGINEERS GROUP LTD.
 5-23/201/ Chandrasekhar Nagar, Hyderabad-17
 Tel: 481-1411-1412 Fax: 481-1411-1412
 E-mail: info@cegroup.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (0) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL NOTES FOR RCC SLAB BRIDGES

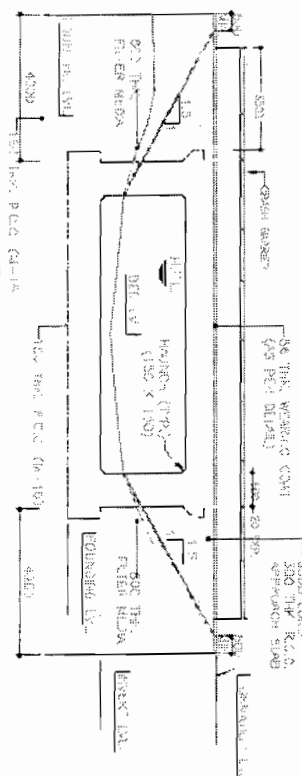
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SQM DATT BUILDERS & CONTRACTORS
 PLOT NO. 12, SECTOR 10, VASANT VIHAR, NEW DELHI-110021
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World Bank
 Project: Orissa State Road Project
 Consultant: Consulting Engineers Group Ltd.
 Engineer: [Signature]
 Inspector: [Signature]
 EMPLOYER

TO BHADARK

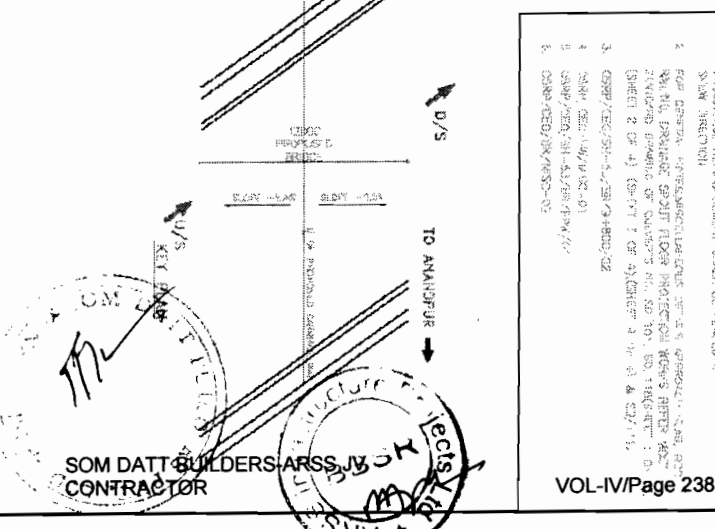
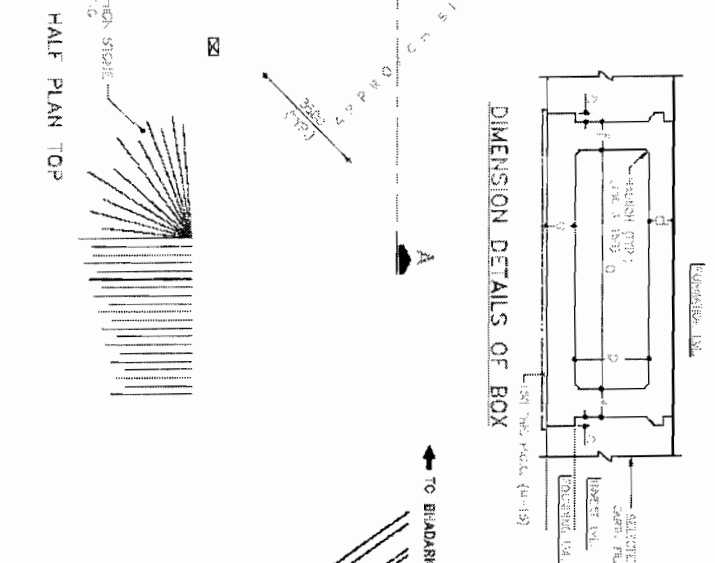
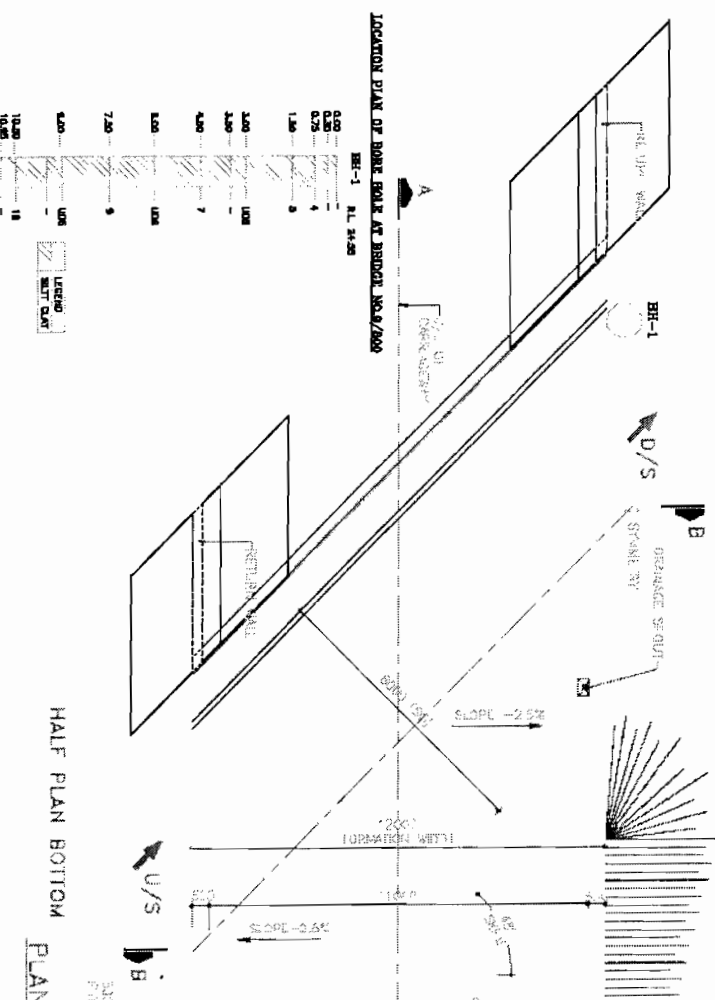
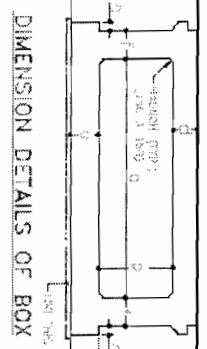
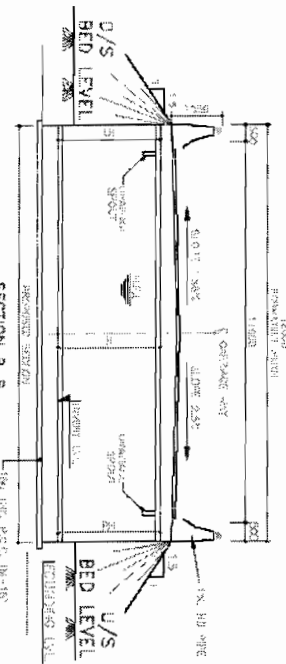
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PROPOSITION LEVEL (m)	BE D LEVEL (m)	CH-ARRANGE (m)
27.250	24.674	10+011.05
27.250	24.380	10+016.0
27.250	24.671	10+020.95

DIMENSION DETAILS OF BOX

BOX TYPE	WIDTH (mm)	HEIGHT (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	BEARING CAPACITY
1. BOX	3000	2200	100	100	100	100	1.5 D. 1.5 M ²



NOTES:

1. ALL DIMENSIONS ARE IN MET & METERS UNLESS OTHERWISE STATED.
2. CHECK WHETHER DIMENSIONS ARE IN IN. FOLLOWING DO NOT SCALE THE DIMENSIONS.
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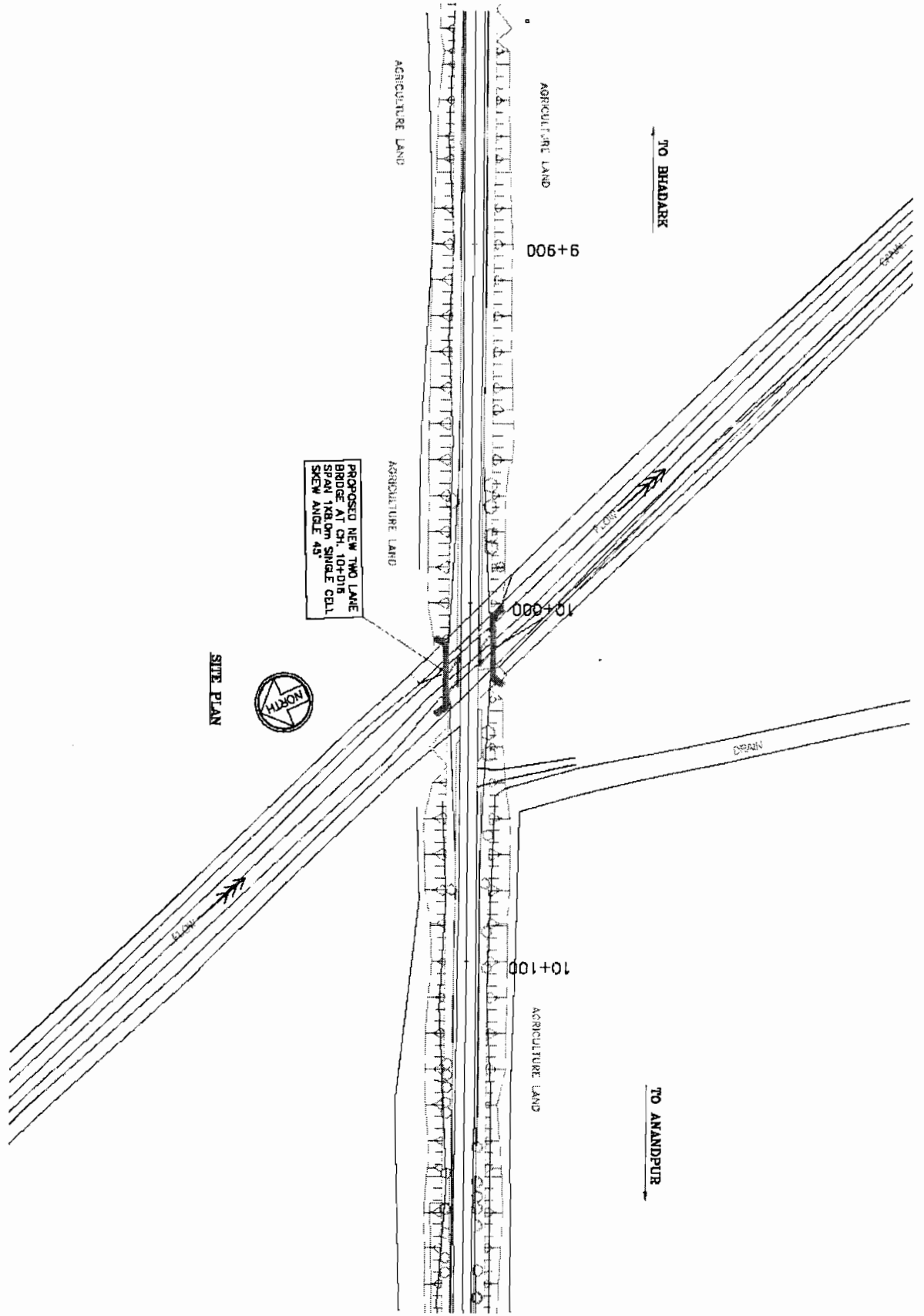
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1. L & D DIMENSIONS & REINFORCEMENT DETAILS OF THE BOX.
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Chief Engineer
World Bank Project, Orissa
EMPLOYER
SOM DATT BUILDERS ARSS JV
CONTRACTOR

CONSULTING ENGINEERS GROUP LTD.
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (0) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
BRIDGE AT PROPOSED CH-10-016
(ANANDPUR NALA)



PROPOSED NEW TWO LANE
BRIDGE AT CH. 10+018
SPAN 18.0m SINGLE CELL
SKEW ANGLE 45°



SITE PLAN

CONSULTING ENGINEERS GROUP LTD.
E-11, Ring Road, Sector 17, Gurgaon, Haryana, India
Tel: 26101111, Fax: 26101112, Email: info@ceg.com

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

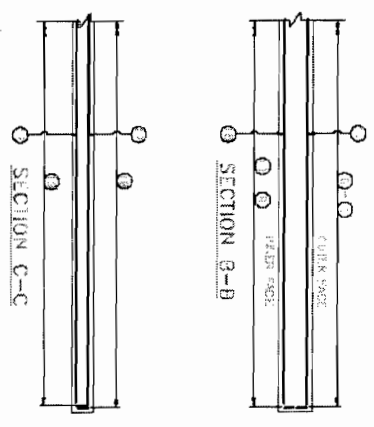
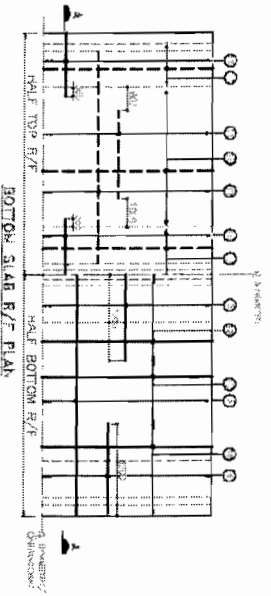
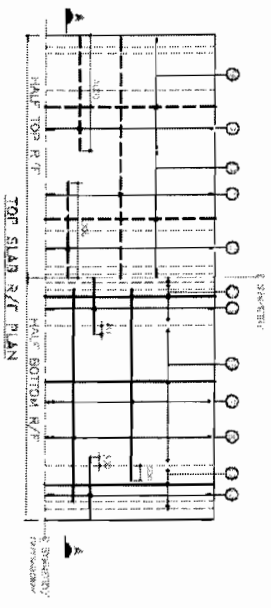
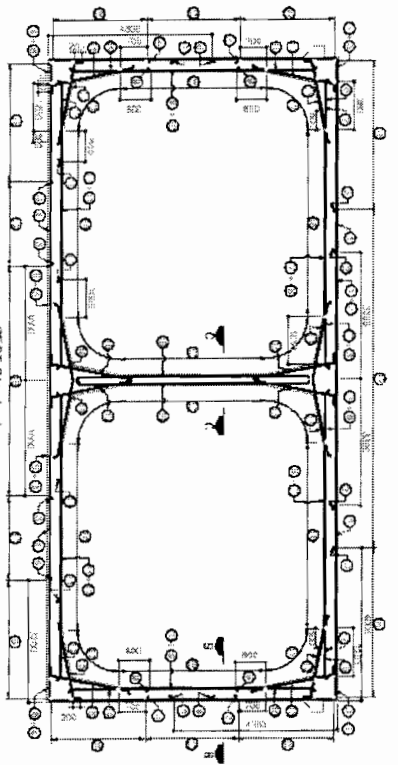
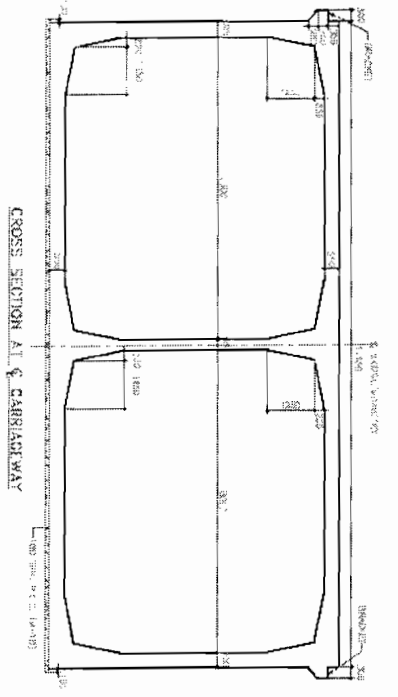
SITE PLAN
BRIDGE AT PROPOSED CH: 10+018
(BHAINPUR N.W.)

NO.	DATE	REVISION	BY	CHKD	APPD

SOM DATT BUILDERS-ARSS JV
CONTRACTOR

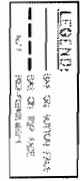
NOTES:-

Chief Engineer
World Bank Projects Office
EMPLOYER
C/o the E.L.C. (Civil)
Orissa, Bhubaneswar.



BAR DETAILS

BAR NO.	BAR DIA.	SPEAKING	SHAPE
1	12	200 270	[Diagram]
2	20	250 270	[Diagram]
3	20	250 270	[Diagram]
4	20	250 270	[Diagram]
5	20	250 270	[Diagram]
6	18	250 270	[Diagram]
7	12	200 270	[Diagram]
8	20	250 270	[Diagram]
9	12	200 270	[Diagram]
10	20	250 270	[Diagram]
11	20	250 270	[Diagram]
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34	18	250 270	[Diagram]
35	18	250 270	[Diagram]
36	18	250 270	[Diagram]
37	18	250 270	[Diagram]
38	18	250 270	[Diagram]
39	18	250 270	[Diagram]
40	18	250 270	[Diagram]
41	18	250 270	[Diagram]
42	18	250 270	[Diagram]



NOTES:

1. ALL DIMENSIONS ARE IN MM AND UNLESS NOTED OTHERWISE TO BE TAKEN AS PER DRAWING.
2. DO NOT SCALE THE DIMENSIONS. THEY ARE TO BE TAKEN FROM THE DRAWING.
3. REINFORCEMENT BARS ARE TO BE SUPPLIED BY THE CONTRACTOR.
4. REINFORCEMENT BARS ARE TO BE PROVIDED AS PER DRAWING.
5. ALL DIMENSIONS ARE TO BE TAKEN AS PER DRAWING.
6. TOP SURFACE OF CONCRETE SHALL BE FINISHED TO THE REQUIRED LEVEL.
7. ALL DIMENSIONS ARE TO BE TAKEN AS PER DRAWING.
8. ALL DIMENSIONS ARE TO BE TAKEN AS PER DRAWING.
9. ALL DIMENSIONS ARE TO BE TAKEN AS PER DRAWING.
10. ALL DIMENSIONS ARE TO BE TAKEN AS PER DRAWING.

REFERENCE DRAWINGS:

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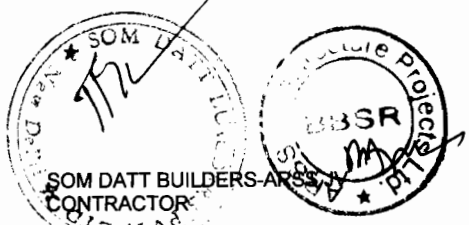
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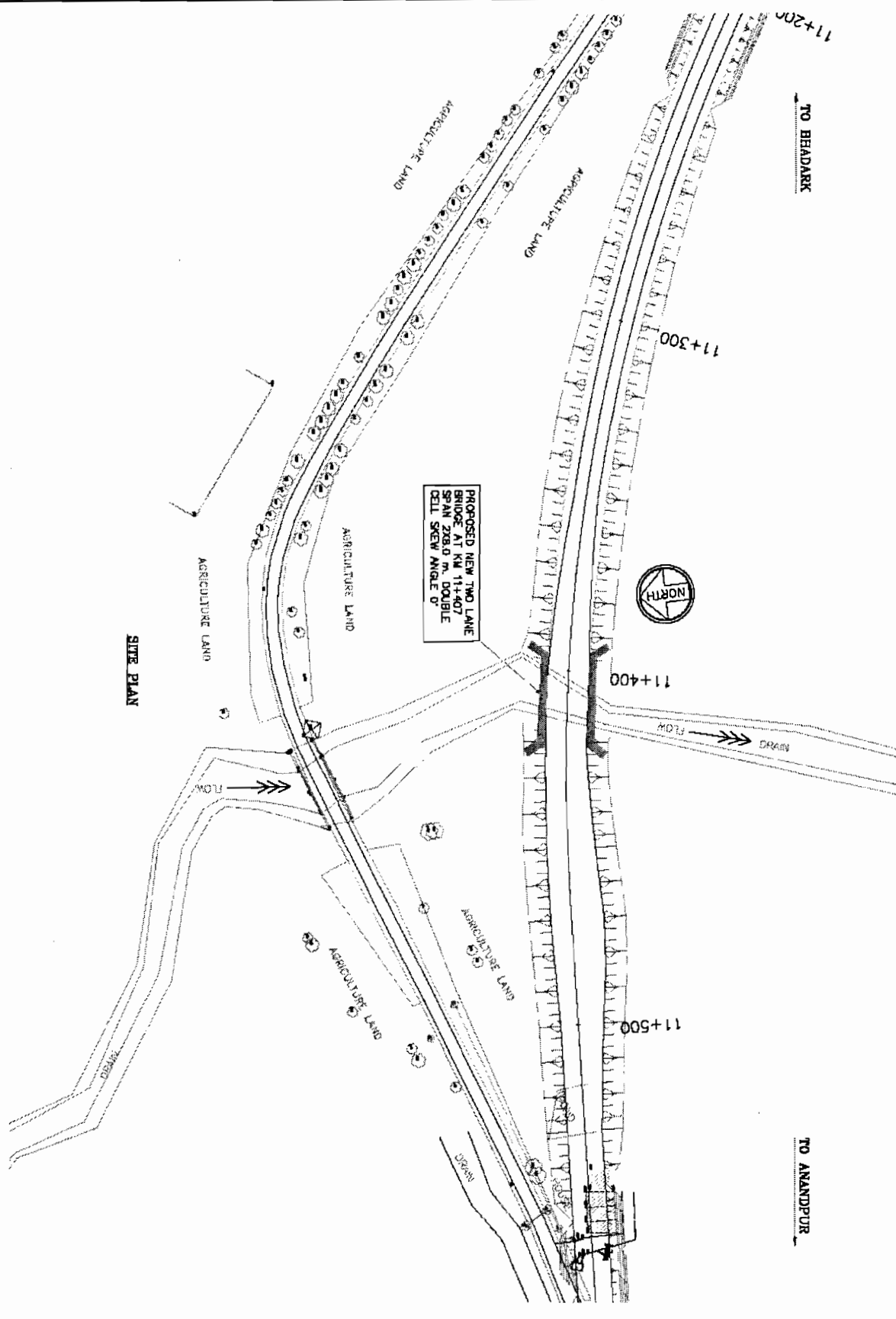
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CONSULTING ENGINEERS GROUP LTD.
 E-12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - 0) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION AND REINFORCEMENT DETAILS BRIDGE AT PROPOSED CH. 111+407 (GANJANUNGA BRIDGE)





PROPOSED NEW TWO LANE
BRIDGE AT KM 11+407
SPAN 208.0 M. DOUBLE
CELL SKEW ANGLE 0°



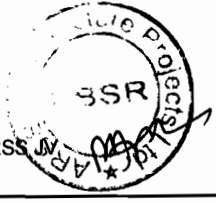
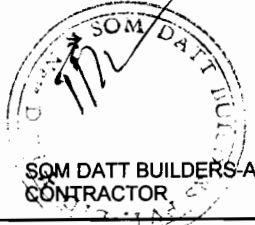
SITE PLAN

CONSULTING
 ENGINEERING GROUP LTD.
 E-12, Indraprastha Nagar, Sector-17
 Gurgaon, Haryana, India
 Tel: +91-11-26101114-26101115
 Fax: +91-11-26101116-26101117
 Web: www.egroup.com

PROJECT
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT
 UNDER WORLD BANK ASSISTANCE

SITE PLAN
 BRIDGE AT PROPOSED CH. 11+407
 (GANANIGA BRIDGE)

Checked By	11/11/2011	11/11/2011	11/11/2011	11/11/2011
Drawn By				
Scale				
Rev. No.				
Appr. By				

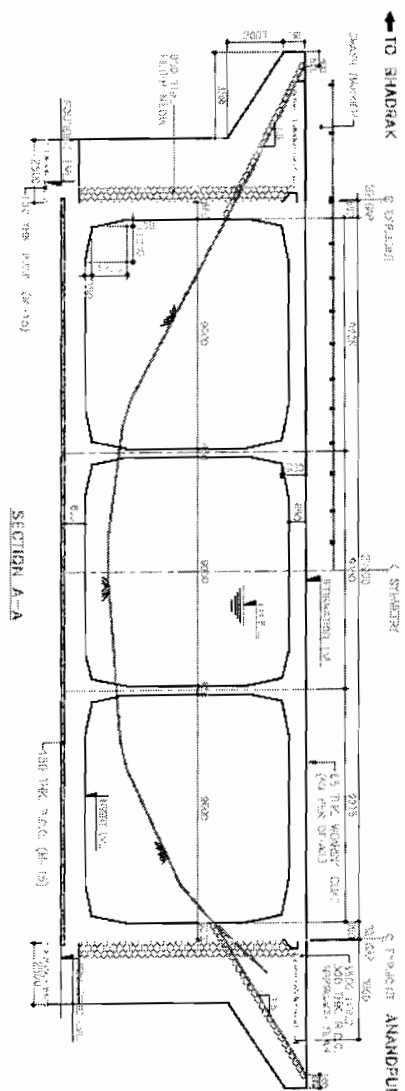


Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 C/o the S.I.C. (Orissa)
 Orissa, Bhubaneswar

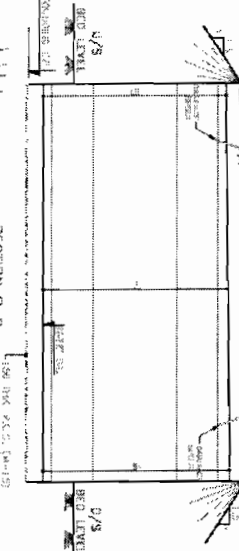
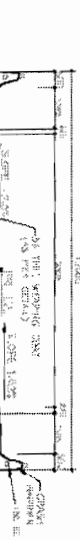
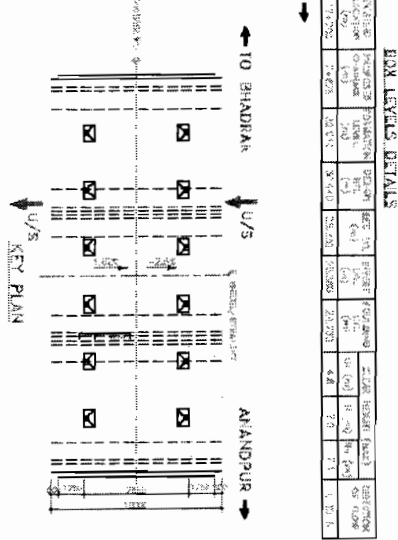
NOTES:-

BOX LEVELS DETAILS

LINE NO.	STATION	PC	PT	HEIGHT (m)	WIDTH (m)	DEPTH (m)	CONCRETE CLASS	REINFORCEMENT	FINISH
1	0+200	0+210	0+210	1.2	1.2	0.3	M20	150mm x 150mm	1:2:4
2	0+210	0+220	0+220	1.2	1.2	0.3	M20	150mm x 150mm	1:2:4
3	0+220	0+230	0+230	1.2	1.2	0.3	M20	150mm x 150mm	1:2:4
4	0+230	0+240	0+240	1.2	1.2	0.3	M20	150mm x 150mm	1:2:4
5	0+240	0+250	0+250	1.2	1.2	0.3	M20	150mm x 150mm	1:2:4
6	0+250	0+260	0+260	1.2	1.2	0.3	M20	150mm x 150mm	1:2:4

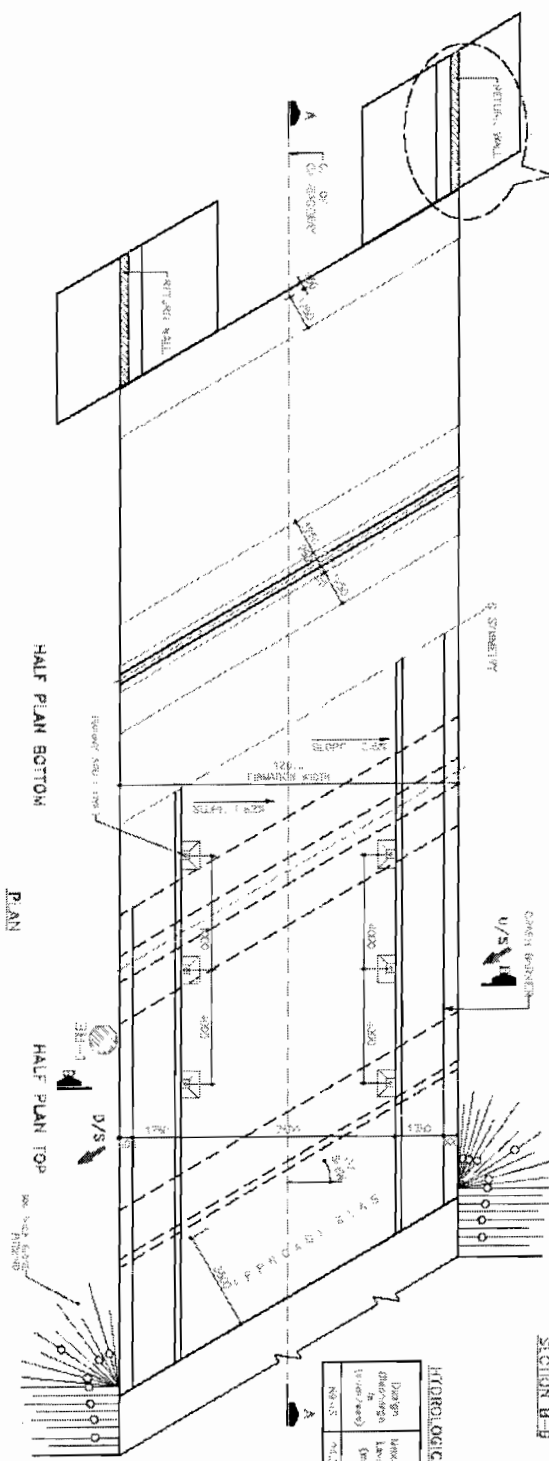


FORMATION LEVEL (m)	0.00	1.00	2.00	3.00	4.00	5.00	6.00
BD LEVEL (m)	1.0	2.0	3.0	4.0	5.0	6.0	7.0
CHANGES (m)	1.0	2.0	3.0	4.0	5.0	6.0	7.0



HYDROLOGICAL DATA

Design discharge (cumecs)	Return period (years)	Maximum Flood level (m)	Minimum Flood level (m)
500	100	5.0	4.5
1000	100	5.0	4.5
1500	100	5.0	4.5
2000	100	5.0	4.5
2500	100	5.0	4.5
3000	100	5.0	4.5
3500	100	5.0	4.5
4000	100	5.0	4.5



NOTE:
SOIL BEING FOUNDING LEVEL, JUMP DITCH, OR E.C.M. SHALL BE APPROVED BY SOIL/AGG ENGINEER BEFORE TO BE THE REQUIRED.

CONSULTING ENGINEERS GROUP LTD.
12, Market Street, Bhubaneswar-751017
Ph: 2531111, 2531112, 2531113, 2531114, 2531115, 2531116, 2531117, 2531118, 2531119, 2531120, 2531121, 2531122, 2531123, 2531124, 2531125, 2531126, 2531127, 2531128, 2531129, 2531130, 2531131, 2531132, 2531133, 2531134, 2531135, 2531136, 2531137, 2531138, 2531139, 2531140, 2531141, 2531142, 2531143, 2531144, 2531145, 2531146, 2531147, 2531148, 2531149, 2531150, 2531151, 2531152, 2531153, 2531154, 2531155, 2531156, 2531157, 2531158, 2531159, 2531160, 2531161, 2531162, 2531163, 2531164, 2531165, 2531166, 2531167, 2531168, 2531169, 2531170, 2531171, 2531172, 2531173, 2531174, 2531175, 2531176, 2531177, 2531178, 2531179, 2531180, 2531181, 2531182, 2531183, 2531184, 2531185, 2531186, 2531187, 2531188, 2531189, 2531190, 2531191, 2531192, 2531193, 2531194, 2531195, 2531196, 2531197, 2531198, 2531199, 2531200, 2531201, 2531202, 2531203, 2531204, 2531205, 2531206, 2531207, 2531208, 2531209, 2531210, 2531211, 2531212, 2531213, 2531214, 2531215, 2531216, 2531217, 2531218, 2531219, 2531220, 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2531998, 2531999, 2532000.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 17+270 (TULO FOLD KAPALI RIVER)

NO.	REVISION	DATE	BY	CHKD.
1				
2				
3				
4				
5				

SOM DATT BUILDERS ARSS JV CONTRACTOR

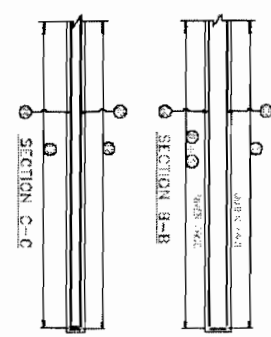
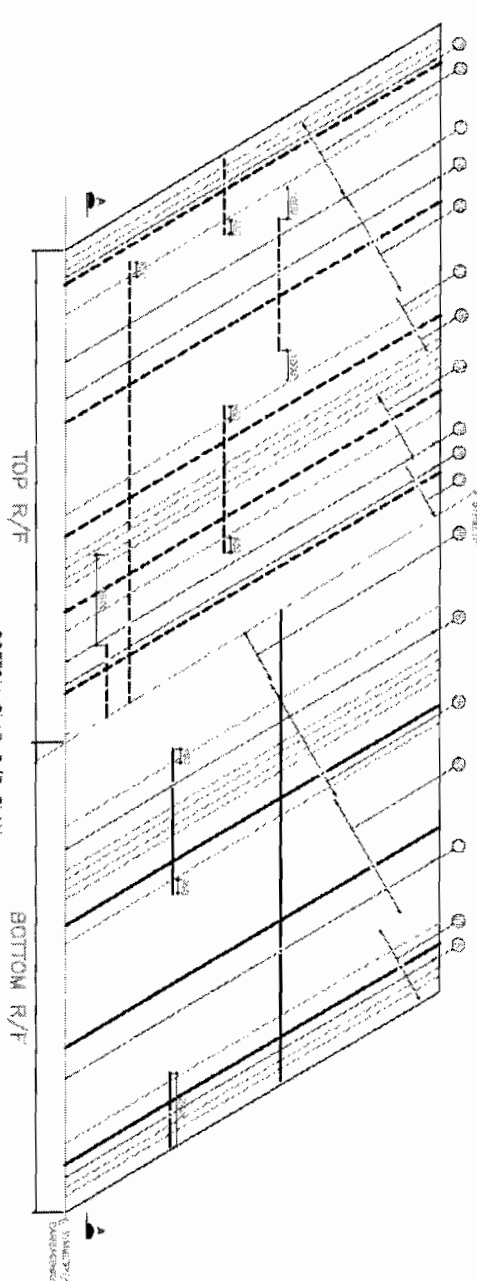
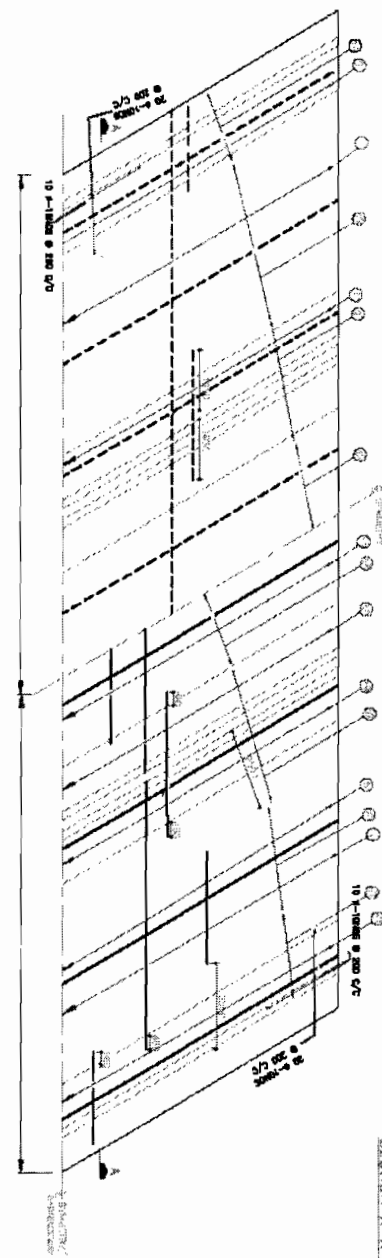
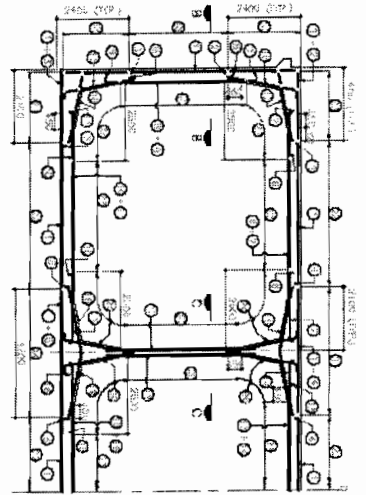
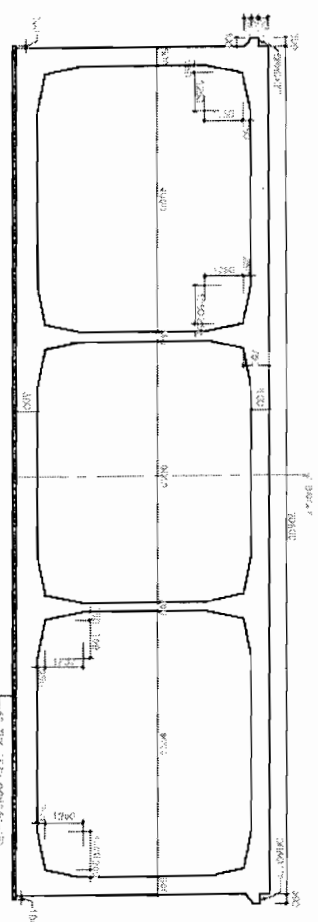
ARSS JV PROJECTS PVT. LTD.

BBSR

NOTES:
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL UNITS ARE TO BE METRIC.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE LOCAL AUTHORITY.
4. WORK SHALL BE COMPLETED WITHIN THE SPECIFIED TIME FRAME.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EXISTING UTILITIES.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ENVIRONMENT.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF SAFETY.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF HEALTH.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PROPERTY.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF REPUTATION.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF CREDIT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF HONOR.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF DIGNITY.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF INTEGRITY.
15. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF FAITH.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PROMISE.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF TRUST.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF RESPECT.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF DUTY.
20. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF JUSTICE.
21. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EQUITY.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF MERCY.
23. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF KINDNESS.
24. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF BENEVOLENCE.
25. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF CHARITY.
26. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF LOVE.
27. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PEACE.
28. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF HARMONY.
29. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF UNITY.
30. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF BROTHERHOOD.
31. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF SISTERHOOD.
32. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF FRIENDSHIP.
33. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF COOPERATION.
34. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF TEAMWORK.
35. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF COLLABORATION.
36. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PARTNERSHIP.
37. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF JOINT VENTURE.
38. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALLIANCE.
39. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PARTNERSHIP AGREEMENT.
40. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF CONTRACT AGREEMENT.
41. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF SERVICE AGREEMENT.
42. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EMPLOYMENT AGREEMENT.
43. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF LICENSING AGREEMENT.
44. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF FRANCHISING AGREEMENT.
45. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF JOINT MARKETING AGREEMENT.
46. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF CO-BRANDING AGREEMENT.
47. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF CROSS-PROMOTION AGREEMENT.
48. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF REFERENCE AGREEMENT.
49. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF TESTIMONIAL AGREEMENT.
50. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF CASE STUDY AGREEMENT.
51. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF PRESS RELEASE AGREEMENT.
52. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF BLOG POSTING AGREEMENT.
53. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF SOCIAL MEDIA AGREEMENT.
54. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF WEBSITE AGREEMENT.
55. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF VIDEO AGREEEMENT.
56. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AUDIO AGREEMENT.
57. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF TEXT MESSAGE AGREEMENT.
58. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EMAIL AGREEMENT.
59. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF NEWSLETTER AGREEMENT.
60. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF WEBCAST AGREEMENT.

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

World Bank Projects, Orissa
Chief Engineer (Civil)
Chief Engineer (Mech)



REINFORCEMENT DETAILS

NO.	BAR DIA.	SPACING	LENGTH	NO.
1	12	150	1.00	1
2	12	150	1.00	2
3	12	150	1.00	3
4	12	150	1.00	4
5	12	150	1.00	5
6	12	150	1.00	6
7	12	150	1.00	7
8	12	150	1.00	8
9	12	150	1.00	9
10	12	150	1.00	10
11	12	150	1.00	11
12	12	150	1.00	12
13	12	150	1.00	13
14	12	150	1.00	14
15	12	150	1.00	15
16	12	150	1.00	16
17	12	150	1.00	17
18	12	150	1.00	18
19	12	150	1.00	19
20	12	150	1.00	20
21	12	150	1.00	21
22	12	150	1.00	22
23	12	150	1.00	23
24	12	150	1.00	24
25	12	150	1.00	25
26	12	150	1.00	26
27	12	150	1.00	27
28	12	150	1.00	28
29	12	150	1.00	29
30	12	150	1.00	30

LEGEND:
 --- REINFORCEMENT
 --- NOT REINFORCEMENT

NOTES:

1. ALL DIMENSIONS ARE IN MM AND ANGLES ARE IN DEGREES.
2. DO NOT SCALE THE DIMENSIONS FROM THE DRAWING.
3. CHECK THE REINFORCEMENT DETAIL WITH THE CONTRACTOR.
4. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.
5. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.
6. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.
7. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.
8. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.
9. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.
10. THE REINFORCEMENT IS TO BE PROVIDED IN ALL THE PARTS OF THE BRIDGE.

REFERENCE DRAWINGS:

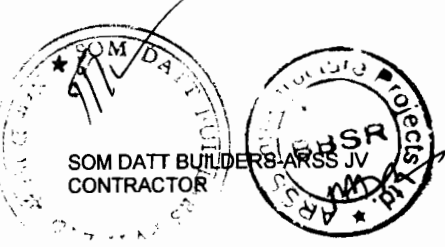
1. DRAWING NO. 17-1-27/8
2. DRAWING NO. 17-1-27/8
3. DRAWING NO. 17-1-27/8

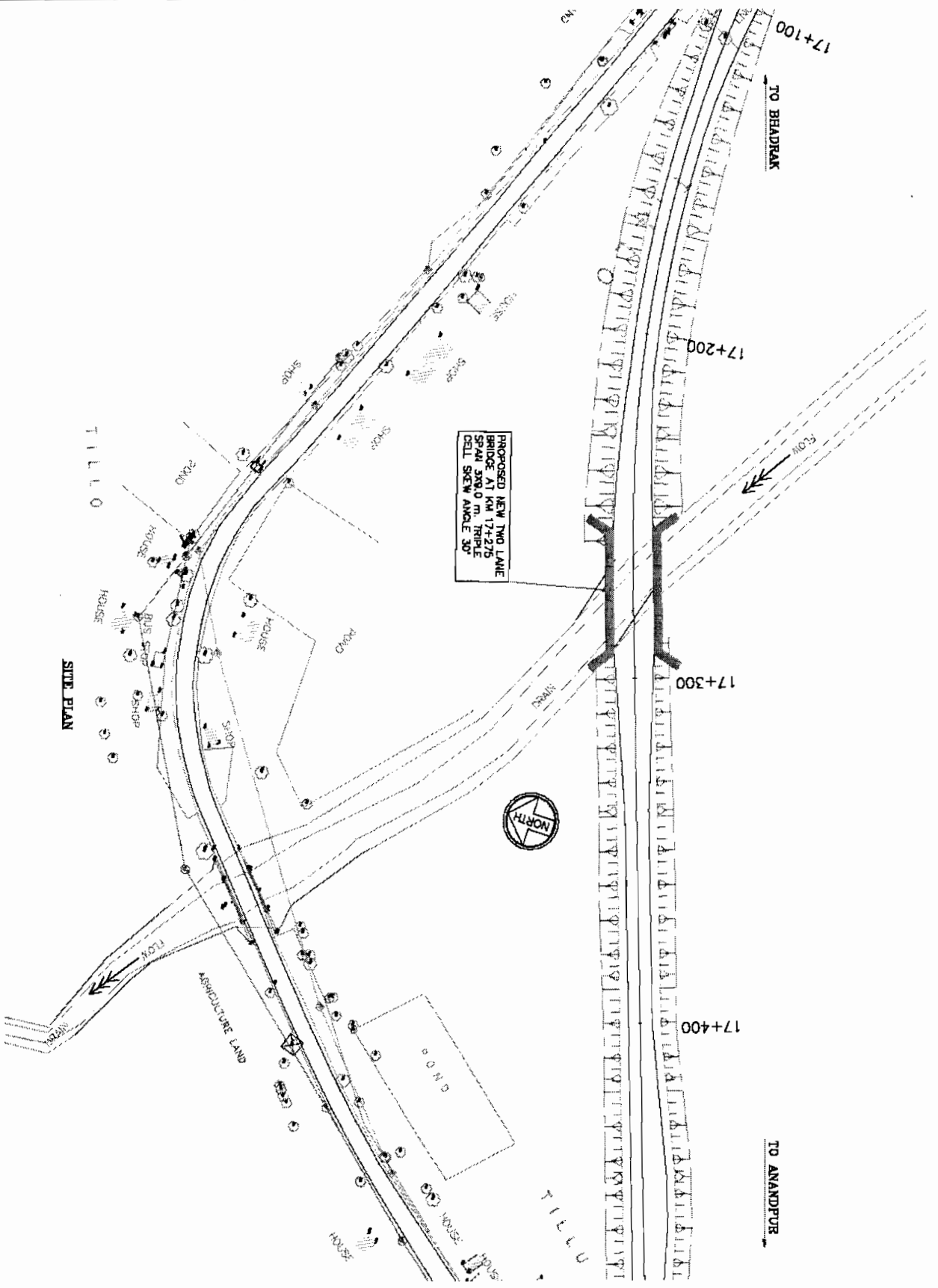
Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER
 World Bank Project
 Orissa State Road Project
 Chief Engineer

CONSULTING ENGINEERS GROUP LTD.
 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION AND REINFORCEMENT DETAILS
 BRIDGE AT PROPOSED CH. 17-1-27/8
 (TULO POLO KAPALI RIVER)





CONSULTING ENGINEERS
ENGINEERS GROUP LTD.
 C-12/34/2, Conchajyoti, Bhubaneswar-751017
 Tel: 257141, Fax: 257142, 257143, 257144

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH. 17+275 (TILLO POLO KAPALI RIVER)

DATE	REVISION	BY	CHKD

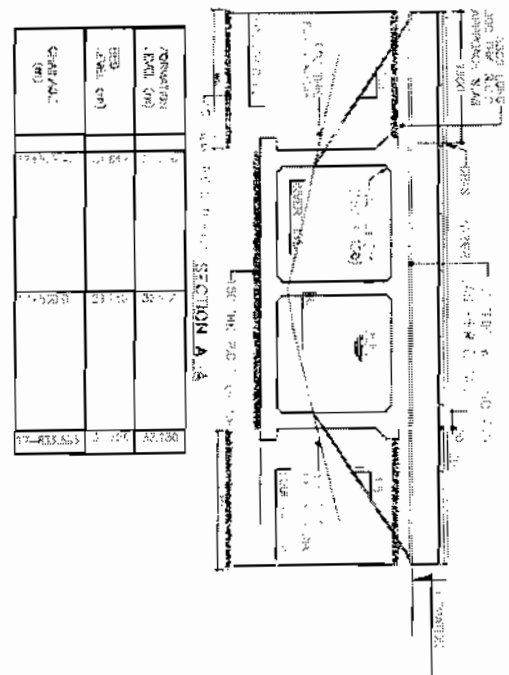
SOM DATT BUILDERS-ARSS JV
CONTRACTOR

Chief Engineer
 World Bank Projects, Orissa
EMPLOYER
 Chief Engineer
 World Bank Projects
 Orissa, Bhubaneswar.

NOTES:-

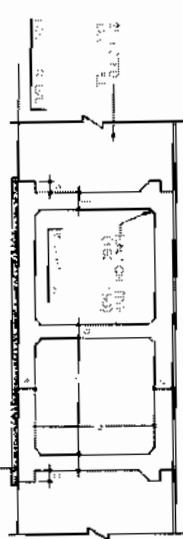
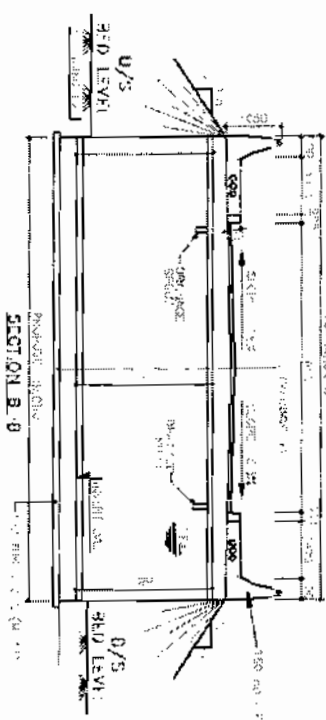
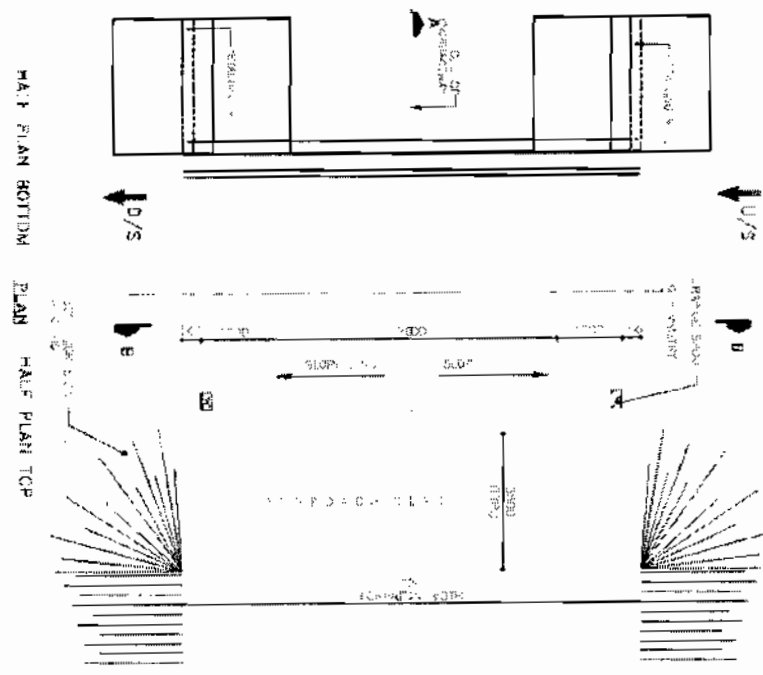
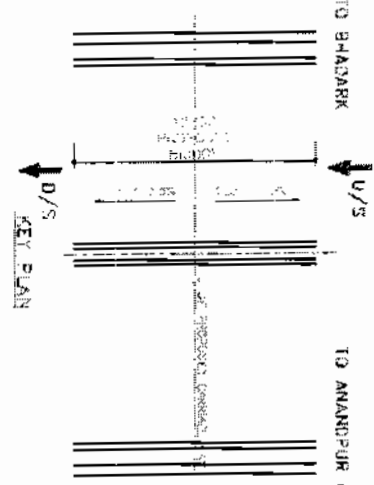
TO BHADRAK

TO ANANDPUR



TO BHADRAK

TO ANANDPUR



NO.	SECTION	LENGTH (M)	WIDTH (M)	HEIGHT (M)	AREA (SQ M)	VOLUME (CU M)	WEIGHT (TONNES)
1	ABUTMENT	10.0	10.0	5.0	500.0	2500.0	20000.0
2	PIER	5.0	5.0	10.0	250.0	1250.0	10000.0
3	DECK	20.0	10.0	0.2	400.0	80.0	600.0

HYDROLOGICAL DATA

NO.	DATE	WATER LEVEL (M)	WATER FLOW (M ³ /SEC)	WIND VELOCITY (KM/H)	WIND DIRECTION
1	10-05-80	10.5	100	10	SW
2	10-06-80	10.8	120	15	SW
3	10-07-80	11.0	150	20	SW

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. THE BRIDGE SHALL BE CONSTRUCTED TO THE DESIGN STANDARD AS PER THE SPECIFICATIONS OF THE NATIONAL BUREAU OF STANDARDS, INDIA.
3. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN LOAD OF 100 TONNES PER METER LENGTH.
4. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN WIND VELOCITY OF 100 KM/H.
5. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN SEISMIC ACCCELERATION OF 0.15 G.
6. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN FLOODING OF 10 METERS ABOVE THE DESIGN WATER LEVEL.
7. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN COLLISION OF 100 TONNES.
8. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN IMPACT OF 10 TONNES.
9. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN LOAD.
10. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN WIND VELOCITY.
11. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN SEISMIC ACCCELERATION.
12. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN FLOODING.
13. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN COLLISION.
14. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN IMPACT.
15. THE BRIDGE SHALL BE CONSTRUCTED TO WITHSTAND A DESIGN OVERLOAD OF 10% ABOVE THE DESIGN OVERLOAD.

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

SOM DATTA BUILDERS
CONTRACTOR



CONSULTING ENGINEERS GROUP LTD.
12/12/11, 11/11/11, 11/11/11, 11/11/11, 11/11/11
11/11/11, 11/11/11, 11/11/11, 11/11/11, 11/11/11

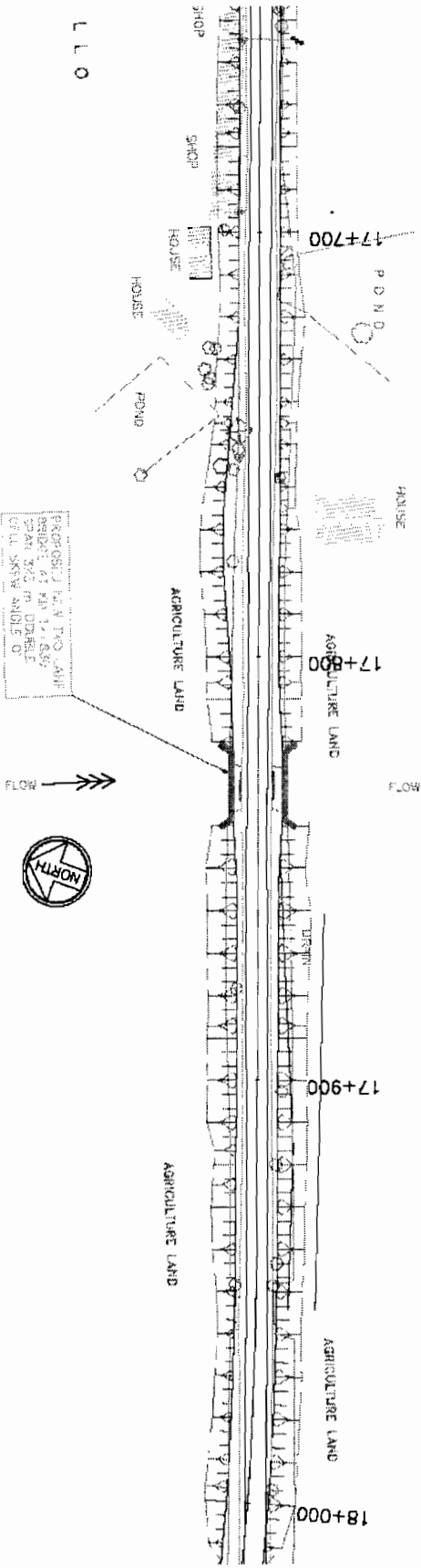
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**GENERAL ARRANGEMENT DRAWING
BRIDGE AT PROPOSED OH. 17+480
GALUBAHILL FOLIO**

NO.	DATE	BY	CHECKED	APPROVED
1	10-05-80	...	...	...
2	10-06-80	...	...	...
3	10-07-80	...	...	...

TO BHADRAK

TO ANANDPUR



PROPOSED L & N TWO LANE
 BRIDGE OF RD. 17+800
 SPAN 300 M DIABLE
 C/C/SKEW ANGLE 0°

SITE PLAN



NOTES:-

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

SOM DATT BUILDERS-ARCHITECTS
 CONTRACTOR

BBSR
 Infrastructure Projects Ltd.

CONSULTING ENGINEERS GROUP LTD.
 1-13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
 BRIDGE AT PROPOSED CH. 17+800
 MALASANI POLYD.

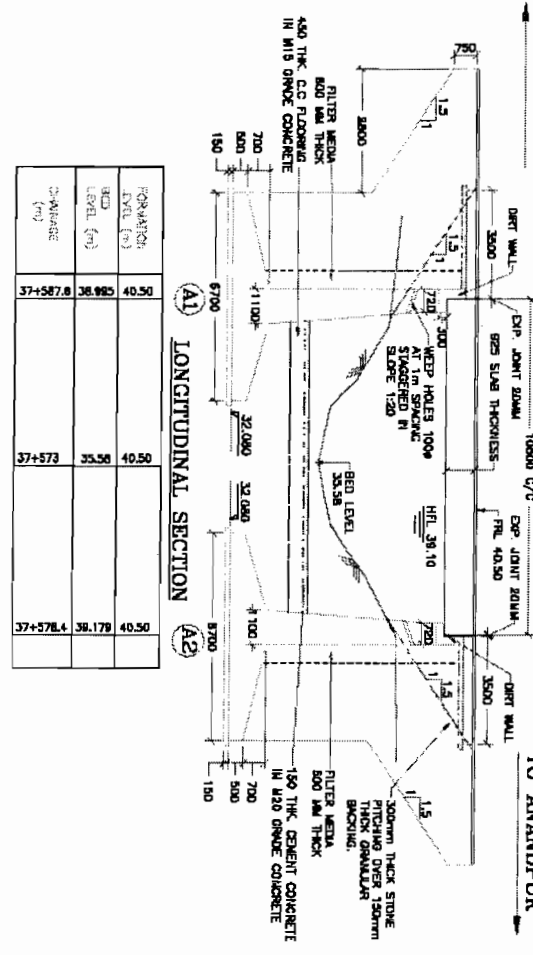
DATE	BY	CHECKED	DATE	APPROVED

TO BHADRAK

TO ANANDPUR

LOCATION PLAN OF BRIDGE AT BRIDGE NO. 28/200

SEE-1 RL-38.70m

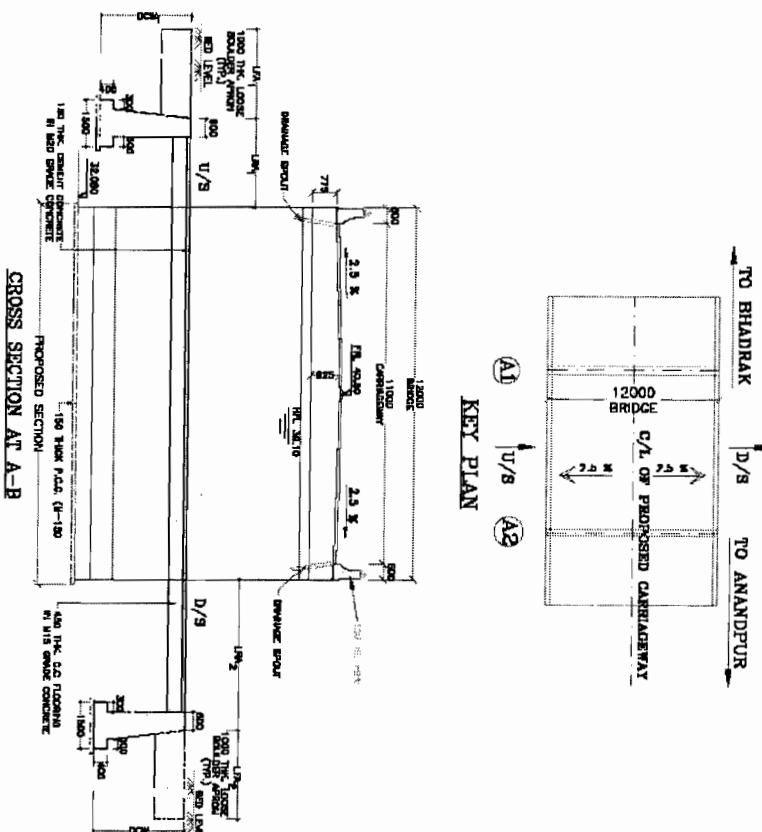
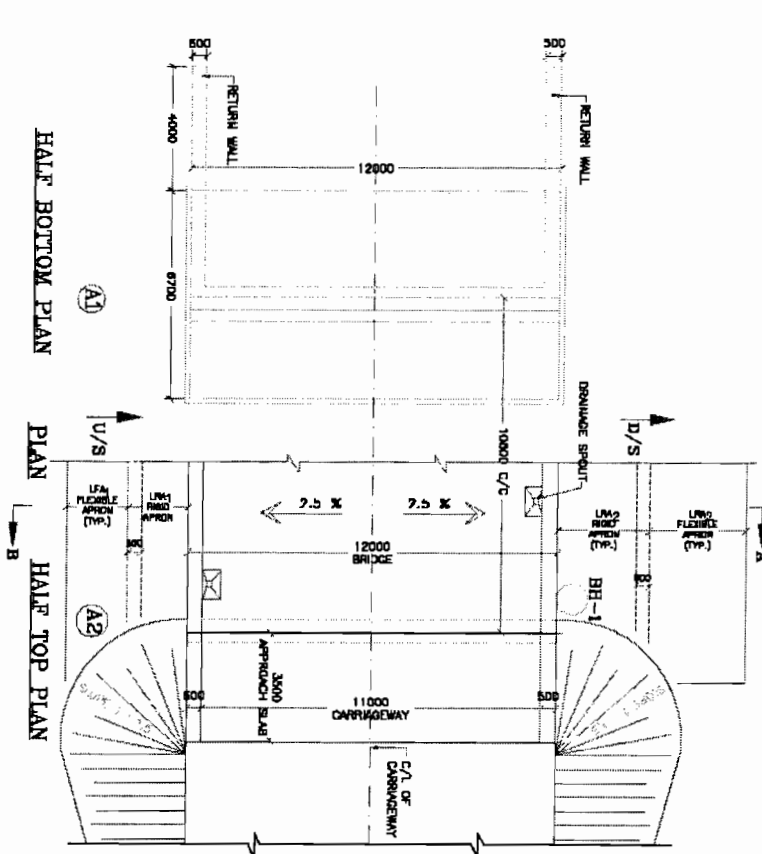


FORMATION LEVEL (m)	40.50	38.95	40.50
LEVEL (m)	37+587.8	36.95	37+573
CH-Width (m)	40.50	36.95	40.50

DEPTH	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00	25.50	26.00	26.50	27.00	27.50	28.00	28.50	29.00	29.50	30.00	30.50	31.00	31.50	32.00	32.50	33.00	33.50	34.00	34.50	35.00	35.50	36.00	36.50	37.00	37.50	38.00	38.50	39.00	39.50	40.00	40.50	41.00	41.50	42.00	42.50	43.00	43.50	44.00	44.50	45.00	45.50	46.00	46.50	47.00	47.50	48.00	48.50	49.00	49.50	50.00	50.50	51.00	51.50	52.00	52.50	53.00	53.50	54.00	54.50	55.00	55.50	56.00	56.50	57.00	57.50	58.00	58.50	59.00	59.50	60.00	60.50	61.00	61.50	62.00	62.50	63.00	63.50	64.00	64.50	65.00	65.50	66.00	66.50	67.00	67.50	68.00	68.50	69.00	69.50	70.00	70.50	71.00	71.50	72.00	72.50	73.00	73.50	74.00	74.50	75.00	75.50	76.00	76.50	77.00	77.50	78.00	78.50	79.00	79.50	80.00	80.50	81.00	81.50	82.00	82.50	83.00	83.50	84.00	84.50	85.00	85.50	86.00	86.50	87.00	87.50	88.00	88.50	89.00	89.50	90.00	90.50	91.00	91.50	92.00	92.50	93.00	93.50	94.00	94.50	95.00	95.50	96.00	96.50	97.00	97.50	98.00	98.50	99.00	99.50	100.00
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HYDROLOGICAL DATA

Parameter	Value
Design Flood Discharge (cumecs)	118.2
Design Flood Depth (m)	4.1
Design Flood Velocity (m/s)	1.0
Design Flood Force (kg/cm ²)	3.2
Design Flood Pressure (kg/cm ²)	6.3

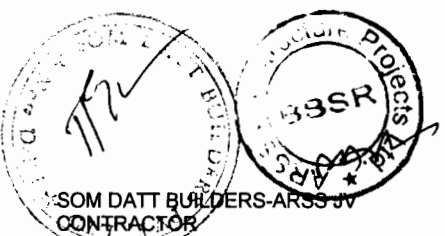


NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. UNITS ARE IN METERS.
2. DIMENSIONS ARE NOT TO BE SCALING ONLY. DIMENSIONS ARE TO BE FOLLOWED.
3. THE GROSS SAFE BEARING CAPACITY OF THE PROPOSED FOUNDATION OF THE BRIDGE SHALL BE NOT LESS THAN 200 T/M².
4. GRADE OF CONCRETE:
 - M-25
 - M-30
 - M-35
 - M-40
 - M-45
 - M-50
 - M-55
 - M-60
5. REINFORCEMENT HYSD. BARS IS CONFORM TO IS:17726 GRADE - Fe-415.
6. FOR DETAIL OF CONCRETE REINFORCEMENT DRAWING.
7. TIE BARS BEARING SHALL BE USED.
8. THE SUPER STRUCTURE REFER MOST STANDARD DRAWING FOR ROAD BRIDGES FOR R.C.C. SOLID SLAB STRUCTURE. DRG. NO. 20/114.
9. THE BRIDGE HAS BEEN DESIGNED FOR 20M (M) + CLASS A AND 3 LANE OF L.R.C. CLASS-A VEHICLE WHICH EVER WILL PRODUCE THE MOST EFFECT.
10. ADEQUATE NOS. OF WEEP HOLES SHALL BE PROVIDED IN THE ABUTMENT & RETAIN WALL AS PER I.R.C. SPECIFICATION.
11. BACK FILL PARAMETERS ASSUMED ARE C-0 & S-07.
12. CLEAR COVER TO AIR REINFORCEMENT = 75mm IN BASE SLAB
13. FOR DETAIL OF BED PROTECTION REFER DRAWING NO. OSR/CEB/SH-53/BR/PM/1/2 OSR/CEB/SH-53/BR/SCW

REFERENCE DRAWING:-

1. OSR/CEB/SH-53/BR/28+200/02
2. OSR/CEB/SH-53/BR/28+200/03

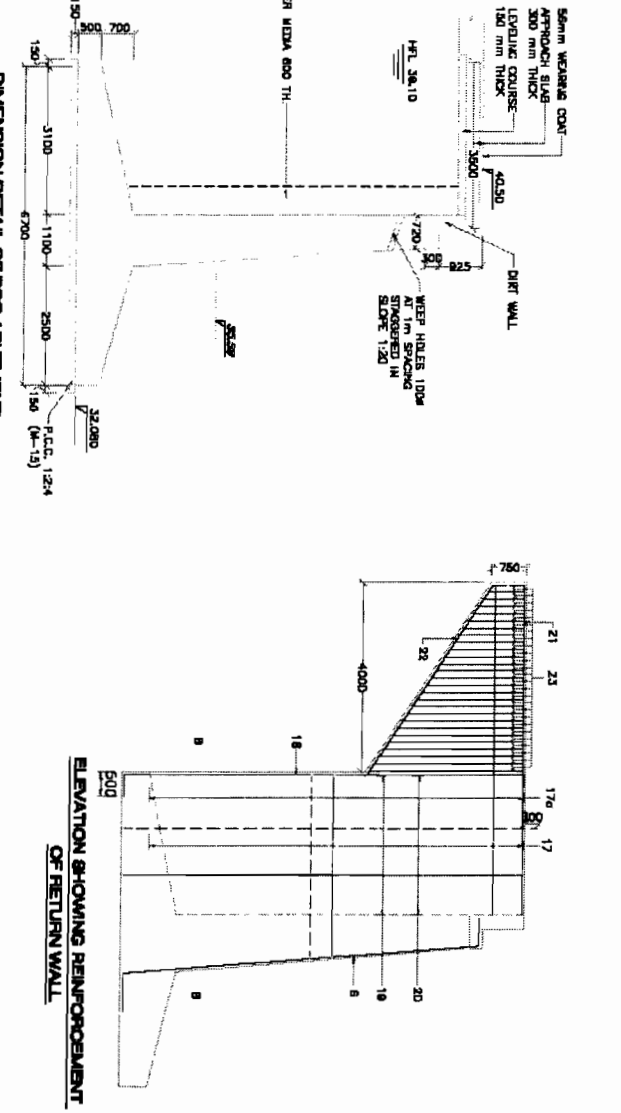


CONSULTING ENGINEERS GROUP LTD. E-12/40 Connaught Place, New Delhi-17. Tel: 2610111, 2610884, 2610886, 2610888

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING BRIDGE AT KM 28+200 CHANWALIA NALA NO - 9

NO.	REVISION	DATE	BY	CHKD	APPD



REINFORCEMENT DETAILS

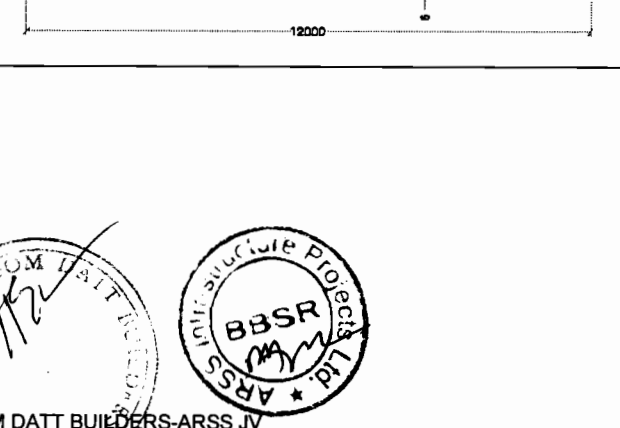
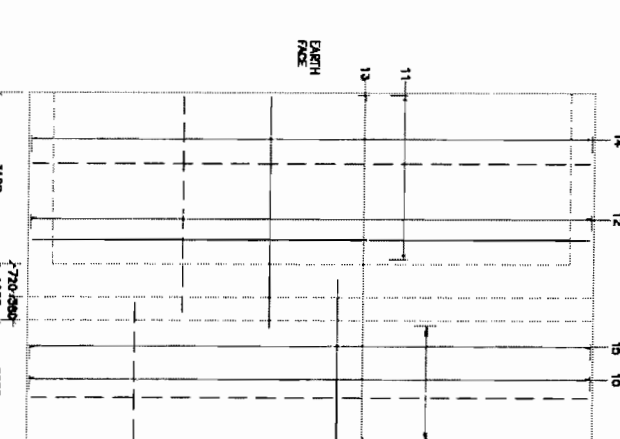
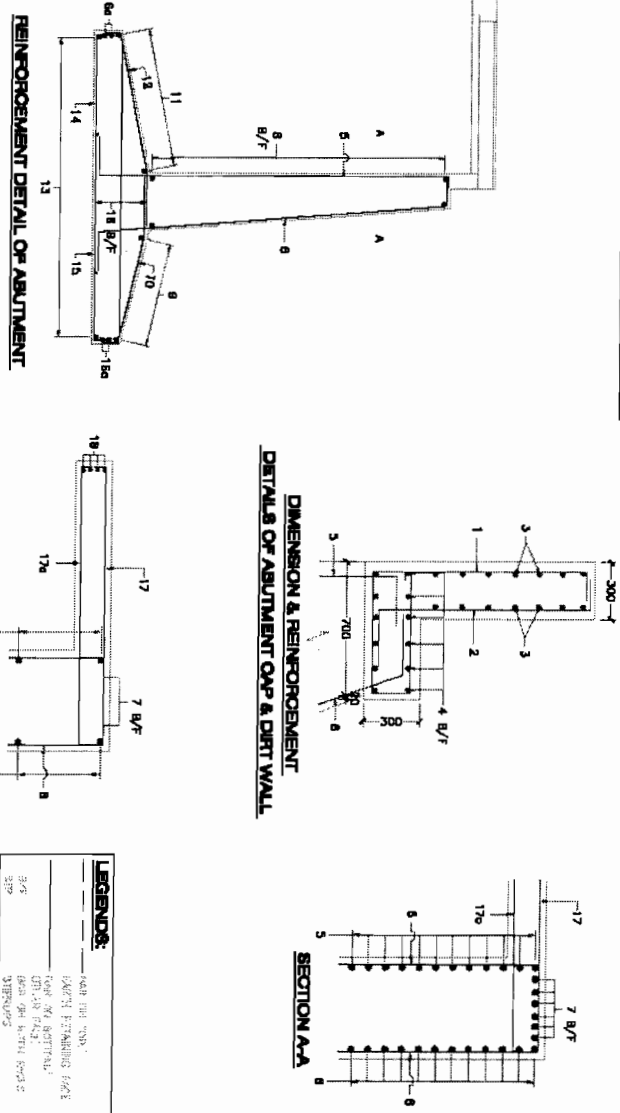
BAR NO.	BAR SIZE (mm)	SPACING/NO.	SHAPE
1	12	200 c/c	SHAKE
2	12	200 c/c	SHAKE
3	12	200 c/c	SHAKE
4	12	200 c/c	SHAKE
5	12	200 c/c	SHAKE
6	12	200 c/c	SHAKE
7	12	200 c/c	SHAKE
8	12	200 c/c	SHAKE
9	12	200 c/c	SHAKE
10	12	200 c/c	SHAKE
11	12	200 c/c	SHAKE
12	12	200 c/c	SHAKE
13	12	200 c/c	SHAKE
14	12	200 c/c	SHAKE
15	12	200 c/c	SHAKE
16	12	200 c/c	SHAKE
17	12	200 c/c	SHAKE
18	12	200 c/c	SHAKE
19	12	200 c/c	SHAKE
20	12	200 c/c	SHAKE
21	12	200 c/c	SHAKE
22	12	200 c/c	SHAKE
23	12	200 c/c	SHAKE

NOTES:-

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METRES.
- DIMENSIONS ARE NOT TO BE SPREAD ONLY WHEN DIMENSIONS ARE TO BE FOLLOWED.
- THE GROSS SAFE BEARING CAPACITY OF SOIL AT THE PROPOSED FOUNDATION OF THE ABUTMENTS, RETURN WALL IN NO CASE BE LESS THAN 200 T/M².
- GRADE OF CONCRETE :
 - M-25
 - M-20
 - M-30
- OPEN EXPOSURE :
 - M-25
 - M-20
 - M-30
- REINFORCEMENT HYSD BARS IS CONFORM TO IS:1786
- TAR PAPER BEARING SHALL BE USED. GRADE - FA-415.
- CLEAR COVER TO ANY REINFORCEMENT IN BASE SLAB SHALL BE 40mm IN ALL OTHER COMPONENTS = 75mm

REFERENCE DRAWING:-

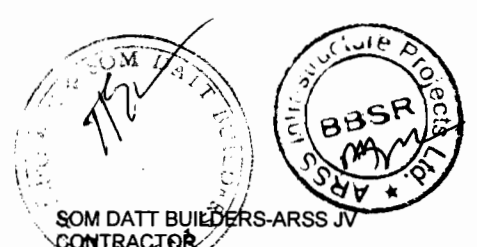
- OSRF/OSR/SH-52/BR/284-200/01
- OSRF/OSR/SH-52/BR/284-200/03



CONSULTING ENGINEERS GROUP LTD.
 CONSULTING ENGINEERS GROUP LTD.
 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION & REINFORCEMENT DETAILS OF SLAB STRUCTURE BRIDGE AT KM 38+200 (CHAMPALVA NALA NO - 9)



Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 World Bank
 C/O the E.P.C. (P) Ltd.
 Orissa State Government

TO BHADRAK

POND

37+500

PROPOSED NEW TWO LANE BRIDGE AT KM. 37+573 SPAN 1X10.8 m. C/C OF EXP. SKEW ANGLE 0°

SITE PLAN

FLOW



37+600

AGRICULTURE LAND

FLOW

TO ANANDPUR

37+700

AGRICULTURE LAND

NOTES:-

Chief Engineer
World Bank Projects, Orissa
Chief Employer
World Bank Project
On the E.I.C. (O.M.)
Orissa, Bhubaneswar.

SOM DATT BUILDERS-ARSS
CONTRACTOR

CONSULTING ENGINEERS GROUP LTD.
17/2, 1st Floor, Sector-17
Gurgaon, Haryana
Tel: 01299-421144, 421145
Fax: 01299-421146, 421147
E-mail: ceg@cegroup.com

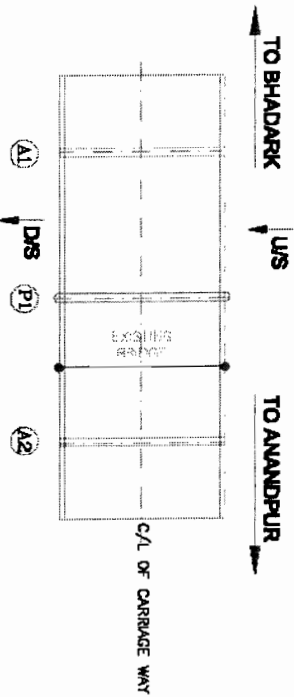
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT KM. 37+500
(CHARANWALA INLAND-8)

DATE	REVISION	BY	CHKD

NOTES:

EXISTING BRIDGE DETAILS			
1	Change	19700	
2	Name of the vehicle	Heavy Load	
3	Year of construction	1975	
4	Type of bridge	High Level Bridge	
5	Spanning span arrangement	2 x 6.3 m	
6	Spanning centre line width	7.0 m	
7	Thickness of superstructure	4.50 m	
8	Type of foundation	Open foundation	
9	Type of reinforcement	RR steel reinforcement wall type	
10	Type of superstructure	RCC mild steel	
11	Spanning Foundation Level	32.48 m	
12	Proposed Foundation Level	32.48 m	
13	Soil Level	39.61 m	
14	Thickness of PCC. WALL/RC	1.1 m / 1.4 m	
REHABILITATION MEASURES (SUGGESTED)			
S. No.	Items	Rehabilitation Measures	Reference Drawings
1	Superstructure	As per RDT, the slab to be demolished and new slab shall be constructed	AS PER STANDARD DRAWINGS FOR ROAD BRIDGES, INDIA
2	Crack binder	Crack binder shall be over	OR/BR/CR/BR/AN/RC-02
3	Expansion joint	As per RDT, expansion joint shall be provided	OR/BR/CR/BR/AN/RC-02
4	Wearing coat	50mm H.C. bit over 100mm thick concrete surface	OR/BR/CR/BR/AN/RC-02
5	Drainage system	Drainage system shall be provided (if any)	OR/BR/CR/BR/AN/RC-02
6	Banking	The proper banking shall be provided	-
7	Approach slab	Approach slab to be constructed	OR/BR/CR/BR/AN/RC-04



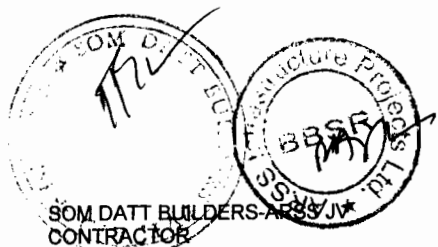
KEY PLAN

CONSULTING ENGINEERS GROUP LTD.
 G-14/47, Convent Road, Sector 17, Gurgaon, Haryana
 Tel: 012-261-2200/2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (0) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS
 BRIDGE AT KM. 18+300

PROJECT NO. 1
 DATE: 19/07/2011
 DRAWN: [Signature]
 CHECKED: [Signature]
 APPROVED: [Signature]



Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER
 World Bank Project
 C/O the E.U.C. (Orissa)
 Orissa, Bhubaneswar.

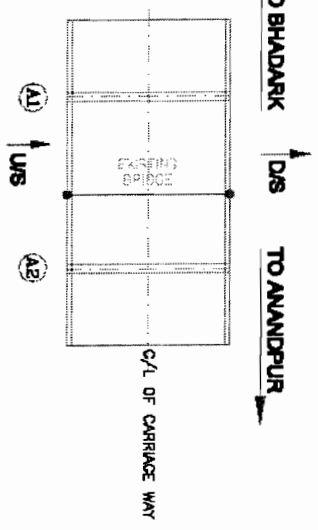
NOTES:

EXISTING BRIDGE DETAILS

S. No.	Items	Rehabilitation Measures	Reference Drawings
1	Challage	30790	
2	Name of the work	Baluga Canal Bridge	
3	Year of construction	1960	
4	Type of bridge	pylone	
5	Existing span arrangement	1 x 33	
6	Existing bridge way width	9.3 m	
7	Thickness of superstructure	-	
8	Type of foundation	2R stone masonry	
9	Type of abutment	-	
10	Type of superstructure	41.26 m	
11	Existing formation level	41.26 m	
12	Proposed formation level	38.75 m	
13	Bed level	0.26 m RLGL	
14	Thickness of P.C.I. V.L. B.C.	0.26 m RLGL	

REHABILITATION MEASURES SUGGESTED

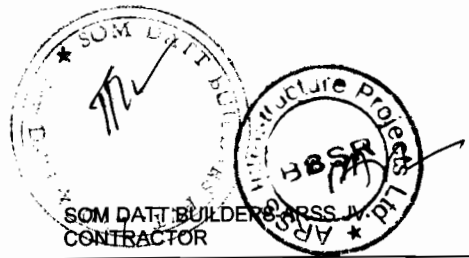
S. No.	Items	Rehabilitation Measures	Reference Drawings
1	Bedding	Bedding to be reconstructed (40.0 and)	MOBT STANDARD DETAIL OF EXISTING BRIDGES (PART 1 OF 4) DETAIL (PART 2 OF 4)
2	Wearing coat	Existing wearing coat shall be dismantled and 50mm MCJ laid over concrete slabs suitable depth shall be laid over it	OMNYCDS/DM/04/02
3	Expansion Joint	Asphalitic joint type expansion joint to be provided shall	OMNYCDS/DM/04/02
4	Vegetation growth	Vegetation to be removed from the structure	-



KEY PLAN

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

World Bank Project
c/o the P. U. C. (C.M.D.)
Orissa, Bhubaneswar.



CONSULTING ENGINEERS GROUP LTD.
C-10/10, CHANDRASEKHAR ROAD, ANANDPUR,
Dist. Bhubaneswar, Orissa-751014
Tel. 0674141111, 0674141112, 0674141113

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS BRIDGE AT KM. 80+960

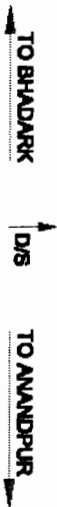
DATE: 10/11/2011	SCALE: 1:100	PROJECT: ROAD
DESIGNER: [Signature]	CHECKED: [Signature]	APPROVED: [Signature]
DATE: 10/11/2011	SCALE: 1:100	PROJECT: ROAD

EXISTING BRIDGE DETAILS

1	Category	37100
2	Name of the bridge	Channel No-1
3	Year of construction	1983
4	Type of bridge	Reinforced Bridge
5	Spanning span arrangement	1 x 8.6m
6	Spanning span length	7.4 m
7	Material of superstructure	RC
8	Type of foundation	Open foundation
9	Type of embankment	Grass cover embankment with type
10	Type of superstructure	RCC solid slab
11	Spanning span length	40.29 m
12	Spanning span length	40.29 m
13	Bed Level	54.87 m
14	Minimum offt set back	4.01 m Right

REHABILITATION MEASURES SUGGESTED

Sl. no.	Measures	Reference Drawings
1	Superstructure	As per RRTT, the slab to be reconstructed and new slab shall be constructed
2	Substructure	Alignment shall be preserved with 25 mm thick cement mortar (1:3)
3	Chalk binder	Chalk binder shall be suit
4	Expansion joint	Asphalite plug type expansion joint shall be provided
5	Wearing coat	20mm BC, laid over 6cm thick sandy asphalt
6	Drainage apron	Drainage apron shall be provided (4 mm)
7	Approach slab	Approach slab to be reconstructed
8	Finishing	Side finishing (forwardly) shall be done
9	Bed Protection	Bed protection to be done and concrete walls shall be provided
10	Vegetation growth	Vegetation to be removed from the abutments



KEY PLAN

HYDROLOGICAL DATA

Design Discharge (cum/Sec)	Measour Level in (mth)	Depth of apron in Well in (mth)				Length of Rigid Apron in (mth)		Length of Flexible Apron in (mth)	
		u/s	d/s	u/s	d/s	u/s	d/s	u/s	d/s
263.37	54.012	2.5	3.0	3.0	5.0	3.5	3.5	3.0	

CONSULTING ENGINEERS GROUP LTD.
 10/1, Sector 10, Gurgaon, Haryana
 India. Phone: 01299-421111
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CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS BRIDGE AT KM. 57+600

DATE	BY	CHECKED	DATE
10/11/2011	...	...	...

SOM DATT BUILDERS-ARSS JV CONTRACTOR

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Chief Engineer
 World Bank Projects, Orissa

NOTES:

EXISTING BRIDGE DETAILS

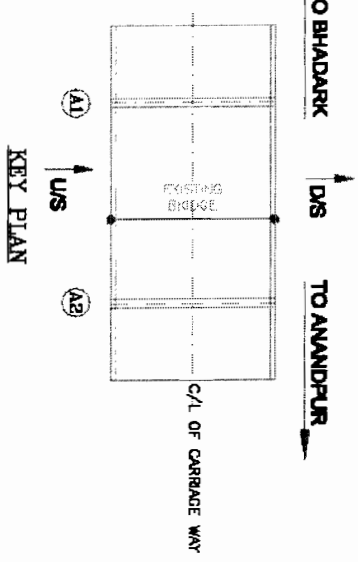
1	Change	37/70	
2	Name of the abut	Channel No-2	
3	Year of construction	1981	
4	Type of bridge	Submersible Bridge	
5	Span length	1 x 8.6m	
6	Span length way width	8.3 m	
7	Thickness of superstructure	0.6 m	
8	Type of foundation	Open foundation	
9	Type of substructure	Cham stone masonry wall type	
10	Type of superstructure	NCT wall slab	
11	Bridge X-section Level	40.27 m	
12	Proposed X-section Level	40.27 m	
13	Bed Level	36.24 m	
14	Distance of P.C.I. w.r.t B.C.I.	0.31 m L&R	

REHABILITATION MEASURES SUGGESTED

Sl. No.	Items	Rehabilitation Measures	Reference Drawings
1	Superstructure	As per 'NOT' made the slab to be demolished and new slab shall be constructed.	NOT FORWARDED DRAWINGS FOR ROAD BRIDGE (B)111 (Contract No. 10/200)
2	Substructure	Abutments shall be provided with 25 mm thick concrete masonry (L&R)	-
3	Crack handling	Crack handling shall be done	CRS/CRS/BR/AM/RC-02
4	Expansion joint	Applicable joint type expansion joint shall be provided	CRS/CRS/BR/AM/RC-02
5	Wearing coat	50mm BCI laid over 100mm thick concrete asphalt.	CRS/CRS/BR/AM/RC-02
6	Drainage system	Drainage system shall be provided (if any)	CRS/CRS/BR/AM/RC-02
7	Approach slab	Approach slab to be constructed	CRS/CRS/BR/AM/RC-02
8	Finishing	Bitu Finishing (precast) shall be done	CRS/CRS/BR/AM/RC-02
9	Bed Protection	Bed protection to be done and suitable walls shall be provided	CRS/CRS/BR/AM/RC-02
10	Vegetation growth	Vegetation to be removed from the structure	-

HYDROLOGICAL DATA

Design Discharge In (cum/Sec)	Mean-seour Level In (m)	Depth of cut/height of Road		length of Right length of Flanche		depth of Apron In (m)	
		u/s	d/s	u/s	d/s	u/s	d/s
0.65 cum	38.272	2.5	3.0	3.5	4.0	4.5	5.0



Chief Engineer
World Bank Projects, Orissa
Chief EMPLOYER

SOM DATT BUILDERS-ARSS IN CONTRACTOR

CONSULTING ENGINEERS GROUP LTD.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS BRIDGE AT KM. 87+700

DATE	BY	CHECKED	APPROVED

NOTES:

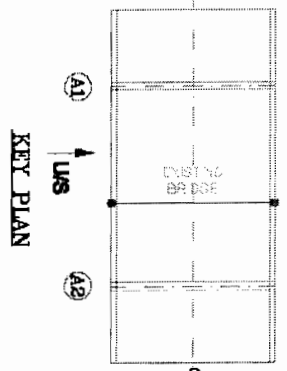
EXISTING BRIDGE DETAILS

1	Channel	37m x 50
2	Name of the subh	Channel No. 3
3	Year of construction	1965
4	Type of bridge	Reinforced Bridge
5	Spanning span arrangement	1 x 30m
6	Spanning bridge span width	8.1 m
7	Thickness of superstructure	0.6 m
8	Type of substructure	Open foundation
9	Type of substructure	Concrete masonry wall type
10	Type of superstructure	RCC solid slab
11	Proposed Foundation Level	40.65 m
12	Proposed Foundation Level	40.65 m
13	Bed Level	36.71 m
14	Delimitation of C/L	1.12 m Right

REHABILITATION MEASURES SUGGESTED

1	Superstructure	Rehabilitation Measures As per NIT work the slab to be dismantled and new slab shall be constructed	Reference Drawings RCC STANDARD DRAWINGS FOR ROAD BRIDGES WITH SPAN UP TO 30 M (REVISED 1972)
2	Substructure	Adjustments shall be placed with 25 mm thick concrete mortar (1:3)	-
3	Chalk bander	Chalk bander shall be cast	OR/NC/DR/BR/AR/CR/DR
4	Expansion joint	Asphalitic joint type expansion joint shall be provided	OR/NC/DR/BR/AR/CR/DR
5	Wearing coat	50mm BC laid over lean thick mastic asphalt	OR/NC/DR/BR/AR/CR/DR
6	Drainage system	Drainage system shall be provided (4 way)	OR/NC/DR/BR/AR/CR/DR
7	Approach slab	Approach slab to be constructed	OR/NC/DR/BR/AR/CR/DR
8	Finishing	Bitu finishing (prevention) shall be done	OR/NC/DR/BR/AR/CR/DR
9	Bed Protection	Bed protection to be done and concrete walls shall be provided	OR/NC/DR/BR/AR/CR/DR
10	Vegetation growth	Vegetation to be removed from the structure	-

TO BHADARK TO ANANDPUR



HYDROLOGICAL DATA

Design Discharge (cum/second)	Maximum Level in (m)	Depth of cut/height/length of Apron in (m)					d/a
		u/a	d/a	u/a	d/a	u/a	
785.57	34.512	DCW ₁	DCW ₂	LBA ₁	LBA ₂	LFA ₁	LFA ₂
		2.5	3.0	3.0	3.0	3.5	5.2

CONSULTING ENGINEERS GROUP LTD.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS BRIDGE AT KM. 97+850

SOM DATT BUILDERS AND CONTRACTORS

BBSR

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the P.O. (Civil)
Orissa Bhubaneswar.

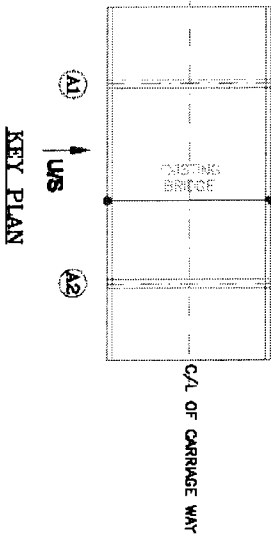
EXISTING BRIDGE DETAILS

1	Outspan	38010	
2	Name of the sublin	Channel No-4	
3	Year of construction	1985	
4	Type of bridge	Submersible bridge	
5	Spanning span arrangement	1 x R. Span	
6	Existing girder way width	4.3 m	
7	Thickness of superstructure	0.4 m	
8	Type of superstructure	Open span	
9	Type of substructure	Column stone masonry wall type	
10	Type of expansion		
11	Existing Foundation Level	RCC 6010 800	
12	Proposed Foundation Level	40.03 m	
13	Bed Level	36.25 m	
14	Distance of P.C.L. v.s. H.C.L.	0.34 m L.R.	

REHABILITATION MEASURES SUGGESTED

Sl. No.	Items	Rehabilitation Measurement	Reference Drawings
1	Superstructure	As per RMT make the slab to be demolished and new slab shall be constructed.	RCR ROAD REPAIR VOL. 1 (Detailed in Item)
2	Substructure	Approach shall be provided with 25 mm thick cement concrete (L.R)	-
3	Crest barrier	Crest barrier shall be suit	OSR/CR/08/AM/0-02
4	Expansion joint	Applicable joint type expansion joint shall be provided.	OSR/CR/08/AM/0-02
5	Wearing coat	50mm B.C. laid over 150mm thick concrete.	OSR/CR/08/AM/0-02
6	Drainage grove	Drainage grove shall be provided (6 nos)	OSR/CR/08/AM/0-02
7	Approach slab	Approach slab to be constructed.	OSR/CR/08/AM/0-02
8	Finishing	Bed Finishing (previously shall be done)	OSR/CR/08/AM/0-02
9	Bed Protection	Bed protection to be done and extend width shall be provided.	OSR/CR/08/AM/0-02
10	Vegetation growth	Vegetation to be removed from the approach	-

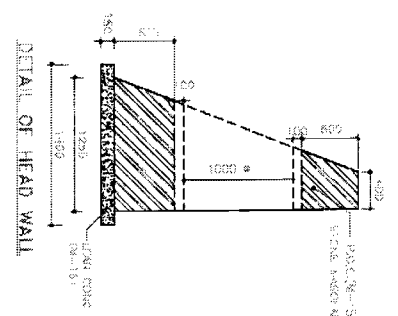
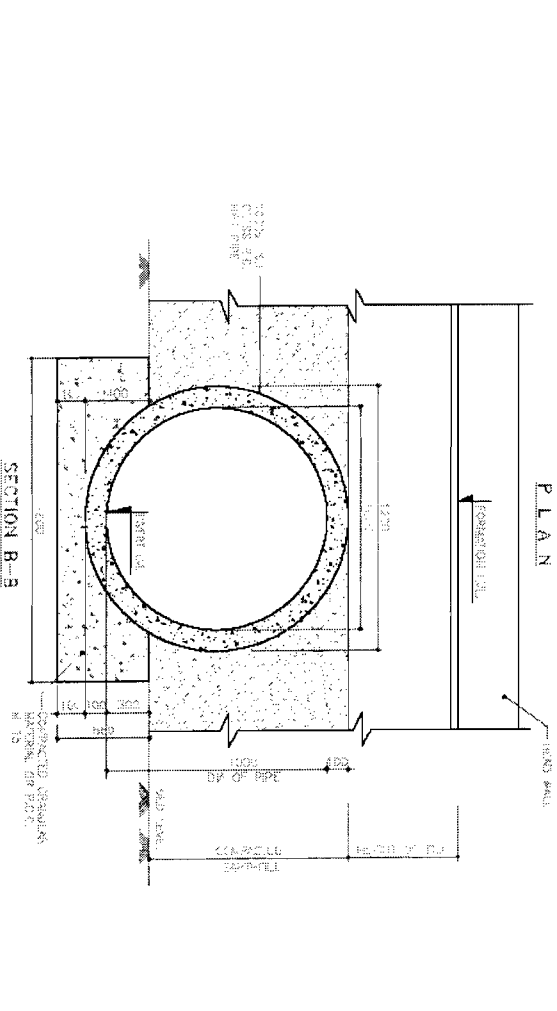
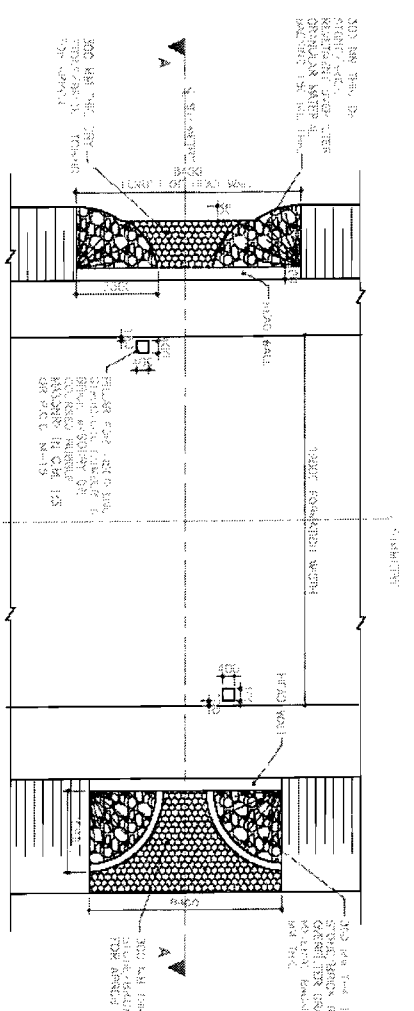
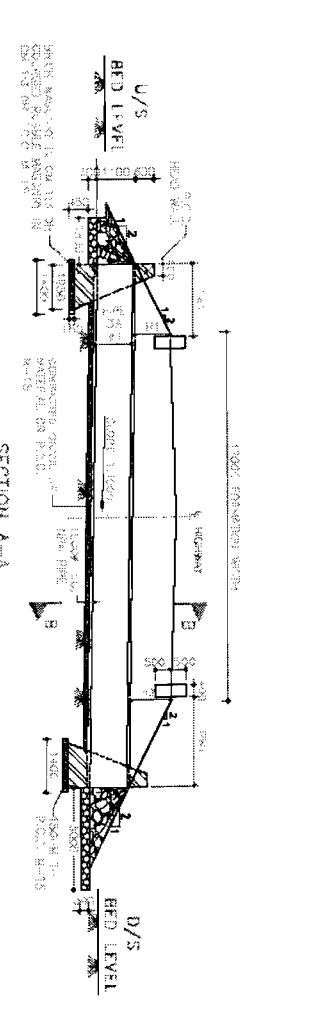
TO BHADARK
 D/S
 TO ANANDPUR



HYDROLOGICAL DATA

Design Discharge in cumecs (cum/Sec)	Measour Level in (mts)	Depth of surfeit/length of Apron in (mts)					
		u/a DCW	d/a DCW	u/a LBA1	d/a LBA2	u/a LFA1	d/a LFA2
285.07	36.012	4.5	3.0	3.0	6.0	3.5	8.0

Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER
 (In the E.I.O. (C.O.))
 Orissa, Bhubaneswar.

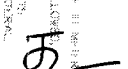


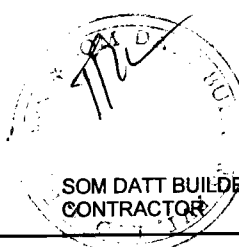

SINGLE PIPE CULVERTS LEVEL DETAIL

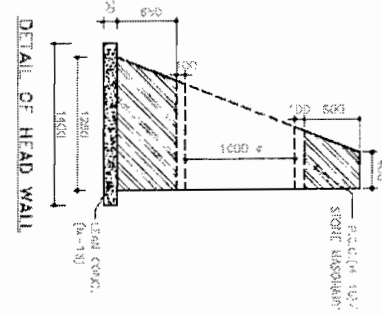
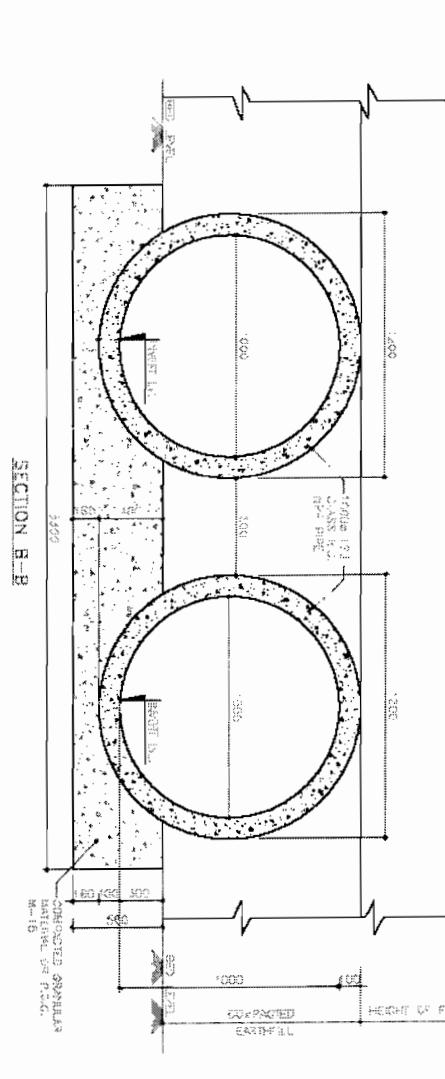
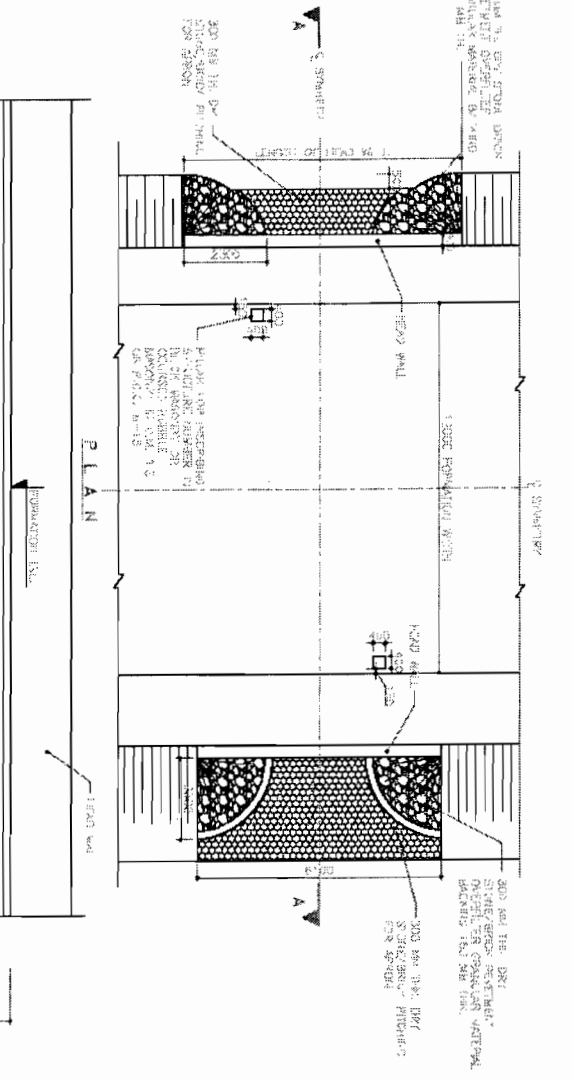
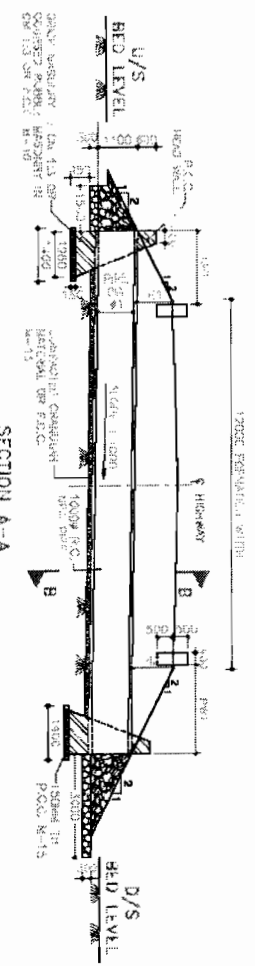
No.	Leveling	Proposed	Elev. of Top	Elevation		Height of Fill		Quantity	Unit	Remarks
				Level	Level	Height	Height			
1	10000	10000	26.40	26.40	0.00	0.00	0.00	0.00	1.00	R.T.O.L
2	10010	10010	26.50	26.50	0.00	0.00	0.00	0.00	1.00	R.T.O.L
3	10020	10020	26.60	26.60	0.00	0.00	0.00	0.00	1.00	R.T.O.L
4	10030	10030	26.70	26.70	0.00	0.00	0.00	0.00	1.00	R.T.O.L
5	10040	10040	26.80	26.80	0.00	0.00	0.00	0.00	1.00	R.T.O.L
6	10050	10050	26.90	26.90	0.00	0.00	0.00	0.00	1.00	R.T.O.L
7	10060	10060	27.00	27.00	0.00	0.00	0.00	0.00	1.00	R.T.O.L
8	10070	10070	27.10	27.10	0.00	0.00	0.00	0.00	1.00	R.T.O.L
9	10080	10080	27.20	27.20	0.00	0.00	0.00	0.00	1.00	R.T.O.L
10	10090	10090	27.30	27.30	0.00	0.00	0.00	0.00	1.00	R.T.O.L
11	10100	10100	27.40	27.40	0.00	0.00	0.00	0.00	1.00	R.T.O.L
12	10110	10110	27.50	27.50	0.00	0.00	0.00	0.00	1.00	R.T.O.L
13	10120	10120	27.60	27.60	0.00	0.00	0.00	0.00	1.00	R.T.O.L

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. THE STRUCTURE SHALL BE CONSTRUCTED IN CONCRETE.
3. THE HEAD WALL SHALL BE 1.20M HIGH AND 0.30M TOP WIDTH.
4. THE TAIL WALL SHALL BE 1.20M HIGH AND 0.30M TOP WIDTH.
5. THE PIPE SHALL BE 1.00M DIAMETER.
6. THE BEDDING SHALL BE 150MM THICK.
7. THE STRUCTURE SHALL BE PROVIDED WITH REINFORCEMENT.
8. THE STRUCTURE SHALL BE PROVIDED WITH CURBS ON BOTH SIDES.
9. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS D/S.
10. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS U/S.
11. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE CENTER.
12. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE SIDES.
13. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE TOP.
14. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE BOTTOM.
15. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE FRONT.
16. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE BACK.
17. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE LEFT.
18. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE RIGHT.
19. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE NORTH.
20. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE SOUTH.
21. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE EAST.
22. THE STRUCTURE SHALL BE PROVIDED WITH A 1% SLOPE TOWARDS THE WEST.


Chief Engineer
 World Bank Project, Orissa
EMPLOYER


SOM DATT BUILDERS AND CONTRACTORS




- NOTES:**
1. ALL DIMENSIONS ARE IN MM UNLESS SPECIFIED OTHERWISE.
 2. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 3. ALL MATERIALS SHALL BE OF THE BEST QUALITY AVAILABLE.
 4. ALL DIMENSIONS SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED.
 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CONCERNED AUTHORITIES.
 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES.
 7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES AND VEGETATION.
 8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING ROADS AND PATHS.
 9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING BUILT-UP AREAS.

DOUBLE PIPE CULVERTS LEVEL DETAIL

S/N	Location	Proposed Channel	Proposed Level		Bed Level		Construction Elevation		Height of Fill		L/W	SLOPE	Distance of flow	Total Length	Area (sqm)
			Left	Right	Left	Right	Left	Right	Left	Right					
1	05/00	4075	24.42	21.08	21.08	21.08	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
2	05/00	4400	24.42	21.08	21.08	21.08	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
3	18/700	10871	22.08	18.74	18.74	18.74	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
4	18/700	10872	22.08	18.74	18.74	18.74	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
5	20/200	20026	20.26	16.92	16.92	16.92	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
6	21/700	21704	21.70	18.36	18.36	18.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
7	22/200	22704	22.70	19.36	19.36	19.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
8	24/700	24700	24.70	21.36	21.36	21.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
9	24/700	24700	24.70	21.36	21.36	21.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
10	24/700	24700	24.70	21.36	21.36	21.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
11	26/700	26700	26.70	23.36	23.36	23.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
12	26/700	26700	26.70	23.36	23.36	23.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
13	26/700	26700	26.70	23.36	23.36	23.36	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
14	27/100	27000	27.00	23.60	23.60	23.60	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
15	27/100	27000	27.00	23.60	23.60	23.60	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
16	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
17	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
18	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
19	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
20	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
21	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0
22	28/200	28000	28.00	23.80	23.80	23.80	-2.0%	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0

CONSULTING ENGINEERS GROUP LTD.

Preparation of Feasibility Study and Detailed Project Report for R.O.C. Double Pipe Culverts (1.0m DIA) Under World Bank Assistance

CONSULTING ENGINEERS GROUP LTD.

Preparation of Feasibility Study and Detailed Project Report for R.O.C. Double Pipe Culverts (1.0m DIA) Under World Bank Assistance

TYPIICAL ARRANGEMENT

FOR R.O.C. DOUBLE PIPE CULVERTS (1.0m DIA)
HEIGHT OF FILL VARYING FROM 0.5 TO 4.0 M

CONSULTING ENGINEERS GROUP LTD.

Preparation of Feasibility Study and Detailed Project Report for R.O.C. Double Pipe Culverts (1.0m DIA) Under World Bank Assistance

TYPIICAL ARRANGEMENT

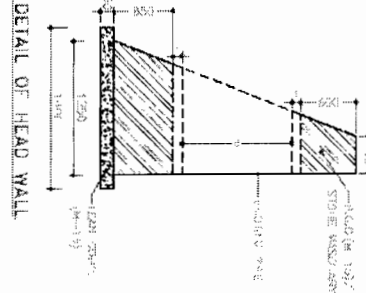
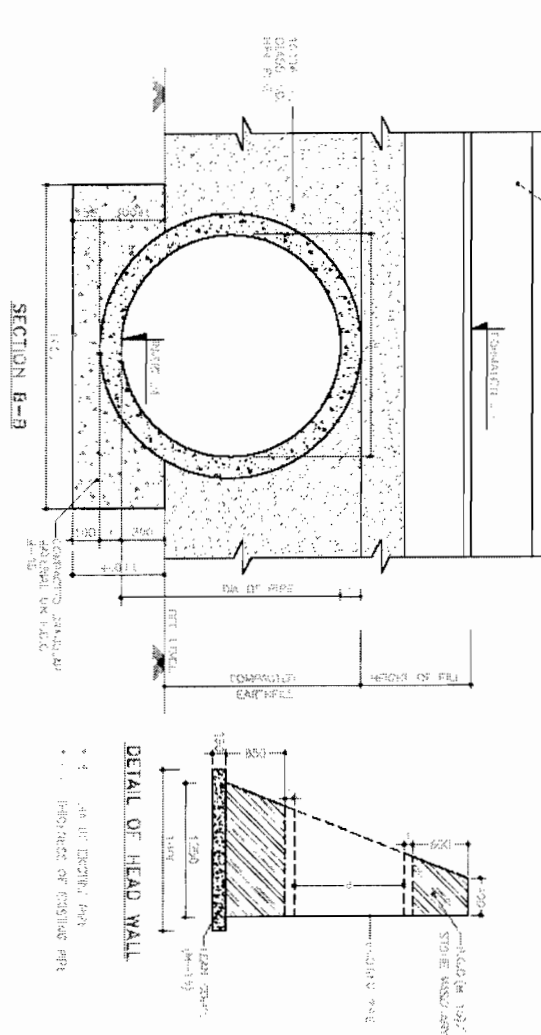
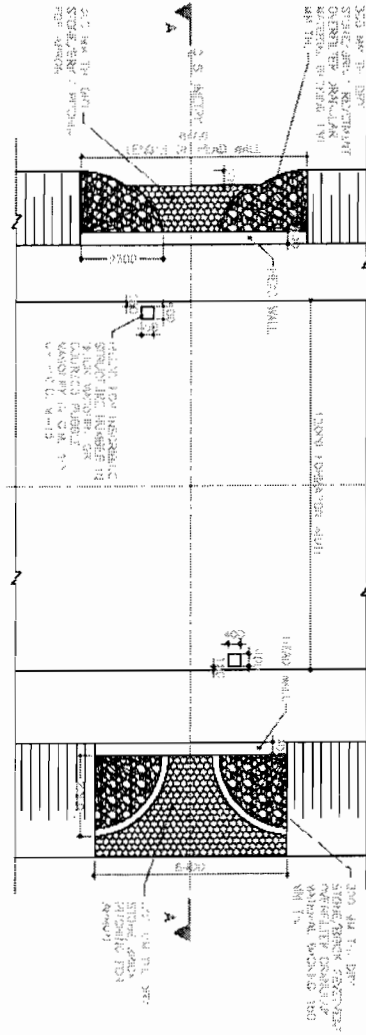
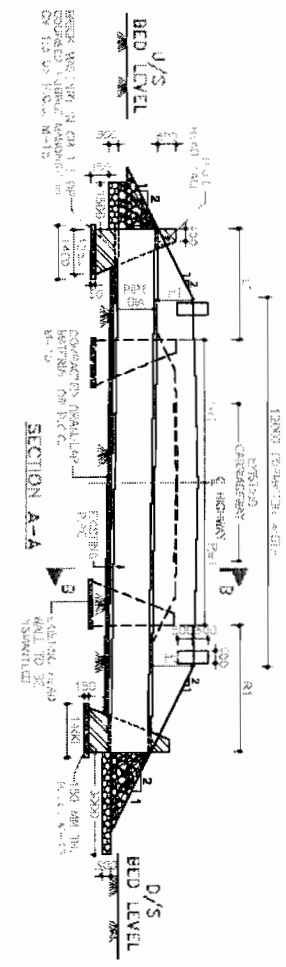
FOR R.O.C. DOUBLE PIPE CULVERTS (1.0m DIA)
HEIGHT OF FILL VARYING FROM 0.5 TO 4.0 M

SOM DATT BUILDERS & CONTRACTORS



Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

World Bank Project
 (Cuttack E.I.C. Project)
 Orissa Etc. Etc. Etc.



- NOTES:**
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
 2. ALL DIMENSIONS ARE TO BE FOLLOWED UNLESS OTHERWISE SPECIFIED.
 3. ALL DIMENSIONS ARE TO BE FOLLOWED UNLESS OTHERWISE SPECIFIED.
 4. ALL DIMENSIONS ARE TO BE FOLLOWED UNLESS OTHERWISE SPECIFIED.
 5. ALL DIMENSIONS ARE TO BE FOLLOWED UNLESS OTHERWISE SPECIFIED.
 6. ALL DIMENSIONS ARE TO BE FOLLOWED UNLESS OTHERWISE SPECIFIED.
 7. ALL DIMENSIONS ARE TO BE FOLLOWED UNLESS OTHERWISE SPECIFIED.

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

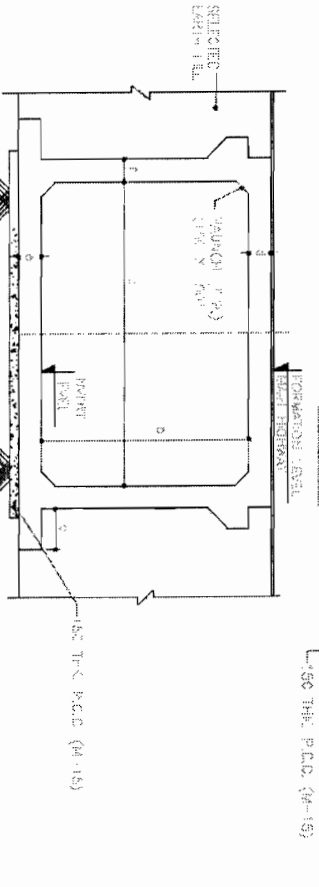
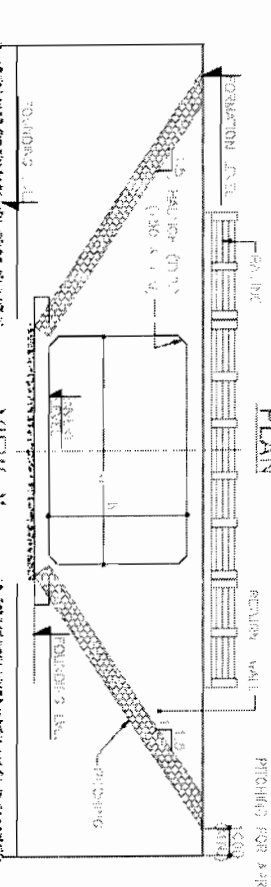
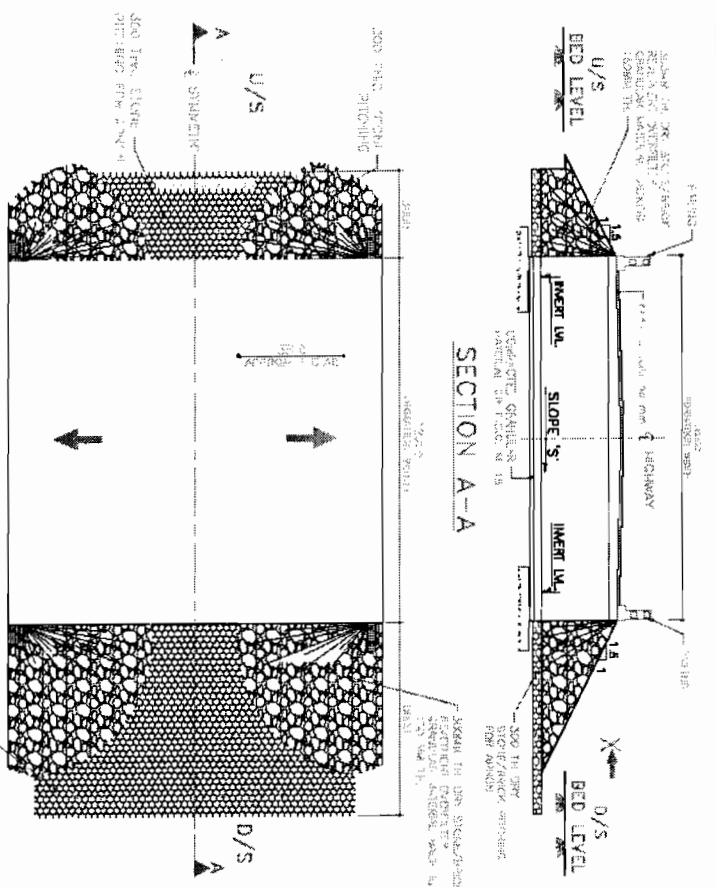
Sl. No.	Location	Proposed	Existing	Bed level		Ground/Proposed		Height of fill		Diameter of pipe	Total		No. of Piles
				Level	Level	Level	Level	Left	Right		Left	Right	
1	0000	0007	2100	8.40	24.00	-2.50	2.2	0.7	0.7	R.T.O.	5.2	4.5	1
2	14000	13000	1400	25.00	25.00	-2.50	0.0	0.0	0.0	R.T.O.	5.2	4.5	1
3	18000	16100	2100	28.10	27.10	-2.50	0.6	1.2	1.2	R.T.O.	5.2	4.5	1
4	18000	17000	2100	32.20	30.20	-2.50	1.7	1.4	1.4	R.T.O.	5.2	4.5	1
5	27000	27400	2100	36.30	36.30	-2.50	0.0	0.0	0.0	R.T.O.	5.2	4.5	1
6	28000	26000	2100	40.40	38.40	-2.50	2.0	2.0	2.0	R.T.O.	5.2	4.5	1
7	30000	28000	2100	44.50	42.50	-2.50	2.0	2.0	2.0	R.T.O.	5.2	4.5	1
8	30000	29000	2100	48.60	46.60	-2.50	2.0	2.0	2.0	R.T.O.	5.2	4.5	1
9	30000	28000	2100	52.70	50.70	-2.50	2.0	2.0	2.0	R.T.O.	5.2	4.5	1
10	34000	33000	2100	56.80	54.80	-2.50	2.0	2.0	2.0	R.T.O.	5.2	4.5	1
11	34000	34000	2100	60.90	60.90	-2.50	0.0	0.0	0.0	R.T.O.	5.2	4.5	1
12	38000	36000	2100	65.00	63.00	-2.50	2.0	2.0	2.0	R.T.O.	5.2	4.5	1

CONSULTING ENGINEERS GROUP LTD.
 E-12601 Computer Lane, New Delhi-110028
 Tel: +91-11-26088400, 2601999, 2602000
 Fax: 2612194, 2612195, 2612196, 2612197, 2612198, 2612199

CONSULTING ENGINEERS GROUP LTD.
 Preparation of Plans - I Provide for Orissa State Road Project
 Under World Bank Assistance

TYPICAL WIDENING ARRANGEMENT
 FOR R.O.D SINGLE PIPE CULVERTS (1.0M DIA)
 (HEIGHT OF FILL VARYING FROM 0.8 TO 4.0M)





DIMENSION DETAILS OF BOX

No.	Level	Elevation	Horizontal Distance		Vertical Distance		Total Length	Total Area
			Left	Right	Top	Bottom		
1	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
2	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
3	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
4	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
5	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
6	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
7	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
8	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
9	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
10	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
11	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
12	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
13	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
14	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
15	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
16	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
17	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
18	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
19	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
20	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00

No.	Level	Elevation	Horizontal Distance		Vertical Distance		Total Length	Total Area
			Left	Right	Top	Bottom		
1	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
2	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
3	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
4	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
5	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
6	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
7	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
8	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
9	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
10	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
11	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
12	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
13	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
14	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
15	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
16	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
17	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
18	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
19	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
20	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00

No.	Level	Elevation	Horizontal Distance		Vertical Distance		Total Length	Total Area
			Left	Right	Top	Bottom		
1	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
2	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
3	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
4	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
5	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
6	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
7	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
8	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
9	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
10	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
11	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
12	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
13	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
14	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
15	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
16	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
17	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
18	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
19	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00
20	U/S	100.00	0.00	0.00	0.00	0.00	0.00	0.00

NO.	W/OIN (mm)	REHAT (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)	THICKNESS (mm)
1	1000	1000	1000	1000	1000	1000
2	1000	1000	1000	1000	1000	1000
3	1000	1000	1000	1000	1000	1000
4	1000	1000	1000	1000	1000	1000
5	1000	1000	1000	1000	1000	1000
6	1000	1000	1000	1000	1000	1000
7	1000	1000	1000	1000	1000	1000
8	1000	1000	1000	1000	1000	1000
9	1000	1000	1000	1000	1000	1000
10	1000	1000	1000	1000	1000	1000
11	1000	1000	1000	1000	1000	1000
12	1000	1000	1000	1000	1000	1000
13	1000	1000	1000	1000	1000	1000
14	1000	1000	1000	1000	1000	1000
15	1000	1000	1000	1000	1000	1000
16	1000	1000	1000	1000	1000	1000
17	1000	1000	1000	1000	1000	1000
18	1000	1000	1000	1000	1000	1000
19	1000	1000	1000	1000	1000	1000
20	1000	1000	1000	1000	1000	1000

NOTES:

- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITIES.
- THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND SERVICES ENCOUNTERED DURING THE WORK.
- THE CONTRACTOR SHALL MAINTAIN A RECORD OF ALL MATERIALS AND LABOR USED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING STRUCTURES AND SERVICES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT PROPERTIES AND SERVICES.
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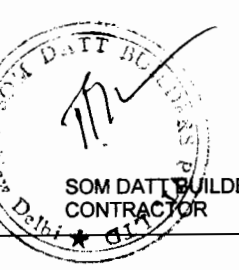
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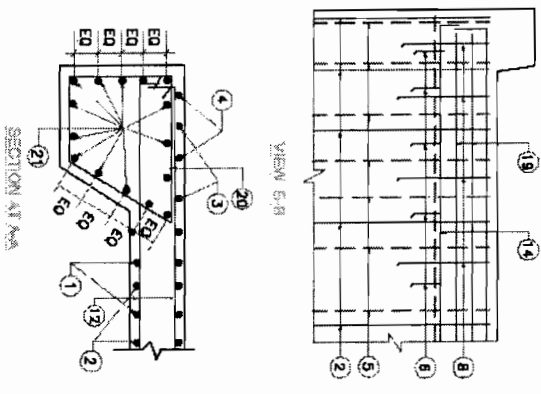
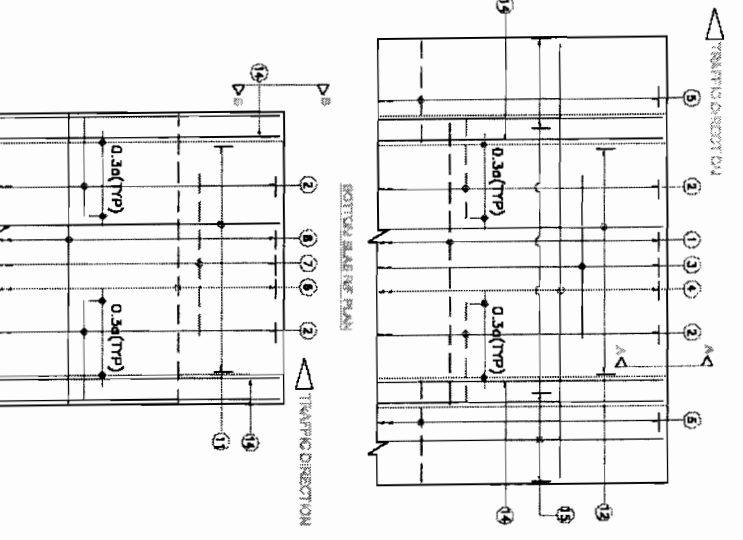
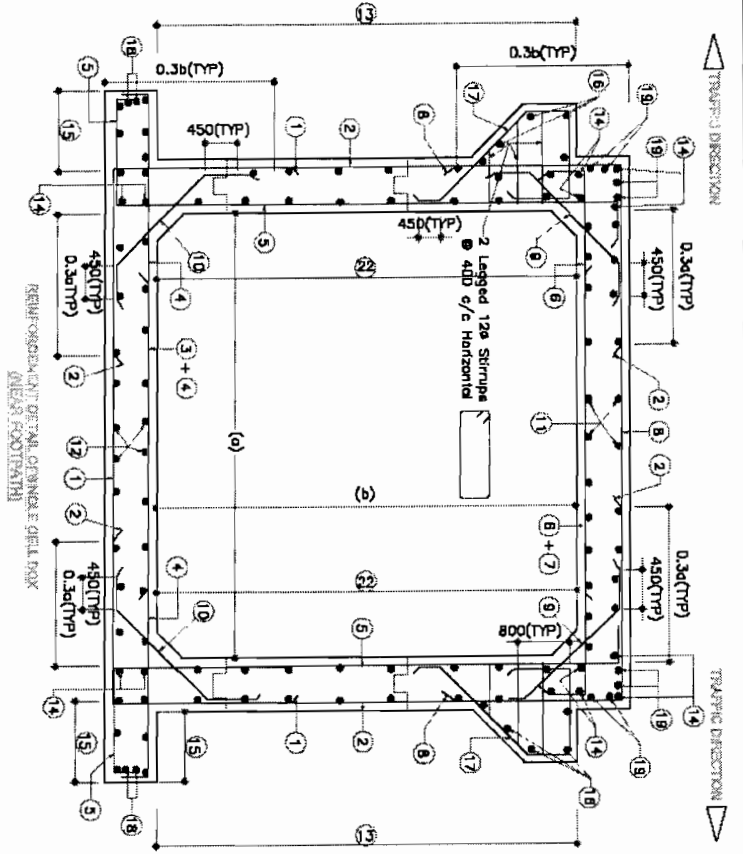
- SEE GENERAL CONTRACT SPECIFICATIONS AND DRAWINGS FOR ALL MATERIALS AND LABOR.
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CONSULTING ENGINEERS GROUP LTD.
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR OISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
 SINGLE CELL R.C.C. BOX CULVERT

DATE: 10/10/2018
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]





BAR NO.	BAR SIZE	1/22/D	1/23/D	1/23/D	1/23/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D	1/24/D
1	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
2	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
3	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
4	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
5	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
6	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
7	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
8	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
9	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
10	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
11	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
12	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
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20	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
21	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
22	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

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

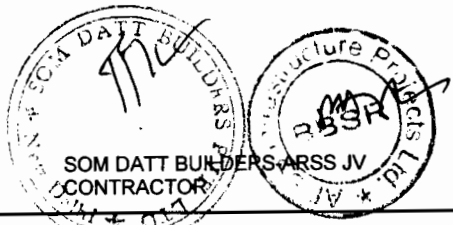
- NOTES :-
- 1 ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS
 - 2 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWINGS/REV./5/14/16/ BOX CL-01
 - 3 MINIMUM CLEAR COVER TO MAIN REINFORCEMENT SHALL BE 40MM.
 - 4 MAXIMUM LAP LENGTH OF REINFORCEMENT SHALL BE NOT MORE THAN 300 MM. THE BARS SHALL BE LAPPED AT ANY ONE LOCATION.
 - 5 LAPS SHOULD BE IN AVOIDED WITH BAR AND CONTINUE ALONG BARREL.
 - 6 LAPS SHALL BE STARTED AT DISTANCE OF HALF THEIR SPACING FROM THE FACE OF SUPPORT.
 - 7 MAXIMUM SIZE OF AGGREGATE TO BE USED IS 10 MM.
 - 8 GRADE OF CONCRETE IS M-20.
 - 9 ALL REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE F415 CONFORMING TO IS 1786-1985 WITH A MINIMUM YIELD STRENGTH OF 415 N/MM².
 - 10 LAP OR LAPPING OF BARS SHALL BE SATISFAC- TORY AS PER CLAUSE 304.5 OF IS:21-2000

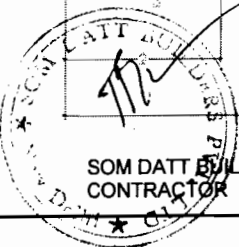
REFERENCE DRAWINGS:-

CONSULTING ENGINEERS GROUP LTD.
 E-20/07, Connaught Place, New Delhi-11
 Tel. 26111111, 26222222, 26333333
 Fax. 26111111, 26222222, 26333333

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REINFORCEMENT DETAIL OF SINGLE CELL BOX UNDERVERT

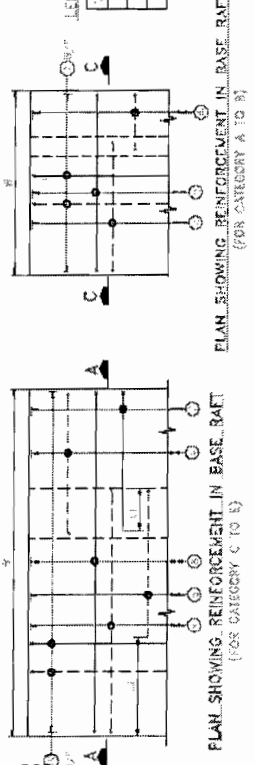
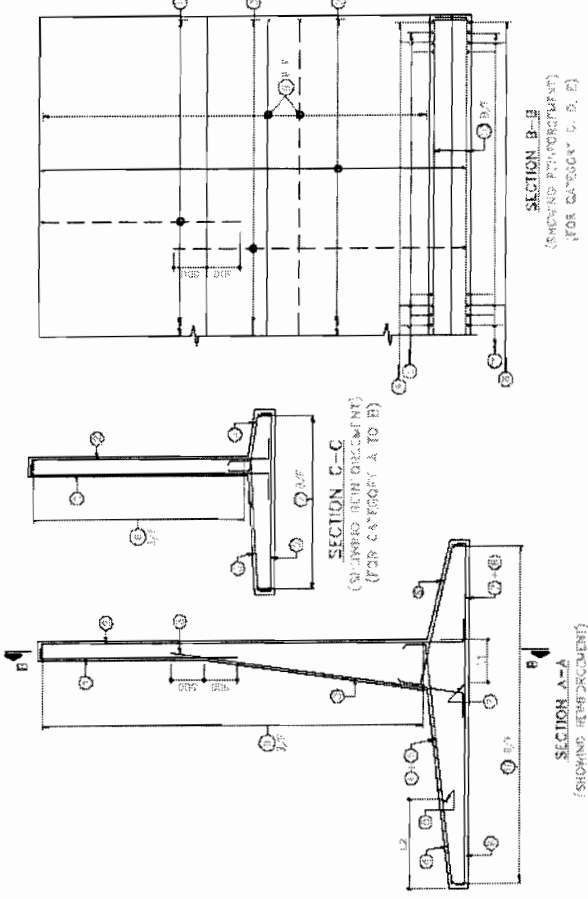
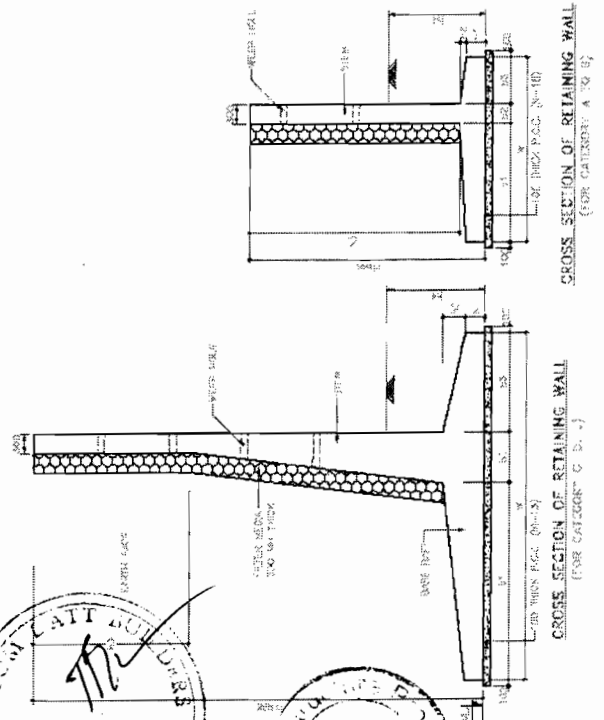




SOM DATT BUILDERS ARSS PVT. LTD.
CONTRACTOR

Chief Engineer
World Bank Projects, Orissa
Chief EMPLOYER

Orissa State Road Project
(Orissa State Road Project)



LENGTH OF CURTAINMENT

CATEGORY	L1	L2	L3
A	1.00	1.00	1.00
B	1.00	1.00	1.00
C	1.00	1.00	1.00
D	1.00	1.00	1.00
E	1.00	1.00	1.00

DIMENSIONAL DETAILS

CATEGORY	Hmax	H1	H2	H3	H4	H5	H6	H7	H8
A	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
B	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
D	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
E	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00



REINFORCEMENT DETAILS

REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT
...

REINFORCEMENT DETAILS

REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT	REINFORCEMENT
...

BHADRAK - ANANDPUR

Prepared by	Checked by	Length of Bridge	Span	Category
...
...
...

NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. DO NOT SCALE THE DIMENSIONS, ONLY WRITTEN DIMENSIONS ARE TO BE USED.
3. SHAPE OF CURTAINMENT FOR ALL CATEGORIES...
4. ALL DIMENSIONS ARE EXPRESSED TO 2 DECIMAL PLACES.
5. CURTAINMENT SHALL BE LESS THAN 100 CM.
6. ALL DIMENSIONS ARE EXPRESSED TO 2 DECIMAL PLACES.
7. THE CURTAINMENT SHALL BE LESS THAN 100 CM.

REFERENCE DRAWING:-

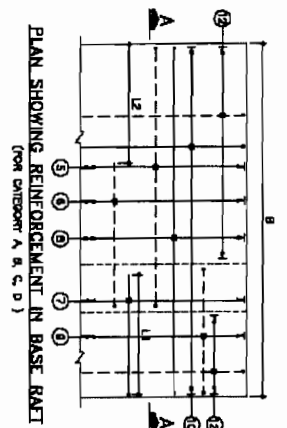
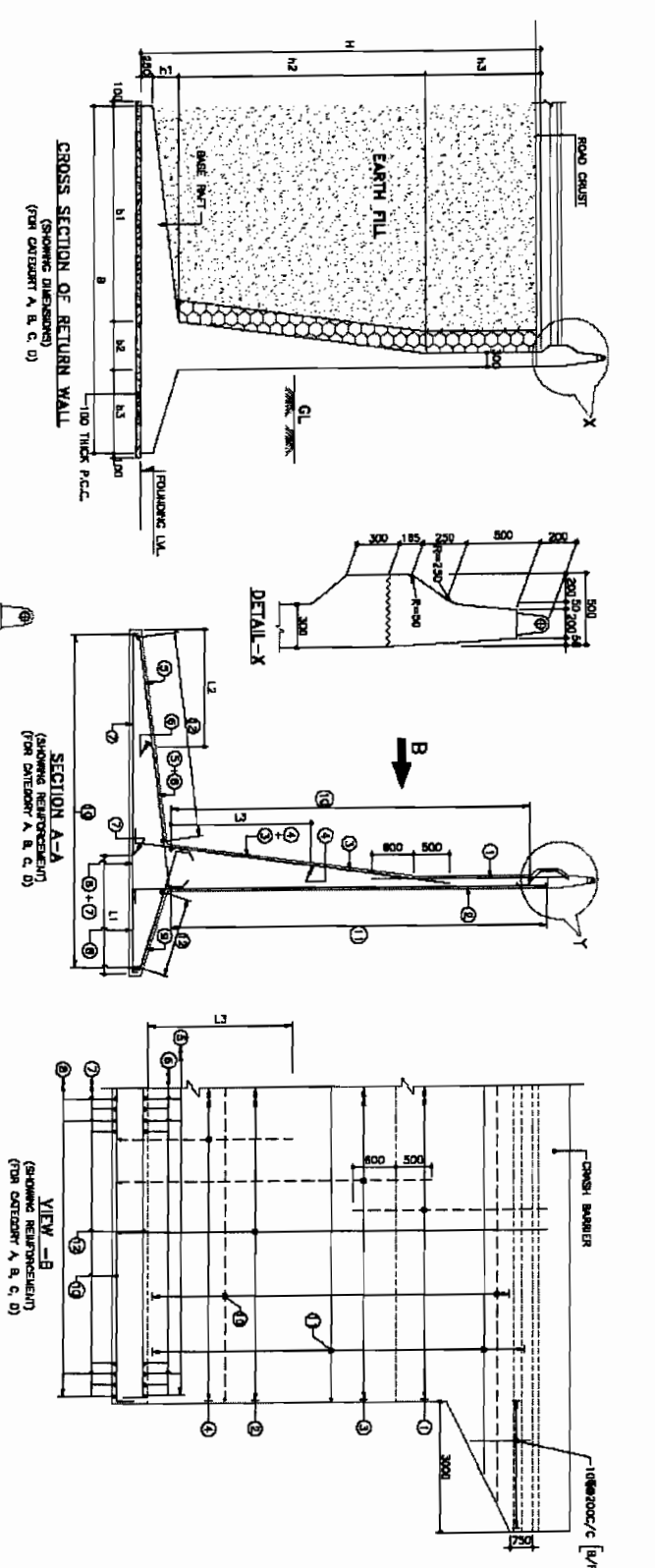
1. ROAD NO. 104, 105, 106, 107, 108, 109
2. ROAD NO. 110, 111, 112, 113, 114, 115
3. ROAD NO. 116, 117, 118, 119, 120, 121

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD ASSISTANCE UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD. 17, Market Street, Cuttack, Orissa, India. Phone: 2521141, 2521142, 2521143, 2521144, 2521145, 2521146, 2521147, 2521148, 2521149, 2521150, 2521151, 2521152, 2521153, 2521154, 2521155, 2521156, 2521157, 2521158, 2521159, 2521160, 2521161, 2521162, 2521163, 2521164, 2521165, 2521166, 2521167, 2521168, 2521169, 2521170, 2521171, 2521172, 2521173, 2521174, 2521175, 2521176, 2521177, 2521178, 2521179, 2521180, 2521181, 2521182, 2521183, 2521184, 2521185, 2521186, 2521187, 2521188, 2521189, 2521190, 2521191, 2521192, 2521193, 2521194, 2521195, 2521196, 2521197, 2521198, 2521199, 2521200.

DIMENSION & REINFORCEMENT DETAILS OF RETURN WALL

DATE	REVISION	BY	CHK	APP
...



LENGTH OF CURTAILMENT

CATEGORY	L1	L2	L3
A	1000	1170	2000
B	1000	1800	4300
C	1000	1750	3200

DIMENSIONAL DETAILS

CATEGORY	H/M	B	h1	h2	h3	b1	b2	b3
A	4500	3600	150	1800	2500	1800	500	1800
B	6000	6000	300	2800	2500	2300	600	2000
C	7500	6200	450	4300	2500	3000	800	2200
D	8500	7500	500	5500	2500	3000	1000	2700

REINFORCEMENT - DIMENSIONS

Sl. No.	Proposed No. of Curtailment	Proposed Area	Min. Area with 100% Lap	Min. Area with 50% Lap	Min. Area with 25% Lap	Min. Area with 10% Lap	Min. Area with 5% Lap	Min. Area with 0% Lap
1	11487.8	3.16 E8 mm ²	3.16 E8 mm ²	1.58 E8 mm ²	0.79 E8 mm ²	0.39 E8 mm ²	0.19 E8 mm ²	0.09 E8 mm ²
2	17278.8	3.88 E8 mm ²	3.88 E8 mm ²	1.94 E8 mm ²	0.97 E8 mm ²	0.48 E8 mm ²	0.24 E8 mm ²	0.12 E8 mm ²

REINFORCEMENT DETAILS

BAR N/O	1	2	3	4	5	6	7	8	9	10	11	12
BAR SHAPES	100	300	300	150	300	150	150	150	150	150	150	150
A	10 10 2000/c	10 10 1500/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c
B	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c
C	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c
D	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c	10 10 2000/c

LEGENDS:
 --- BAR ON TOP / EARLY FACE
 --- BAR ON BOTTOM / OUTER FACE
 --- BAR ON BOTH FACE

CONSULTING ENGINEERS GROUP LTD.
 17, P. NO. 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200.

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION & REINFORCEMENT DETAILS OF RETURN WALL

NOTES

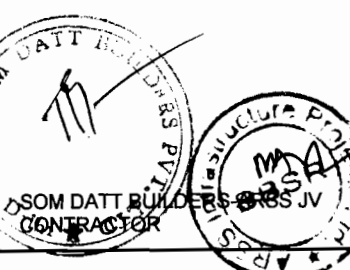
1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS.
2. DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OR CONC. FOR P.C.C. WORKS --- 1:1:6.
4. ALL HBSB BARS IS CONSIDERED TO BE 17MM GRADE FOR ALL OTHER BARS.
5. CLEAR COVER TO ALL BARS:
 - IN BASE RAFT = 75 mm
 - ALL OTHER COMPONENTS = 40mm
6. NOT MORE THAN SIX OF BAR IS LAPPED AT A SECTION AND LAPPING IS STAGGERED. LAP LENGTH IS MINIMUM 75 % DIA OF BAR FOR WALL BARS 30 TIMES DIA OF BAR FOR ALL OTHER BARS.

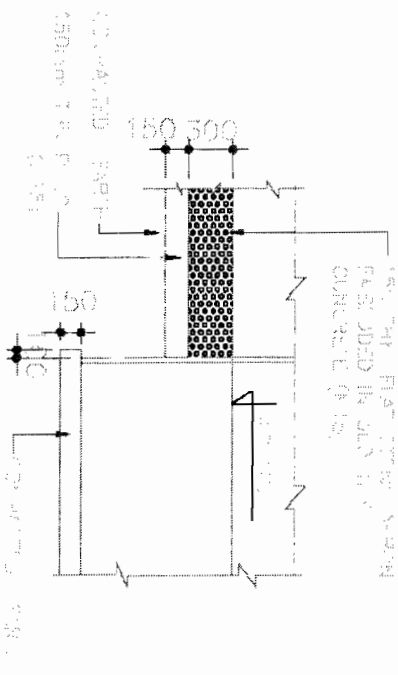
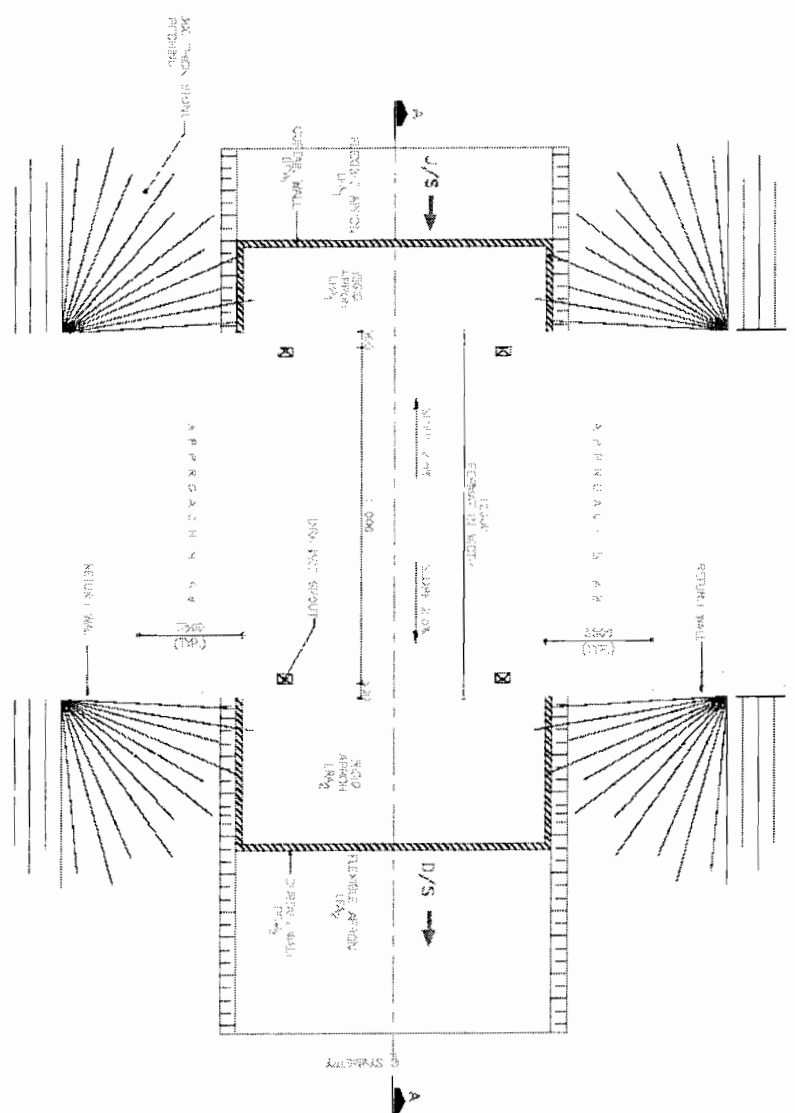
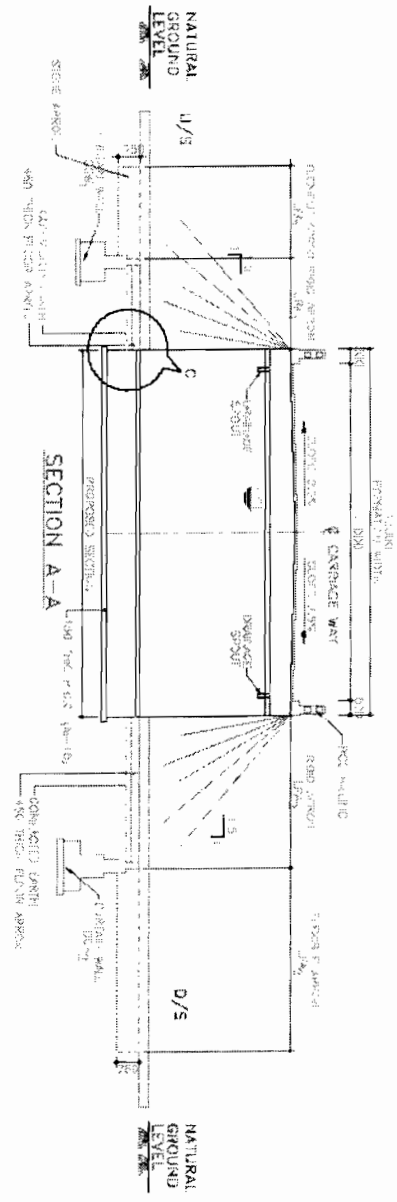
2. THE BEARING CAPACITY SHALL NOT BE LESS THAN THE FOLLOWING:

REFERENCE DRAWING:-

1. OMRP/255/SH-03/RR/11+000/01
2. OMRP/255/SH-02/RR/12+200/01

Chief Engineer
World Bank Project, Orissa
EMPLOYER.





NOTES:

1. ALL DIMENSIONS ARE IN METERS.
2. CHECK MATERIAL SPECIFICATIONS ARE TO BE FOLLOWED. DO NOT SCALE THE DIMENSIONS.

REFERENCE DRAWINGS:-

1. ROADWAY DESIGN - 1:1000 (S.1)
2. ROADWAY DESIGN - 1:1000 (S.2)
3. ROADWAY DESIGN - 1:1000 (S.3)
4. ROADWAY DESIGN - 1:1000 (S.4)

Chief Engineer
World Bank Projects, Orissa
EMPLOYER

CONSULTING ENGINEERS GROUP LTD.
10/1, BANGALORE ROAD, CALCUTTA 700 017
TELEPHONE: 2211111, 2211112, 2211113
FAX: 2211114, 2211115, 2211116, 2211117
WWW.CEGROUP.COM

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
TYPICAL DETAILS OF ROAD PROTECTION WORKS

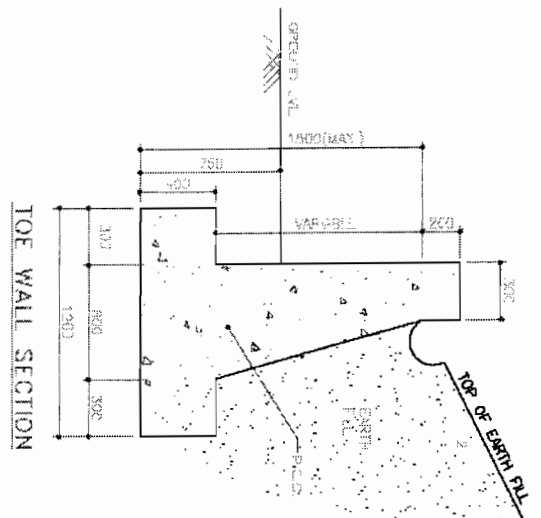
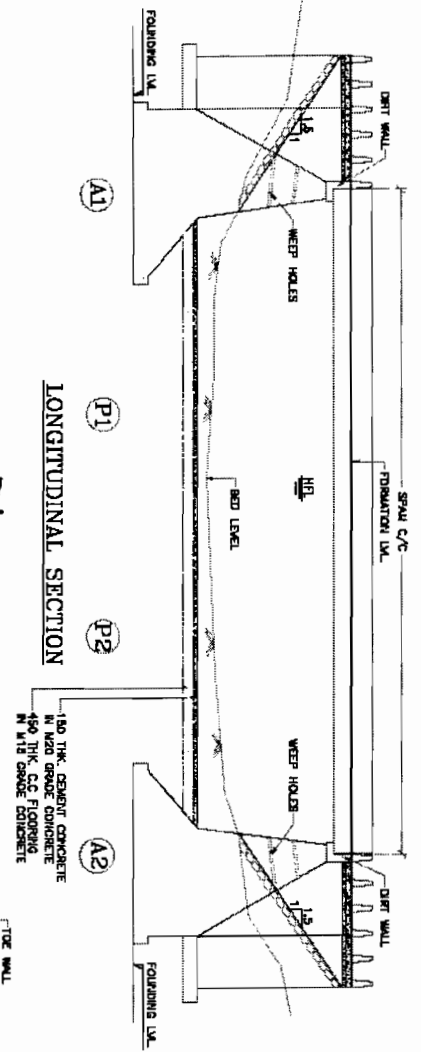
DATE	BY	CHECKED	APPROVED

SOM DATTA BUILDERS PVT. LTD.
CONTRACTOR

ARSS

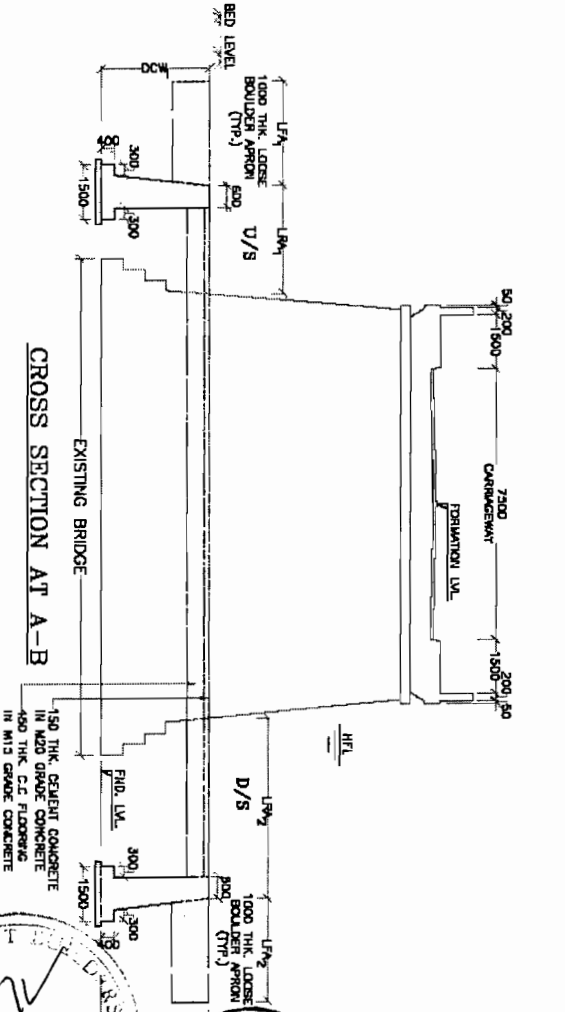
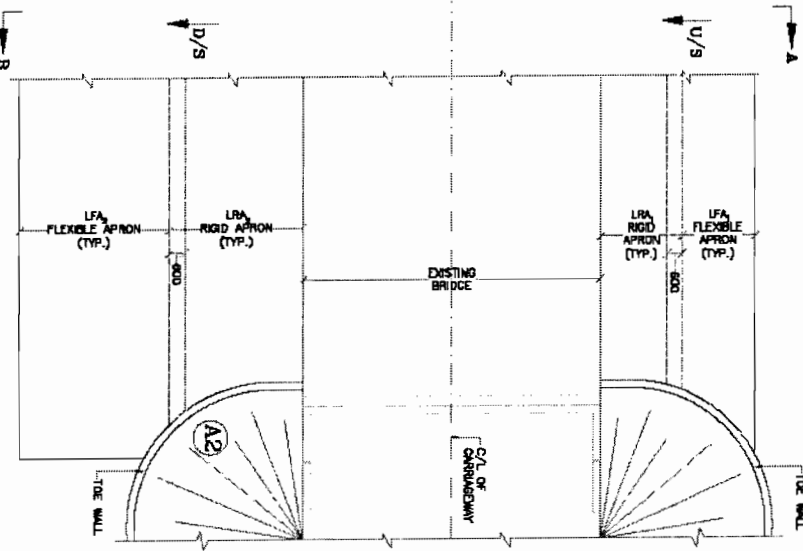
TO BHADARK

TO CHANDBALL



HALF BOTTOM PLAN

PLAN HALF TOP PLAN

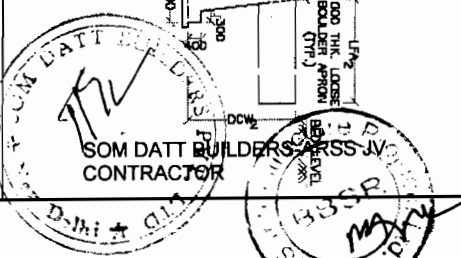


CONSULTING ENGINEERS GROUP LTD.
 10/1, 10/2, 10/3, 10/4, 10/5, 10/6, 10/7, 10/8, 10/9, 10/10, 10/11, 10/12, 10/13, 10/14, 10/15, 10/16, 10/17, 10/18, 10/19, 10/20, 10/21, 10/22, 10/23, 10/24, 10/25, 10/26, 10/27, 10/28, 10/29, 10/30, 10/31, 10/32, 10/33, 10/34, 10/35, 10/36, 10/37, 10/38, 10/39, 10/40, 10/41, 10/42, 10/43, 10/44, 10/45, 10/46, 10/47, 10/48, 10/49, 10/50, 10/51, 10/52, 10/53, 10/54, 10/55, 10/56, 10/57, 10/58, 10/59, 10/60, 10/61, 10/62, 10/63, 10/64, 10/65, 10/66, 10/67, 10/68, 10/69, 10/70, 10/71, 10/72, 10/73, 10/74, 10/75, 10/76, 10/77, 10/78, 10/79, 10/80, 10/81, 10/82, 10/83, 10/84, 10/85, 10/86, 10/87, 10/88, 10/89, 10/90, 10/91, 10/92, 10/93, 10/94, 10/95, 10/96, 10/97, 10/98, 10/99, 10/100

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL ARRANGEMENT DRAWING
 TYPICAL DETAILS OF FLOOR PROTECTION WORKS

NO.	DATE	BY	CHECKED	APPROVED



NOTES:
 1. ALL DIMENSIONS ARE IN MM.
 2. CHECK WHETHER FOUNDATION DEPT IS AS PER PLAN/SECTION.
 3. SCALE THE DIMENSIONS.

Chief Engineer
 World Bank Projects, Orissa
 Chief Engineer
 World Bank Projects, Orissa
 (Sd/-) E. C. (Sd/-)
 E. C. (Sd/-)

GOVERNMENT OF ORISSA

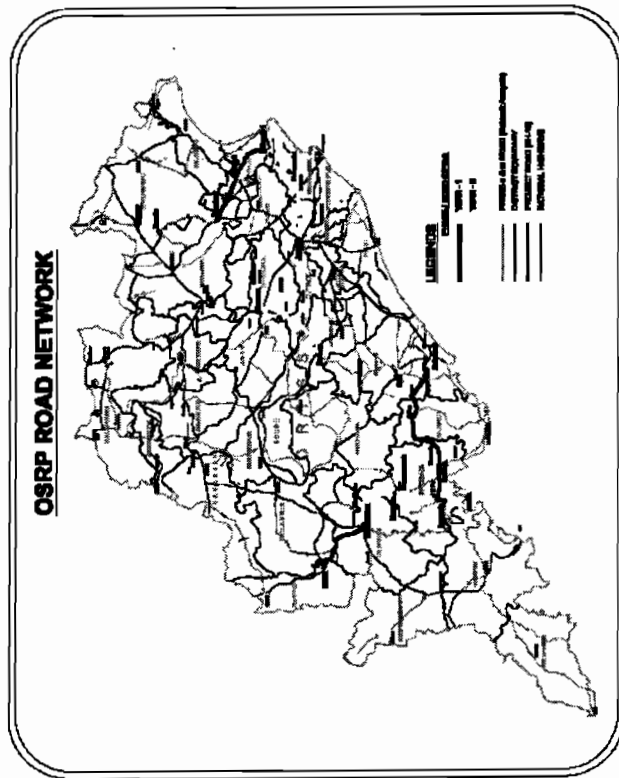
WORKS DEPARTMENT ORISSA STATE ROAD PROJECT

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT
PREPARATION OF PHASE (I) ROADS FOR ORISSA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

STANDARD DRAWINGS FOR HIGHWAYS

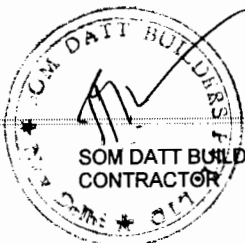
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
- (1) - COVER SHEET
- (2) - INDEX OF DRAWINGS
- (3) - STANDARD DRAWING



FINAL DPR

**CONSULTING
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Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521948, E-mail: ceg@cegroupindia.com




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Chief Engineer
World Bank Project
Office, E.I.C. (Orissa)
Orissa, Bhubaneswar.

INDEX OF DRAWINGS

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24	Standard Drawings Details of Footpath Barriers	OSRP/CEG/CB
25	Standard Drawings Metal Beam Crash Barrier Details	OSRP/CEG/M01
26	Standard Drawings Typical KM Stone & 5th Km Stone	OSRP/CEG/M & GP
27	Standard Drawings Typical Details of 200m Stone & Guard Post	OSRP/CEG/RD
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29	Standard Drawings Details of RPMs & Chevron Markers	OSRP/CEG/RM01
30	Standard Drawings Typical Road Marking Details (Sheet 1 of 2)	OSRP/CEG/RM02
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35	Standard Drawings Typical Road Signs (Sheet 4 of 4)	OSRP/CEG/RS04
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42	Standard Drawings Toll Plaza Main Office	OSRP/CEG/TP03
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44	Standard Drawings Barrier Gate for Toll Plaza	OSRP/CEG/TP05
45	Standard Drawings Electrical Layout Toll Plaza and Main Office	OSRP/CEG/TP06
	Standard Drawings Electrical Layout Toll Plaza	OSRP/CEG/TP06
	Standard Drawings Plumbing Layout - Toll Plaza	OSRP/CEG/TP07

Sl.No.	Description	Drawing No.
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02	Typical Cross Section	OSRP/CEG/TCS/03 & 04
03	Typical Cross Section	OSRP/CEG/TCS/05 & 06
04	Typical Cross Section	OSRP/CEG/TCS/07 & 08
05	Typical Cross Section	OSRP/CEG/TCS/09 & 10
06	Typical Cross Section	OSRP/CEG/TCS/11 & 12
07	Typical Cross Section	OSRP/CEG/TCS/13, 14 & 15
08	Typical Cross Section	OSRP/CEG/TCS/16, 17 & 18
09	Typical Cross Section	OSRP/CEG/TCS/19, 20 & 21
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12	Typical Details of Transition Slab between Rigid & Flexible Pavement	OSRP/CEG/RIGID02
13	Typical Details of Pavement Layer	OSRP/CEG/OD
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	Standard Drawings Typical - Cross Drain Single Lane BT Road/Earth Road	OSRP/CEG/CDJN

INDEX OF STANDARD DRAWINGS

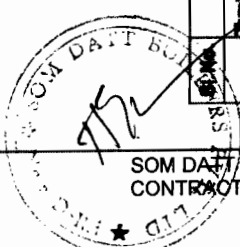
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

CEG

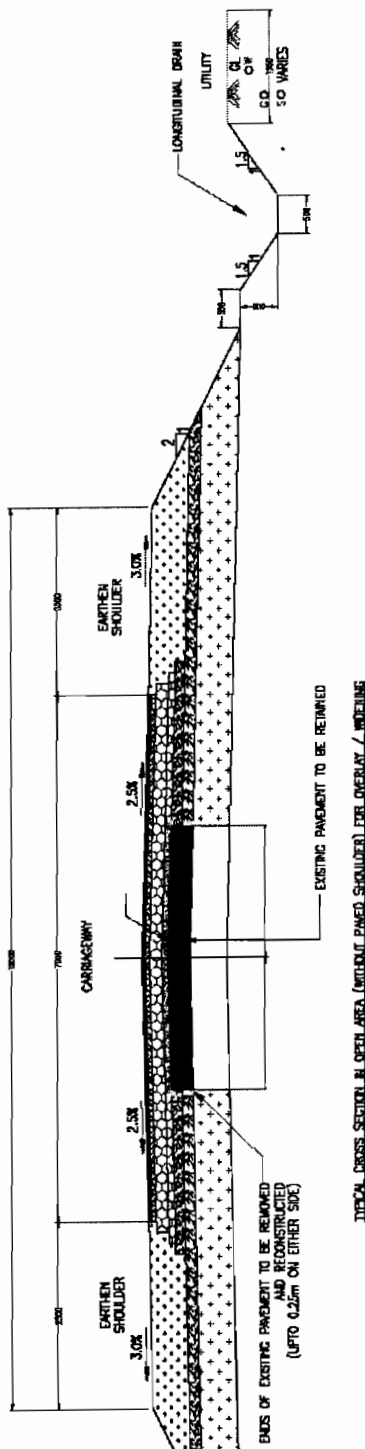
CONSULTING ENGINEERS GROUP LTD.
 E-12, Moji Colony, Malviya Nagar, Jaipur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegindia.com

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 (Name E.I.C. (S))
 Supt. Shobabeswar.

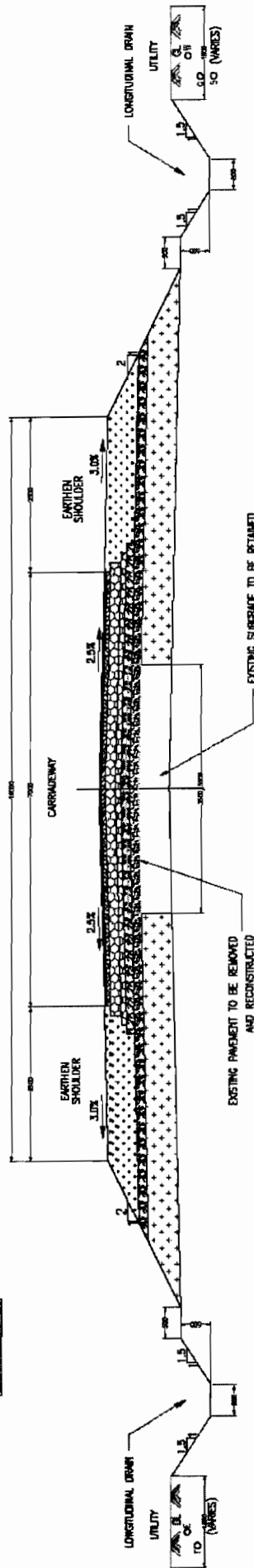
DIRG NO. OSRP/CEG/INDEX	DATE	REV	RO	OWNER (I)	CHECKED (I)	APPROVED (I)
SH. NO.	B	DATE	REV	RO	B.M	R.R.D.K
SCALE	RTS			R.J	R.R.D.K	S.G



SOM DATT BUILDERS-ARSS JV
 CONTRACTOR



TYPICAL CROSS SECTION IN OPEN AREA (WITHOUT PAVED SHOULDER) FOR RECONSTRUCTION / WIDENING



TYPICAL CROSS SECTION IN OPEN AREA (WITHOUT PAVED SHOULDER) FOR RECONSTRUCTION / WIDENING

LEGEND

1. GR	Gravel	11. 1.5 - 1.0m depth layer
2. CR	Crushed rock	12. 1.5 - 1.0m depth layer
3. BR	Best quality brick	13. 1.5 - 1.0m depth layer
4. CB	Crushed brick	14. 1.5 - 1.0m depth layer
5. S	Subgrade	15. 1.5 - 1.0m depth layer
6. M	Mortar	16. 1.5 - 1.0m depth layer

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETERS
 2. FOR DRAIN DETAILS REFER DRAWING NO. DS/RP/CEG/01
 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 ROAD AND FLEXIBLE REFER DRAWING NO. DS/RP/CEG/02
 5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. DS/RP/CEG/03
 6. POC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
 7. RAISE THE UTILITIES/AREAS OBSTRUCTING THE LONGITUDINAL DRAINS. THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

**TYPICAL CROSS-SECTION
TCS - 01 & TCS - 02**

**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

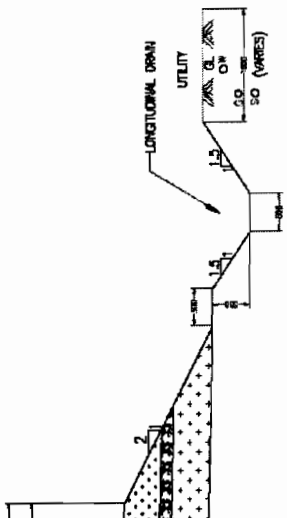
**CONSULTING
ENGINEERS GROUP LTD.**
E-12, Mall Colony, Malviya Nagar, Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegroupindia.com

Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank Project
(in the E.M.O. (C.M.)
Orissa, Bhubaneswar.

DRG. NO.	CEP/252/TCS/01/002	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	01	DATE	REV	RO	
SCALE		NTS			
		B.M	R.J	R.P.D.K	S.G

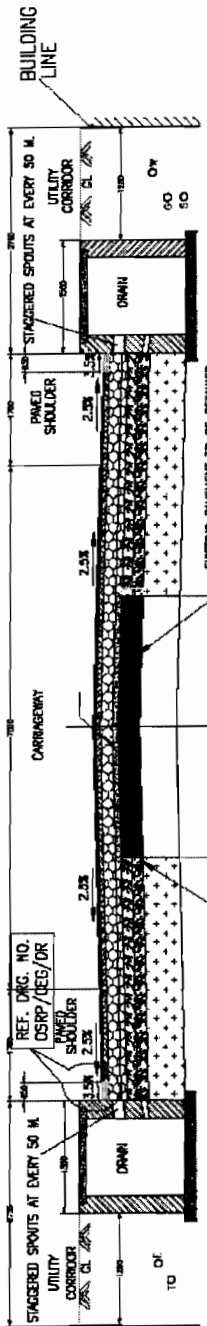
**SOM DATT BUILDERS-ARSS JV
CONTRACTOR**
LTD
Delhi

STRUCTURE ENGINEER
ARSS



TYPICAL CROSS SECTION IN DEEP AREA (WITHOUT PAVED SHOULDER) FOR NEW CONSTRUCTION

TCS-03



TYPICAL CROSS SECTION IN BUILD-UP AREA FOR OVERLAY WORK

TCS-04

LEGEND

1	11.5 - 11.5	11.5 - 11.5
2	11.5 - 11.5	11.5 - 11.5
3	11.5 - 11.5	11.5 - 11.5
4	11.5 - 11.5	11.5 - 11.5
5	11.5 - 11.5	11.5 - 11.5
6	11.5 - 11.5	11.5 - 11.5
7	11.5 - 11.5	11.5 - 11.5
8	11.5 - 11.5	11.5 - 11.5
9	11.5 - 11.5	11.5 - 11.5
10	11.5 - 11.5	11.5 - 11.5

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 ROAD AND FLEXIBLE REFER DRAWING NO. OSRP/CEG/ROD 02.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/00
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 INVERTED AS PER ENGINEERS DIRECTIONS

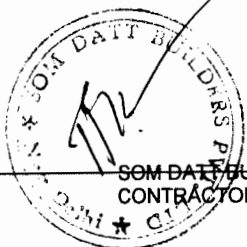
TYPICAL CROSS-SECTION
TCS - 03 & TCS - 04

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
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Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegroupindia.com

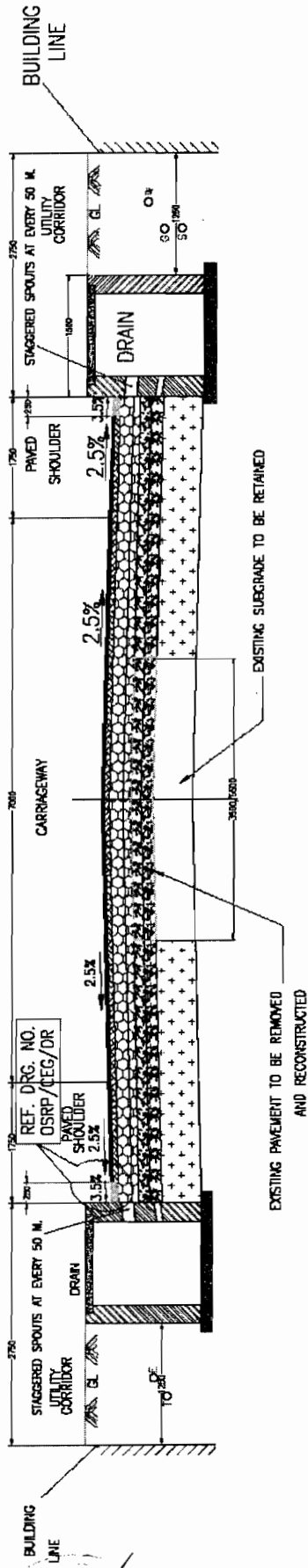


DIRG. NO. OSRP/CEG/TCS/03 & 04	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 02	DATE	REV	RD	
SCALE	NTS	B.M	R.J	R.R.D.K
				S.G



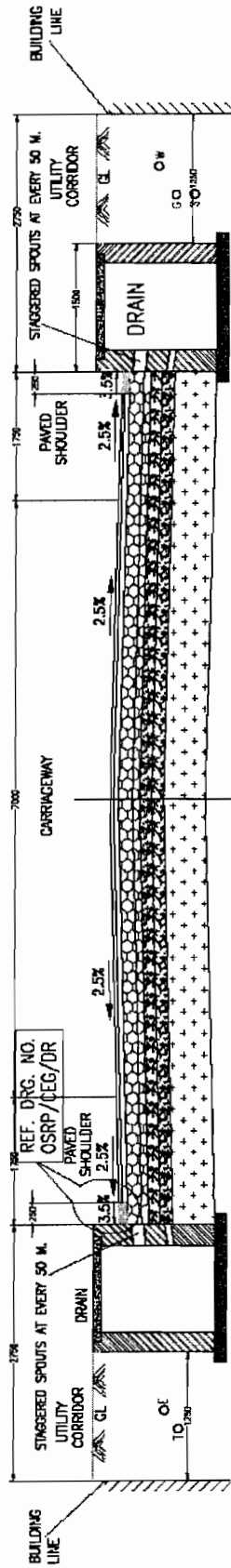
SOM DATT BUILDERS & CONTRACTORS

TCS-05



TYPICAL CROSS SECTION IN BUILT-UP AREA FOR RECONSTRUCTION \ WIDENING

TCS-06



TYPICAL CROSS SECTION IN BUILT-UP AREA FOR NEW CONSTRUCTION

LEGENDS

1) GR	4) G.C.	10) F - 10mm Gravel
2) C.M.	5) P.C.	11) S - 10mm Gravel
3) M.M.	6) G.W.P. M.L.	12) S - 20mm
4) C.C.	7) E - Existing Earth	
5) SURFACE	8) T - 10mm Gravel	

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/ROAD 02
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/02
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. RAISE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS. THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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



World Bank Projects, Orissa
 EMPLOYER
 (On the E.M.C. Form)
 Cutka, Bhubaneswar.

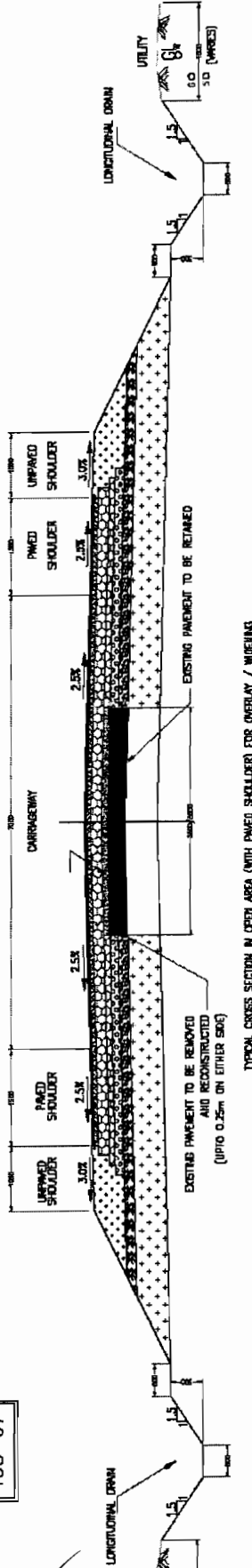
**TYPICAL CROSS-SECTION
 TCS - 05 & TCS - 06**

DRG. NO.	OSRP/CEG/CEG/DR	DATE	REV	RO	APPROVED (C)	APPROVED (D)
SH. NO.	03				B.M	R.J
SCALE	NTS				R.R.D.K	S.G

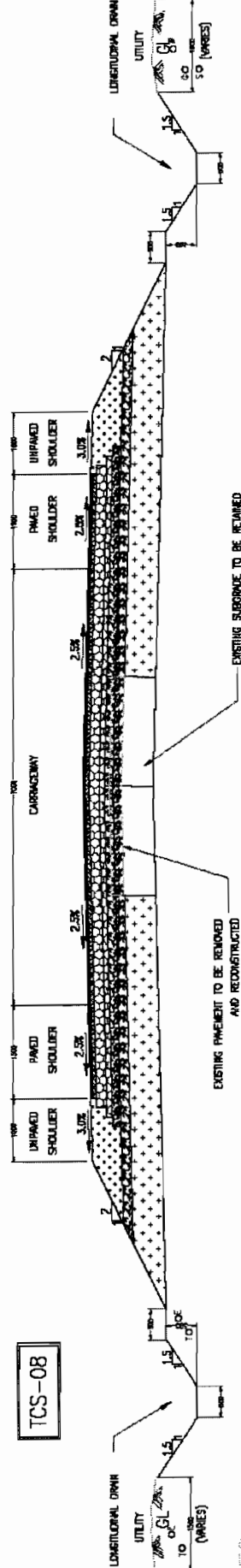
SOM DATT BUILDERS ASSOCIATION
 CONTRACTOR



TCS-07



TCS-08



LEGENDS

1 m	10 m	100 m	1000 m
2 m	20 m	200 m	2000 m
3 m	30 m	300 m	3000 m
4 m	40 m	400 m	4000 m
5 m	50 m	500 m	5000 m
6 m	60 m	600 m	6000 m
7 m	70 m	700 m	7000 m
8 m	80 m	800 m	8000 m
9 m	90 m	900 m	9000 m
10 m	100 m	1000 m	10000 m

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAW 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/03
6. POE-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OPERATING LAYER ABOVE IT.
7. IN CASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

TYPICAL CROSS-SECTION
TCS - 07 & TCS - 08

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

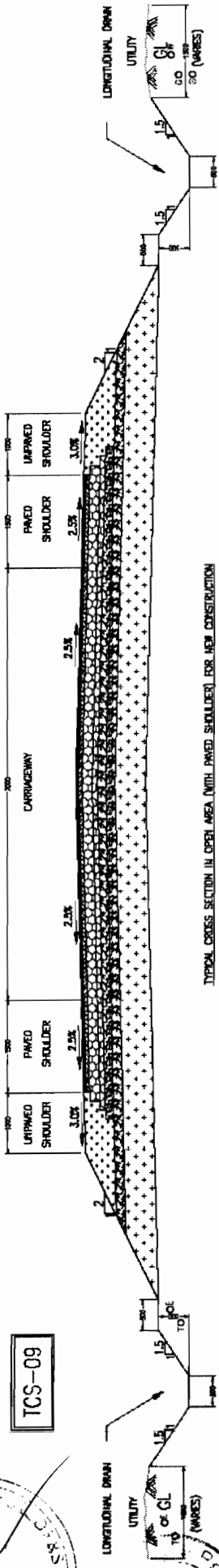
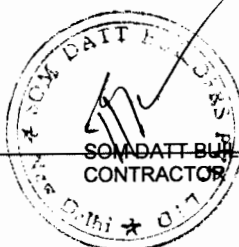
CONSULTING ENGINEERS GROUP LTD.
 E-12, Moji Colony, Malviya Nagar Jaipur-17
 Tel: +91-141-2520898, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@ceginia.com

CEG
 Chief Engineer

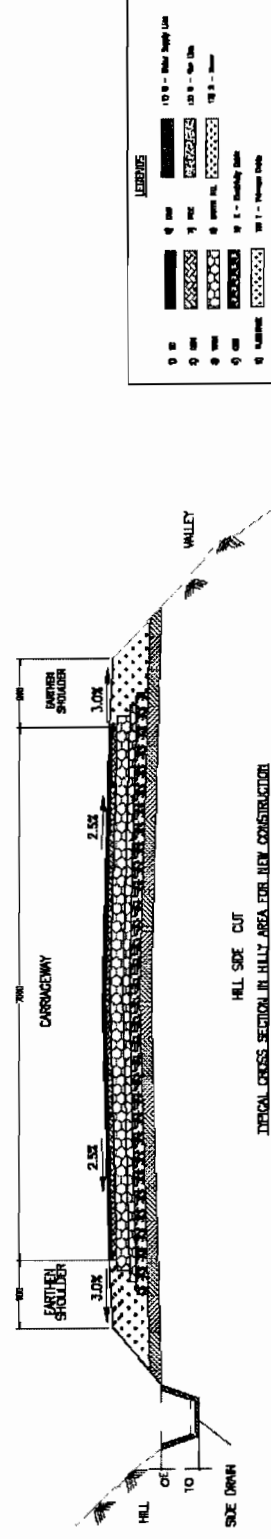
DRG. NO.	OSRP/CEG/TS/07 & 08	CHECKED (M)	DATE	REV	RD	APPROVED (D)
SH. NO.	04	DATE	REV	RD		
SCALE					NTS	
					B.M	
					R-J	
					R.R.D.K	
					S.C	

SOM DATT BUILDERS ARSS-IV
CONTRACTOR

World Bank Projects, Orissa
 Chief Engineer
 EMPLOYER
 Chief Engineer
 Chief Engineer



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



TYPICAL CROSS SECTION IN HILLY AREA FOR NEW CONSTRUCTION

LEGEND

10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm
10.0 - 100.0 mm	10.0 - 100.0 mm

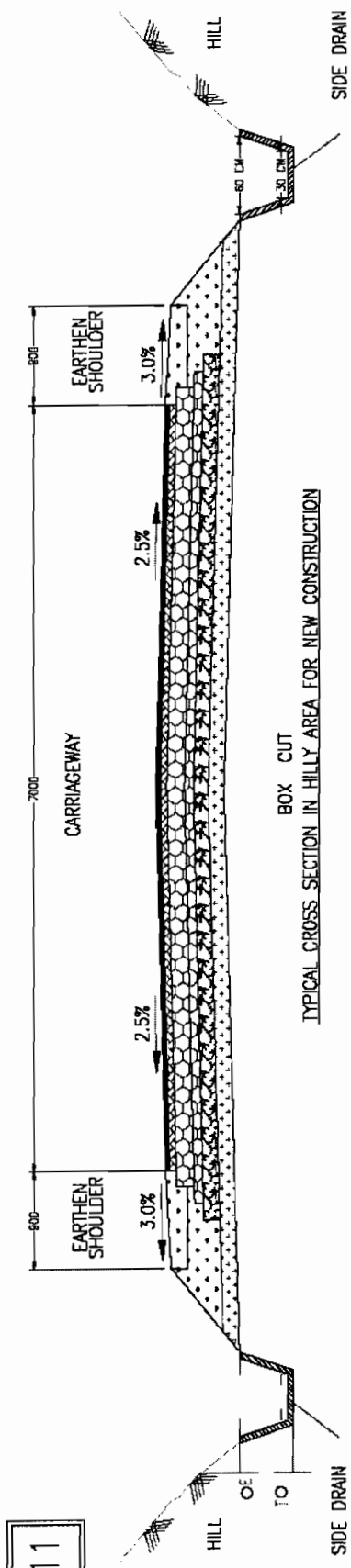
1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO.OSRP/CEG/DR
3. FOR LAYER THICKNESS DETAILS REFER SCHEDULE OF WORKS AND LAYER THICKNESS DETAILS
4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN ROAD AND FLEXIBLE REFER DRAWING NO.OSRP/CEG/RIGID D2
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/00
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. INCREASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS. THE DRAINS MAY BE OVERTAKEN AS PER ENGINEER'S DIRECTIONS

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

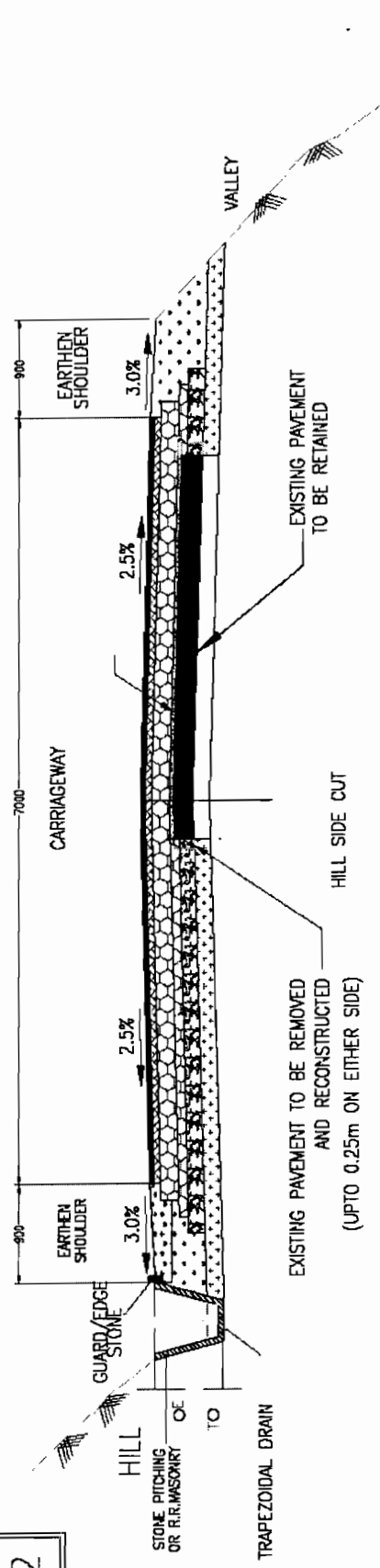
CONSULTING ENGINEERS GROUP LTD.
 E-12, Moj Colony, Malviya Nagar, Jaipur-17
 Tel: +91-141-2520889, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

DRG NO. 08RP/03/105/MS & 10	DATE 05	REV	RD	SCALE	NTS
SH. NO.	05				
ISSUED (A)	DESIGN (B)	CHECKED (C)	APPROVED (D)	B.M	R.R.D.K
					S.G

World Bank Project, Orissa
 EMPLOYER
 World Bank Project
 Orissa State Road Project
 (I) ROAD



TYPICAL CROSS SECTION IN HILLY AREA FOR NEW CONSTRUCTION



TYPICAL CROSS SECTION IN HILLY AREA FOR OVERLAY AND WIDENING

LEGENDS

1) 10	1) 10	1) 10	1) 10
2) 10	2) 10	2) 10	2) 10
3) 10	3) 10	3) 10	3) 10
4) 10	4) 10	4) 10	4) 10
5) 10	5) 10	5) 10	5) 10

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO. OSRP/CES/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/CES/RIGID DZ.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CES/OD
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. INCREASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS. THE DRAINS MAY BE INVERTED AS PER ENGINEERS DIRECTIONS

**TYPICAL CROSS-SECTION
TCS - 11 & TCS - 12**

**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

**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

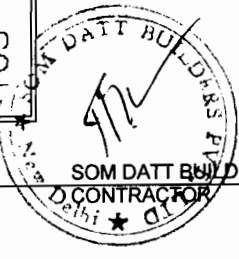
Chief Engineer
EMPLOYER

World Bank Projects, Orissa
Chief Engineer
EMPLOYER
Vishal Kumar
Chief Engineer (Civil)
Orissa, Bhubaneswar.

DRG. NO. OSRP/CES/TCS/2011. # 12	DATE	REV	RO	APPROVED (D)
SH. NO. 06	DATE	REV	RO	APPROVED (D)
SCALE	INTS	B.M	R.J	R.R.D.K
				S.G

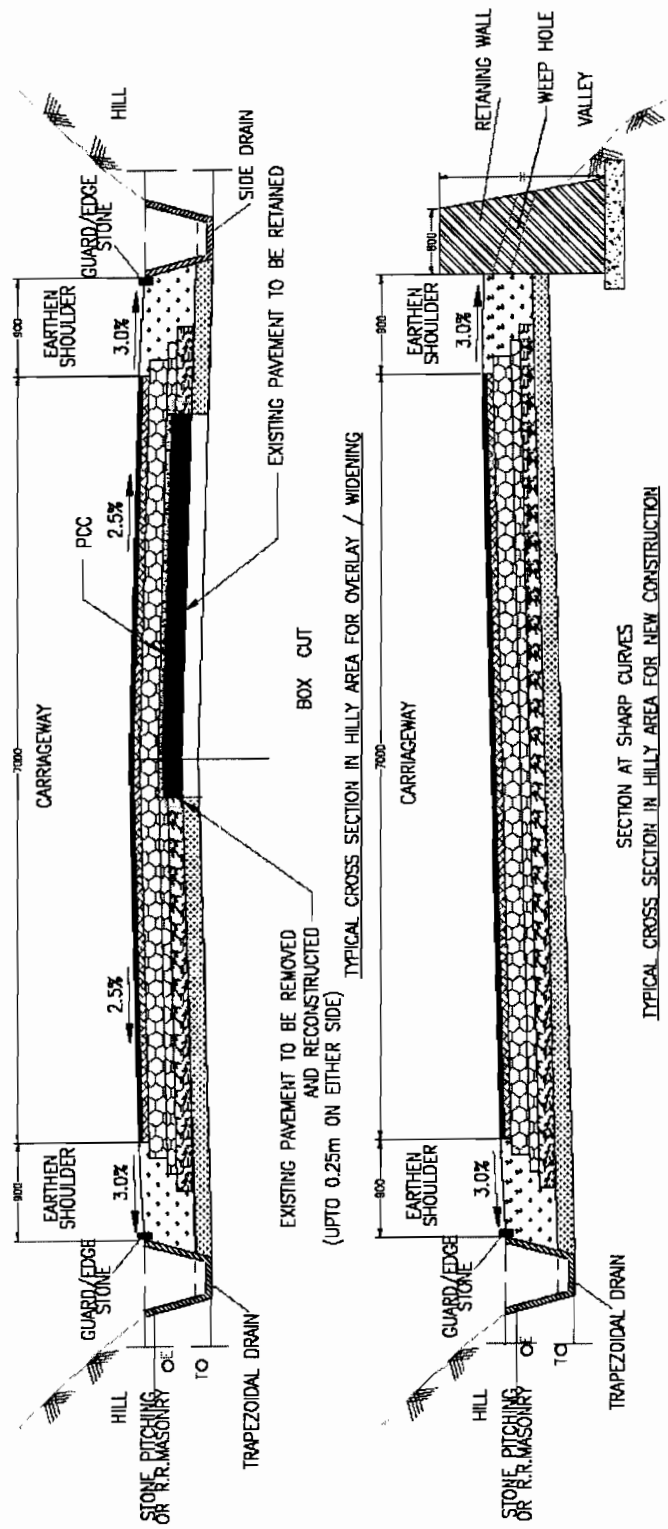
TCS-11

TCS-12



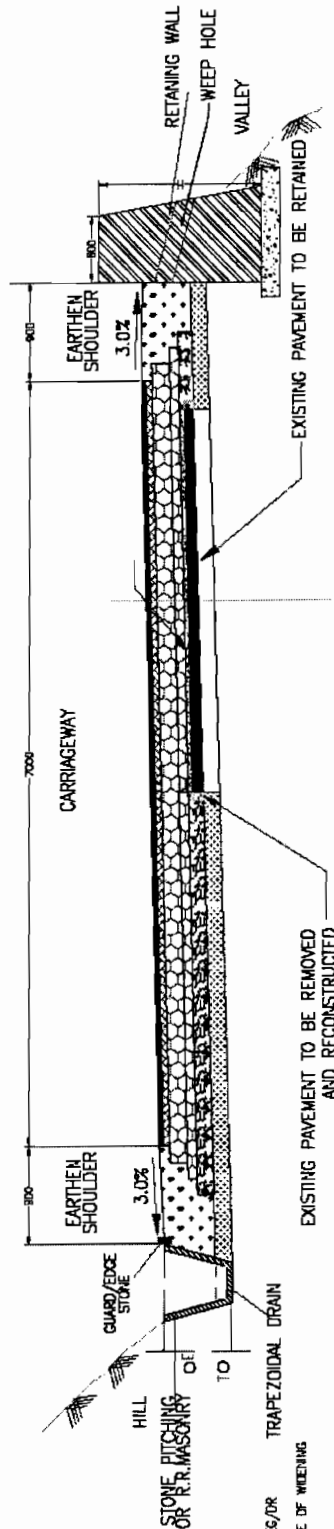
SOM DATT BUILDERS PVT. LTD.
CONTRACTOR





TYPICAL CROSS SECTION IN HILLY AREA FOR OVERLAY / WIDENING

SECTION AT SHARP CURVES
TYPICAL CROSS SECTION IN HILLY AREA FOR NEW CONSTRUCTION



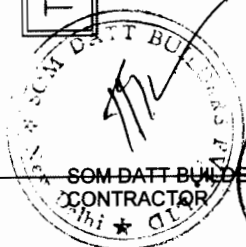
SECTION AT SHARP CURVES
TYPICAL CROSS SECTION IN HILLY AREA FOR OVERLAY / WIDENING

SYMBOL	DESCRIPTION
---	1.5% Slope
---	3.0% Slope
---	4.5% Slope
---	6.0% Slope
---	7.5% Slope
---	9.0% Slope
---	10.5% Slope
---	12.0% Slope
---	13.5% Slope
---	15.0% Slope
---	16.5% Slope
---	18.0% Slope
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---	85.5% Slope
---	87.0% Slope
---	88.5% Slope
---	90.0% Slope
---	91.5% Slope
---	93.0% Slope
---	94.5% Slope
---	96.0% Slope
---	97.5% Slope
---	99.0% Slope
---	100.0% Slope

TCS-13

TCS-14

TCS-15



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 ROAD AND FLEXIBLE REFER DRAWING NO. OSRP/CEG/RN/02.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/00
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. INCREASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS. THE DRAINS MAY BE OVERTAKEN AS PER ENGINEERS DIRECTIONS
8. FOR DETAILS OF RETAINING WALL REFER DRA. NO. OSRP/CEG/RW.

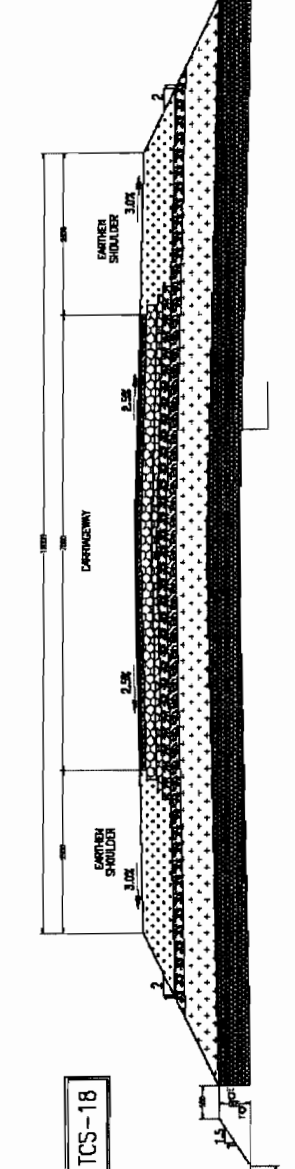
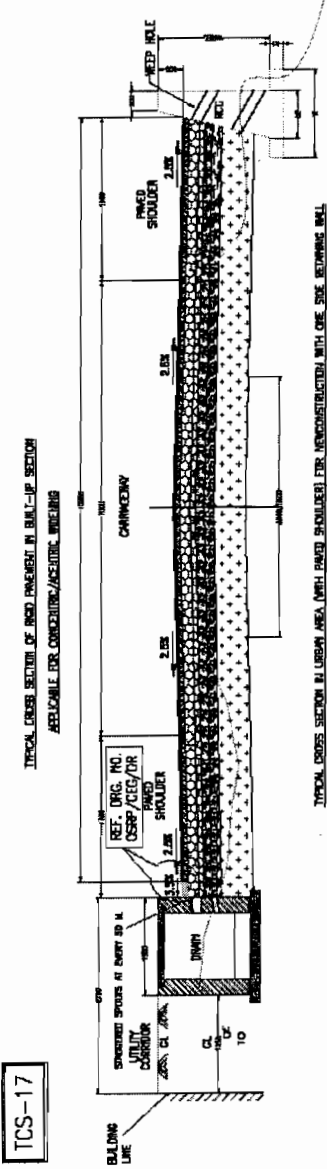
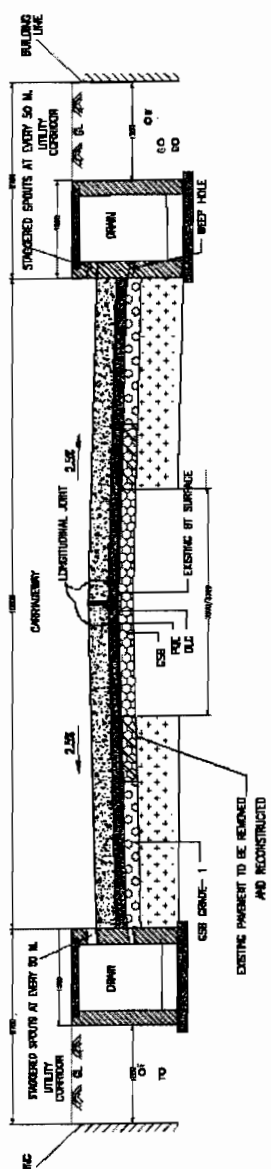
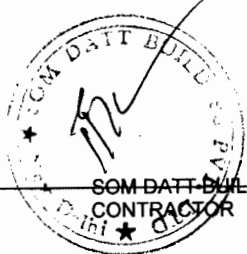
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Malviya Colony, Malviya Nagar Jaipur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegidia.com

Chief Engineer
 World Bank Projects, Orissa
 Employer
 Chief Engineer
 Chief Engineer

**TYPICAL CROSS-SECTION
 TCS - 13, TCS- 14 & TCS-15**

DRG NO.	OSRP/CEG/TCS/13, 14 & 15	DATE	REV	RO	DESIGNED (A)	APPROVED (D)
SH. NO.	07	DATE	REV	RO	DESIGNED (A)	APPROVED (D)
SCALE	NTS				B.M	R.J
					B.M	R.R.D.K
					B.M	S.G



LEGENDS

1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10
1	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETERS
 2. FOR DRAIN DETAILS REFER DRAWING NO. OSRP/CEG/00
 3. FOR LAYER THICKNESS DETAILS REFER SCHEDULE OF WORKING AND LAYER THICKNESS DETAILS
 4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN ROAD AND FLEXIBLE REFER DRAWING NO. OSRP/CEG/02.
 5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/00
 6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
 7. INCREASE THE UTILITIES/PIPES OBSTRUCTING THE LONGITUDINAL DRAINS. THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS
 8. FOR DETAILS OF RETAINING WALL REFER DRAW. NO. OSRP/CEG/04.

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

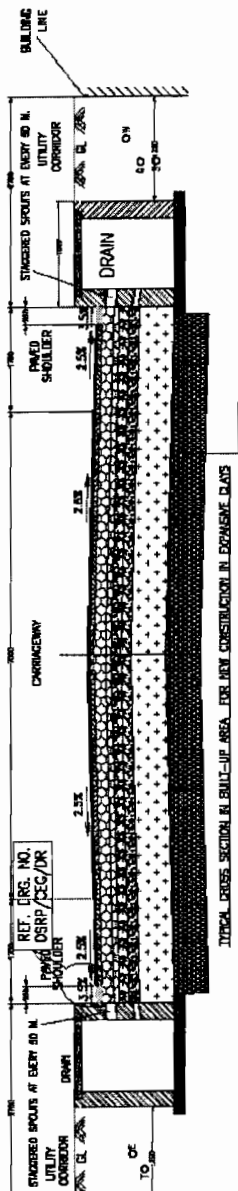


World Bank Projects, Orissa
 Chief EMPLOYER
 World Bank Project
 Civil Engineering
 C/O the E.I.C. (Orissa)
 Bhubaneswar.

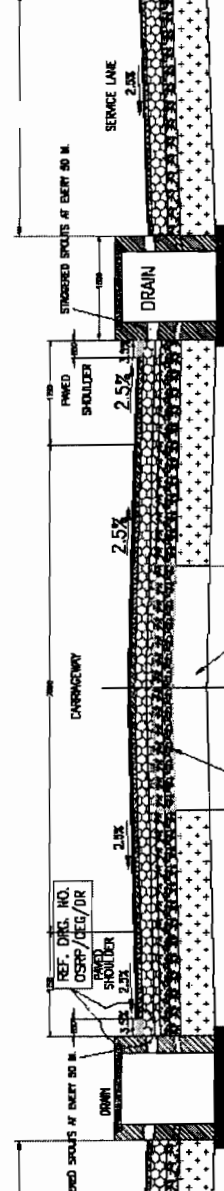
TYPICAL CROSS-SECTION
TCS - 16, TCS- 17 & TCS- 18

DRG. NO.	OSRP/CEG/16, 17 & 18	DESIGNED (A)	APPROVED (C)
SH. NO.	DB	DATE	REV
SCALE	NTS		RD
OWNER (B)	DRW. (D)	CHKD. (E)	APPROV. (F)
R.J.J	B.M	R.R.D.K	S.G

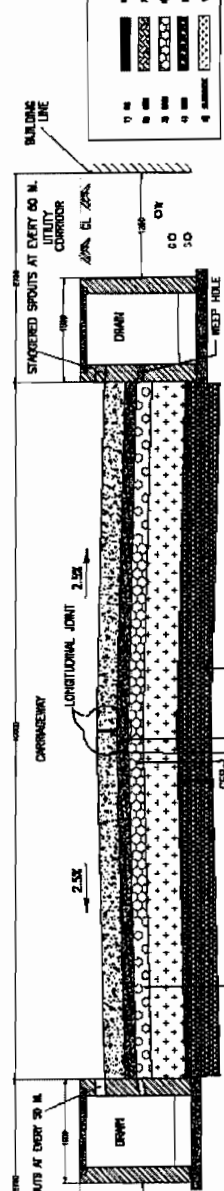
TCS-19



TCS-20



TCS-21



LEGEND

1	100	100	100	100	100	100	100	100	100
2	100	100	100	100	100	100	100	100	100
3	100	100	100	100	100	100	100	100	100
4	100	100	100	100	100	100	100	100	100
5	100	100	100	100	100	100	100	100	100
6	100	100	100	100	100	100	100	100	100
7	100	100	100	100	100	100	100	100	100
8	100	100	100	100	100	100	100	100	100
9	100	100	100	100	100	100	100	100	100
10	100	100	100	100	100	100	100	100	100
11	100	100	100	100	100	100	100	100	100
12	100	100	100	100	100	100	100	100	100
13	100	100	100	100	100	100	100	100	100
14	100	100	100	100	100	100	100	100	100
15	100	100	100	100	100	100	100	100	100
16	100	100	100	100	100	100	100	100	100
17	100	100	100	100	100	100	100	100	100
18	100	100	100	100	100	100	100	100	100
19	100	100	100	100	100	100	100	100	100
20	100	100	100	100	100	100	100	100	100

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAWING DETAILS REFER DRAWING NO. OSRP/CEG/DR
3. FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WORKING AND LAYER THICKNESS DETAILS'
4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN RIGID AND FLEXIBLE REFER DRAWING NO. OSRP/CEG/DR/INT 02.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/DR
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 ENGINEER'S DIRECTIONS
8. FOR DETAILS OF RETAINING WALL REFER DRAW. NO. OSRP/CEG/RW.

PROJECT:-

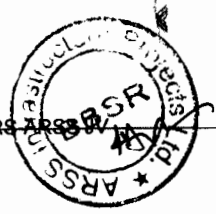
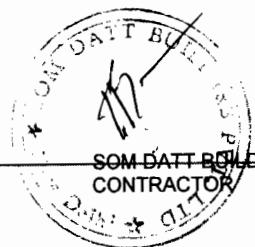
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Mofj Colony, Maiviya Nagar Jalpur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

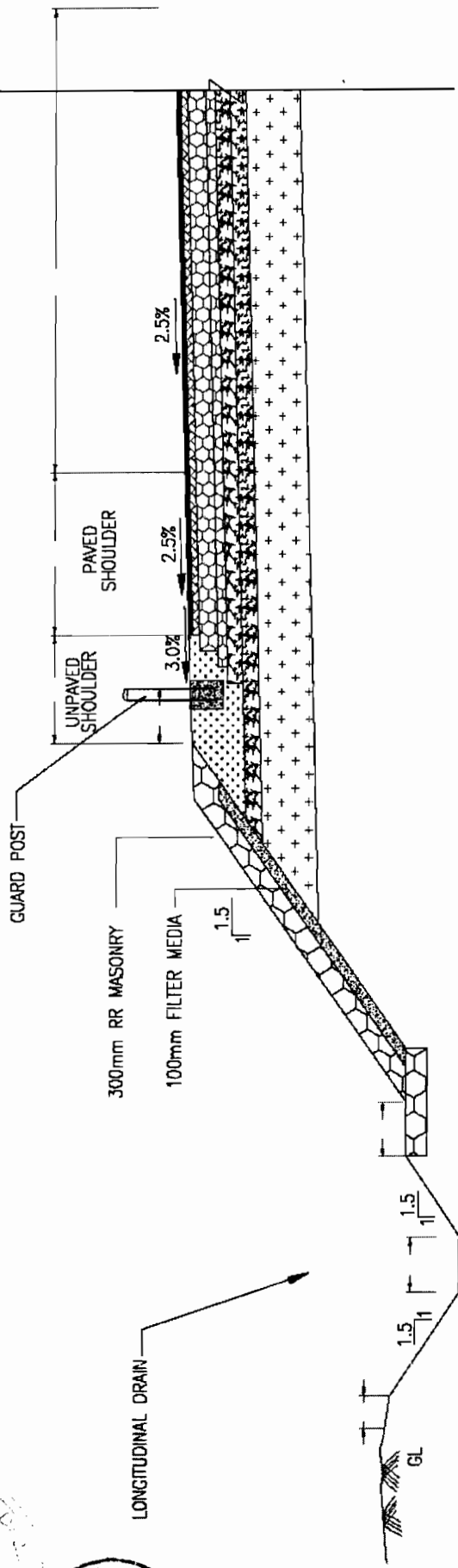


World Bank Projects, Orissa
 Chief EMPLOYER
 World Bank Project
 Chief Engineer (Civil)
 Chief Engineer (Mechanical)

DRG NO.	OSRP/CEG/DR-19, 20 & 21	DESIGNED (A)	R.J	CHECKED (C)	R.R.D.K	APPROVED (P)	S.C
SH. NO.	09	DATE	REV	RO	B.M	DRWING (D)	
SCALE	NTS						



CARRIAGEWAY



LEGENDS

1) 100	1) 100	10) 10 - Road Supply Line
2) 100	2) 100	11) 10 - 100
3) 100	3) 100	12) 10 - 100
4) 100	4) 100	13) 10 - 100
5) 100	5) 100	14) 10 - 100
6) 100	6) 100	15) 10 - 100
7) 100	7) 100	16) 10 - 100
8) 100	8) 100	17) 10 - 100
9) 100	9) 100	18) 10 - 100
10) 100	10) 100	19) 10 - 100
11) 100	11) 100	20) 10 - 100
12) 100	12) 100	21) 10 - 100
13) 100	13) 100	22) 10 - 100
14) 100	14) 100	23) 10 - 100
15) 100	15) 100	24) 10 - 100
16) 100	16) 100	25) 10 - 100
17) 100	17) 100	26) 10 - 100
18) 100	18) 100	27) 10 - 100
19) 100	19) 100	28) 10 - 100
20) 100	20) 100	29) 10 - 100
21) 100	21) 100	30) 10 - 100

HIGH EMBANKMENT PROTECTION WORK WITH STONE PITCHING AND CRASH BARRIERS

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. THE STONE PITCHING SHALL BE PROVIDED FOR EMBANKMENT HEIGHT MORE THEN 3M ALONG WITH METAL CRASH BARRIERS
3. FOR CRASH BARRIERS REFER DWG. NO. OGRP/REG/CB.

TYPICAL SLOPE PROTECTION WORK

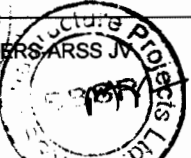
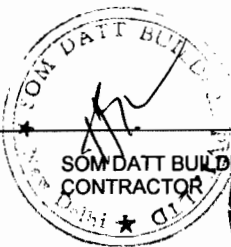
DRG. NO.	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	TO	DATE	REV	RO	B.M	R.J	R.R.D.K
SCALE	NTS						S.G

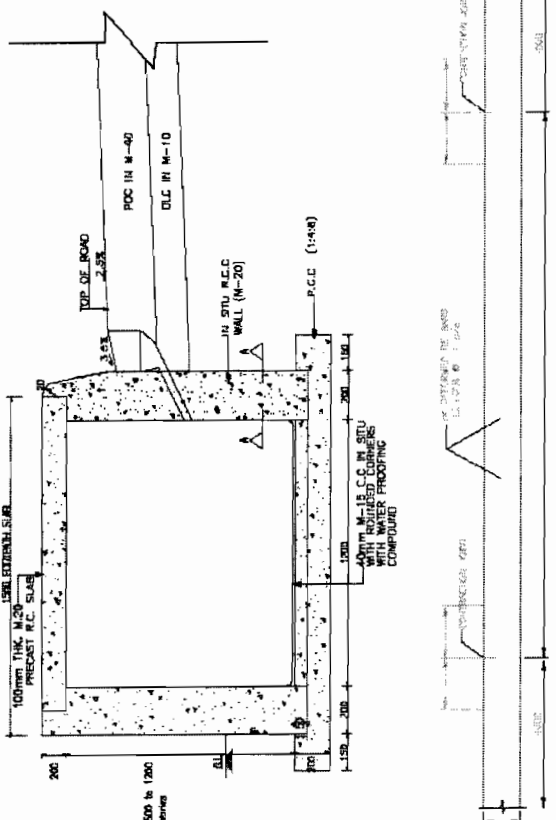
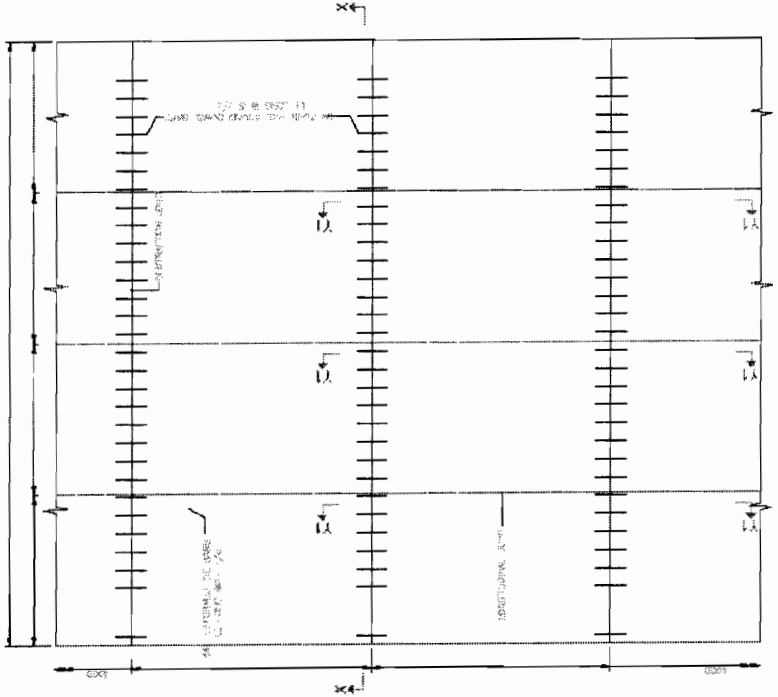
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Majji Colony, Malviya Nagar, Jaipur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegltda.com



Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Chief Engineer
 Chief Engineer

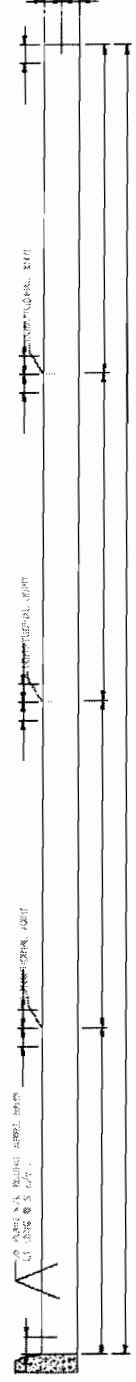




SECTION Y1-Y1 (SHOWING TIE BAR ARRANGEMENT BETWEEN CARRIAGEWAYS)

Sl. No.	Description
1	Powerplant Thickness
2	D.L.C. Thickness
3	Subgrade of Dowel Bars
4	Subgrade of Tie Bars
5	Dowel Bar Dia
6	Tie Bar Dia
7	Length of Dowel Bar
8	Length of Tie Bar

- NOTES:
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE MENTIONED.
 2. THIS DRAWING IS TO BE READ ALONG WITH TYPICAL DRAWING SET FOR ROAD PAVEMENT (ISS. NO. CEG/AT/04/17).
 3. FOR PAVEMENT THICKNESS AND OTHER DIMENSIONS REFER DRAWING NO. CEG/AT/04/17.



SECTION X-X (SHOWING DOWEL BAR ARRANGEMENT)

TYPICAL DETAILS OF DOWEL BAR AND TIE BAR ARRANGEMENT

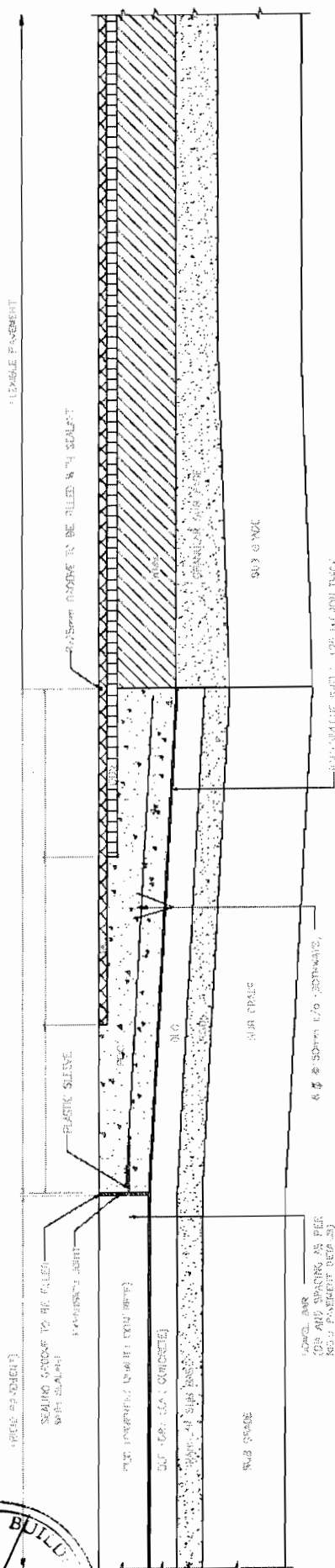
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CEG ENGINEERS GROUP LTD.
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 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegindia.com



Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER
 World Bank Project
 Orissa State Road Project
 Orissa, Bhubaneswar.





TYP. DETAILS OF TRANSITION SLAB BETWEEN RIGID & FLEXIBLE PAVEMENT

NOTES:

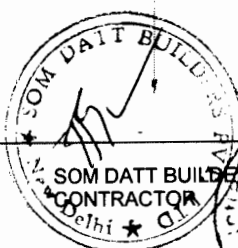
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING IS TO BE USED ALONG WITH OTHER TYP. ROAD & STRUCTURE DRAWINGS.
3. FOR TRANSITION DETAILS, REFER CORR/200/20.

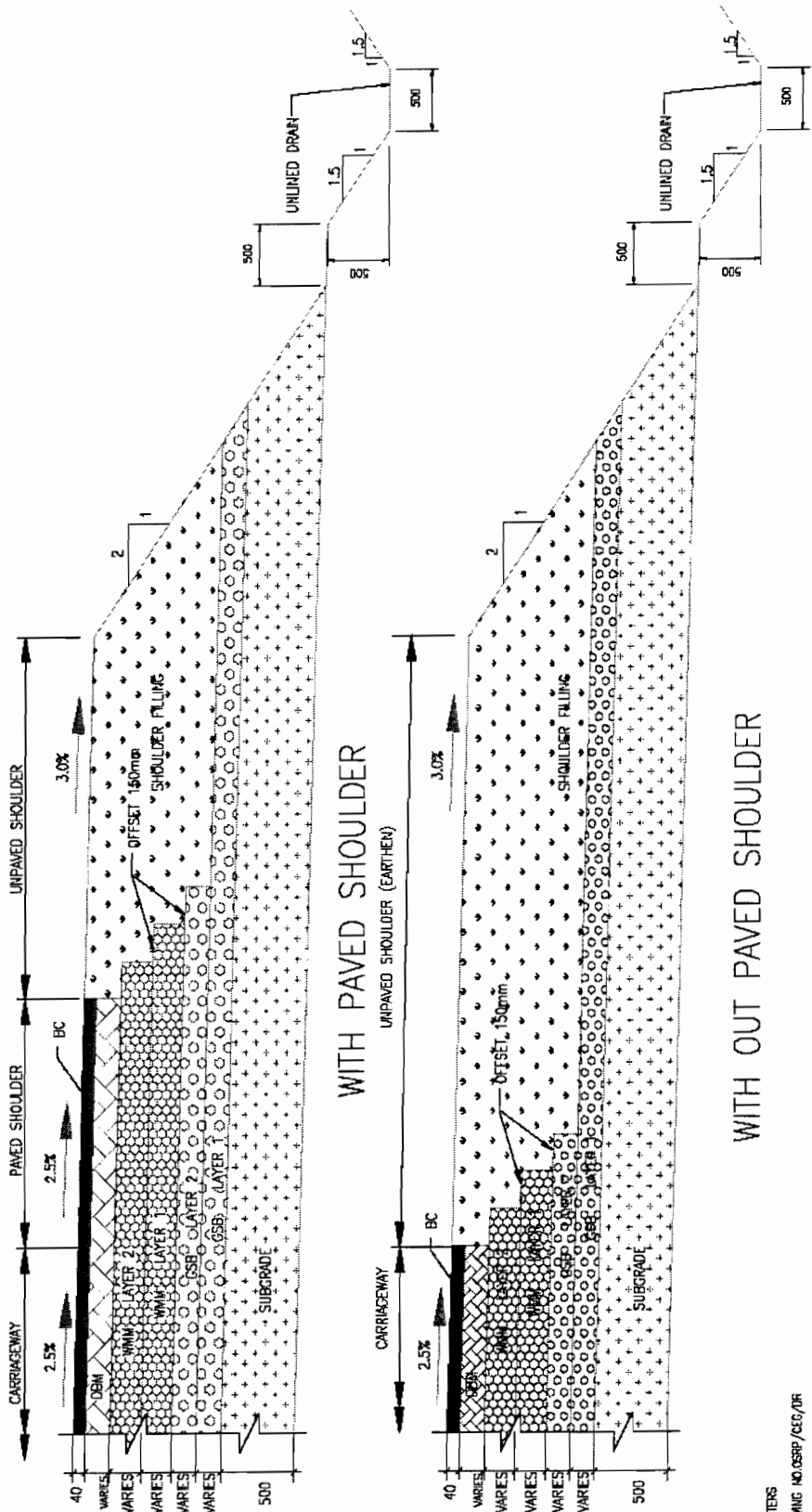
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

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ENGINEERS GROUP LTD.
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Chief Engineer
 World Bank Projects, Orissa
 Chief EMPLOYER
 World Bank Project
 Chief E.I.C. (Orissa)
 Cuttack, Bhubaneswar.

DRG. NO. ORP/200/200/20		DESIGNED (A)		DRAWN (B)		CHECKED (C)		APPROVED (D)	
SH. NO.	12	DATE		REV		RO		B.M	
SCALE		NTS		R.J		R.R.D.K		S.G	





LEGENDS

1) DEN	10 B - Water Supply Line
2) DEN	10 B - Bar Line
3) WMM	10 B - Water
4) GSB	10 B - Bar Line
5) SUBGRADE	10 B - Water

WITH OUT PAVED SHOULDER

- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETERS
 2. FOR DRAIN DETAILS REFER DRAWING NO. OSRP/CEG/0R
 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 ROAD AND FLEXIBLE.
 5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/00
 6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
 7. INCREASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE ADJUSTED AS PER ENGINEERS DIRECTIONS

TYPICAL DETAILS OF PAVEMENT LAYER

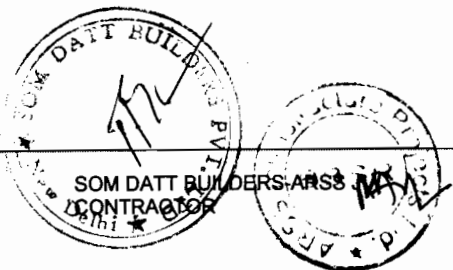
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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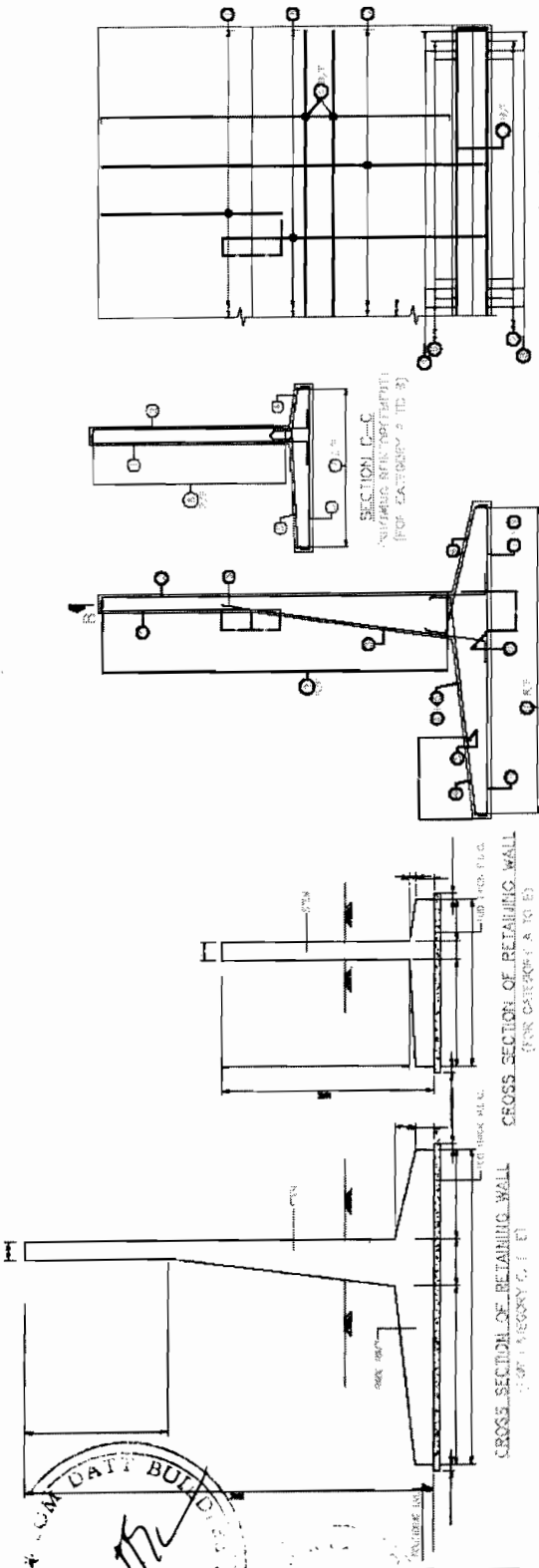
Chief Engineer
 World Bank Projects, Orissa
 Chief Engineer
 EMPLOYER
 Chief Engineer
 Chief Engineer
 Chief Engineer

DRG. NO. CEMP/2002/00	DATE	REV	RD	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 13							
SCALE	NTS			B.M	R.J	R.R.D.K	S.G



NOTES

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRE.
2. DO NOT SCALE THE DIMENSIONS. ONLY WORK WITH DIMENSIONS.
3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
5. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
6. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
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8. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
9. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
10. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
11. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
12. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
13. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
14. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
15. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
16. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
17. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
18. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
19. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
20. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.



SECTION B-B
CROSS SECTION OF RETAINING WALL
(FOR CATEGORY C, D, E)

SECTION A-A
CROSS SECTION OF RETAINING WALL
(FOR CATEGORY A, B)

CROSS SECTION OF RETAINING WALL
(FOR CATEGORY A TO E)

CROSS SECTION OF RETAINING WALL
(FOR CATEGORY C, D, E)

LEGENDS:

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRE.

2. DO NOT SCALE THE DIMENSIONS. ONLY WORK WITH DIMENSIONS.

3. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

5. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

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13. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

14. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

15. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

16. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

17. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

18. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

19. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

20. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.

REINFORCEMENT DETAILS

BAR W.D.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BAR SHAPE										
A	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C
B	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C

REINFORCEMENT DETAILS

BAR W.D.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BAR SHAPE										
C	12 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C
D	12 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C
E	12 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C

REINFORCEMENT DETAILS

BAR W.D.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
BAR SHAPE										
C	12 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C
D	12 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C
E	12 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C	10 @ 100/C

PLAN SHOWING REINFORCEMENT IN BASE SLAB
(FOR CATEGORY A TO E)

DIMENSIONAL DETAILS

CATEGORY	H _{max}	W	H1	H2	H3	B1	B2	B3
A	2000	2100	300	300	2000	1200	300	500
B	2000	2000	300	300	2000	1575	300	500
C	4000	3100	300	300	2400	1800	410	775
D	5000	4200	300	300	2400	2200	520	1000
E	6000	4900	300	300	2400	3100	610	1175

LENGTH OF CURTAILMENT

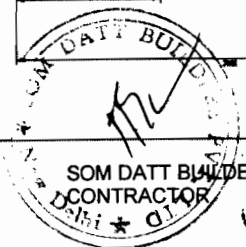
CATEGORY	L1	L2	L3
C	-	-	-
D	-	-	-
E	500	1000	-

**STANDARD DRAWINGS
RETAINING WALL**

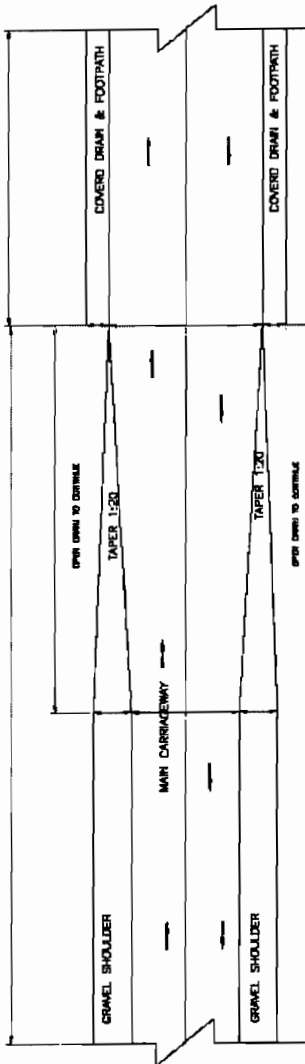
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

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E-12, Malviya Colony, Malviya Nagar, Jaipur-17
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Fax: 2521348, e-mail: ceg@ceginfolia.com

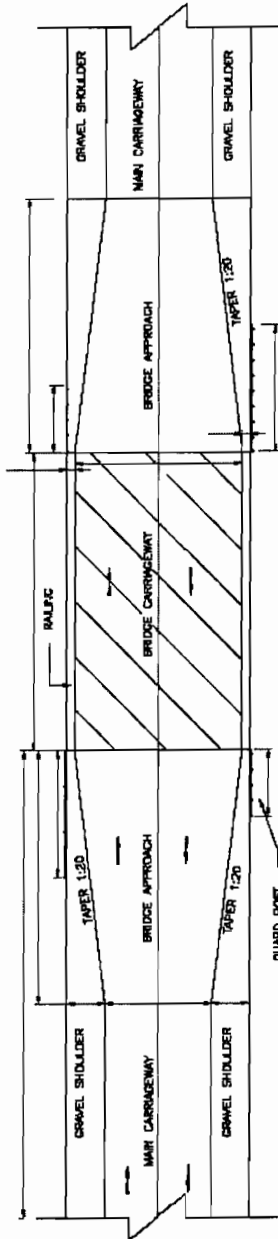
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SH. NO. 14	RD				
SCALE	NTS		B.M	R.J	R.R.D.K
					S.G



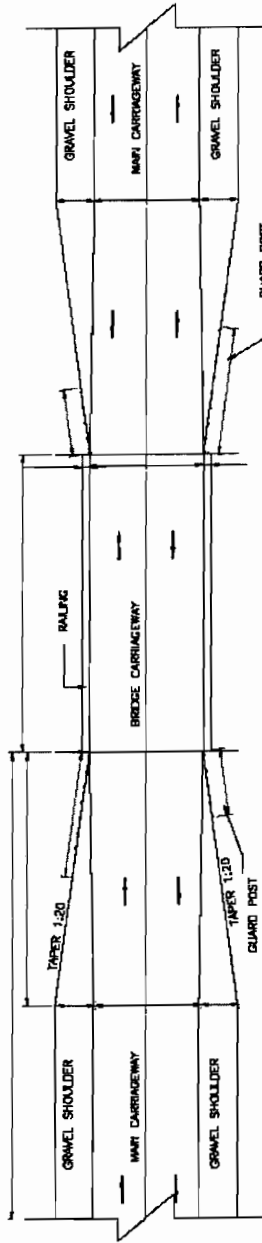
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
SOM DATT BUILDERS ARSS JV
CONTRACTOR



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 BRIDGE SECTION

- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS INDICATED OTHERWISE.
 2. FOR DETAILS OF STRUCTURES REFER STRUCTURAL DINGS.
 3. GUARD POSTS ARE INSTALLED WHERE EMBANKMENT HEIGHT IS MORE THAN 3 METRES & AT BRIDGE APPROACHES.
 4. FOR GUARD POST DETAIL REFER DMC NO. CSR/P/CEG/04 & CP.
 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 DMC. NO. CSR/P/CEG/04/02

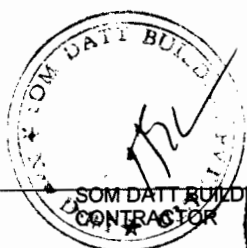
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

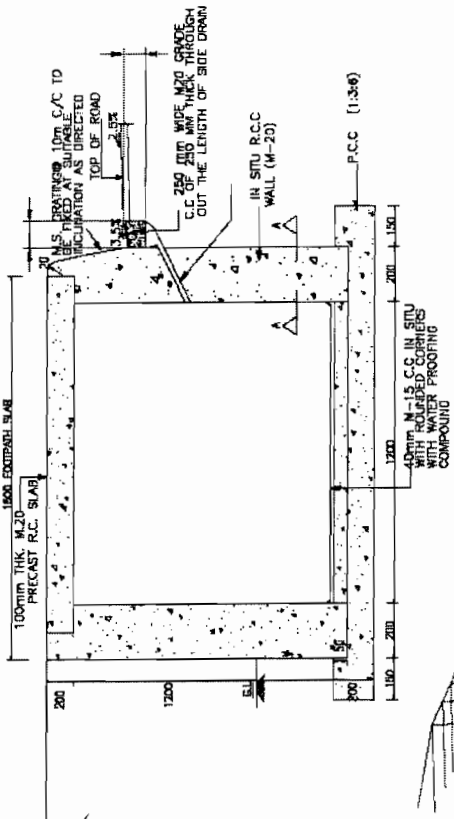
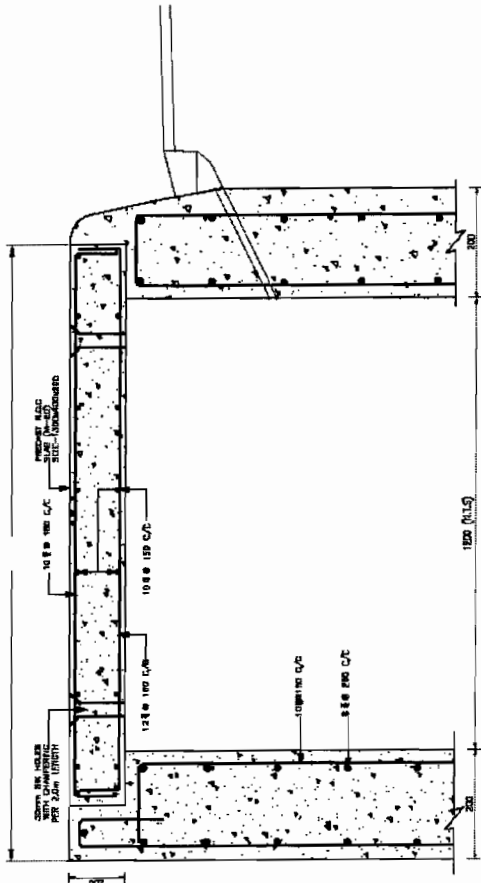
CONSULTING ENGINEERS GROUP LTD.
 E-12, Mo J Colony, Malviya Nagar Jaipur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

CEG
 Chief Engineer

TYPICAL DETAILS OF TRANSITION OF DIFFERENT ROAD SECTION

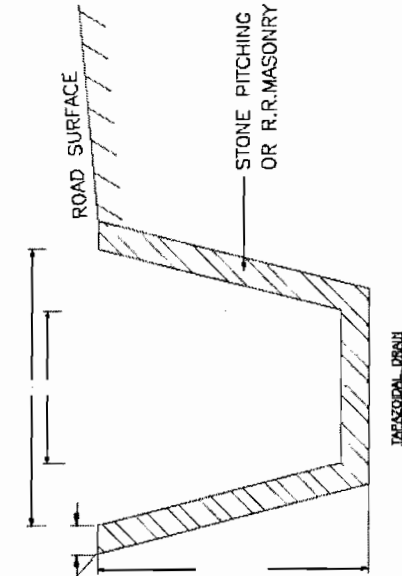
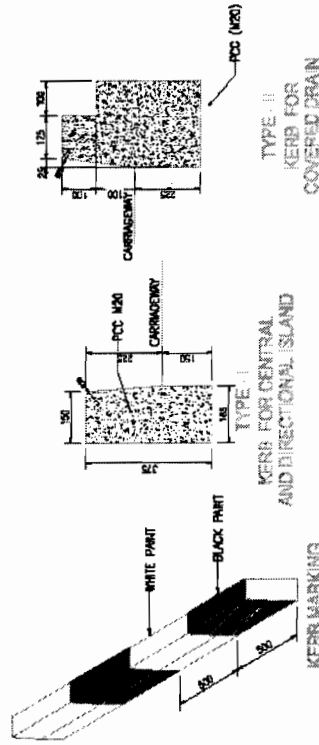
DRG NO.	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	15				R.J	R.R.D.K	S.G
SCALE	NTS			B.M			





DETAIL OF REINFORCEMENT

DETAIL OF SIDE DRAIN



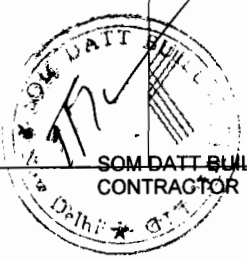
**STANDARD DRAWINGS
DETAILS OF DRAIN AND KERB**

**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
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ASSISTANCE**

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Fax: 2521348, e-mail: ceg@cegroupindia.com

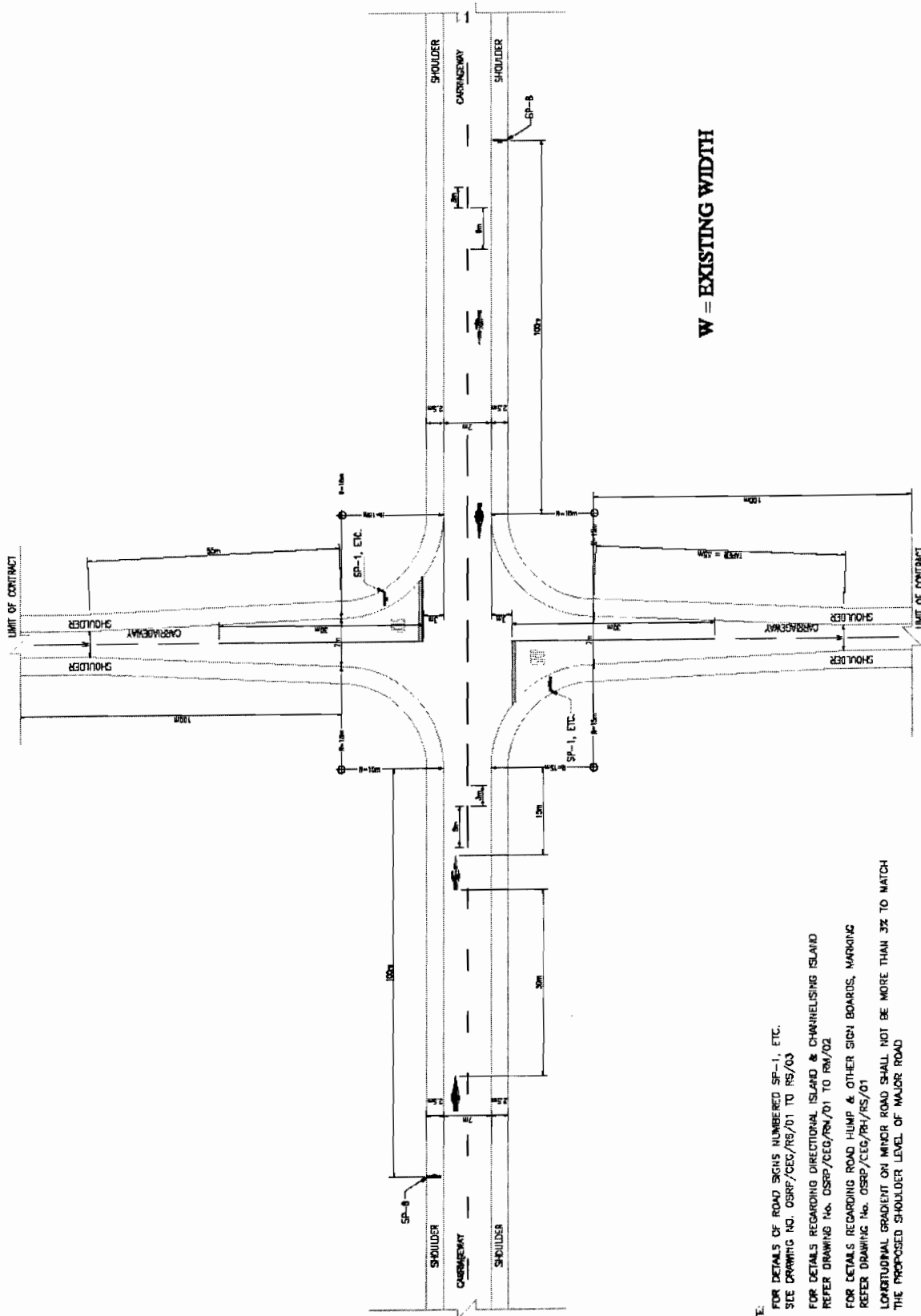


DRG. NO. 10MP/VED/DR	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 16							
SCALE	NTS			B.M	R.J	R.R.D.K	S.G



SOM DATT BUILDERS ARSS, IV
CONTRACTOR

EMPLOYER
CHIEF ENGINEER
C/O THE E.C.O. (ORISSA)
Cuttack, Bhubaneswar.



W = EXISTING WIDTH

NOTE:

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

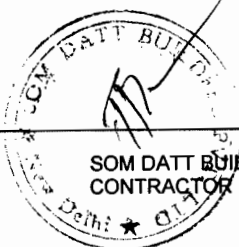
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

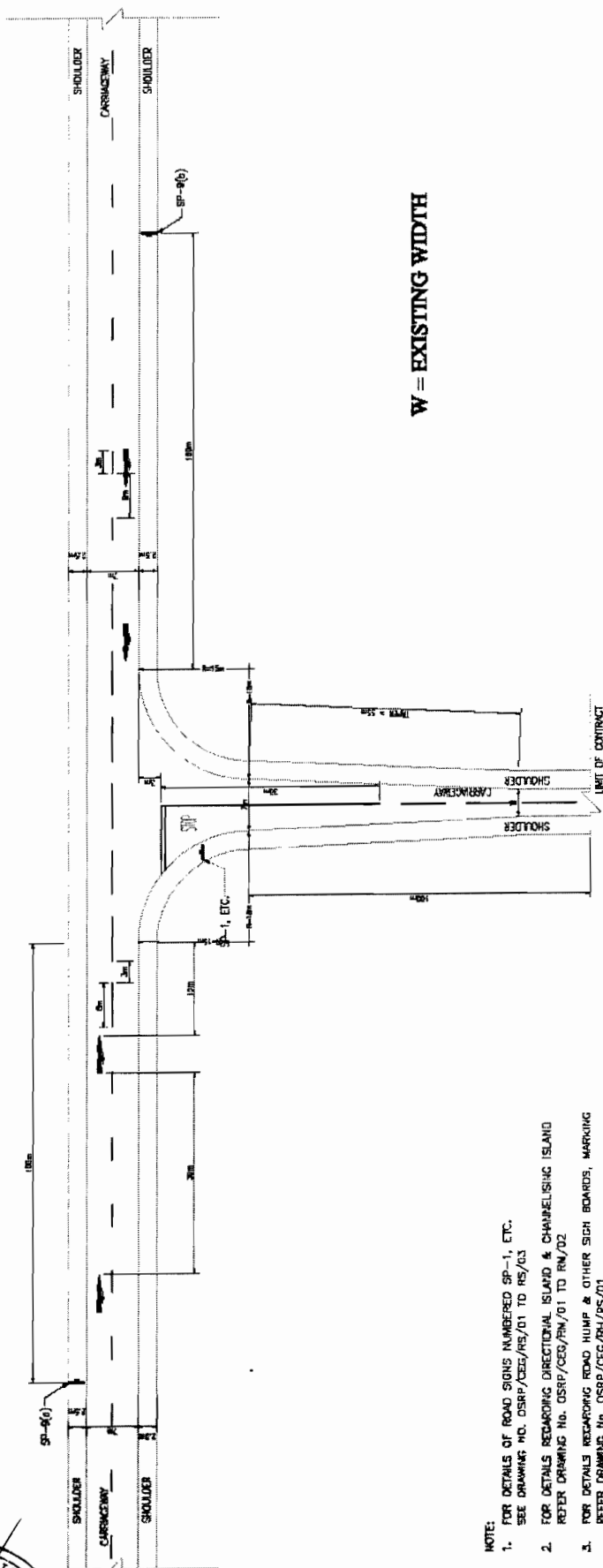
CONSULTING ENGINEERS GROUP LTD.
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Chief Engineer
 World Bank Projects, Orissa
 Chief Engineer
 World Bank Project
 On the S.L.C. (O.P.V.)
 Circle, Bhubaneswar.

DRG. NO. OSRF/ASB/RS/01		DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	18	DATE	REV	RO	
SCALE	NTS		B.M	R.J	R.R.D.K
					S.C





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
3. FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING NO. OSRP/CEG/RM/RS/01
4. LONGITUDINAL GRADIENT ON MINOR ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

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

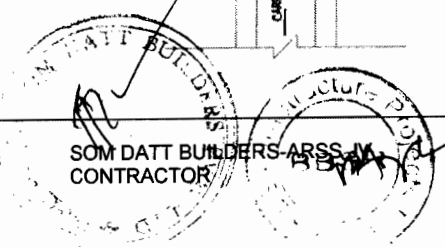
DRG. NO.	OSRP/RS/RS/02	DESIGNED (A)	DESIGNED (B)	DESIGNED (C)	DESIGNED (D)
SH. NO.	19	DATE	REV	RO	
SCALE	NTS				
		B.M	R.J	R.R.D.K	S.G

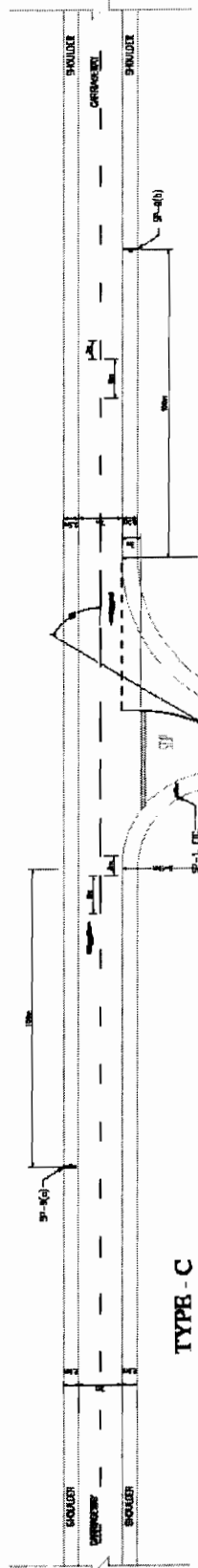
**PROJECT:-
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Tel: +91-141-2520899, 2521899, 2520556
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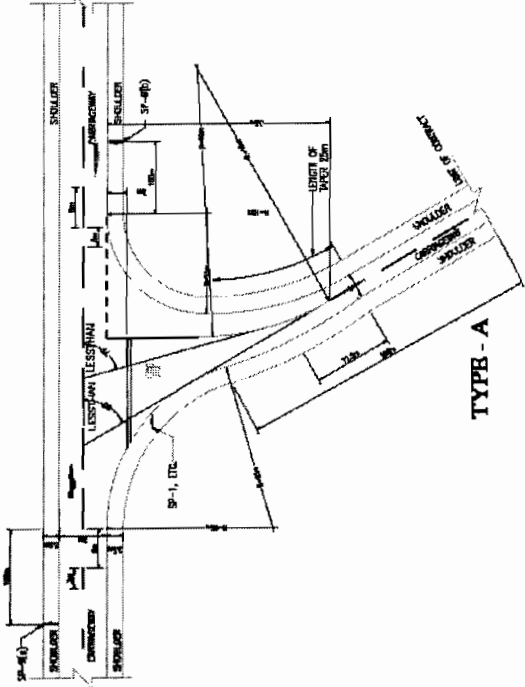


Chief Engineer
World Bank Projects, Orissa
EMPLOYER
C/o the P.U.C. (C.E.)
Cuttack, Orissa

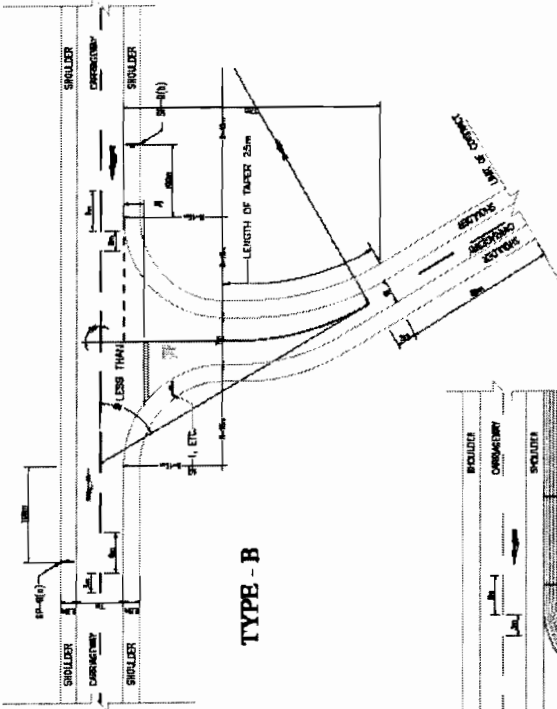




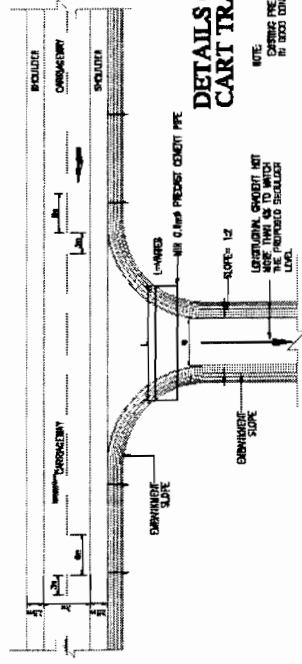
TYPE - C



TYPE - A



TYPE - B



DETAILS OF CART TRACK

- NOTE:
1. WHERE THE SIDE ROAD INTERSECTS THE MAIN ROAD AT ANGLES GREATER THAN 90°, THE DESIGN SHOWN AS 'C' CAN BE ADOPTED WHERE THE ANGLES IS LESS THAN 90°. DESIGN 'X' OR 'U' CAN BE ADOPTED.
 2. FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING No. DRRP/CEG/MA/01 TO RA/02.
 3. FOR DETAILS REGARDING ROAD ISLAND & OTHER SIDE BARRIERS, REFER DRAWING No. DRRP/CEG/MA/01 TO RA/02.
 4. LONGITUDINAL GRADIENT ON MAIN ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD.

W-EXISTING WIDTH

NOTE: ALL THE PIPES SHALL BE CONCRETE PIPE UNLESS OTHERWISE SPECIFIED.

STANDARD DRAWINGS
TYPICAL Y-JUNCTION WITH
SINGLE LANE BT ROAD/EARTHEN ROAD

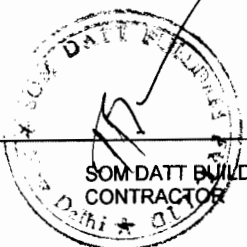
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

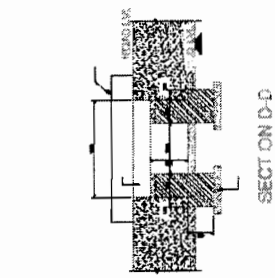
CONSULTING ENGINEERS GROUP LTD.
E-12, Malviya Colony, Malviya Nagar, Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegroupindia.com



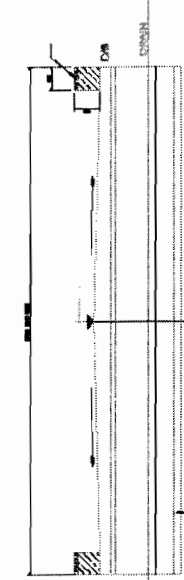
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
SOM DATT BUILDERS & ARCHITECTS
CONTRACTOR

DRG. NO.	CEG/MA/01/01	DATE	REV	RD	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	20					R.J	R.R.D.K	S.G
SCALE	NTS							

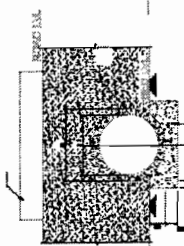




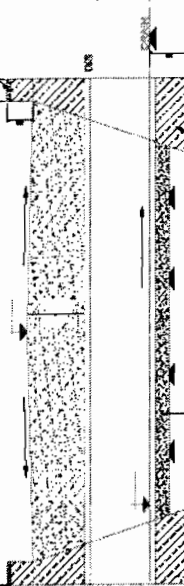
SECTION A-A



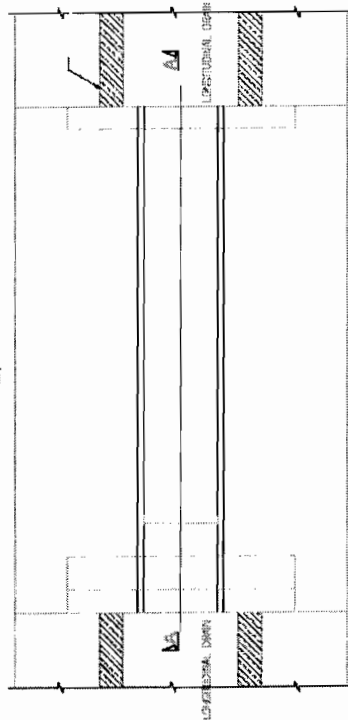
SECTION B-B



SECTION C-C

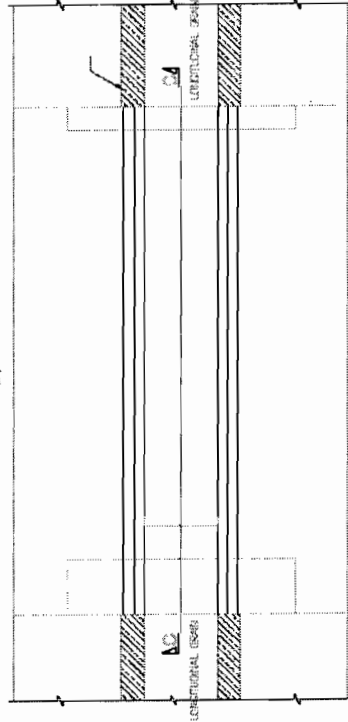


SECTION D-D



B1

TYPICAL PLAN FOR PIPE CULVERT ON CROSS ROAD

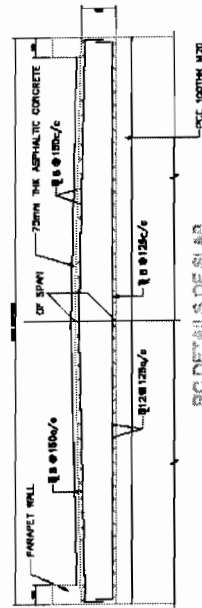


B2

TYPICAL PLAN FOR SLAB CULVERT ON CROSS ROAD

SCHEDULE OF PRECAST CONCRETE PIPE

NOMINAL DIAMETER 'D'	450	600	750
EXTERNAL DIAMETER 'D1'	540	720	810



RC DETAILS OF SLAB

NOTED

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL PRECAST CONCRETE PIPES TO BE OF GRADE M25 CONFORMING TO IS 458.
3. REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS (DENOTED AS) HAVING YIELD STRENGTH OF 415 MPa AND CONFORMING TO IS 1786
4. CLEAR COVER TO ANY REINFORCEMENT SHALL BE 50mm, UNLESS OTHERWISE MENTIONED.
5. THE SUITABILITY OF PIPE OR SLAB CULVERT FOR CROSS ROADS SHOULD BE DECIDED AT SITE BY ENGINEER-IN-CHARGE DEPENDING ON SITE CONDITIONS.

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FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

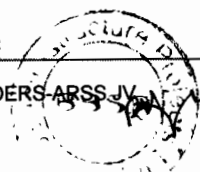
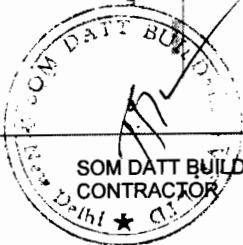
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ENGINEERS GROUP LTD.
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 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@ceginia.com

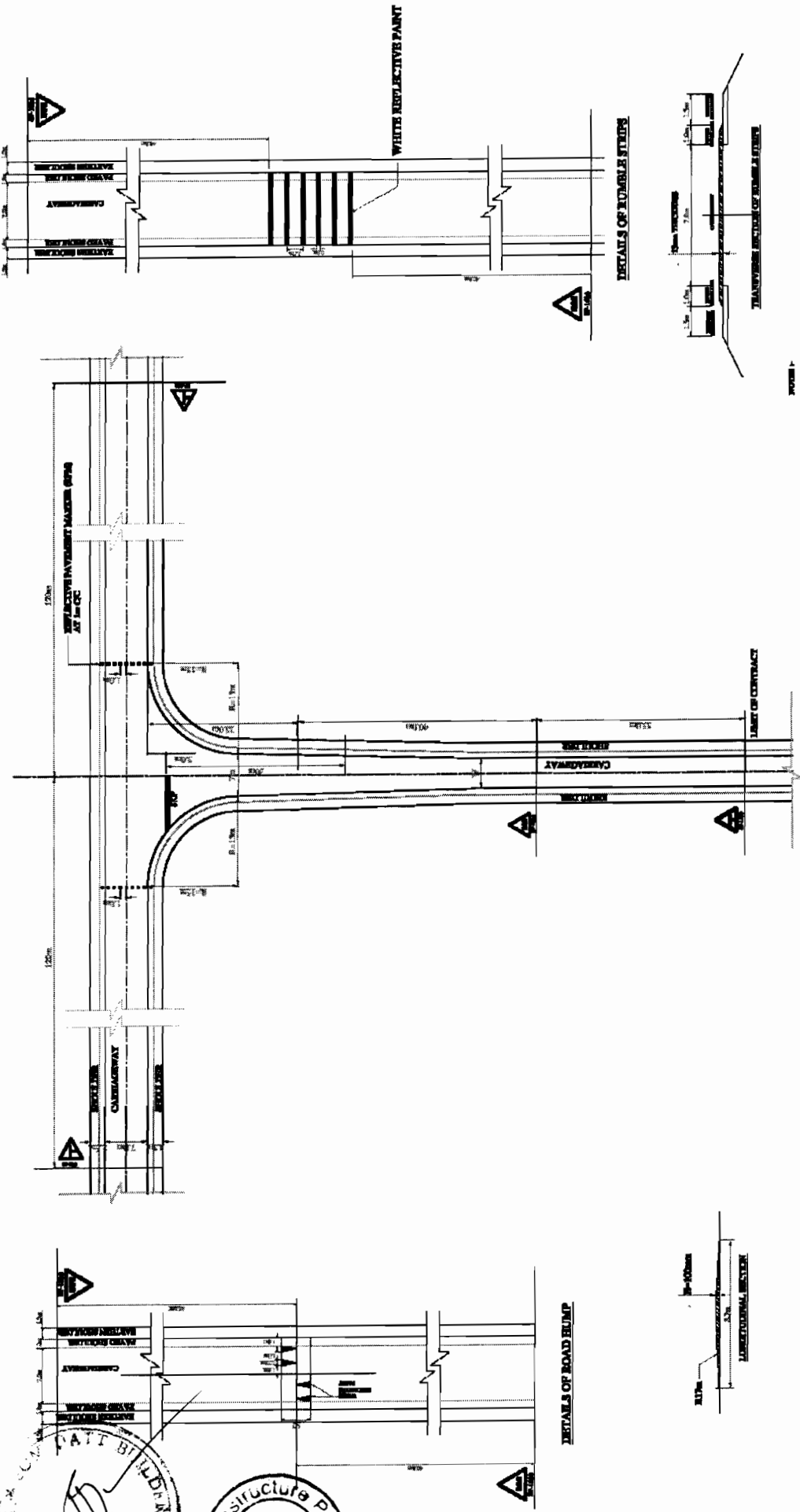


Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 World Bank Building
 15, Connaught Place, New Delhi
 Orissa, Bhubaneswar

STANDARD DRAWINGS
TYPICAL - CROSS DRAIN
SINGLE LANE BT ROAD/EARTHEN ROAD

DRG NO.	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	21						
SCALE	NTS			B.M	R.J	R.R.D.K	S.G





LOCATION OF ROADHUMP AT MINOR ROAD INTERSECTIONS

- NOTES:-
1. THE HUMP SHALL BE 150MM HIGH AND 150MM WIDE AT THE TOP.
 2. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.
 3. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.
 4. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.
 5. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.
 6. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.
 7. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.
 8. THE HUMP SHALL BE 150MM WIDE AT THE TOP AND 150MM WIDE AT THE BOTTOM.

STANDARD DRAWING

DETAILS OF ROAD HUMPS AND RUMBLE STRIPS

DESIGN NO.	DATE	SCALE	REV	BY	NO	APPROVED BY

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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Chief Engineer
 World Bank Project
 EMPLOYER
 On the F.I.C. (CIVIL)
 Cuttack, Odisha, India

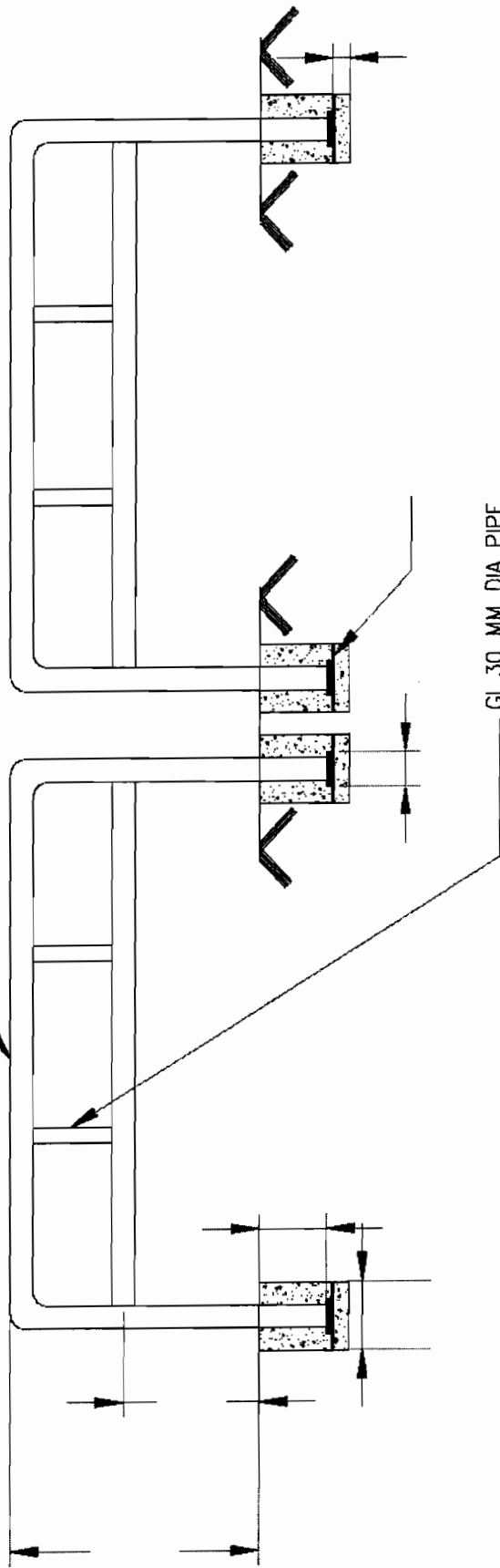
SOM DATTA BUILDERS & CONTRACTORS
 CONTRACTOR

AS Infrastructure Projects

GI 40 MM DIA PIPE

GI 30 MM DIA PIPE

ELEVATION OF FOOTPATH BARRIER



STANDARD DRAWINGS
DETAILS OF FOOTPATH BARRIERS

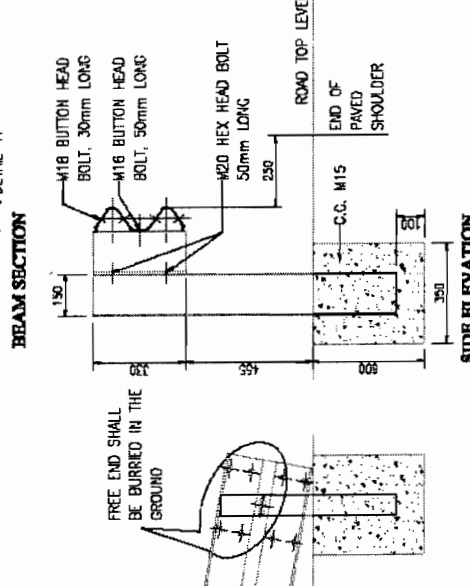
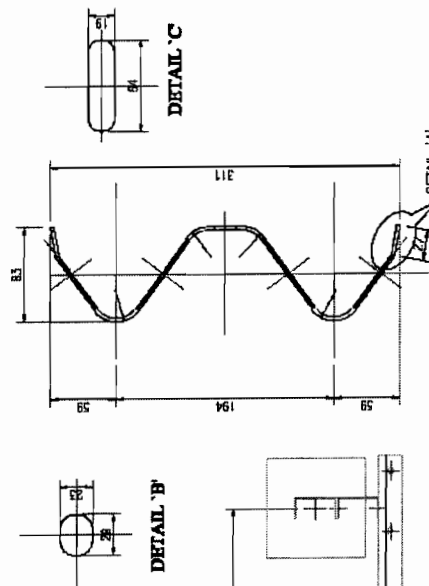
DRG. NO.	DRG. DATE	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	ZS	DATE	REV	RD	
SCALE	NTS				
			B.M	R.J	R.F.D.K
					S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
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 Fax: 2521348, e-mail: ceg@cegindia.com



DETAILS OF W-BEAM CRASH BARRIERS



- NOTE:**
- HEIGHT OF POSTS SHOULD BE 785mm LONG ABOVE THE FINISHED ROAD LEVEL.
 - SPACING OF POSTS SHOULD BE 2.0m C/C.
 - 1 No. SPACER CHANNEL SHOULD BE PLACED AT EACH POST.
 - W-PROFILE FORMED CORRUGATED BEAMS (EFFECTIVE LENGTH OF 4318mm), 311mm x 93mm.
 - POST CONSISTS OF FORMED CHANNEL OF SIZE 150 x 75 x 5, 785mm LONG ABOVE GROUND LVL.
 - SPACER CONSISTS OF FORMED CHANNEL OF SIZE 150 x 75 x 5, 330mm LONG.
 - BUTTON HEAD BOLTS M16 x 30mm LONG, 8 Nos FOR THE SPLICING OF THE W PROFILE AT EACH LOCATION.
 - BUTTON HEAD BOLTS M16 x 50mm LONG, 1 Nos AT THE CONNECTION OF THE W BEAM TO SPACER.
 - 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 560g/50 m², EACH FACE IN CONFORMANCE TO M.D.R.T & H. SPECIFICATIONS (CLAUSE 810).
 13. BEAMS TO BE ERRECTED ON A RADIUS OF 46m (150') OR LESS SHALL BE SPACE CURVED TO APPROPRIATE CURVATURE.
 14. CRASH BARRIERS ARE POSTED ON ALL SECTION OF ENBANKMENT 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 REFLECTORISED PAINT CONFORMING CL.603.5 OF M.O.R.T & H SPEC.

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

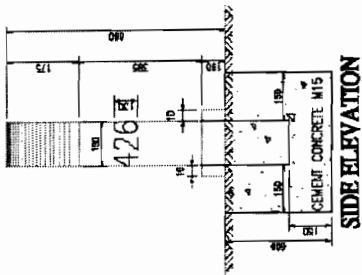
STANDARD DRAWINGS
METAL BEAM CRASH BARRIER DETAILS

DRG NO.	COMP/REV/CHG	ISSUED (A)	DESIGNED (B)	CHECKED (C)	APPROVED (D)
SH. NO.	24	DATE	REV	RO	
SCALE	NTS				
			B.M	R.J	R.R.D.K
					S.G

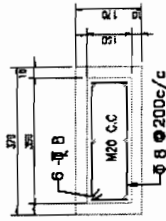
CEG ENGINEERS GROUP LTD.
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 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@ceginfolia.com

CEG
 Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

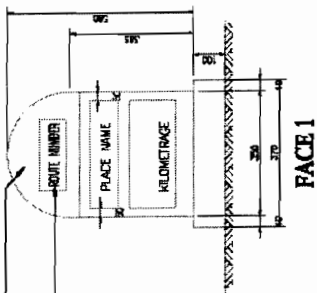
SOM DATT BUILDERS-ARSS JV
 CONTRACTOR



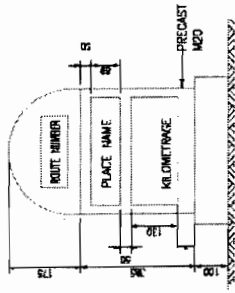
SIDE ELEVATION



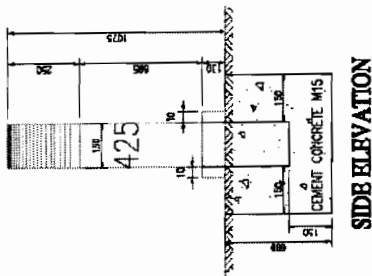
SECTIONAL PLAN



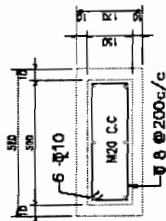
FACE 1



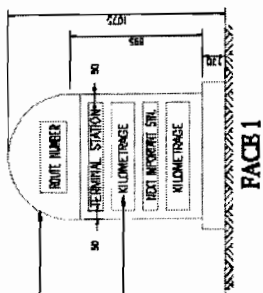
FACE 2



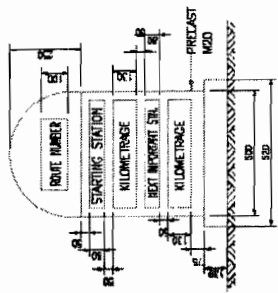
SIDE ELEVATION



SECTIONAL PLAN



FACE 1



FACE 2

TYPICAL DESIGN FOR THE 5TH KILOMETRE STONE

INDEX FOR KILOMETRE STONES	
Sl. No.	PLACE TO BE SHOWN
0	TERMINAL/STARTING STATION AND NEXT IMPORTANT TOWN
1	NEXT IMPORTANT TOWN
2	NEXT IMPORTANT TOWN
3	TERMINAL / STARTING STATION
4	TERMINAL / STARTING STATION AND NEXT IMPORTANT TOWN
5	NEXT IMPORTANT TOWN
6	NEXT IMPORTANT TOWN

TYPICAL DESIGN FOR ORDINARY KILOMETRE STONE

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 PRACTICE SHALL BE REFERRED.
4. LETTERING IS DONE WITH APPROVED QUALITY BLACK ENAMEL PAINT USING STENCIL

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
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 Fax: 2521348, e-mail: ceg@cegroupindia.com



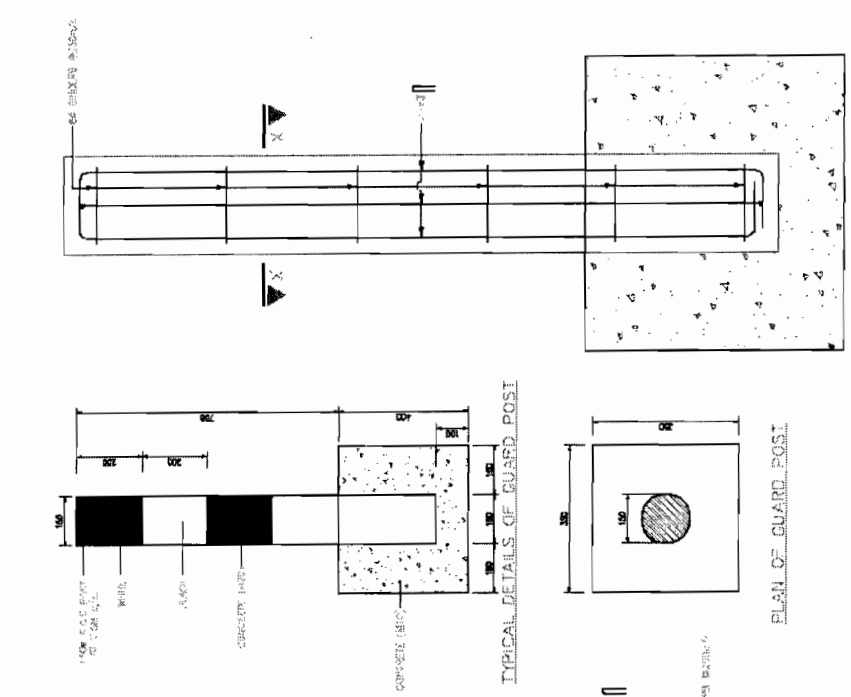
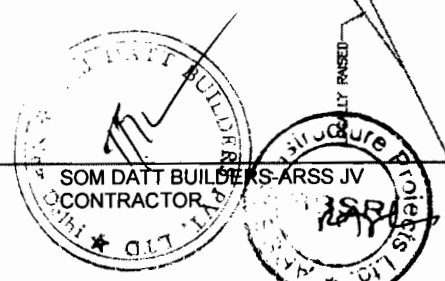
Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 Chief Engineer
 Orissa, Bhubaneswar.



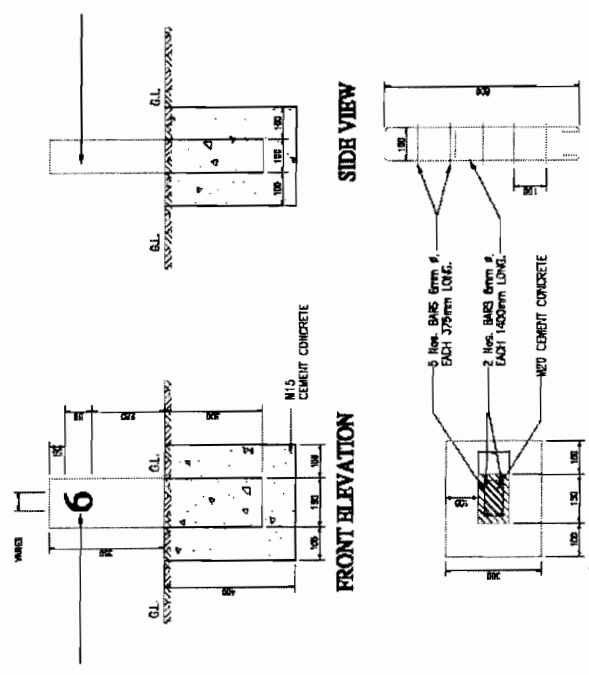
STANDARD DRAWINGS

TYPICAL KM STONE & 5TH KM STONE

DRG. NO.	EMP/REG/AM/PH	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	25	DATE	REV	RD	
SCALE	NTS				
		B.M	R.J	R.R.D.K	S.G



- NOTE:-**
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.



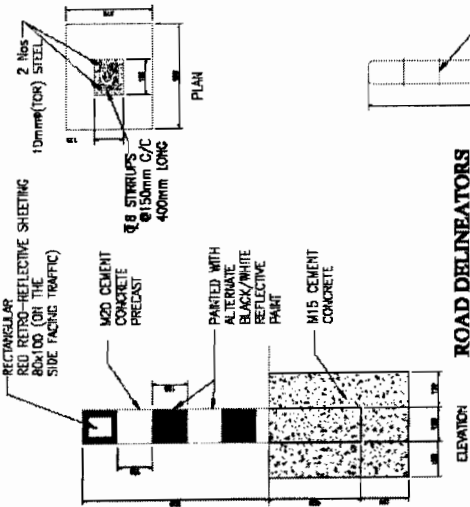
- NOTE:-**
1. ALL DIMENSIONS ARE IN MILLIMETRES
 2. REFLECTORISED PAINT SHALL BE IN ACCORDANCE WITH CL803.5 OF M.O.R.T & H SPEC.
 3. FOR TYPE & STYLE SIZE OF LETTERING RELEVANT IRC CODE OF PRACTICE SHALL BE REFERRED.
 4. LETTERING IS DONE WITH APPROVED QUALITY BLACK ENAMEL PAINT USING STENCIL

CEG
 Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER
 World Bank
 (Civil)
 6/1000, Bhubaneswar.

PROJECT:-
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
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 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
 ASSISTANCE

STANDARD DRAWINGS
TYPICAL DETAILS OF 200M STONE & GUARD POST

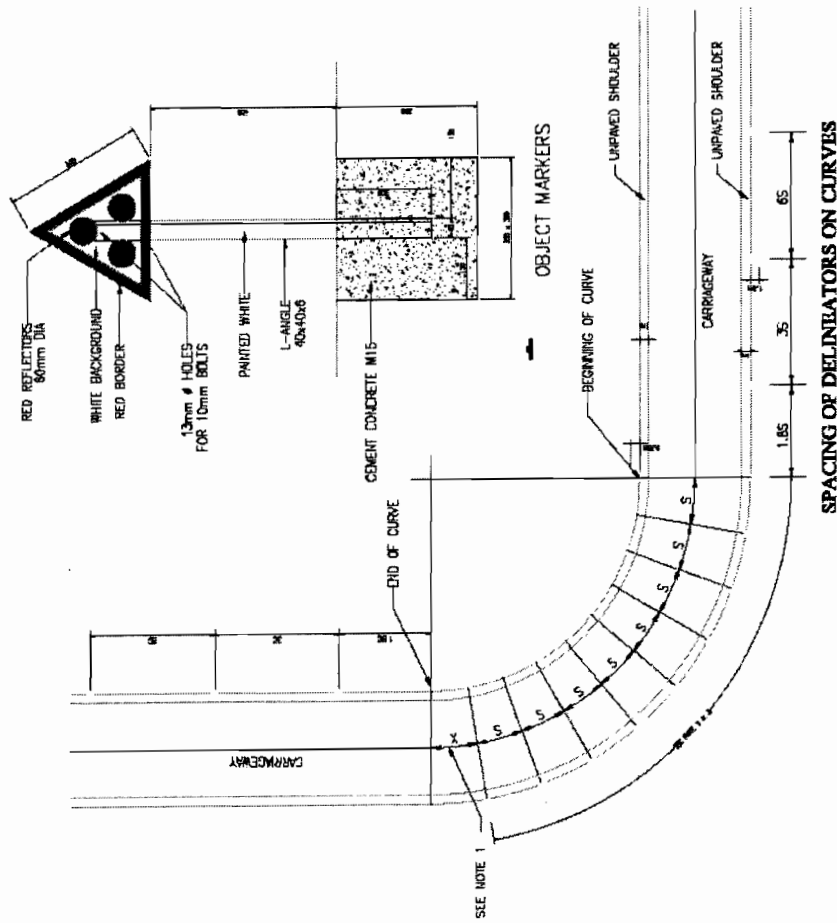
DRG NO. 088/252/089 & OP	DATE 28	REV	RD	DESIGNED (A)	CHECKED (C)	APPROVED (D)
SH. NO. 28	DATE	REV	RD	B.M	R.J	R.R.D.K
SCALE	NTS			B.M	R.J	R.R.D.K
						S.G



ROAD DELINEATORS

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. ADJUST DISTANCE 'X' SUITABLY SO THAT THE LAST ROWWAY DELINEATOR IS AT THE END OF THE CURVE.
3. INSTALL ALL DELINEATORS AT EDGE AS SHOWN IN THE DRAWING PERPENDICULAR TO THE ONCOMING TRAFFIC.
4. SEE TABLE FOR VALUE OF 'S', i.e. SPACING OF DELINEATORS ON THE CURVE.
5. ON STRAIGHT SECTIONS DELINEATORS SHOULD BE SPACED UNIFORMLY 50m FROM EACH OTHER, THE POSTS BEING IN LINES, ONE ON EACH SIDE OF THE ROWWAY.
6. LOCATIONS OF OBJECT MARKERS
 - I. TRAFFIC ISLANDS AT APPROACHES TO INTERSECTIONS
 - II. MEDIAN OPENINGS
 - III. ON MEDIAN & ISLANDS ON FAR SIDE OF THE INTERSECTIONS
 - IV. ON FACING APPROACHING TRAFFIC AT ISLANDS FORMING LEFT INFILTRATION LINES
7. OBJECT MARKERS SHOULD BE SET BACK FROM THE FACE OF THE KERB A DISTANCE OF ATLEAST 500mm
8. REQUIREMENT OF REFLECTIONS SHALL BE IN ACCORDANCE WITH PROVISIONS OF CODE OF PRACTICE.
9. ON EMBANKMENTS WITH HEIGHT MORE THAN 2m CLEAR SPACING OF DELINEATORS SHALL BE 25m.
10. DELINEATORS ARE NOT PROVIDED AT LOCATIONS WHERE CHEVRON SIGN BOARDS ARE PROPOSED.
11. GAUDDI POSTS ARE PROVIDED ON EMBANKMENTS OF HEIGHT >2m AND <3m AT 5m INTERVAL.
12. 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.
13. REFLECTIVE PAINT SHALL BE IN ACCORDANCE WITH CLAUSE OF M.O.R.T. & H. SPEC.



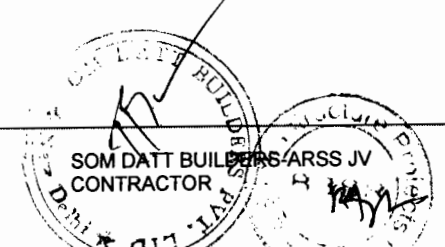
SL. No.	RAIUS OF CURVE (METRES)	SPACING ON CURVE, S (METRES)
1	30	5
2	50	8
3	100	12
4	200	20
5	300	25
6	400	30
7	500	35
8	600	38
9	700	42
10	800	45
11	900	48
12	1000	50

**STANDARD DRAWINGS
DETAILS OF ROAD DELINEATORS**

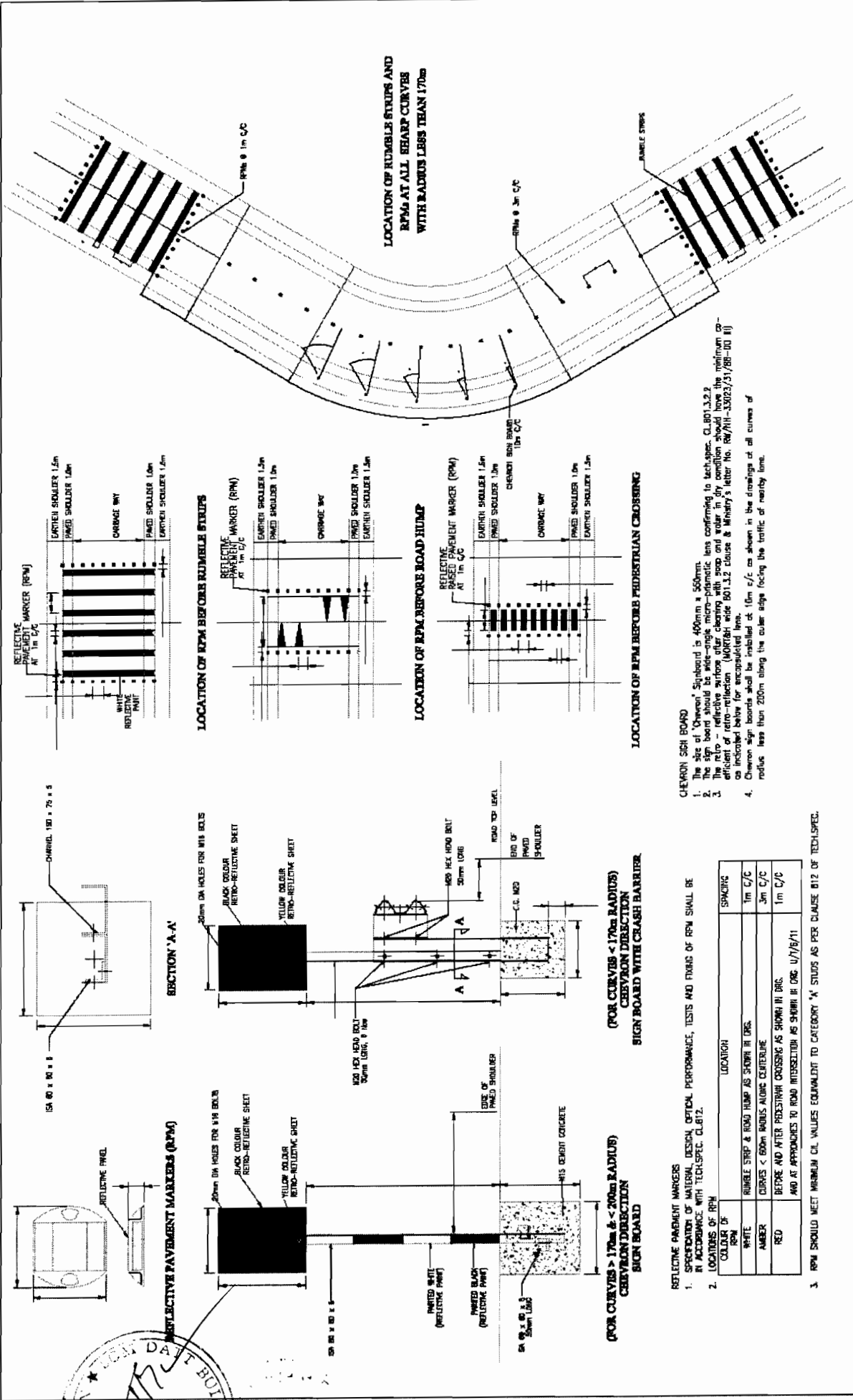
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

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Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Sd/- (Civil)
Chief Engineer



DRG NO. 1000/CEG/08	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 27	DATE	REV	RD	
SCALE	NTS			
	B.M	R.J	R.R.D.K	S.G



STANDARD DRAWINGS
DETAILS OF RPMs & CHEVRON MARKERS

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
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CEG

Chief Engineer
 World Bank Projects, Orissa
 Chief Engineer
 World Bank Project
 Civil Engrg. (Civil)
 Bhubaneswar.

DRG NO. 1000/200/100	DESIGNED (A)	CHECKED (C)	APPROVED (D)
SH. NO. 28	DATE	REV	RO
SCALE	NTS		
	B.M	R.J	R.R.D.K
			S.G

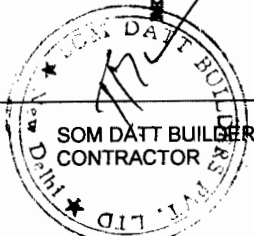
- CHEVRON SIGN BOARD**
- The size of 'Chevron' signboard is 400mm x 500mm.
 - The sign board should be wide-angle micro-prismatic lens conforming to tech.spec. CL.B01.3.2.2
 - The retro-reflective surface after cleaning with soap and water in dry condition should have the minimum coefficient of retro-reflection (MORF) wide B01.3.2 clause & Ministry's letter No. RW/11-33023/31/86-10 II) as indicated below for encapsulated lens.
 - Chevron sign boards shall be installed at 15m c/c as shown in the drawings of all curves of radius less than 200m along the outer edge facing the traffic of nearby lane.

REFLECTIVE PAVEMENT MARKERS

- SPECIFICATION OF MATERIAL, DESIGN, OPTICAL PERFORMANCE, TESTS AND FINISH OF RPM SHALL BE IN ACCORDANCE WITH TECH.SPEC. CL.B12.
- LOCATIONS OF RPM

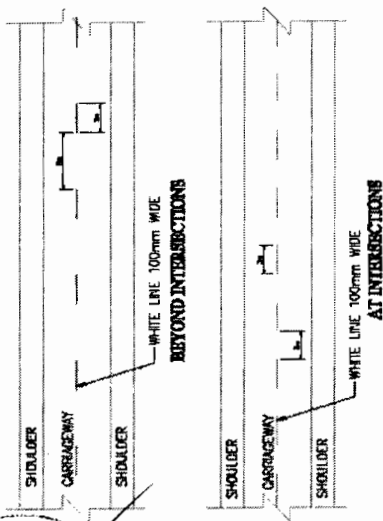
CLOUR OF RPM	LOCATION	SPACING
WHITE	RUMBLE STRIP & ROAD HUMP AS SHOWN IN DRG.	1m C/C
AMBER	CURVES < 600m RADIUS ALONG CENTERLINE	3m C/C
RED	BEFORE AND AFTER PEDESTRIAN CROSSING AS SHOWN IN DRG. AND AT APPROACHES TO ROAD INTERSECTION AS SHOWN IN DRG. 1/7/8/11	1m C/C

- RPM SHOULD MEET MINIMUM C.I. VALUES EQUIVALENT TO CATEGORY 'X' STUDS AS PER CLAUSE B12 OF TECH.SPEC.

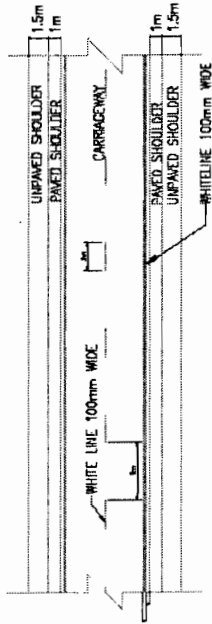


LONGITUDINAL MARKING

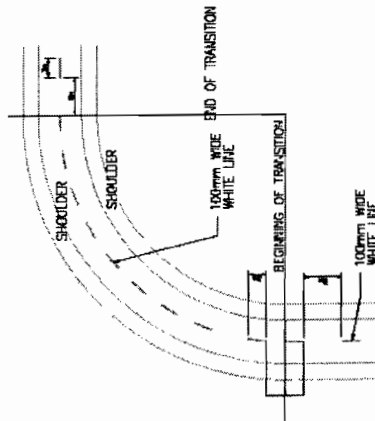
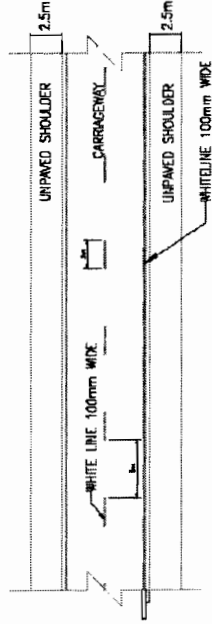
DETAILS OF CENTRE LINE



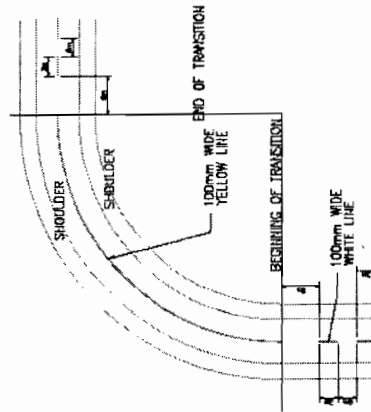
DETAILS OF EDGE LINE MARKING



DETAILS OF EDGE LINE MARKING



DETAILS AT CURVES



DETAILS AT SHARP CURVES
(NO-OVERTAKING ZONE)

NOTE:

1. EDGE LINE MARKINGS SHOULD NOT BE CARRIED ACROSS THE MOUTHS OF SIDE ROADS.
2. EDGE LINE & END MARKS SHALL BE AT THE STOP LINE & SHALL NOT BE CONTINUED.
3. ROAD MARKINGS SHOULD BE DONE WITH THERMOPLASTIC PAINT CONFORMING TO CL. 800.4 OF MORTH'S SPECIFICATIONS.
4. DETAILS OF ROAD MARKING ARE AS PER IRC: 35-1987, CODE OF PRACTICE FOR ROAD MARKINGS.

STANDARD DRAWINGS
TYPICAL ROAD MARKING DETAILS
(SHEET 1 OF 2)

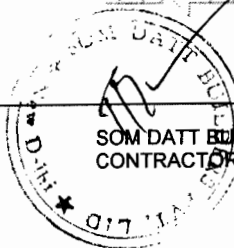
DRG NO. EMP/200/PA/VI	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 29	DATE	REV	RO	
SCALE	NTS		B.M	R.J
			R.R.D.K	S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

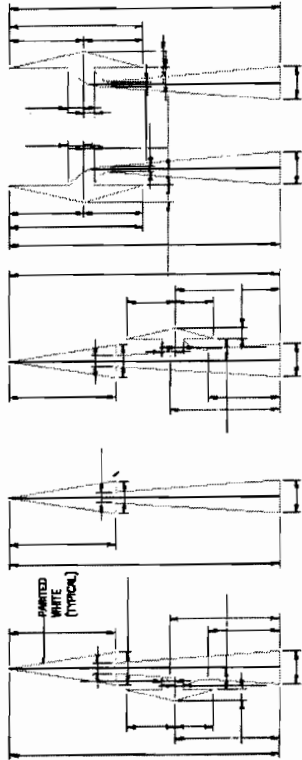
CONSULTING ENGINEERS GROUP LTD.
E-12, Malviya Colony, Malviya Nagar Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: cegcegroupindia.com



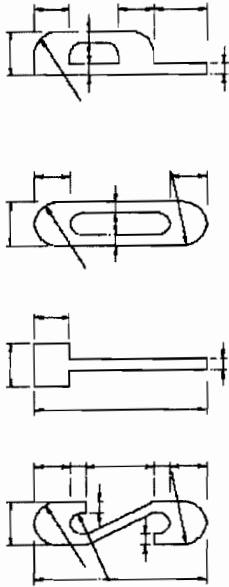
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank Project
On the E.I.C. (Civil)
Orissa, Bhubaneswar.



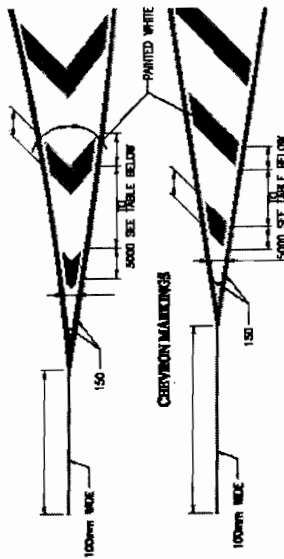
DIRECTIONAL ARROWS



SIZE OF LETTERS



DIAGONAL MARKINGS



PEDESTRIAN CROSSING

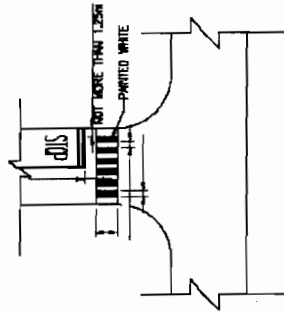
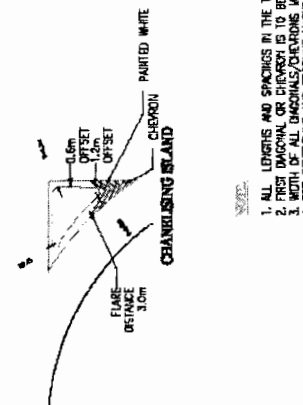


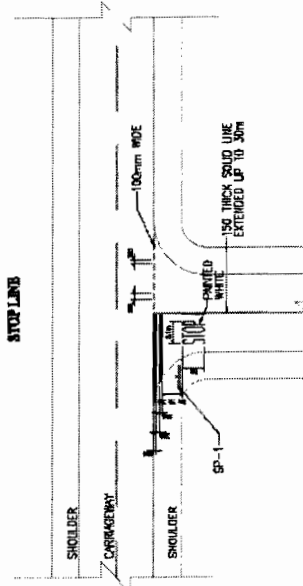
TABLE : SPACING BETWEEN DIAGONALS/CHEVRONS
CLEAR SPACING BETWEEN DIAGONALS OR CHEVRONS (mm)

SPACING BETWEEN DIAGONALS/CHEVRONS (mm)	WIDTH (mm)
150	150
300	300
450	450
600	600
750	750
900	900
1050	1050
1200	1200
1350	1350
1500	1500
1650	1650
1800	1800
2000	2000
2200	2200
2400	2400
2600	2600
2800	2800
3000	3000
3200	3200
3400	3400
3600	3600
3800	3800
4000	4000
4200	4200
4400	4400
4600	4600
4800	4800
5000	5000

PEDESTRIAN CROSSING



1. ALL LENGTHS AND SPACINGS IN THE TABLE ARE MEASURED PARALLEL TO ROAD CENTRE LINE.
2. FIRST DIAGONAL OR CHEVRON IS TO BE SO LOCATED THAT ITS LENGTH IS AT LEAST EQUAL TO ITS WIDTH.
3. WIDTH OF ALL DIAGONALS/CHEVRONS MEASURED AT RIGHT ANGLES TO THE DIAGONALS OR CHEVRONS IS 600mm.
4. FOR CENTRELINE AND EXCEEDING MARKINGS AT BUS BAY LOCATION REFER DRAWING NO. CESP/CEB/89/01
5. ROAD MARKINGS SHOULD BE DONE WITH THERMOPLASTIC PAINT CONFORMING TO CL 96.4 OF M.O.R.T & H SPECIFICATIONS
6. DETAILS OF MARKING AT INTERSECTIONS ARE AS PER M.O.R.T & H TYPE DESIGNS FOR INTERSECTIONS ON NATIONAL HIGHWAYS



**STANDARD DRAWINGS
TYPICAL ROAD MARKING DETAILS
(SHEET 2 OF 2)**

DRG NO.	CESP/CEB/89/01	REVISION (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	30	DATE	REV	RD	
SCALE	NTS				
			B.M	R.J	R.R.D.K
					S.G

**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

**CONSULTING
ENGINEERS GROUP LTD.**
E-12, Miji Colony, Malviya Nagar, Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegroupindia.com



Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank
Office of the E.I.C. (Orissa)
Orissa, Bhubaneswar.

SOM DATT BUILDERS ARSS JV
CONTRACTOR
3

SP-1



STOP

SP-2



COMPULSORY
KEEP LEFT

SP-2(a)



RESTRICTION ENDS

SP-3



GIVE WAY

SP-4(a)



SPEED LIMIT

SP-4(b)



SPEED LIMIT

SP-4(c)



SPEED LIMIT

SP-4(d)



SPEED LIMIT

SP-4(e)



SPEED LIMIT

SP-7



COMPULSORY
SOUND HORN

SP-9(a)



RIGHT SIDE ROAD

SP-9(b)



LEFT SIDE ROAD

SP-10(a)



RIGHT HAND
CURVE

SP-10(b)



LEFT HAND
CURVE

SP-10(c)



RIGHT HAIR PIN
BEND

SP-10(d)



LEFT HAIR PIN
BEND

SP-10(e)



RIGHT REVERSE
BEND

SP-10(f)



LEFT REVERSE
BEND

SP-11



T-INTERSECTION

SP-12



PEDESTRIAN
CROSSING

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

**C O N S U L T I N G
E N G I N E E R S G R O U P L T D .**
E-12, Moji Colony, Malviya Nagar, Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegindia.com



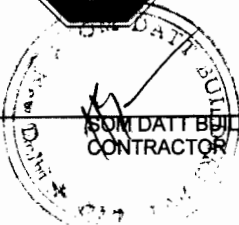
Chief Engineer

EMPLOYER

World Bank Projects, Orissa
Chief Engineer
On the E.L.C. (Civil)
Cuttack, Bhubaneswar.

STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 1 OF 4)

DRG. NO.	DATE	REV	RD	APPROVED (C)
SH. NO.	31			
SCALE	NTS			B.M
				R.R.D.K
				S.G



M/s. DATT BUILDERS-ARSS JV
CONTRACTOR

SP-13(C) STAGGERED INTERSECTION



SP-14(C) Y-INTERSECTION



SP-13(C) MAJOR ROAD AHEAD



SP-14(C) GAP IN MEDIAN



SP-13(C) MAJOR ROAD AHEAD



SP-14(C) OVERHEAD CABLE



SP-13(C) MAJOR ROAD AHEAD



SP-15(C) NARROW BRIDGE



SP-14(C) Y-INTERSECTION



SP-15(C) DUAL C'WAY STARTS



SP-14(C) Y-INTERSECTION



SP-15(C) DUAL C'WAY ENDS



SP-15(C) SERIES OF BENDS



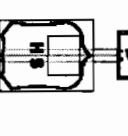
SP-16(C) HUMP OR ROUGH ROAD



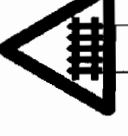
SP-16(C) BARRIER AHEAD



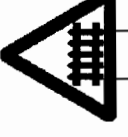
SP-17 STATE ROUTE MARKER SIGN



SP-18 (a) GUARDED RAILWAY CROSSING AT 200m



SP-18 (b) GUARDED RAILWAY CROSSING AT 50-100m



SP-24 PUBLIC TELEPHONE



SP-22 PETROL BUNK



SP-23 HOSPITAL



SP-25 DISPENSARY



SP-26 EATING PLACE



LEGEND

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

- NOTE:**
1. DETAILS OF ROAD SIGNS ARE AS PER IRC: 67-2007.
 2. DETAIL OF STATEROUTE MARKER SIGN IS AS PER IRC: 37-1969.
 3. ALL MANDATORY AND CAUTIONARY SIGNS SHOULD BE HIGH INTENSITY WIDE ANGLE MICRO PRISMATIC SHEETINGS CONFORMING TO CL-801 OF TECH. SPECIFICATION
 4. ALL INFORMATION SIGNS SHOULD CONFORM TO STANDARDS OF HIGH INTENSITY ENCAPSULATED TYPE RETRO REFLECTIVE SHEETING AS PER CL. 801 OF TECH. SPECIFICATION

**STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 2 OF 4)**

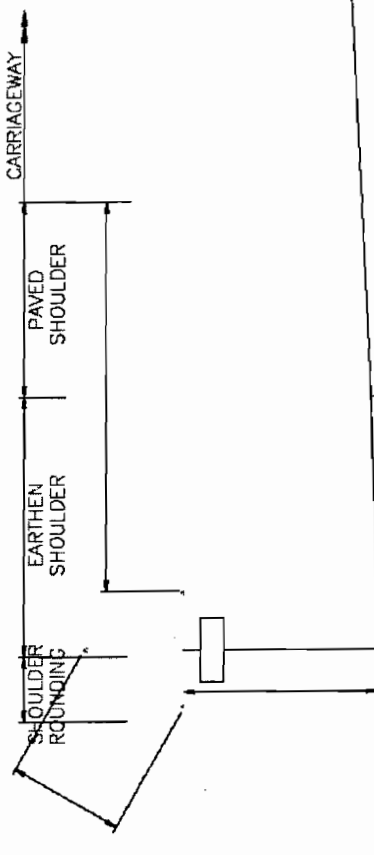
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

**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

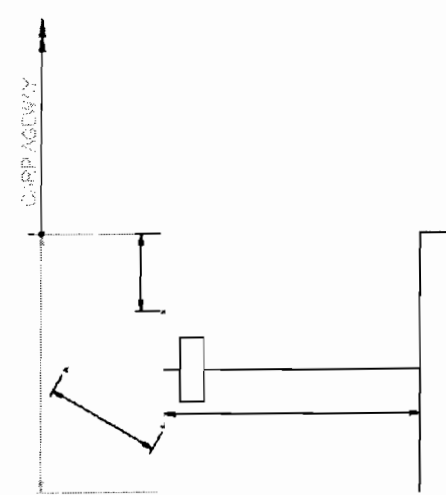


DRG. NO.	DATE	REV.	RO	DESIGNED (S)	DRAWN (C)	CHECKED (C)	APPROVED (O)
SH. NO.	32						
SCALE	NTS			B.M.	R.J.	R.R.D.K	S.G

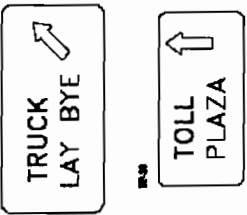
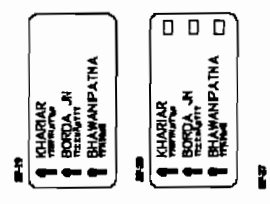
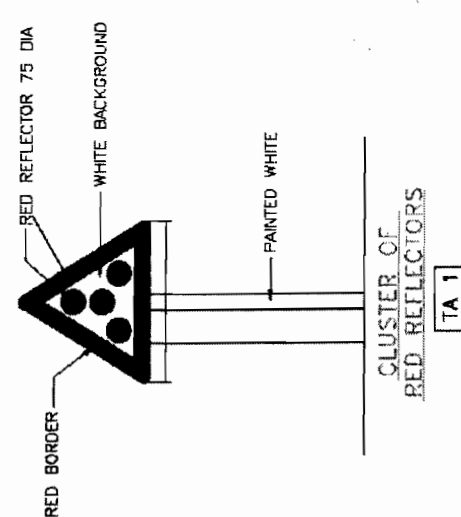
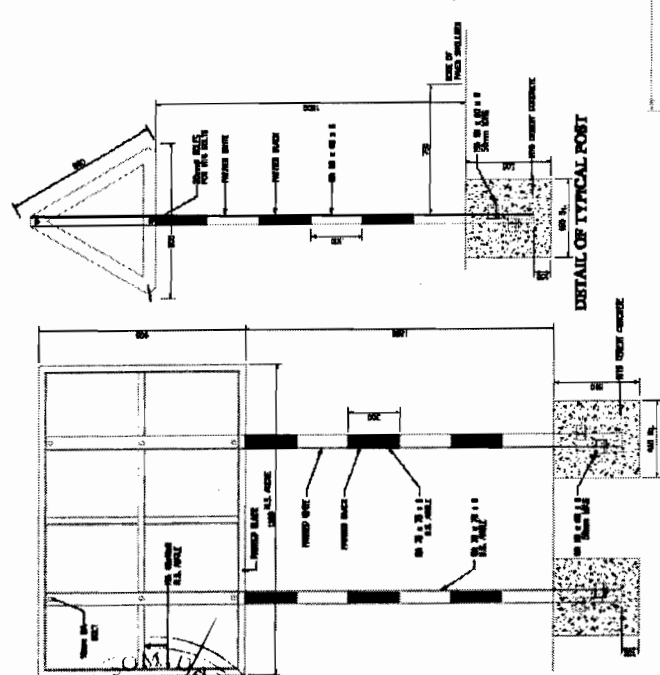




MINIMUM CLEARANCE OF SIGNS
IN UNKERBED SECTIONS



MINIMUM CLEARANCE OF SIGNS
IN KERBED SECTIONS



NOTES

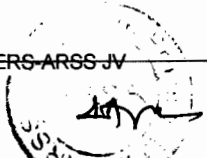
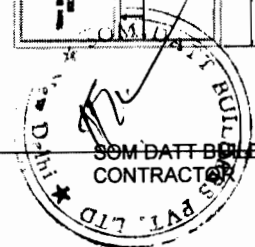
1. ALL DIMENSIONS ARE IN MM UNLESS INDICATED OTHERWISE.
2. ROAD SIGNS, SIZES OF ARROWS, LETTERS & NUMERALS IS AS PER IRC:87-2001.
3. ALL ROAD SIGNS ARE NORMALLY BE PLACED AT RIGHT ANGLES TO THE LINE OF TRAVEL OF THE APPROACHING TRAFFIC.
4. ALL WARNING SIGNS ARE NORMALLY BE LOCATED AT 120M IN ADVANCE OF THE HAZARD MARKED AGAINST IN HIGH-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 DISCULATED LETTERS FIXED OVER ALUMINIUM SHEET AS PER MORTH SPECIFICATIONS.
6. ROUTE MARKER SIGN FOR UH IS AS PER IRC :3-1988.
7. SIGNS WITH AN AREA UP TO 0.9sq. m. SHALL BE MOUNTED ON A SINGLE POST, AND FOR GREATER AREA TWO OR MORE SUPPORTS SHALL BE PROVIDED.
8. POST ANCHORS USED TO SUPPORT THE SIGN BOARD SHALL BE PAINTED WITH TWO COATS OF 6000 GRADE QUALITY (ANTI-CORROSION) EMBEL PAINT OVER.

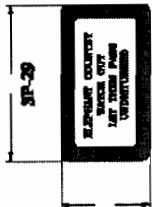
STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 3 OF 4)

DIRG NO. / DATE / REV / DATE	REV	RO	DATE	REV	RO	DATE	REV	RO
33								
SCALE	MTS			E.L.M.			R.J.	
	R.R.D.K			S.G.				

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

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





SP-29



SP-30



SP-31



SP-33



SP-34



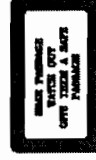
SP-35



SP-36



SP-37



SP-38



SP-39



SP-40



SP-41



SP-42



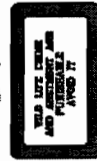
SP-43



SP-44



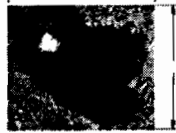
SP-45



SP-46



SP-47



SP-48



SP-49



NOTE:

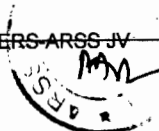
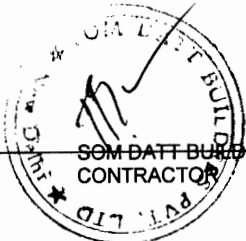
1. DETAILS OF ROAD SIGNS ARE AS PER IRC: 67-2001 & IRC 30-1988
2. DETAIL OF STATEROUTE MARKER SIGN IS AS PER IRC: 31-1989
3. ALL MANDATORY AND CAUTIONARY SIGNS SHOULD BE HIGH INTENSITY WIDE ANGLE MICRO PRISMATIC SHEETING CONFORMING TO CL-801 OF TECH. SPECIFICATION
4. ALL INFORMATORY SIGNS SHOULD CONFORM TO STANDARD OF HIGH INTENSITY ENCAPSULATED TYPE RETRO REFLECTIVE SHEETING AS PER CL. 801 OF TECH. SPECIFICATION

**STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 4 OF 4)**

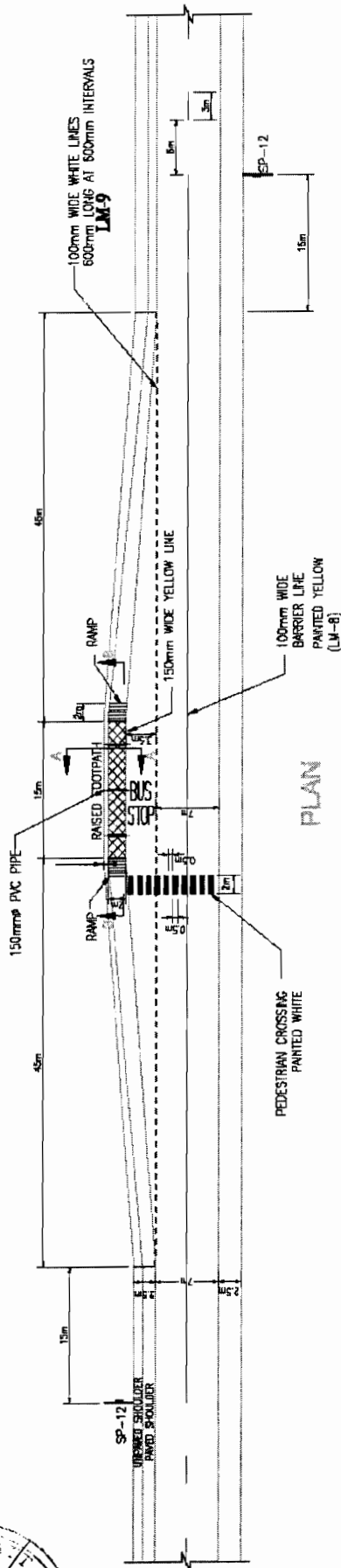
DRG NO.	DATE	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	34	DATE	REV	RO	NTS
SCALE				B.M	R.J
					R.R.D.K
					S.G

**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

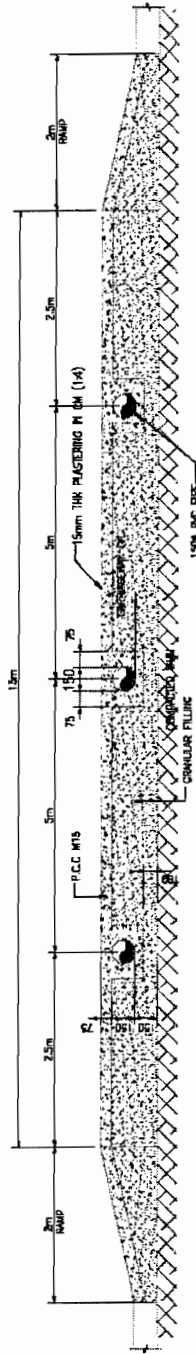
**CONSULTING
ENGINEERS GROUP LTD.**
E-12, Moji Colony, Melviya, Nagar, Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@cegindia.com



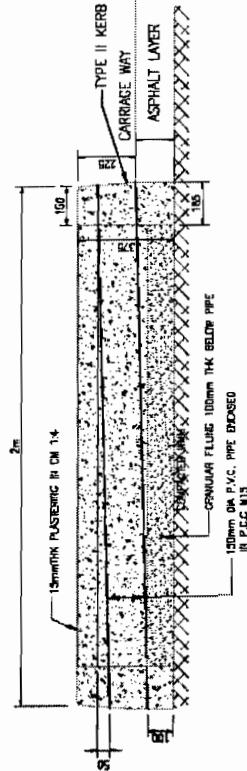
BUS BAY DETAILS



PLAN



SECTION ON B-B



SECTION ON A-A

NOTE.

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED
2. PVC PIPE SHALL BE OF CLASS 4 AND AS PER SPECIFICATION OF IS: 4985-2000
3. PAVENT LAYERS OF CARRIAGEWAY SHALL BE EXTENDED IN THE BUS BAY AREA.
4. GRANULAR FILLING AS PER TECH. SPEC. CI 401
5. PLAIN CEMENT CONCRETE M15 AS PER TECH. SPEC. CI 1500 & 1700
6. 15mm THICK PLASTERING IN 1:4 AS PER TECH. SPEC. CI 1312.4
7. PRECAST KERB TYPE-II AS PER DRAWING No. CSRP/CEG/DR
8. PAINTING
 - a) KERB PAINTING AS PER TECH. SPEC. CI 803.5
 - b) ROAD MARKING AS PER TECH. SPEC. CI 803.4

STANDARD DRAWINGS TYPICAL BUS BAY TYPE - 1

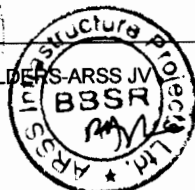
DRG NO.	COMP/ISS/REV/NO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	35	DATE	REV	RD	
SCALE	NTS				
		B.M	R.J	R.R.D.K	S.G

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE

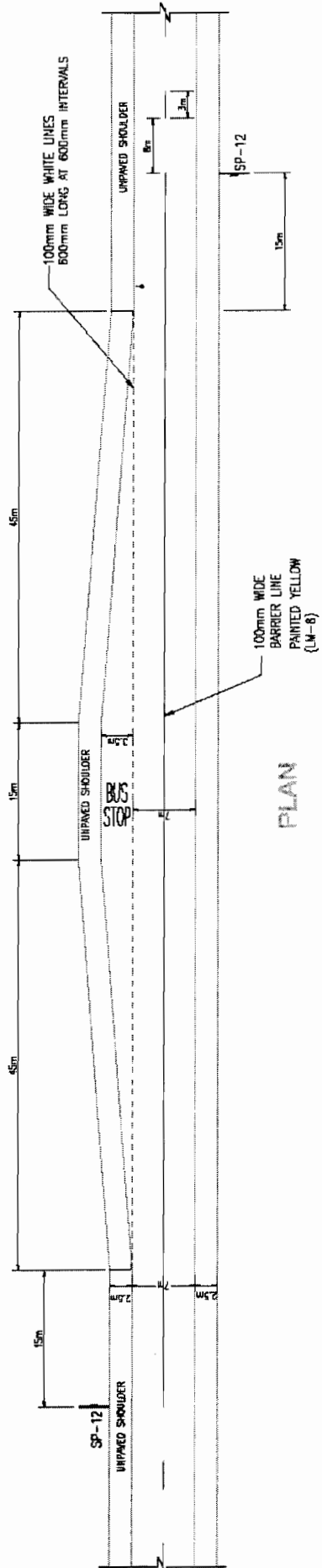
CONSULTING ENGINEERS GROUP LTD.
E-12, Moll Colony, Maivija Nagar, Jaipur-17
Tel: +91-141-2520899, 2520556
Fax: 2521348, e-mail: ceg@cegindia.com



Chief Engineer
World Bank Projects, Orissa
EMPLOYER
O/o the E.I.C. (C.N.)
Orissa, Bhubaneswar.



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
3. LOWER STANDARD TYPE-II SHALL BE ADOPTED IN PLACE OF TYPE - I AS PER ENGINEER IN CHARGE
4. CARRIAGEWAY WIDTH MAY VARY ACCORDING TO THE LOCATION OF THE BUS BAY FROM 7m TO 10m

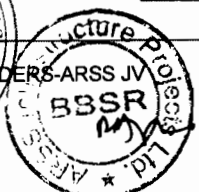
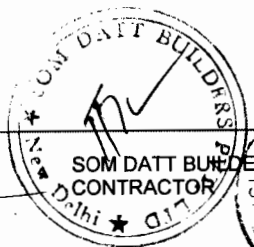
**STANDARD DRAWINGS
TYPICAL BUS BAY TYPE - II**

DRG NO. /	COMPY/REV/DATE	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	36	DATE	REV	RO	
SCALE	NTS			B.M	R.J
				R.R.D.K	S.G

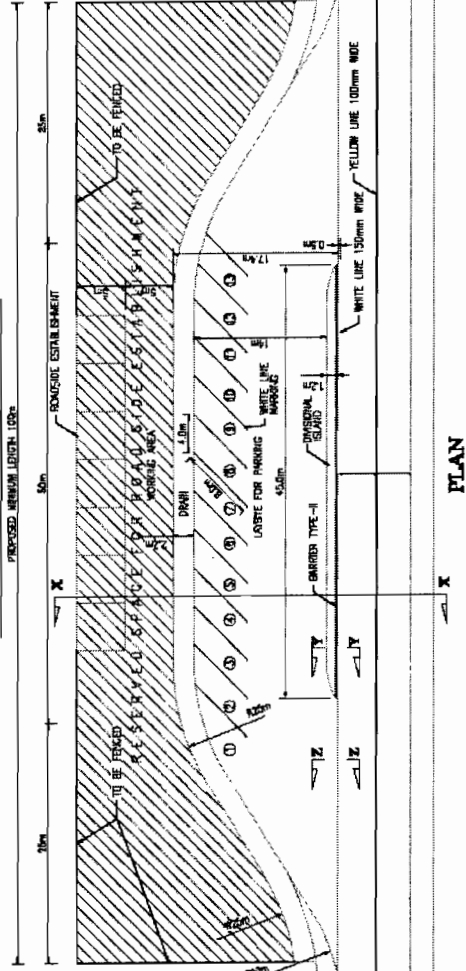
**PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
ASSISTANCE**

**CONSULTING
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E-12, Maji Colony, Malviya Nagar Jaipur-17
Tel: +91-141-2520899, 2521899, 2520556
Fax: 2521348, e-mail: ceg@ceginia.com

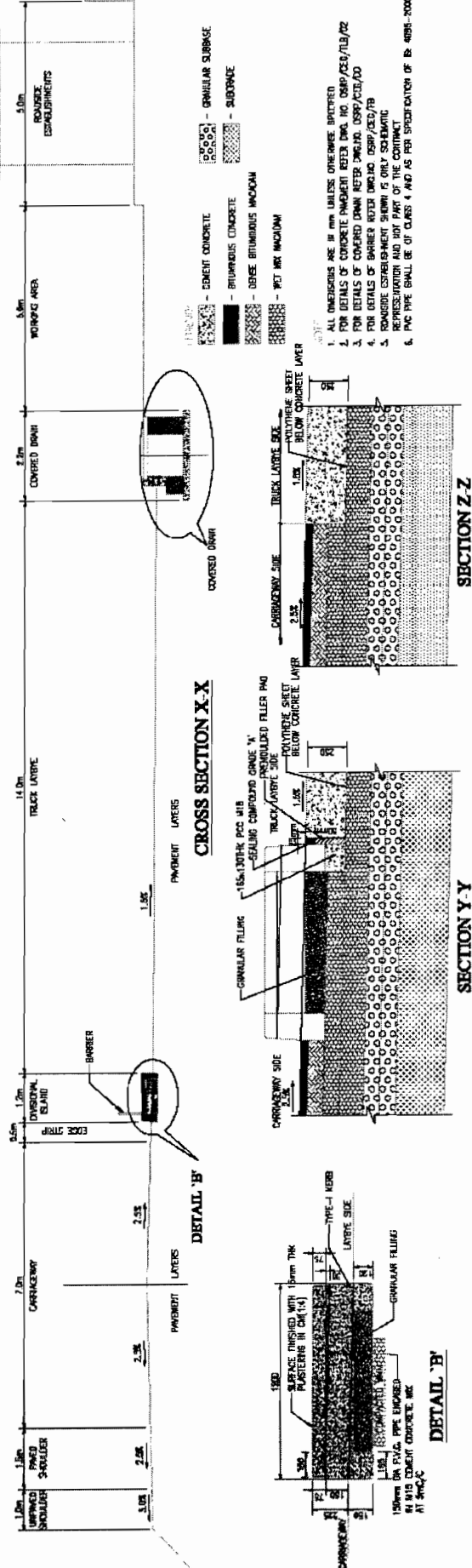
Chief Engineer
World Bank Projects, Orissa
EMPLOYER
Office: B.O. Civil
Orissa State Road Project



DETAILS OF TRUCK LAYBY



PLAN



CROSS SECTION X-X

SECTION Y-Y

SECTION Z-Z

DETAIL 'B'

- GRANULAR SUBBASE
 - SUBGRADE
 - BRUSHED CONCRETE
 - DENSE BITUMINOUS MCOBAM
 - PORTLAND CEMENT CONCRETE
 - MET W/RY MCOBAM

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
2. FOR DETAILS OF CONCRETE PAVEMENT REFER DRG. NO. DS/SP/236/TLB/02
3. FOR DETAILS OF COVERED DRAIN REFER DRG. NO. DS/SP/236/00
4. FOR DETAILS OF BARRIER REFER DRG. NO. DS/SP/236/03
5. ROADSIDE ESTABLISHMENT SIGN IS ONLY SCHEMATIC REPRESENTATION AND NOT PART OF THE CONTRACT
6. PCC PIPE SHALL BE OF CLASS 4 AND AS PER SPECIFICATION OF IS 4886-2000

PROJECT:-

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND
 DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS
 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK
 ASSISTANCE**

CONSULTING ENGINEERS GROUP LTD.
 E-12, Maji Colony, Malviya Nagar, Jaipur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

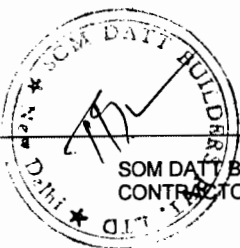


Chief Engineer
 World Bank Projects, Orissa
 World Bank EMPLOYER
 On the B.O.C. (S.O.)
 Office, Bhubaneswar

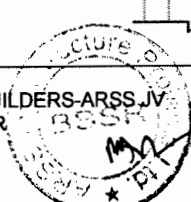
STANDARD DRAWINGS

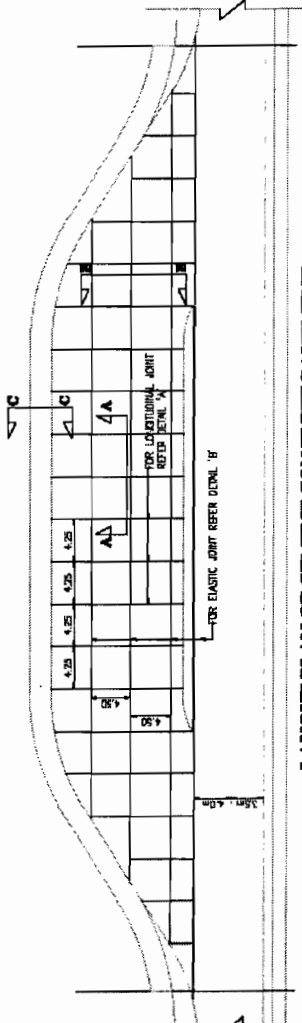
DETAILS OF TRUCK LAYBYES (SHEET 1 OF 2)

DRG. NO.	COMP. PERS./TLB/PA	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	37	DATE	REV	RD	
SCALE	NTS			B.M	R.J
				B.M	R.R.D.K
					S.G

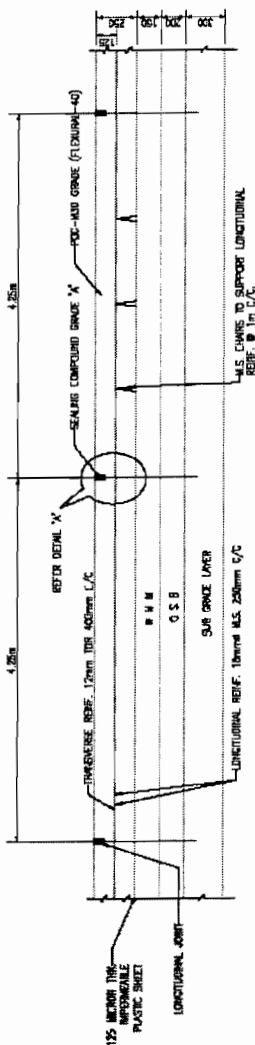


SOM DATT BUILDERS JV
 CONTRACTOR

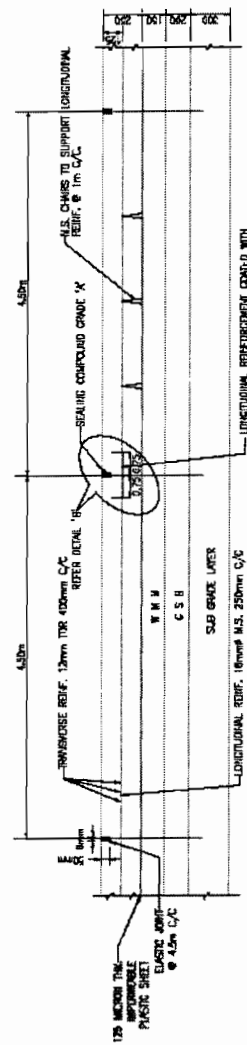




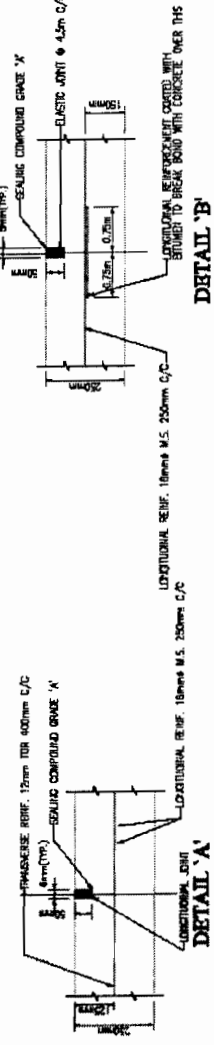
LAYOUT PLAN OF CEMENT CONCRETE PAVEMENT



SECTION A-A

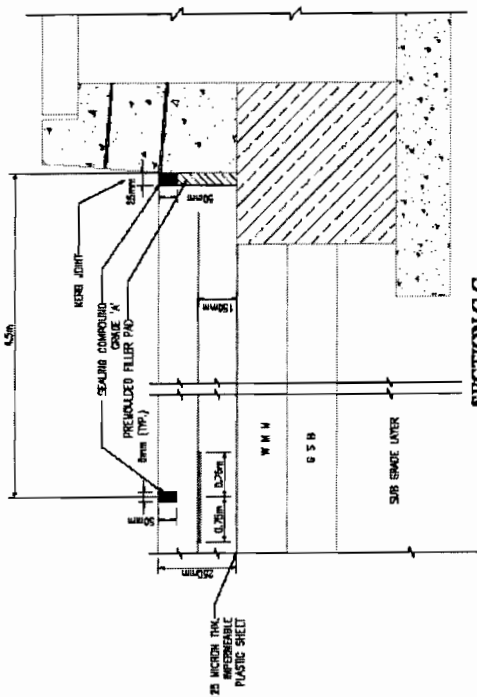


SECTION B-B



DETAIL 'A'

DETAIL 'B'



SECTION C-C

- 1 - CEMENT CONCRETE
- 2 - BITUMINOUS CONCRETE
- 3 - BITUMINOUS MACHAM
- 4 - DENSE BITUMINOUS MACHAM
- 5 - NET MIX MACHAM
- 6 - GRANULAR SUBGRADE
- 7 - SURGRADE

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED
2. MATERIAL TYPE, CONSTRUCTION EQUIPMENT, CONSTRUCTION METHODOLOGY SHALL BE AS PER RELEVANT CLAUSES OF M.O.R.T. & H. SPECIFICATIONS
3. WORKERS SHALL BE PROPERLY TRAINED TO OBTAIN A FLAT SURFACE FINISH FROM UNDERLAYINGS, SUBGRADES & LODE PROFILES OF ASPHALTES
4. CONSTRUCTION JOINTS SHALL BE LOCATED AS TO COINCIDE WITH THE LANEING JOINT.
5. THE DESIGN FOR PCC SHALL BE NOT APPROVED BY THE OWNER TO CONSTRUCTION
6. THE DESIGN FOR PCC SHALL BE NOT APPROVED BY THE OWNER TO CONSTRUCTION
7. THE DESIGN FOR PCC SHALL BE NOT APPROVED BY THE OWNER TO CONSTRUCTION
8. THE DESIGN FOR PCC SHALL BE NOT APPROVED BY THE OWNER TO CONSTRUCTION
9. THE DESIGN FOR PCC SHALL BE NOT APPROVED BY THE OWNER TO CONSTRUCTION
10. THE DESIGN FOR PCC SHALL BE NOT APPROVED BY THE OWNER TO CONSTRUCTION
11. ROAD MARKING AND PAINTING AS PER TECH. SPEC. D 803
12. THERMOPLASTIC ROAD MARKING AS PER TECH. SPEC. D 804

PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS GROUP LTD.
 E-12, Maji Colony, Malviya Nagar Jaipur-17
 Tel: +91-141-2520899, 2521899, 2520556
 Fax: 2521348, e-mail: ceg@cegroupindia.com

Chief Engineer
 World Bank Projects, Orissa
 EMPLOYER

STANDARD DRAWINGS
DETAILS OF TRUCK LAYBYES (SHEET 2 OF 2)

DRG. NO.	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 38							
SCALE	NTS			B.M	R.J	R.R.D.K	S.G



GOVERNMENT OF ORISSA
WORKS DEPARTMENT

CIVIL WORKS CONTRACT

[PACKAGE No. OSRP-CW-ICB-Y1-P02]

For

*Widening & Strengthening of existing carriageway to 2-lane for
"Chandabali-Bhadrak-Anandapur" road
(Km. 0/0 to Km. 45/0 of SH-9 & Km. 0/0 to Km 50/0 of SH – 53)*

*under
Orissa State Roads Project*

between

**Chief Engineer, World Bank Projects, Orissa
on behalf of
Orissa Works Department, Government of Orissa**

and

SOM DATT BUILDERS – ARSS JV
Plot No. 38, SECTOR – A, Zone – D
Mancheswar Industrial Estate, Mancheswar, Bhubaneswar – 751010 [INDIA]

[VOLUME -V : SCHEDULES]
Agreement Value: Rs. 216,23,17,622.00

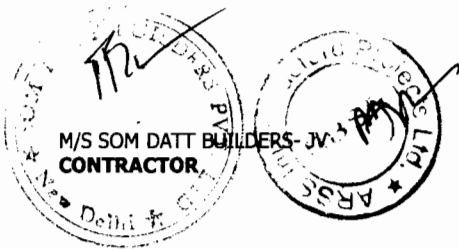
*Project Management Unit, Orissa State Roads Project
Office of the Engineer-in-Chief (Civil), Orissa,
Nirman Soudha, Keshari Nagar, Unit – V, Bhubaneswar – 751 001*
Dated: 3rd November, 2008


CONTENTS of CONTRACT

Volume – I	:	Letter of Acceptance, Letter Bid and addenda
Volume – II	:	Particular Conditions and the General Conditions;
Volume – III	:	Specifications
Volume – IV	:	Drawings
Volume – V	:	Completed Schedules,

CONTENTS of VOLUME V

Sl.	Description	Page No.
1	Grand Summary of Price Schedule	1
2	Daywork Summary	2
3	Price Schedule	3 – 43




Chief Engineer
World Bank Projects, Orissa
EMPLOYER
World Bank
C/O the S.L.C. (CBP)
Orissa, Bhubaneswar.

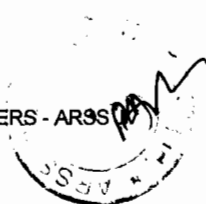
Grand Summary of Price Schedule

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane Road from Chandbali-Bhadrak-Anandapur (0/0 km to 45/0 km of SH-9 & 0/0 km to 50/0 km of SH-53)- ICB Package OSRP-CW-ICB-Y1-02

Contract No.: Agreement No. 4 of 2008 - 09

<i>General Summary</i>	<i>Page</i>	<i>Amount</i>
BILL NO.1 : SITE CLEARANCE	3	20,676,912.10
BILL NO.2 : EARTH WORKS	5	250,818,046.00
BILL NO.3 : SUB-BASE AND BASE COURSES	7	475,888,050.00
BILL NO.4 : BITUMINOUS COURSES	8	666,369,994.00
BILL NO.5 : CULVERTS AND UNDERPASSES	10	233,485,430.00
BILL NO.6 : BRIDGES	14	223,886,215.00
BILL NO.7 : RETAINING WALL, DRAINAGE AND PROTECTIVE WORKS	20	170,629,520.00
BILL NO.8 : MISCELLANEOUS ITEMS	22	74,804,865.00
BILL NO.9 : MAINTENANCE, REPAIR AND REHABILITATION	27	53,995,000.00
BILL NO.10 : ENVIRONMENTAL MITIGATION MEASURES	28	69,741,885.00
BILL NO.11 : PROVISIONAL ITEMS	35	7,895,460.00
Subtotal of Bills	(A)	2,248,191,377.10
Total for Daywork (Provisional Sum)	(B)	3,772,812.50
Specified Provisional Sums included in subtotal of bills	(C)	450000.00
Total of Bills Plus Provisional Sums (A + B + C)	(D)	2,252,414,189.60
Add Provisional Sum for Contingency Allowance	(E)	0.00
Bid Price (D + E)	(F)	2,252,414,189.60
Less Discount @4% on the tendered Amount (F) (4% Discount shall be effected in each work bill)	(G)	90,096,567.58
Final Bid Price (F-G)	(H)	2,162,317,622.02
	Say	2,162,317,622.00

Rupees Two Hundred Sixteen Crore Twenty Three Lakh Seventeen Thousand Six Hundred Twenty Two Only



Daywork Summary

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane Road from Chandbali-Bhadrak-Anandapur (0/0 km to 45/0 km of SH-9 & 0/0 km to 50/0 km of SH-53)
- ICB Package OSRP-CW-ICB-Y1-02

Contract No.: Agreement No. 4 of 2008 - 09

	<i>Amount (Rs.)</i>	<i>% Foreign</i>
1. Total for Daywork: Labour	360,625.00	NIL
2. Total for Daywork: Materials	2,773,437.50	NIL
3. Total for Daywork: Contractor's Equipment	638,750.00	NIL

Total for Daywork (Provisional Sum) 3,772,812.50

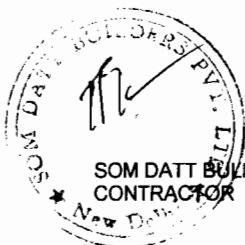
(carried forward to Bid Summary, p.1)

Summary of Specified Provisional Sum

	<i>Amount (Rs.)</i>	<i>% Foreign</i>
Providing and maintaining wireless communication system comprising of mobile Trans-receiver suitable for mounting on four wheeler with micro phone assembly including antenna, speaker etc. (10 sets), base trans-receiver with all accessories (3 sets) and hand-held radio sets (10 sets) including necessary statutory approval for obtaining the frequency to operate the wireless system.	350,000.00	
Providing and maintaining passenger ambassador car of 1400 CC capacity (for 600 vehicle day)	100,000.00	

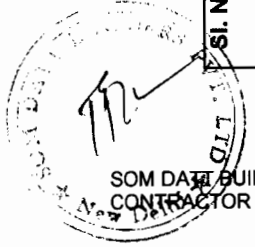
Total for Specified Provisional Sum 450,000.00

(carried forward to Bid Summary, p.1)



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane Road from Chandball-Bhadrak-Anandapur
(0/0 km to 45/0 km of SH-9 & 0/0 km to 50/0 km of SH-53) - ICB Package OSRP-CW-ICB-Y1-02
PRICE SCHEDULE (Works Items & Dayworks)

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
1.01	BILL NO.1 : SITE CLEARANCE Cleaning and Grubbing for road land complete as per Technical Specification Clause 201 and as per the direction of Engineer-in-charge.	Hectare	136.00	20000.00 Rupees Twenty Thousand Only	2,720,000.00 Rupees Twenty Seven Lakh Twenty Thousand Only
1.02	Dismantling structures and pavement including disposal of resulting material and/or salvaging useful materials complete as per Technical Specification Clause 202, 2809 and as per the direction of Engineer-in-charge.				
	a) Brick/ Stone Structures of dry or in lime/cement mortar	Cum	1012.31	150.00 Rupees One Hundred Fifty Only	151,846.50 Rupees One Lakh Fifty One Thousand Eight Hundred Forty Six And Fifty Paise Only
	b) Concrete/Reinforced concrete/ Prestressed concrete structures including cleaning straightening & cutting of bars and separating them out from RCC/PSC. For Slab Culverts & Box Culverts and Bridges				
	i) P.C.C.	Cum	1110.12	240.00 Rupees Two Hundred Forty Only	266,428.80 Rupees Two Lakh Sixty Six Thousand Four Hundred Twenty Eight And Eighty Paise Only
	ii) R.C.C.	Cum	1799.56	360.00 Rupees Three Hundred Sixty Only	647,841.60 Rupees Six Lakh Forty Seven Thousand Eight Hundred Forty One And Sixty Paise Only
	c) Dismantling of all type of Pavement course	Cum	75600.00	220.00 Rupees Two Hundred Twenty Only	16,632,000.00 Rupees One Crore Sixty Six Lakh Thirty Two Thousand Only
	d) Hume pipe	Lm	1110.80	48.00 Rupees Forty Eight Only	53,318.40 Rupees Fifty Three Thousand Three Hundred Eighteen And Forty Paise Only
	e) Kerb	Lm	360.40	7.00 Rupees Seven Only	2,522.80 Rupees Two Thousand Five Hundred Twenty Two And Eighty Paise Only



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
	f) Dry stone pitching	Cum	119.40	170.00 Rupees One Hundred Seventy Only	20,298.00 Rupees Twenty Thousand Two Hundred Ninety Eight Only
	g) RCC railing	Lm	467.20	30.00 Rupees Thirty Only	14,016.00 Rupees Fourteen Thousand Sixteen Only
	h) Expansion joint	Lm	126.00	1790.00 Rupees One Thousand Seven Hundred Ninety Only	225,540.00 Rupees Two Lakh Twenty Five Thousand Five Hundred Forty Only
	i) Wearing coat				
	a) Bituminous concrete	Sqm	540.00	45.00 Rupees Forty Five Only	24,300.00 Rupees Twenty Four Thousand Three Hundred Only
	b) Cement concrete	Sqm	80.00	60.00 Rupees Sixty Only	4,800.00 Rupees Four Thousand Eight Hundred Only
1.03	Rebate towards salvage value of scarified/dismantled material for each type of item				
	a) Steel	MT	15.00	-5000.00 Minus Rupees Five Thousand Only	(75,000.00) Minus Rupees Seventy Five Thousand Only
	b) Aggregate	Cum	100.00	-100.00 Minus Rupees One Hundred Only	(10,000.00) Minus Rupees Ten Thousand Only
	c) Concrete	Cum	100.00	-10.00 Minus Rupees Ten Only	(1,000.00) Minus Rupees One Thousand Only
	Sub-Total- Bill No-1				20,676,912.10 Minus Rupees One Thousand Only
Rupees Two Crore Six Lakh Seventy Six Thousand Nine Hundred Twelve And Ten Paise Only					

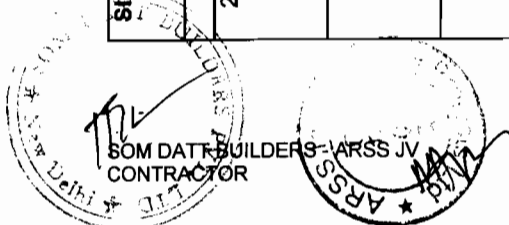


SOM DATT BUILDERS ARSS CONTRACTOR




 Chief Engineer,
 World Bank Projects, Orissa
 EMPLOYER

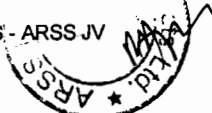
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
2.01	BILL NO.2 : EARTH WORKS Roadway excavation including removal of unsuitable soil necessary for construction of roadway complete as per Technical Specification Clause 301 and as per the direction of Engineer-in-charge.				
	a) All kinds of soil	Cum	802823.00	32.00 Rupees Thirty Two Only	25,690,336.00 Rupees Two Crore Fifty Six Lakh Ninety Thousand Three Hundred Thirty Six Only
	b) softrock (blasting not required) (LS)	Cum	2000.00	61.00 Rupees Sixty One Only	122,000.00 Rupees One Lakh Twenty Two Thousand Only
	c) Hard rock (blasting required) (LS)	Cum	2000.00	250.00 Rupees Two Hundred Fifty Only	500,000.00 Rupees Five Lakh Only
	d) Hard rock (blasting not required) (LS)	Cum	1000.00	150.00 Rupees One Hundred Fifty Only	150,000.00 Rupees One Lakh Fifty Thousand Only
2.02	Construction of embankment with approved material from approved borrow areas complete as per drawing and Technical Specification Clause 305 and as per the direction of Engineer-in-charge.	Cum	202103.00	152.00	30,719,656.00
2.03	Construction of subgrade and earthen shoulder with approved material as per drawing complete and Technical Specification Clause 305 and as per the direction of Engineer-in-charge.	Cum	744131.00	199.00 Rupees One Hundred Fifty Two Only	Rupees Three Crore Seven Lakh Nineteen Thousand Six Hundred Fifty Six Only
2.04	Construction of embankment and subgrade with suitable material deposited at site from roadway and drainage excavation all complete as per drawing and Technical Specification Clause 305 and as per the direction of Engineer-in-charge.	Cum	481700.00	70.00 Rupees Seventy Only	148,082,069.00 Rupees Fourteen Crore Eighty Lakh Eighty Two Thousand Sixty Nine Only
					33,719,000.00 Rupees Three Crore Thirty Seven Lakh Nineteen Thousand Only



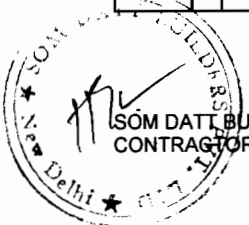
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
2.05	Loosening and recompacting the existing subgrade in all kinds of soil upto a depth of 300mm/500mm to meet the requirement of table 300-2 complete as per Technical Specification Clause 305 and as per the direction of Engineer-in-charge.	Cum	19313.00	45.00 Rupees Forty Five Only	869,085.00 Rupees Eight Lakh Sixty Nine Thousand Eighty Five Only
2.06	Earthwork with agriculture soil for filling of median/visland complete as per Technical Specification Clause 407 and as per the direction of Engineer-in-charge.	Cum	5130.00	140.00 Rupees One Hundred Forty Only	718,200.00 Rupees Seven Lakh Eighteen Thousand Two Hundred Only
2.07	Scarifying the existing bituminous surface layers without disturbing the base including carrying, processing, laying and disposal of waste material complete as per Technical Specification Clause 501 and as per the direction of Engineer-in-charge.	Sqm	21508.00	25.00 Rupees Twenty Five Only	537,700.00 Rupees Five Lakh Thirty Seven Thousand Seven Hundred Only
2.08	Lime stabilisation for improving embankment (laying & spreading available soil/excavated soil in the embankment on a prepared surface, pulverising, mixing the spread soil in place with rotavator with 3% slake lime having minimum content of 70% of CaO, grading with motor grader and compacting with the road roller at OMC to the desired density to form a layer of improved sub grade)	Cum	10000.00	900.00 Rupees Nine Hundred Only	9,000,000.00 Rupees Ninety Lakh Only
2.09	Providing Geotextiles for improvemtn of sub-soil strength as per drawing and technical specification.	Sqm	10000.00	71.00 Rupees Seventy One Only	710,000.00 Rupees Seven Lakh Ten Thousand Only
	Sub-Total- Bill No-2				250,818,046.00 Rupees Twenty Five Crore Eight Lakh Eighteen Thousand Forty Six Only



SOM DATT BUILDERS - ARSS JV
CONTRACTOR



Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
G.O. No. 1000/2011
Dated: 08/08/2011



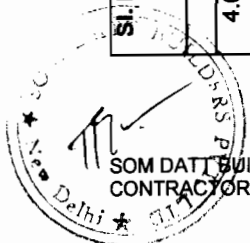
SOM DATT BUILDERS - ARSS JV
CONTRACTOR



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
3.01	BILL NO.3 : SUB-BASE AND BASE COURSES Construction of Granular Sub-base course by providing the materials i.e. naturally occurring morrum , gravel , sand or combination thereof conforming to Gr-I of Table 400-2 complete as per Technical Specification clause 401 and as per the direction of Engineer-in-charge.	Cum	193565.00	920.00 Rupees Nine Hundred Twenty Only	178,079,800.00 Rupees Seventeen Crore Eighty Lakh Seventy Nine Thousand Eight Hundred Only
3.02	Construction of wet mix macadam complete as per Technical Specification clause 406 and as per the direction of Engineer-in-charge. a) for Base	Cum	205385.00	1450.00 Rupees One Thousand Four Hundred Fifty Only	297,808,250.00 Rupees Twenty Nine Crore Seventy Eight Lakh Eight Thousand Two Hundred Fifty Only
	Sub-Total- Bill No-3				475,888,050.00 Rupees Forty Seven Crore Fifty Eight Lakh Eighty Eight Thousand Fifty Only

Chief Engineer,
World Bank Projects - Orissa
EMPLOYER
SOM DATT BUILDERS ARSS JV
CONTRACTOR

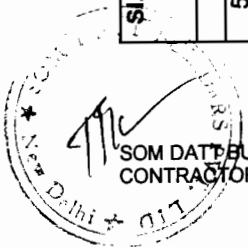
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
4.01	BILL NO.4 : BITUMINOUS COURSES Providing bituminous Primer coat over granular surface complete all as per Technical specification clause 502 and as per the direction of Engineer-in-charge.	Sqm	775598.00	20.00 Rupees Twenty Only	15,511,960.00 Rupees One Crore Fifty Five Lakh Eleven Thousand Nine Hundred Sixty Only
4.02	Providing Tack coat complete as per Technical Specification clause 503 and as per the direction of Engineer-in-charge. a) Granular surface treated with primer	Sqm	775598.00	7.00 Rupees Seven Only	5,429,186.00 Rupees Fifty Four Lakh Twenty Nine Thousand One Hundred Eighty Six Only
	b) over normal bituminous surface	Sqm	775598.00	6.00 Rupees Six Only	4,653,588.00 Rupees Forty Six Lakh Fifty Three Thousand Five Hundred Eighty Eight Only
4.03	Providing dense bituminous macadam course complete as per Technical Specification Clause 507 and as per the direction of Engineer-in-charge.	Cum	50810.00	5600.00 Rupees Five Thousand Six Hundred Only	284,536,000.00 Rupees Twenty Eight Crore Forty Five Lakh Thirty Six Thousand Only
4.04	Providing bituminous concrete wearing course using CRMB-55 complete as per Technical Specification Clause 509 & 521 and as per the direction of Engineer-in-charge.	Cum	30984.00	6700.00 Rupees Six Thousand Seven Hundred Only	207,592,800.00 Rupees Twenty Crore Seventy Five Lakh Ninety Two Thousand Eight Hundred Only



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
4.05	Providing, laying mixed seal surfacing in spur roads complete as per technical specification clause 512 and as per the direction of Engineer-in-charge.	Sqm	17663.00	100.00 Rupees One Hundred Only	1,766,300.00 Rupees Seventeen Lakh Sixty Six Thousand Three Hundred Only
4.06	Providing dry lean concrete subbase complete as per technical specification clause 601 and as per the direction of Engineer-in-Charge.	Cum	10722.00	2780.00 Rupees Two Thousand Seven Hundred Eighty Only	29,807,160.00 Rupees Two Crore Ninety Eight Lakh Seven Thousand One Hundred Sixty Only
4.07	Providing cement concrete pavemtn complete as per Technical Specification Clause 602 and as per the direction of Engineer -in-charge.	Cum	21286.00	5500.00 Rupees Five Thousand Five Hundred Only	117,073,000.00 Rupees Eleven Crore Seventy Lakh Seventy Three Thousand Only
Sub-Total- Bill No-4					666,369,994.00
Rupees Sixty Six Crore Sixty Three Lakh Sixty Nine Thousand Nine Hundred Ninety Four Only					

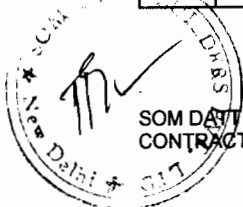


Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
5.01	BILL NO.5 : CULVERTS AND UNDERPASSES Earthwork in excavation of foundation for structures complete as per drawing and technical specifications clause 304 including all leads and lifts and as per the direction of Engineer-in-charge.	Cum	16253.00	40.00 Rupees Forty Only	650,120.00 Rupees Six Lakh Fifty Thousand One Hundred Twenty Only
5.02	Earth fill below pitching in quadrant portion with approved material complete as per drawing and Technical Specification Clause 305 with all leads and lifts and as per the direction of Engineer-in-charge.	Cum	6754.00	130.00 Rupees One Hundred Thirty Only	878,020.00 Rupees Eight Lakh Seventy Eight Thousand Twenty Only
5.03	Providing and filling behind abutment, wing wall and return wall with granular material etc. and below pipe bed in layers not exceeding 150mm thick including All leads and lifts complete as per drawings, direction of the Engineer and Technical specification clause 304 and as per the direction of Engineer-in-charge.	Cum	6277.00	450.00 Rupees Four Hundred Fifty Only	2,824,650.00 Rupees Twenty Eight Lakh Twenty Four Thousand Six Hundred Fifty Only
5.04	Providing filter media behind abutment, wing wall and return wall complete as per drawing and Technical Specification clause 2504, 2509, 2510 and as per the direction of Engineer-in-charge.	Cum	4292.00	1500.00 Rupees One Thousand Five Hundred Only	6,438,000.00 Rupees Sixty Four Lakh Thirty Eight Thousand Only
5.05	Cement Concrete M-15 grade in leveling course etc. including centering and shuttering all complete as per Drawings and Technical Specification Sections 1500 and 1700 and as per the direction of Engineer-in-charge.	Cum	4915.00	3200.00 Rupees Three Thousand Two Hundred Only	15,728,000.00 Rupees One Crore Fifty Seven Lakh Twenty Eight Thousand Only

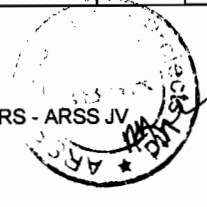


Chief Engineer,
World Bank Projects, Orissa
EMPLOYER

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
5.06	Cement Concrete M-15 grade in substructure & headwall including centering and shuttering all complete as per Drawings and Technical Specification Sections 1500, 1700, 2200 and as per the direction of Engineer-in-charge.	Cum	2200.00	3400.00 Rupees Three Thousand Four Hundred Only	7,480,000.00 Rupees Seventy Four Lakh Eighty Thousand Only
5.07	Reinforced cement concrete in all types of culverts as per drawing and technical specification Section 1500, 1700 & 2200 and as per the direction of Engineer-in-charge.				
	a) M-20 grade	Cum	6604.00	4200.00 Rupees Four Thousand Two Hundred Only	27,736,800.00 Rupees Two Crore Seventy Seven Lakh Thirty Six Thousand Eight Hundred Only
	b) M-25 grade	Cum	7450.00	4500.00 Rupees Four Thousand Five Hundred Only	33,525,000.00 Rupees Three Crore Thirty Five Lakh Twenty Five Thousand Only
5.08	Reinforced cement concrete M-30 grade in approach slabs including cost of reinforcement all complete as per Drawing and Technical Specification Clause 2704 and as per the direction of Engineer-in-charge.	Cum	2948.00	7000.00 Rupees Seven Thousand Only	20,636,000.00 Rupees Two Crore Six Lakh Thirty Six Thousand Only
5.09	HYSD(TMT) bar reinforcement complete as per drawing and technical specifications clause 1600 and as per the direction of Engineer-in-charge.	MT	854.00	45000.00 Rupees Forty Five Thousand Only	38,430,000.00 Rupees Three Crore Eighty Four Lakh Thirty Thousand Only
5.10	Providing laying and joining NP-4(I.S 458) hume pipes for culverts complete as per drawing Tech. Specification section 2900 and IRC special publication no.13 and as per the direction of Engineer-in-charge.				
	a) 1m dia. hume pipe in single row	Lm	7963.00	3800.00 Rupees Three Thousand Eight Hundred Only	30,259,400.00 Rupees Three Crore Two Lakh Fifty Nine Thousand Four Hundred Only
	b) 1m dia. hume pipe in double row	Lm	1413.00	7400.00 Rupees Seven Thousand Four Hundred Only	10,456,200.00 Rupees One Crore Four Lakh Fifty Six Thousand Two Hundred Only



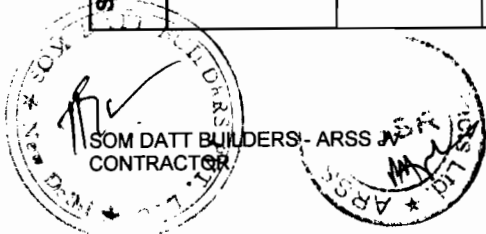
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CONTRACTOR

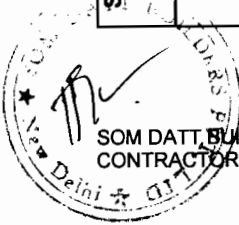


Chief Engineer,
World Bank Projects, Orissa
EMPLOYER

(Signature)


Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
5.11	Providing and laying filter material underneath stone pitching in slopes complete as per drawings and technical specification section 2504, 2509, 2510 and as per the direction of Engineer-in-charge.	Cum	2743.00	1500.00	4,114,500.00
5.12	Providing and laying stone Pitching on embankment slopes complete as per drawing and technical specification Clause 2504 and as per the direction of Engineer-in-charge	Cum	5444.00	1000.00	5,444,000.00
5.13	Providing rubble stone flooring in Cement mortar (1 Cement:3 Sand) and joints complete as per Drawing and Technical Specification Section 1400, 2504 and as per the direction of Engineer-in-charge.	Cum	3180.00	2300.00	7,314,000.00
5.14	Providing weep holes in box portion, return wall, wing wall etc. all complete as per drawing and technical specification clause . 2706 and as per the direction of Engineer-in-charge.	Nos	12767.00	90.00	1,149,030.00
5.15	Supplying, fitting and fixing in position true to line and level tar paper bearings conforming to IRC-83 (para-II) section IX complete with all accessories as per drawings and technical specification clause 2011, IS 1398 and as per the direction of Engineer-in-charge.				
a)	Tar paper bearing	Sqm	24.00	50.00 Rupees Fifty Only	1,200.00 Rupees One Thousand Two Hundred Only
5.16	Supplying and fixing Asphaltic Plug expansion joints complete as per Drawing and as per IRC: SP : 69-2005 and as per the direction of Engineer-in-charge.	Lm	3024.00	1500.00	4,536,000.00
5.17	Reinforced cement concrete railing complete as per Drawing and Technical Specification Section 2700 (Including cost of Reinforcement) and as per the direction of Engineer-in-charge.	Lm	2641.00	1250.00 Rupees One Thousand Two Hundred Fifty Only	3,301,250.00 Rupees Thirty Three Lakh One Thousand Two Hundred Fifty Only



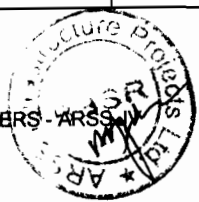


Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
5.18	Bituminous wearing course 56mm thick comprising 50mm thick asphaltic concrete in a single layer over Bituminous mastic course 6mm thick with a prime coat complete as per Drawing and Technical Specification Section 2700, Clause 512 and as per the direction of Engineer-in-charge.	Sqm	15042.00	830.00 Rupees Eight Hundred Thirty Only	12,484,860.00 Rupees One Crore Twenty Four Lakh Eighty Four Thousand Eight Hundred Sixty Only
5.19	Synthetic enamel painting of culvert no. and span arrangement as per IRC - 7 - 1971 and as per the direction of Engineer-in-charge.	No.	492.00	200.00 Rupees Two Hundred Only	98,400.00 Rupees Ninety Eight Thousand Four Hundred Only
Sub-Total- Bill No-5					233,485,430.00

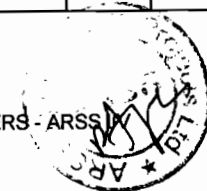
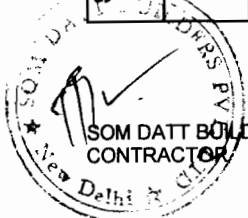
Rupees Twenty Three Crore Thirty Four Lakh Eighty Five Thousand Four Hundred Thirty Only


 Chief Engineer,
 World Bank Projects, Orissa
 EMPLOYER
 (Orissa, Electrical Work)

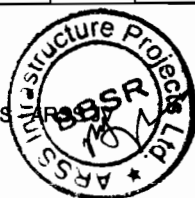
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.01	BILL NO.6 : BRIDGES Earthwork in excavation of foundation for structures complete as per drawing and technical specification clause 304 including all leads & lift and as per the direction of Engineer-in-charge.	Cum	59884.00	45.00 Rupees Forty Five Only	2,694,780.00 Rupees Twenty Six Lakh Ninety Four Thousand Seven Hundred Eighty Only
6.02	Providing and filling foundation and at the back of abutment, wing wall and return wall etc. and below pipe bed in layers not exceeding 150mm thick with granular material including all leads & lifts as per Technical specification Clause 304 and as per the direction of Engineer-in-charge.	Cum	4009.00	450.00	1,804,050.00
6.03	Providing Filter media behind abutment, wing wall and return wall complete as per drawing and technical Specification clause 2504 and as per the direction of Engineer-in-charge.	Cum	1292.00	1500.00 Rupees One Thousand Five Hundred Only	1,938,000.00 Rupees Nineteen Lakh Thirty Eight Thousand Only
6.04	Cement concrete M-15 grade in leveling course etc including centering and shuttering all complete as per drawing and Technical specification Section 1500 and 1700 and as per the direction of Engineer-in-charge.	Cum	2736.00	3200.00 Rupees Three Thousand Two Hundred Only	8,755,200.00 Rupees Eighty Seven Lakh Fifty Five Thousand Two Hundred Only
6.05	Cement concrete in foundation and substructure etc including centering and shuttering all complete as per drawing and Technical specification Section 1500, 1700, 2100, 2200 and as per the direction of Engineer-in-charge.				
	a) M-15 Grade	Cum	5403.00	3400.00 Rupees Three Thousand Four Hundred Only	18,370,200.00 Rupees One Crore Eighty Three Lakh Seventy Thousand Two Hundred Only



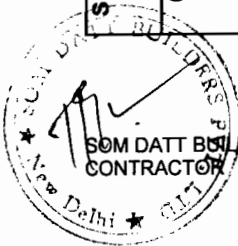
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.06	Reinforced cement concrete in foundation complete as per drawing & Technical specification sections 1500, 1700, 2100, 2200 and as per the direction of Engineer-in-charge. a) M-20 Grade	Cum	146.00	4200.00 Rupees Four Thousand Two Hundred Only	613,200.00 Rupees Six Lakh Thirteen Thousand Two Hundred Only
6.07	Reinforced cement concrete in substructure complete as per drawing & Technical specification sections 1500, 1700, 2200 and as per the direction of Engineer-in-charge. a) M-20 Grade	Cum	832.00	4350.00 Rupees Four Thousand Three Hundred Fifty Only	3,619,200.00 Rupees Thirty Six Lakh Nineteen Thousand Two Hundred Only
	b) M-25 Grade	Cum	6642.00	4500.00 Rupees Four Thousand Five Hundred Only	29,889,000.00 Rupees Two Crore Ninety Eight Lakh Eighty Nine Thousand Only
	c) M-30 Grade	Cum	741.00	4600.00 Rupees Four Thousand Six Hundred Only	3,408,600.00 Rupees Thirty Four Lakh Eight Thousand Six Hundred Only
	d) M-35 Grade	Cum	6978.00	5000.00 Rupees Five Thousand Only	34,890,000.00 Rupees Three Crore Forty Eight Lakh Ninety Thousand Only
6.08	Reinforced cement concrete in super structure complete as per drawing and Technical specification section 1500, 1700, 2300 and as per the direction of Engineer-in-charge. a) M-20 grade	Cum	27.00	5000.00 Rupees Five Thousand Only	135,000.00 Rupees One Lakh Thirty Five Thousand Only
	b) M-25 grade	Cum	10.00	5100.00 Rupees Five Thousand One Hundred Only	51,000.00 Rupees Fifty One Thousand Only
	c) M-30 grade	Cum	462.00	5200.00 Rupees Five Thousand Two Hundred Only	2,402,400.00 Rupees Twenty Four Lakh Two Thousand Four Hundred Only
6.09	Reinforced cement concrete railing complete as per drawing and Technical specification section 2703 and as per the direction of Engineer-in-charge.	Lm	1030.00	1250.00 Rupees One Thousand Two Hundred Fifty Only	1,287,500.00 Rupees Twelve Lakh Eighty Seven Thousand Five Hundred Only



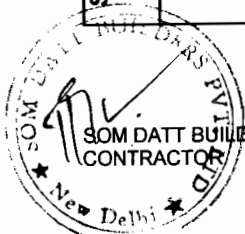
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.10	HYSD(TMT)bar reinforcement complete as per drawing and technical specifications clause 1600 and as per the direction of Engineer-in-charge. a) in foundation	MT	9.00	45000.00 Rupees Forty Five Thousand Only	405,000.00 Rupees Four Lakh Five Thousand Only
	b) in substructure	MT	1255.00	45000.00 Rupees Forty Five Thousand Only	56,475,000.00 Rupees Five Crore Sixty Four Lakh Seventy Five Thousand Only
	c) in superstructure	MT	8.00	45000.00 Rupees Forty Five Thousand Only	360,000.00 Rupees Three Lakh Sixty Thousand Only
6.11	Providing and fixing specified bearings complete as per Drawing and technical specification 2000 and as per the direction of Engineer-in-charge. a) Elastomeric bearing	Cum	144000.00	1.20 Rupees One And Twenty Paise Only	172,800.00 Rupees One Lakh Seventy Two Thousand Eight Hundred Only
	b) Tar paper bearing	Sqm	18.00	50.00 Rupees Fifty Only	900.00 Rupees Nine Hundred Only
6.12	Reinforced cement concrete M-30 grade for in approach slabs complete as per Drawing and Technical specification section 1500, 1600, 1700, 2700 and as per the direction of Engineer-in-charge.	Cum	1200.00	7000.00 Rupees Seven Thousand Only	8,400,000.00 Rupees Eighty Four Lakh Only
6.13	Bituminous wearing course 56mm thick comprising 50mm thick asphaltic Concrete in a single layer over Bituminous mastic course 6 mm thick with a prime Coat Complete as per drawing and Technical Specification Section 509 & 2700 and as per the direction of Engineer-in-charge.	Sqm	9935.00	830.00 Rupees Eight Hundred Thirty Only	8,246,050.00 Rupees Eighty Two Lakh Forty Six Thousand Fifty Only
6.14	Providing and fixing Drainage Spouts Complete as per drawing and Technical Specification Clause 2705 and as per the direction of Engineer-in-charge.	No	334.00	1100.00 Rupees One Thousand One Hundred Only	367,400.00 Rupees Three Lakh Sixty Seven Thousand Four Hundred Only



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.15	Providing and laying Stone pitching in slopes complete as per drawing and Technical Specification Section 2500 and as per the direction of Engineer-in-charge.	Cum	2183.00	1000.00 Rupees One Thousand Only	2,183,000.00 Rupees Twenty One Lakh Eighty Three Thousand Only
6.16	Providing and laying filter material underneath Stone pitching in slopes Complete as per drawing and Technical Specification clause 2504 and as per the direction of Engineer-in-charge.	Cum	1157.00	1500.00 Rupees One Thousand Five Hundred Only	1,735,500.00 Rupees Seventeen Lakh Thirty Five Thousand Five Hundred Only
6.17	Providing weep holes in abutments, wing walls and return walls etc. as per drawing and Technical Specification clause 2706 and as per the direction of Engineer-in-charge.	Nos	4490.00	90.00 Rupees Ninety Only	404,100.00 Rupees Four Lakh Four Thousand One Hundred Only
6.18	Providing rubble Stone flooring in Cement mortar (1Cement:3 sand) and joints Complete as per drawing and Technical Specification Section 1400 and 2500 and as per the direction of Engineer-in-charge.	Cum	7764.00	2000.00 Rupees Two Thousand Only	15,528,000.00 Rupees One Crore Fifty Five Lakh Twenty Eight Thousand Only
6.19	Supplying as fixing the following types of expansion joints Complete as per Drawing and as per IRC: SP : 69-2005 and as per the direction of Engineer-in-charge. a) Asphaltic plug	Lm	1281.00	1500.00 Rupees One Thousand Five Hundred Only	1,921,500.00 Rupees Nineteen Lakh Twenty One Thousand Five Hundred Only
6.2	Synthetic enamel painting of culvert no. and span arrangement as per IRC - 7 - 1971 and as per the direction of Engineer-in-charge.	No.	176.00	200.00 Rupees Two Hundred Only	35,200.00 Rupees Thirty Five Thousand Two Hundred Only

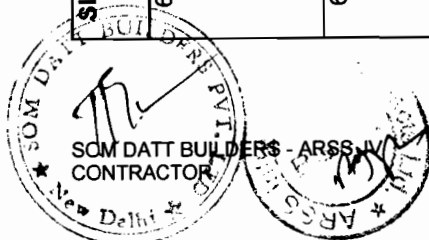


SI. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.21	Carrying and Confirmatory bores up to required depth at locations of bridges as directed by Engineer complete in all respects, conducting all the tests required as directed by the Engineer and as per Technical Specification Section 2400 and interpretation of the bore data and presentation of the results and as per the direction of Engineer-in-charge. a) In all types of soil (except rock) i) depth from 0m to 10m	Lm	50.00	400.00 Rupees Four Hundred Only	20,000.00 Rupees Twenty Thousand Only
6.22	Providing and painting of flood gauge on substructure is fall height and 500mm width and as per the direction of Engineer-in-charge.	Lm	255.00	600.00 Rupees Six Hundred Only	153,000.00 Rupees One Lakh Fifty Three Thousand Only
6.23	Providing and laying 150mm dia. HDPE Service pipe as per drawing and as per the direction of Engineer-in-charge.	Lm	3766.00	350.00 Rupees Three Hundred Fifty Only	1,318,100.00 Rupees Thirteen Lakh Eighteen Thousand One Hundred Only
6.24	Earth fill below pitching in quadrant portion with approved material complete as per drawing and Technical Specification Clause 305 with all leads and lifts and as per the direction of Engineer-in-charge.	Cum	3412.00	130.00 Rupees One Hundred Thirty Only	443,560.00 Rupees Four Lakh Forty Three Thousand Five Hundred Sixty Only
6.25	Sand filling in foundation Trenches as per Drawing & Technical specification Clause 304, 305 and as per the direction of Engineer-in-charge.	Cum	15636.00	450.00 Rupees Four Hundred Fifty Only	7,036,200.00 Rupees Seventy Lakh Thirty Six Thousand Two Hundred Only
6.26	PCC in flooring as per Drawing & Technical Specification section 1700, 2500 and as per the direction of Engineer-in-charge. a) M-15 b) M-20	Cum	956.00 414.00	3200.00 Rupees Three Thousand Two Hundred Only 3400.00 Rupees Three Thousand Four Hundred Only	3,059,200.00 Rupees Thirty Lakh Fifty Nine Thousand Two Hundred Only 1,407,600.00 Rupees Fourteen Lakh Seven Thousand Six Hundred Only




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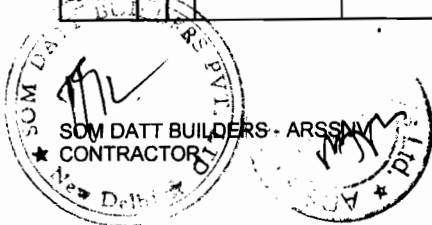
Chief Engineer,
World Bank Projects, Orissa
EMPLOYER.



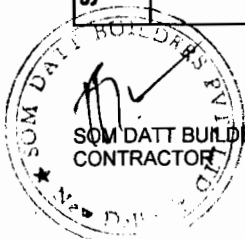
SI. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.27	Reinforced cement concrete crash barrier including cost of steel and its fabrication to bridge structures as per the approved drawing and Technical Specification clause 809, and section 1500, 1600, 1700 and as per the direction of Engineer-in-charge .	Lm	1667.00	2600.00 Rupees Two Thousand Six Hundred Only	4,334,200.00 Rupees Forty Three Lakh Thirty Four Thousand Two Hundred Only
6.28	Cement Plastering (1:3) as per direction of the Engineer-in-charge.	Sqm	335.00	65.00 Rupees Sixty Five Only	21,775.00 Rupees Twenty One Thousand Seven Hundred Seventy Five Only
	Sub-Total- Bill No-6				223,886,215.00 Rupees Twenty Two Crore Thirty Eight Lakh Eighty Six Thousand Two Hundred Fifteen Only


 Chief Engineer,
 World Bank Projects, Orissa
 EMPLOYER
 (Signature)
 (Name)

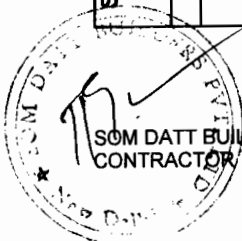
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
BILL NO.7 : RETAINING WALL, DRAINAGE AND PROTECTIVE WORKS					
7.01	Retaining Wall				
(a)	Earthwork in excavation for foundation complete as per drawing and Technical Specification Clause 304 in Retaining wall for high embankment stretches as per the direction of Engineer-in-charge.	Cum	6840.00	45.00 Rupees Forty Five Only	307,800.00 Rupees Three Lakh Seven Thousand Eight Hundred Only
(b)	Filter media behind wall complete as per drawing and Technical Specification Clauses 2504 and as per the direction of Engineer-in-charge.	Cum	2592.00	1500.00 Rupees One Thousand Five Hundred Only	3,888,000.00 Rupees Thirty Eight Lakh Eighty Eight Thousand Only
(c)	Plain cement concrete M -15 in foundation leveling course etc. including centering and shuttering all complete as per drawing and Technical Clauses 1500, 1700 and as per the direction of Engineer-in-charge.	Cum	456.00	3200.00 Rupees Three Thousand Two Hundred Only	1,459,200.00 Rupees Fourteen Lakh Fifty Nine Thousand Two Hundred Only
(d)	Cement concrete M -25 for reinforced concrete in foundation and substructure including centering and shuttering all complete as per drawing and Technical Clauses 1500, 1700, 2100 and as per the direction of Engineer-in-charge.	Cum	2568.00	3700.00 Rupees Three Thousand Seven Hundred Only	9,501,600.00 Rupees Ninety Five Lakh One Thousand Six Hundred Only
(e)	Providing steel reinforcement HYSD(TMT) for retaining wall complete as per drawing and Technical Specification Clause 1600 and as per the direction of Engineer-in-charge.	MT	205.44	45000.00 Rupees Forty Five Thousand Only	9,244,800.00 Rupees Ninety Two Lakh Forty Four Thousand Eight Hundred Only
(f)	Providing guard post complete as per drawings and Technical specifications section 806 and as per the direction of Engineer-in-charge.	No.	640.00	360.00 Rupees Three Hundred Sixty Only	230,400.00 Rupees Two Lakh Thirty Thousand Four Hundred Only
(g)	Providing weep holes in retaining wall complete as per drawing and Technical Specification Clause 2706 and as per the direction of Engineer-in-charge.	No.	400.00	90.00 Rupees Ninety Only	36,000.00 Rupees Thirty Six Thousand Only



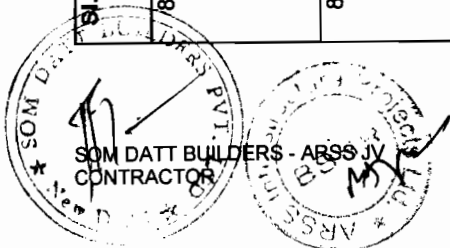
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
7.02	Providing and laying stone pitching on embankment slopes as per drawing and Technical Specification Clause 2504 and as per the direction of Engineer-in-charge.	Cum	4025.00	1000.00 Rupees One Thousand Only	4,025,000.00 Rupees Forty Lakh Twenty Five Thousand Only
7.03	Providing and laying filter material underneath stone pitching on embankment slopes as per drawing and Technical Specification Clause 2504 and as per the direction of Engineer-in-charge.	Cum	2013.00	1500.00 Rupees One Thousand Five Hundred Only	3,019,500.00 Rupees Thirty Lakh Nineteen Thousand Five Hundred Only
7.04	Turfing side slopes of main road and service road with grass sods complete as per Technical Specification Clause 307 and as per the direction of Engineer-in-charge.	Sqm	383861.00	20.00 Rupees Twenty Only	7,677,220.00 Rupees Seventy Six Lakh Seventy Seven Thousand Two Hundred Twenty Only
7.05	Constructing lined surface drains/ sub surface drains to the required lines and grades as per drawing and Technical Specification section 1500, 1600, 1700, 2100 and as per the direction of Engineer-in-charge.	Lm	27300.00	4000.00 Rupees Four Thousand Only	109,200,000.00 Rupees Ten Crore Ninety Two Lakh Only
7.06	Constructing box type drains to the required lines and grades including cost of steel and its fabrication as per drawing and technical specification section 1500, 1600, 1700, 2100 and as per the direction of Engineer-in-charge.	Lm	2320.00	9500.00 Rupees Nine Thousand Five Hundred Only	22,040,000.00 Rupees Two Crore Twenty Lakh Forty Thousand Only
Sub-Total- Bill No-7					170,629,520.00
Rupees Seventeen Crore Six Lakh Twenty Nine Thousand Five Hundred Twenty Only					



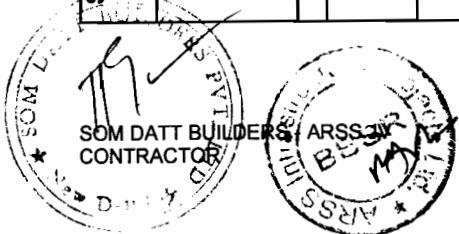
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.01	BILL NO-8 : MISCELLANEOUS ITEMS. Providing and laying plain cement concrete kerb as per drawing and Technical Specifications Clauses 408, section 1500,1700 and as per the direction of Engineer-in-charge.	Lm	1818.55	300.00 Rupees Three Hundred Only	545,565.00 Rupees Five Lakh Forty Five Thousand Five Hundred Sixty Five Only
8.02	Providing Service ducts with 150mm dia GI pipes over concrete base of M-15 under existing and proposed carriageways including cutting of trenches through existing roadway and reinstatement of the same as per design and specification and as per the direction of Engineer-in-charge.	Lm	945.00	1800.00 Rupees One Thousand Eight Hundred Only	1,701,000.00 Rupees Seventeen Lakh One Thousand Only
8.03	Providing and fixing RCC boundary posts complete as per drawing and Technical Specification Clause 806 and as per the direction of Engineer-in-charge.	No	1043.00	300.00 Rupees Three Hundred Only	312,900.00 Rupees Three Lakh Twelve Thousand Nine Hundred Only
8.04	Providing and fixing RCC/PCC hectometer, Kilometer and 5th kilometer stones complete as per Technical Specification Clause 804 and as per the direction of Engineer-in-charge.				
	a) No of (200) Hectometer Stone	No	381.00	300.00 Rupees Three Hundred Only	114,300.00 Rupees One Lakh Fourteen Thousand Three Hundred Only
	b) No of Kilometer stone	No	75.00	1000.00 Rupees One Thousand Only	75,000.00 Rupees Seventy Five Thousand Only
	c) No. of 5th Kilometer Stone	No	20.00	1900.00 Rupees One Thousand Nine Hundred Only	38,000.00 Rupees Thirty Eight Thousand Only
8.05	Constructing footpath/ paved separator at toll plaza, passenger platform / paved part of medians and islands complete as per drawing and Technical Specifications Clause 409 and 407 and as per the direction of Engineer-in-charge.	Sqm	5529.00	2500.00 Rupees Two Thousand Five Hundred Only	13,822,500.00 Rupees One Crore Thirty Eight Lakh Twenty Two Thousand Five Hundred Only



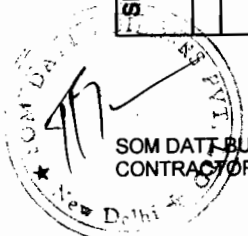
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.06	Providing passenger shelters for Bus Bays as per drawing and Technical Specifications Section 1500, 1600, 1700, 2100, 2200, 2300 and as per the direction of Engineer-in-charge.	No	79.00	125000.00 Rupees One Lakh Twenty Five Thousand Only	9,875,000.00 Rupees Ninety Eight Lakh Seventy Five Thousand Only
8.07	Construction of temporary diversion including Cross drainage works where necessary and maintenance thereof including traffic control and safety complete as per Technical Specification Clause 112 and as per the direction of Engineer-in-charge.	Lm	13881.00	2500.00 Rupees Two Thousand Five Hundred Only	34,702,500.00 Rupees Three Crore Forty Seven Lakh Two Thousand Five Hundred Only
8.08	Pavement marking with hot applies thermoplastic paints confirming to ASTM D86 / BS 3262-Part as per drawing and Technical specifications Clause 803.4 and as per the direction of Engineer-in-charge.				
	a) Lane line / Edge marking	sqm	24403.00	350.00 Rupees Three Hundred Fifty Only	8,541,050.00 Rupees Eighty Five Lakh Forty One Thousand Fifty Only
	b) Directional arrows and lettering etc.	No	293.00	650.00 Rupees Six Hundred Fifty Only	190,450.00 Rupees One Lakh Ninety Thousand Four Hundred Fifty Only



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.09	Supplying and fixing sign boards complete as per Technical Specifications Clause 801. Including the cost of Posts, Fitting & fixing. Sheetting will be retro reflective type of high intensively grade and messages / boarders and as per the direction of Engineer-in-charge.				
(a)	Informatory Signs				
	(i) Facility Information (800 x 600)mm	No	8.00	3150.00 Rupees Three Thousand One Hundred Fifty Only	25,200.00 Rupees Twenty Five Thousand Two Hundred Only
	(ii) Direction Signs (1200 x 700 mm)	No	4.00	9000.00 Rupees Nine Thousand Only	36,000.00 Rupees Thirty Six Thousand Only
	(iii) Advance Direction (size 1800 x 1200mm) ,	No	2.00	9500.00 Rupees Nine Thousand Five Hundred Only	19,000.00 Rupees Nineteen Thousand Only
	(iv) Re-Assurance Sign (1800 X 1200 mm) ,	No	2.00	9500.00 Rupees Nine Thousand Five Hundred Only	19,000.00 Rupees Nineteen Thousand Only
	(v) Destination Sign (1500 X 900 mm) ,	No	4.00	7400.00 Rupees Seven Thousand Four Hundred Only	29,600.00 Rupees Twenty Nine Thousand Six Hundred Only
	(vi) Place Identification (1500 X 900 mm) ,	No	2.00	7400.00 Rupees Seven Thousand Four Hundred Only	14,800.00 Rupees Fourteen Thousand Eight Hundred Only
	(vii) Route Marker Sign (450mm x 600mm)	No	4.00	2700.00 Rupees Two Thousand Seven Hundred Only	10,800.00 Rupees Ten Thousand Eight Hundred Only
	(viii) Other Informatory Signs (2100mm x 1500mm)	No	4.00	10000.00 Rupees Ten Thousand Only	40,000.00 Rupees Forty Thousand Only
(b)	CAUTIONARY SIGNS triangular 900mm side	No	70.00	3900.00 Rupees Three Thousand Nine Hundred Only	273,000.00 Rupees Two Lakh Seventy Three Thousand Only



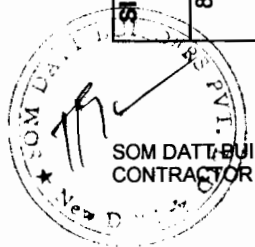
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
(c)	Mandatory signs				
	(i) Circular 600mm dia	No	90.00	3400.00 Rupees Three Thousand Four Hundred Only	306,000.00 Rupees Three Lakh Six Thousand Only
	(ii) Octagon 900 mm height	No	53.00	4500.00 Rupees Four Thousand Five Hundred Only	238,500.00 Rupees Two Lakh Thirty Eight Thousand Five Hundred Only
	(iii) Triangular 900 mm side	No	43.00	4500.00 Rupees Four Thousand Five Hundred Only	193,500.00 Rupees One Lakh Ninety Three Thousand Five Hundred Only
8.10	Providing & fixing retro - reflectorised road delineators complete as per drawing , Technical specifications clause 805 and as per the direction of Engineer-in-charge.				
	(I) Roadway delineator	No	1600.00	860.00 Rupees Eight Hundred Sixty Only	1,376,000.00 Rupees Thirteen Lakh Seventy Six Thousand Only
	(ii) Hazard Marker	No	336.00	860.00 Rupees Eight Hundred Sixty Only	288,960.00 Rupees Two Lakh Eighty Eight Thousand Nine Hundred Sixty Only
	(iii) Object Marker	No	64.00	860.00 Rupees Eight Hundred Sixty Only	55,040.00 Rupees Fifty Five Thousand Forty Only
8.11	Providing and fixing RCC Guard post with reflective paint marking on the top 25mm width band complete including end anchorage as per drawing and Technical Specifications Clause 806 and as per the direction of Engineer-in-charge.	No.	960.00	350.00 Rupees Three Hundred Fifty Only	336,000.00 Rupees Three Lakh Thirty Six Thousand Only
8.12	Supply of colour recorded photographs negative and two colour prints there-from mounted in album and also in digital form in CD as per Technical Specifications Clause 125 As per requirements and as per the direction of Engineer-in-charge.	No	1100.00	6.00 Rupees Six Only	6,600.00 Rupees Six Thousand Six Hundred Only
8.13	Supply of additional prints of coloured photographs referred to above as per Technical Specifications Clause 125 As per requirements and as per the direction of Engineer-in-charge.	No	1600.00	6.00 Rupees Six Only	9,600.00 Rupees Nine Thousand Six Hundred Only



SOM DATA BUILDERS - ARSS
CONTRACTOR

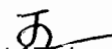


Chief Engineer,
World Bank Projects, Office
EMPLOYER
Gurgaon, Haryana



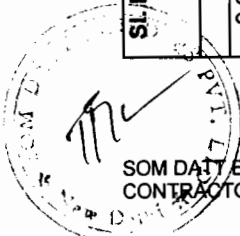
SOM DATT BUILDERS
CONTRACTOR




 Chief Engineer,
 World Bank Projects, Orissa
 EMPLOYER.
 Chief Engineer's Office,
 Cuttack, Odisha, India.

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.14	Supply of colour video coverage in CD form during construction as per Technical Specifications Clause 126 As per requirement and as per the direction of Engineer-in-charge.	set	4.00	10000.00 Rupees Ten Thousand Only	40,000.00 Rupees Forty Thousand Only
8.15	Providing rumble strips for complete carriageway width at required places as per drawing and as per the direction of Engineer-in-charge.	No.	18.00	6000.00 Rupees Six Thousand Only	108,000.00 Rupees One Lakh Eight Thousand Only
8.16	Providing road hump complete at required places as per drawing and as per the direction of Engineer-in-charge.	No.	78.00	12000.00 Rupees Twelve Thousand Only	936,000.00 Rupees Nine Lakh Thirty Six Thousand Only
8.17	Providing toll plaza as per drawing and technical specification and as per the direction of Engineer-in-charge.	No.	2.00	1500.00 Rupees One Thousand Five Hundred Only	3,000.00 Rupees Three Thousand Only
8.18	Providing utility duct across the road in specified locations as per the schedule mentioned in drawing and as per the direction of Engineer-in-charge.	Lm.	58.00	9000.00 Rupees Nine Thousand Only	522,000.00 Rupees Five Lakh Twenty Two Thousand Only
Sub-Total- Bill No-8					74,804,865.00
Rupees Seven Crore Forty Eight Lakh Four Thousand Eight Hundred Sixty Five Only					

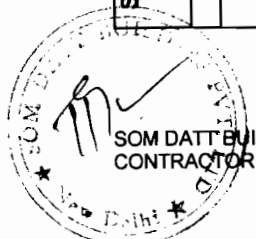
Sl.No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
9.01	BILL NO.9 MAINTENANCE, REPAIR AND REHABILITATION Carrying out all such as pothole repairs, shoulders making up, jungle clearance, crack sealing etc. routine maintenance of Highway as per Technical Specifications Section 3000 and as per direction of the Engineer-in-charge.	Km-month	729.00	2000.00 Rupees Two Thousand Only	1,458,000.00 Rupees Fourteen Lakh Fifty Eight Thousand Only
9.02	Carrying out surface treatment and any necessary patching to the existing bituminous carriageway surfacing with 2 coat surface dressing as per Technical Specification Section 3000 & Clause 510 and as per direction of the Engineer-in-charge.	Sqm	100000.00	500.00 Rupees Five Hundred Only	50,000,000.00 Rupees Five Crore Only
9.03	Guniting by 25mm thick complete as per Technical specification clause 2807 and as per direction of the Engineer-in-charge.	Sqm	360.00	3000.00 Rupees Three Thousand Only	1,080,000.00 Rupees Ten Lakh Eighty Thousand Only
9.04	Grouting with polymer modified cementitious material complete as per Technical specification clause 2806 and as per direction of the Engineer-in-charge.	Sqm	50.00	10000.00 Rupees Ten Thousand Only	500,000.00 Rupees Five Lakh Only
9.05	Jacketing to the existing structure in M-20 grade concrete as per technical specification section 1500, 1700, 2200 and as per direction of Engineer-in-charge.	Cum	34.00	9000.00 Rupees Nine Thousand Only	306,000.00 Rupees Three Lakh Six Thousand Only
9.06	Providing and laying 75mm thick Cement concrete wearing coat M-30 grade complete as per technical specification section 2700 and as per direction of the Engineer-in-charge.	Cum	93.00	7000.00 Rupees Seven Thousand Only	651,000.00 Rupees Six Lakh Fifty One Thousand Only
Sub-Total- Bill No-9					53,995,000.00 Rupees Five Crore Thirty Nine Lakh Ninety Five Thousand Only



SOM DATT BUILDERS & CONTRACTORS



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.01	BILL NO.10 ENVIRONMENTAL MITIGATION MEASURES Earthwork in excavation of foundation for structures complete as per drawing no. OSRP/CEG/SH/ENV/1-A,B,C,D,03,04-A,B,05,05-A,07,09,10,12 and technical specifications clause 304 including all leads and lifts and as per the direction of Engineer-in-charge.	Cum	7785.00	45.00 Rupees Forty Five Only	350,325.00 Rupees Three Lakh Fifty Thousand Three Hundred Twenty Five Only
10.02	Sand filling below foundation of wing wall and return wall, pipe bed in layers not exceeding 150mm thick including All leads and lifts complete as per drawing no. OSRP/CEG/SH/ENV/1-A,B,C,D,03,04-A,B,05,05-A,07,09,10,12 direction of the Engineer and Technical specification clause 304 and as per the direction of Engineer-in-charge.	Cum	1124.00	550.00 Rupees Five Hundred Fifty Only	618,200.00 Rupees Six Lakh Eighteen Thousand Two Hundred Only
10.03	Providing & making K.B. Brick masonry work in 1:3 cement mortar in sub-structure complete as per the drawing as per drawing no.OSRP/CEG/SH/ENV/06,07 and Technical Specifications 1300 and as per the direction of Engineer-in-charge.	Cum	302.00	2500.00 Rupees Two Thousand Five Hundred Only	755,000.00 Rupees Seven Lakh Fifty Five Thousand Only
10.04	Providing & laying in position Cement Concrete M-15 grade in foundation, levelling course etc. including centering and shuttering all complete as per drawing no. OSRP/CEG/SH/ENV/1-A,B,C,D,03,04-A,05-A,07,09,10,12 and Technical Specification Sections 1500 and 1700 and as per the direction of Engineer-in-charge.	Cum	453.00	3400.00 Rupees Three Thousand Four Hundred Only	1,540,200.00 Rupees Fifteen Lakh Forty Thousand Two Hundred Only
10.05	Providing & laying in position plain cement concrete M 20 grade (in kerbs) as per drawing no. OSRP/CEG/SH/ENV/01-A,01-B,01-C and Technical Specifications Clause 408 and section 1700 and as per the direction of Engineer-in-charge.	Lm	3520.00	300.00 Rupees Three Hundred Only	1,056,000.00 Rupees Ten Lakh Fifty Six Thousand Only



SI. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.06	Providing & laying in position Cement Concrete M-20 grade over stone masonry, levelling course etc. including centering and shuttering all complete as per Drawing no. OSRP/CEG/SH/ENV/03/09/10 and Technical Specification Sections 1500 and 1700 and as per the direction of Engineer-in-charge.	Cum	6938.00	3600.00	24,976,800.00
10.07	Providing weep holes in PCC toe wall with 100mm dia AC pipe at 1mtrs horizontal interval all complete as per Drawing no. OSRP/CEG/SH/ENV/03 and Technical Specification section. 2700& 2200 and as per the direction of Engineer-in-charge.	Nos	6684.00	100.00	668,400.00
10.08	Providing & laying in position Reinforced cement concrete of M-20 Grade in foundation complete as per drawing no.OSRP/CEG/SH/ENV/04-A,B,C,05,05-A,06,07,10 & Technical specification sections 1700, 2100 & 2200 and as per the direction of Engineer-in-charge.	Cum	370.00	4500.00	1,665,000.00
10.09	Providing & laying in position Reinforced cement concrete in superstructure complete as per drawing no.OSRP/CEG/SH/ENV/04-A,B,05 & Technical specification sections 1500, 1700 & 2300 and as per the direction of Engineer-in-charge.	Cum	543.00	5600.00	3,040,800.00
10.10	HYSD(TMT) bar reinforcement with anti-corrosive treatment coating complete as per drawing no.OSRP/CEG/SH/ENV/04-A,B,C,D,05,06,07,10 and technical specifications clause 1600 and as per the direction of Engineer-in-charge.	MT	37.00	45000.00	1,665,000.00
				Rupees Three Thousand Six Hundred Only	Rupees Two Crore Forty Nine Lakh Seventy Six Thousand Eight Hundred Only
				Rupees One Hundred Only	Rupees Six Lakh Sixty Eight Thousand Four Hundred Only
				Rupees Four Thousand Five Hundred Only	Rupees Sixteen Lakh Sixty Five Thousand Only
				Rupees Five Thousand Six Hundred Only	Rupees Thirty Lakh Forty Thousand Eight Hundred Only
				Rupees Forty Five Thousand Only	Rupees Sixteen Lakh Sixty Five Thousand Only



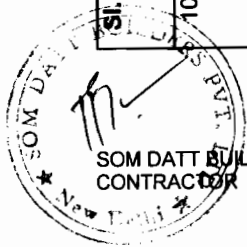
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.11	Painting two coats with synthetic enamel paint on new concrete surface as per drawing no.OSRP/CEG/SH/ENV/01-A,B,C and technical specification on building items and as per the direction of Engineer-in-charge.	Sqm	704.00	60.00 Rupees Sixty Only	42,240.00 Rupees Forty Two Thousand Two Hundred Forty Only
10.12	Supplying and fixing of M.S.GRILL at junctions including cost of painting as per drawing no.OSRP/CEG/SH/ENV/01-B as per technical specifications on building items and as per the direction of Engineer-in-charge.	kg	13552.00	60.00 Rupees Sixty Only	813,120.00 Rupees Eight Lakh Thirteen Thousand One Hundred Twenty Only
10.13	Supplying and fixing of M.S grill gate for sensitive receptors complete as per Drawing no.OSRP/CEG/SH/ENV/05-A as per technical specifications for building items and as per the direction of Engineer-in-charge.	kg	6028.00	65.00 Rupees Sixty Five Only	391,820.00 Rupees Three Lakh Ninety One Thousand Eight Hundred Twenty Only
10.14	Supplying and fixing of 50X50X6 mm angle post, split 70 mm at the bottom end and galvanised, to be fixed vertically in position in concrete (cost of concrete to be paid separately) and holes drilled in it, at a spacing of 1500mm c/c as per drawing OSRP/CEG/SH/ENV/04-B,C,D and 05 and as per the direction of Engineer-in-charge.	kg	4124.00	60.00 Rupees Sixty Only	247,440.00 Rupees Two Lakh Forty Seven Thousand Four Hundred Forty Only
10.15	Providing and fixing pedestrian guard rail (Footpath barrier) for interception as per drawing no. OSRP/CEG/FB technical specification cl no. 808 and as per the direction of Engineer-in-charge.	Lm	57.00	3300.00 Rupees Three Thousand Three Hundred Only	188,100.00 Rupees One Lakh Eighty Eight Thousand One Hundred Only
10.16	Providing and fixing of G.I wire of 4mm dia @ 100 gms/m including cost of material, labour all complete as per drawing no. OSRP/CEG/SH/ENV/04-B,C and 05 and as per the direction of Engineer-in-charge.	kg	7830.00	80.00 Rupees Eighty Only	626,400.00 Rupees Six Lakh Twenty Six Thousand Four Hundred Only



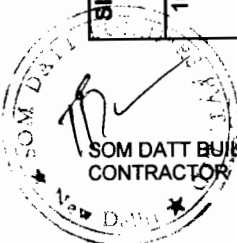
SOM DATT BUILDERS - ARSS-IV
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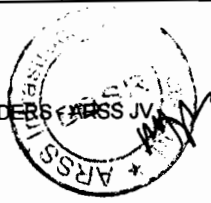
Srl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.17	Providing and fixing in position 'Tree Guard', including cost of all materials, labour, fabrication & painting with approved synthetic enamel paint using 25mm X50mmX13 G welded mesh, as per drawing no.OSRP/CEG/SH/ENV/08 and as per the direction of Engineer-in-charge.	Nos	10310.00	1100.00	11,341,000.00
10.18	Providing & planting tree species as per the schedule attached and maintaining the same upto 3 years and as per the direction of Engineer-in-charge.	Nos	10140.00	Rupees One Thousand One Hundred Only 150.00	Rupees One Crore Thirteen Lakh Forty One Thousand Only 1,521,000.00
10.19	Supplying and laying in position 600mm dia NP3 Hume pipes complete as per drawing no. OSRP/CEG/SH/ENV/12, at the location of trap drains and technical specification CI no. 2900 and as per the direction of Engineer-in-charge.	Lm	138.00	3000.00	414,000.00
10.2	Providing 100mm dia PVC pipe for soak pit as per Drawing no. OSRP/CEG/SH/ENV/07 and as per the direction of Engineer-in-charge.	Lm	850.00	Rupees Three Thousand Only 180.00	Rupees Four Lakh Fourteen Thousand Only 153,000.00
10.21	Laying of 20mtrs long 20mm PVC pipe with all fittings and tap point in position for stand post including digging of pipe line and connecting the mains supply with ferrule.as per Drawing no. OSRP/CEG/SH/ENV/07 and as per the direction of Engineer-in-charge.	Lm	340.00	Rupees One Hundred Eighty Only 1650.00	Rupees One Lakh Fifty Three Thousand Only 561,000.00
10.22	Providing & laying in position of PCC M15 for fixing of PVC pipe from platform to soak pit below G.L with a base and cover as per Technical specification cl. 1500, 1700, 2100 as per Drawing no. OSRP/CEG/SH/ENV/07 and as per the direction of Engineer-in-charge.	Cum	59.00	Rupees One Thousand Six Hundred Fifty Only 3400.00	Rupees Five Lakh Sixty One Thousand Only 200,600.00
				Rupees Three Thousand Four Hundred Only	Rupees Two Lakh Six Hundred Only

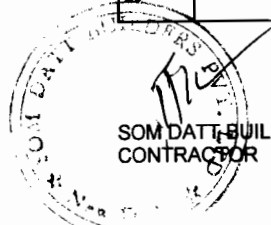


Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.23	Providing and laying of boulder apron with HG Boulders at spilling locations as per technical specification CI.2506 and as per Drawing no. OSRP/CEG/SH/ENV/10 and as per the direction of Engineer-in-charge.	Cum	16.00	1200.00 Rupees One Thousand Two Hundred Only	19,200.00 Rupees Nineteen Thousand Two Hundred Only
10.24	Constructing course rubble hard granite stone masonry in CM1:3 (at bathing ghat) as per technical specification cl. No.1400,2200 as per Drawing No.OSRP/CEG/SH/ENV/09 and as per the direction of Engineer-in-charge.	Cum	82.00	2500.00 Rupees Two Thousand Five Hundred Only	205,000.00 Rupees Two Lakh Five Thousand Only
10.25	Providing and laying filter material underneath pitching in slopes at water bodies and ponds as per technical specification Section 2500 and as per Drawing No.OSRP/CEG/SH/ENV/03 and as per the direction of Engineer-in-charge.	Cum	2707.00	1500.00 Rupees One Thousand Five Hundred Only	4,060,500.00 Rupees Forty Lakh Sixty Thousand Five Hundred Only
10.26	Providing and laying pitching on slopes over filter media as per technical specification Section 2500 and as per Drawing No.OSRP/CEG/SH/ENV/03 and as per the direction of Engineer-in-charge.	Cum	5414.00	1200.00 Rupees One Thousand Two Hundred Only	6,496,800.00 Rupees Sixty Four Lakh Ninety Six Thousand Eight Hundred Only
10.27	Providing Cement plastering 12mm with punning 1:3 for platform as per technical specification ci.1300& 2200 & as per Drawing No.OSRP/CEG/SH/ENV/01--A,B,C,04-A,B,C,D,05.05-A,06,07 and as per the direction of Engineer-in-charge.	Sqm	5691.00	80.00 Rupees Eighty Only	455,280.00 Rupees Four Lakh Fifty Five Thousand Two Hundred Eighty Only
10.28	Providing and making site enhancement by planting of two trees at tube well and water stand post as per Drawing no. OSRP/CEG/SH/ENV/07 and as per the direction of Engineer-in-charge.	No	170.00	300.00 Rupees Three Hundred Only	51,000.00 Rupees Fifty One Thousand Only
10.29	Planting at junction as per drawing no. OSRP/CEG/SH/ENV/01-A,01-B,01-C and as per the direction of Engineer-in-charge.	No	30800.00	130.00 Rupees One Hundred Thirty Only	4,004,000.00 Rupees Forty Lakh Four Thousand Only



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.3	Providing and fixing fixed flower vase as per drawing no. OSRP/CEG/SH/ENV/04-A and as per the direction of Engineer-in-charge.	No	758.00	300.00 Rupees Three Hundred Only	227,400.00 Rupees Two Lakh Twenty Seven Thousand Four Hundred Only
10.31	Planting of shrubs & trees at 2.5m spacing including digging of pits manure as per drawing no. OSRP/CEG/SH/ENV/04-A, B, C, D, 05 and as per the direction of Engineer-in-charge.	No	800.00	70.00 Rupees Seventy Only	56,000.00 Rupees Fifty Six Thousand Only
10.32	Planting of shrubs on both sides of approach road at 30cm interval with digging of pits, 30/30/30cm manuring insecticides and pesticides as per drawing no. OSRP/CEG/SH/ENV/04-A,B,C,D,05 and as per the direction of Engineer-in-charge.	No	1400.00	70.00 Rupees Seventy Only	98,000.00 Rupees Ninety Eight Thousand Only
10.33	Planting of climbers at 50cm interval from plant to plant inside the compound near boundary wall and interception wall with digging of pits 30/30/30cm manuring, watering etc for 1yr as per drawing no. OSRP/CEG/SH/ENV/04-A,B,C,D,05 and as per the direction of Engineer-in-charge.	No	700.00	50.00 Rupees Fifty Only	35,000.00 Rupees Thirty Five Thousand Only
10.34	Construction of approach road with GSB and murrum topping well mixed and compacted as hard shoulder as per technical specification CI.400-2 drawing no. OSRP/CEG/SH/ENV/04-A,B,C,D,05 and as per the direction of Engineer-in-charge.	Lm	192.00	1200.00 Rupees One Thousand Two Hundred Only	230,400.00 Rupees Two Lakh Thirty Thousand Four Hundred Only
10.35	Providing Cement paint two coats to the walls as per drawing no. OSRP/CEG/SH/ENV/04-A,B,C,D,05 and as per the direction of Engineer-in-charge.	Sqm	525.00	100.00 Rupees One Hundred Only	52,500.00 Rupees Fifty Two Thousand Five Hundred Only






SOM DATTA BUILDERS CONTRACTORS

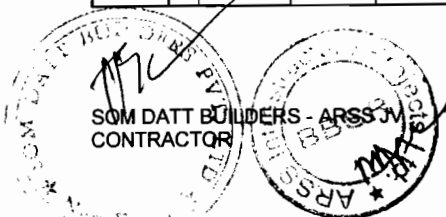


ARS INFRASTRUCTURE PROJECTS LTD

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.36	Maintenance of haulage road for 4 occurrences through out the construction period as per technical specification cl.no.3002 and as per the direction of Engineer-in-charge.	Lm	9856.00	60.00 Rupees Sixty Only	591,360.00 Rupees Five Lakh Ninety One Thousand Three Hundred Sixty Only
10.37	Providing and making site enhancement Plantation including maintenance with specified enclosed in schedule and as per the direction of Engineer-in-charge.	No	360.00	900.00 Rupees Nine Hundred Only	324,000.00 Rupees Three Lakh Twenty Four Thousand Only
Sub-Total- Bill No-10					69,741,885.00
Rupees Six Crore Ninety Seven Lakh Forty One Thousand Eight Hundred Eighty Five Only					


 Chief Engineer,
 World Bank Projects, Orissa
 EMPLOYER.

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
11.01	BILL NO. - 11 : PROVISIONAL ITEMS Cutting of trees including cutting of trunks, branches and removal of stumps including stacking of serviceable material within a lead of 1000 metres and earthing in the depression/pit				
	a) Girth From 300mm to 600mm	No	182.00	90.00 Rupees Ninety Only	16,380.00 Rupees Sixteen Thousand Three Hundred Eighty Only
	b) Girth From 600mm to 900mm	No	243.00	170.00 Rupees One Hundred Seventy Only	41,310.00 Rupees Forty One Thousand Three Hundred Ten Only
	c) Girth From 900mm to 1800mm	No	5345.00	300.00 Rupees Three Hundred Only	1,603,500.00 Rupees Sixteen Lakh Three Thousand Five Hundred Only
	d) Girth From 1800mm to Above	No	483.00	550.00 Rupees Five Hundred Fifty Only	265,650.00 Rupees Two Lakh Sixty Five Thousand Six Hundred Fifty Only
11.02	A) Plantation of trees	No	800.00	100.00 Rupees One Hundred Only	80,000.00 Rupees Eighty Thousand Only
	B) Planting of plants & shrubs in median/ verges	Lm	40000.00	20.00 Rupees Twenty Only	800,000.00 Rupees Eight Lakh Only
11.03	Boring for soil investigation including conducting necessary tests and preparation of report, as per direction of the Engineer and Technical Specification Clause 2400.	Lm	600.00	400.00 Rupees Four Hundred Only	240,000.00 Rupees Two Lakh Forty Thousand Only
11.04	Co-ordination for Shifting of Utilities as per Technical Specification Clause 110.	Km	94.00	3000.00 Rupees Three Thousand Only	282,000.00 Rupees Two Lakh Eighty Two Thousand Only



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
11.05	Construction of building (plinth area 9 sq m.) and installation of weigh bridge including arrangement for electric supply, all electrical items like lights, exhaust fans, sockets, receptacles and complete wiring with necessary earthing etc. complete as directed by Engineer.	No	4.00	75.00 Rupees Seventy Five Only	300.00 Rupees Three Hundred Only
11.06	Providing and fixing Pedestrian guard rails in 2m and 1m modules including painting with approved paint complete as per drawing and Technical Specification Clause 803,1008,1300 & 1700	Lm	200.00	2500.00 Rupees Two Thousand Five Hundred Only	500,000.00 Rupees Five Lakh Only
11.07	Conducting drilling a perfectly vertical bore hole of specified dia and depth through consolidated & unconsolidated rock with down the hole with own hammer drilling rigs or combination drilling rigs as required to suit the site condition as per Eng-in-Charge and including tools, plants and consumables etc., for lowering of 125mm dia PVC/CI pipes for housing fitted with socket and with or without well screen as per the necessity for soft, medium, hard and boulder formation (CI/PVC) casing pipes if prevent to collapse of over burden is to be provide by the contractor including lowering and withdrawing after completion of the tube well 125/100mm dia bore.as per drawing no.OSRP/CEG/SH/ENV/07.				
	0 to 30mtr.	Mtr	2040.00	380.00 Rupees Three Hundred Eighty Only	775,200.00 Rupees Seven Lakh Seventy Five Thousand Two Hundred Only
	31Mtr to 60mtr.	Mtr	2040.00	400.00 Rupees Four Hundred Only	816,000.00 Rupees Eight Lakh Sixteen Thousand Only
	60mtr. To 75mtr	Mtr	1020.00	430.00 Rupees Four Hundred Thirty Only	438,600.00 Rupees Four Lakh Thirty Eight Thousand Six Hundred Only



SOM D&T BUILDERS - ARSS JV
CONTRACTOR

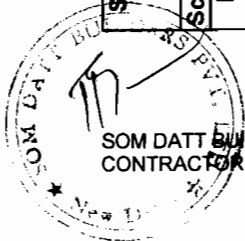
Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
Green, Bhubaneswar.



SOM DATT BUILDERS - ARSS JV
CONTRACTOR

Chief Engineer,
World Bank Projects, Orissa
EMPLOYER

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
11.08	Providing labour for lowering the following size of PVC or GI pipes or without strainers as per necessity and fitted and fixed including cutting and threading the pipe as may be necessary and supplying all jointing materials extra socket (GI or PVC of heavy quality) T&P etc, complete and keeping the top of the casing pipe threaded including plugging the tube well to prevent the entry of foreign matter from above.90 to 60mtr and above.as per drawing no.OSRP/CEG/SH/ENV/07and labour as per direction of Eng-in-Charge.	Mtr	2040.00	40.00	81,600.00
11.09	a) Cleaning & developing the tube wells with Compressor supplied by the contractor continuously worked till clear and the quota discharge is obtained from the tubewells including supply and use of necessary equipment and labour as per direction of Eng-in-Charge.	Each	68.00	1000.00	Rupees Eighty One Thousand Six Hundred Only
	b) Providing labour for fixing of 1m ll hand pump	Each	68.00	Rupees One Thousand Only	Rupees Sixty Eight Thousand Only
	c) Supplying 125mm PVC pipe	RM	2040.00	300.00 Rupees Three Hundred Only	20,400.00 Rupees Twenty Thousand Four Hundred Only
	d) Supplying 1m ll hand pump	Each	68.00	550.00 Rupees Five Hundred Fifty Only	1,122,000.00 Rupees Eleven Lakh Twenty Two Thousand Only
	e) Supplying 32mm GI riser pipe	Each	544.00	7500.00 Rupees Seven Thousand Five Hundred Only	510,000.00 Rupees Five Lakh Ten Thousand Only
11.10	Conducting enumeration of trees jointly by forest, revenue, private individual, PIU and contractors representatives with blazing 15/15cm removal of blazed bark, encircling the cut end with approved paint digit hammering of the property hammer and marking hammer impression	Nos	188.00	400.00 Rupees Four Hundred Only	217,600.00 Rupees Two Lakh Seventeen Thousand Six Hundred Only
Sub-Total- Bill No-11					
			Rupees Seventy Eight Lakh Ninety Five Thousand Four Hundred Sixty Only		
			7,895,460.00		



SOM DATT BUILDERS - ARSS JV
CONTRACTOR



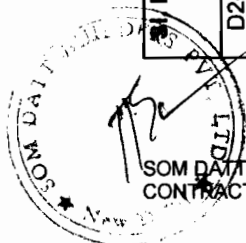
Chief Engineer,
World Bank Projects, Orissa
EMPLOYER

Signature of Chief Engineer

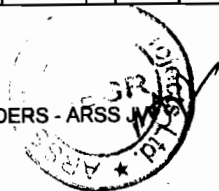
Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
Schedule of Daywork Rates: 1. Labour					
D101	Labour	Day	400.00	100.00 Rupees One Hundred Only	40,000.00 Rupees Forty Thousand Only
D102	Mason	Day	50.00	150.00 Rupees One Hundred Fifty Only	7,500.00 Rupees Seven Thousand Five Hundred Only
D103	Carpenter	Day	20.00	150.00 Rupees One Hundred Fifty Only	3,000.00 Rupees Three Thousand Only
D104	Steelworker Erector	Day	70.00	150.00 Rupees One Hundred Fifty Only	10,500.00 Rupees Ten Thousand Five Hundred Only
D105	Driver for vehicle up to 10 tons	Day	50.00	200.00 Rupees Two Hundred Only	10,000.00 Rupees Ten Thousand Only
D106	Operator for excavator, dragline, shovel or crane	Day	50.00	350.00 Rupees Three Hundred Fifty Only	17,500.00 Rupees Seventeen Thousand Five Hundred Only
D107	Operator for tractor with dozer blade or ripper	Day	50.00	400.00 Rupees Four Hundred Only	20,000.00 Rupees Twenty Thousand Only
D108	Operator grader	Day	50.00	800.00 Rupees Eight Hundred Only	40,000.00 Rupees Forty Thousand Only
D109	Operator in other construction equipment	Day	50.00	800.00 Rupees Eight Hundred Only	40,000.00 Rupees Forty Thousand Only
D110	Chowkidars for watch & ward	Day	500.00	200.00 Rupees Two Hundred Only	100,000.00 Rupees One Lakh Only
					288500.00
					Rupees Two Lakh Eighty Eight Thousand Five Hundred Only
D111	Allow 25% (Twenty-five percent) of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				72125.00
					Rupees Seventy Two Thousand One Hundred Twenty Five Only
	Total-Dayworks-Labour				360625.00
					Rupees Three Lakh Sixty Thousand Six Hundred Twenty Five Only

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
Schedule of Daywork Rates: 2. Materials					
D201	Cement, ordinary Portland or equivalent in bags conforming to IS:269:1989 and IS 455:1989	Per Mt	20.00	5000.00 Rupees Five Thousand Only	100,000.00 Rupees One Lakh Only
D202	HYSD reinforcing bars upto 25 mm dia conforming to IS:1786:1989	Per Mt	5.00	40000.00 Rupees Forty Thousand Only	200,000.00 Rupees Two Lakh Only
D203	Bricks of class designation 75 as per IS:1077:1992	Per 1000 Nos	500.00	3000.00 Rupees Three Thousand Only	1,500,000.00 Rupees Fifteen Lakh Only
D204	Anti Corrosive Bituminous paint	Per Lit	10.00	150.00 Rupees One Hundred Fifty Only	1,500.00 Rupees One Thousand Five Hundred Only
D205	Enamel Paint of any shade & colour (IS:2932-1964 & IS 137-1975)	Per Lit	10.00	100.00 Rupees One Hundred Only	1,000.00 Rupees One Thousand Only
D206	Coarse Sand as per IS 1542	Per Cum	50.00	375.00 Rupees Three Hundred Seventy Five Only	18,750.00 Rupees Eighteen Thousand Seven Hundred Fifty Only
D207	R.R. Stone for masonry	Per Cum	50.00	1000.00 Rupees One Thousand Only	50,000.00 Rupees Fifty Thousand Only
D208	Crusher broken stone aggregates up to 25 mm nominal size	Per Cum	50.00	1000.00 Rupees One Thousand Only	50,000.00 Rupees Fifty Thousand Only





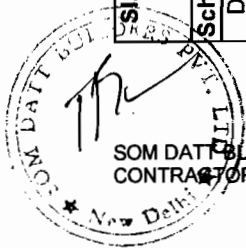
SOM DAIT BUILDERS - ARSS
CONTRACTOR



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
D209	Crusher broken stone aggregates Above 25 mm nominal size	Per Cum	50.00	950.00 Rupees Nine Hundred Fifty Only	47,500.00 Rupees Forty Seven Thousand Five Hundred Only
D210	Portable water at site	Per 1000 ltr	5000.00	50.00 Rupees Fifty Only	250,000.00 Rupees Two Lakh Fifty Thousand Only
					2218750.00
D211	Allow 25% (Twenty-five percent) of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				Rupees Twenty Two Lakh Eighteen Thousand Seven Hundred Fifty Only
					554687.50
					Rupees Five Lakh Fifty Four Thousand Six Hundred Eighty Seven And Fifty Paise Only
	Total-Daywork-Materials				2773437.50
					Rupees Twenty Seven Lakh Seventy Three Thousand Four Hundred Thirty Seven And Fifty Paise Only

Chief Engineer,
World Bank Projects, Orissa
EMPLOYER
SOM DAIT BUILDERS - ARSS CONTRACTOR

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
Schedule of Daywork Rates: 3. Contractor's Equipment					
D301	Excavator, face shovel, or dragging:				
D301.1	Up to and including 1 m ³	Hour	50.00	1500.00 Rupees One Thousand Five Hundred Only	75,000.00 Rupees Seventy Five Thousand Only
D301.2	Over 1 m ³ to 2 m ³	Hour	30.00	2200.00 Rupees Two Thousand Two Hundred Only	66,000.00 Rupees Sixty Six Thousand Only
D301.3	Over 2 m ³	Hour	10.00	3000.00 Rupees Three Thousand Only	30,000.00 Rupees Thirty Thousand Only
D302	Tractor, including bull or angle dozer:				
D302.1	Up to and including 150 kW	Hour	50.00	300.00 Rupees Three Hundred Only	15,000.00 Rupees Fifteen Thousand Only
D302.2	Over 150 kW to 200 kW	Hour	30.00	400.00 Rupees Four Hundred Only	12,000.00 Rupees Twelve Thousand Only
D302.3	Over 200 kW to 250 kW	Hour	10.00	500.00 Rupees Five Hundred Only	5,000.00 Rupees Five Thousand Only
D303	Tractor with ripper:				
D303.1	Up to and including 200 kW	Hour	30.00	600.00 Rupees Six Hundred Only	18,000.00 Rupees Eighteen Thousand Only
D303.2	Over 200 kW to 250 kW	Hour	10.00	650.00 Rupees Six Hundred Fifty Only	6,500.00 Rupees Six Thousand Five Hundred Only
D304	Motor grader	Hour	40.00	2000.00 Rupees Two Thousand Only	80,000.00 Rupees Eighty Thousand Only
D305	Crane- 5 tonne	Hour	40.00	600.00 Rupees Six Hundred Only	24,000.00 Rupees Twenty Four Thousand Only



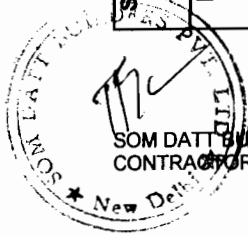
SOM DATT BUILDERS
CONTRACTORS




Chief Engineer,
World Bank Projects, Orissa
EMPLOYER

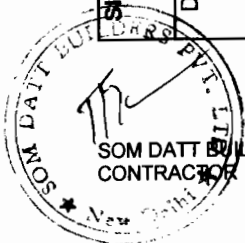
Orissa, Bhubaneswar

Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
D306	Diesel Road Roller, or Vibratory Compactor upto 10 t	Hour	40.00	950.00 Rupees Nine Hundred Fifty Only	38,000.00 Rupees Thirty Eight Thousand Only
D307	Trucks, or Truck tipper, or Truck with mounted water tank or truck with crane for removal of accidental vehicles.	Hour	100.00	500.00 Rupees Five Hundred Only	50,000.00 Rupees Fifty Thousand Only
D308	Tractor with trolley, or tractor with water tanker trailer, tractor with ripper Tractor with hydraulic scraper				
	(a) upto 25 HP	Hour	40.00	300.00 Rupees Three Hundred Only	12,000.00 Rupees Twelve Thousand Only
	(b) For 25-40 HP	Hour	30.00	400.00 Rupees Four Hundred Only	12,000.00 Rupees Twelve Thousand Only
D309	Bitumen mixture (10-14 Cft.) C.C	Hour	20.00	200.00 Rupees Two Hundred Only	4,000.00 Rupees Four Thousand Only
D310	Mix tyre (10-14 Cft.) Water pumping sets mounted on trolley (diesel driven)with inlet & outlet pipes.				
	a) Sets up to 10 HP	Hour	10.00	200.00 Rupees Two Hundred Only	2,000.00 Rupees Two Thousand Only
	b) Sets 11 to 20 HP	Hour	10.00	500.00 Rupees Five Hundred Only	5,000.00 Rupees Five Thousand Only
	c) Sets above 20 HP	Hour	10.00	1000.00 Rupees One Thousand Only	10,000.00 Rupees Ten Thousand Only
D311	Generator sets mounted on trolley				
	a) Sets upto 5 Kva	Hour	10.00	300.00 Rupees Three Hundred Only	3,000.00 Rupees Three Thousand Only
	b) Sets 5-15 Kva	Hour	10.00	600.00 Rupees Six Hundred Only	6,000.00 Rupees Six Thousand Only



 SOM DATT BUILDERS ARS
 CONTRACTOR
 New Delhi


 Chief Engineer,
 World Bank Projects, Orissa,
 EMPLOYER
 (Name, Address and Work)



Sl. No.	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
D312	Mobile Crane / Power winch	Hour	10.00	600.00 Rupees Six Hundred Only	6,000.00 Rupees Six Thousand Only
D313	Bull Dozer 100/110 Hp	Hour	10.00	1500.00 Rupees One Thousand Five Hundred Only	15,000.00 Rupees Fifteen Thousand Only
D314	Plate compactors	Hour	10.00	250.00 Rupees Two Hundred Fifty Only	2,500.00 Rupees Two Thousand Five Hundred Only
D315	Jack hammers for dismantling	Hour	10.00	100.00 Rupees One Hundred Only	1,000.00 Rupees One Thousand Only
D316	Utility Vehicles	Hour	10.00	300.00 Rupees Three Hundred Only	3,000.00 Rupees Three Thousand Only
D317	Mini Hot Mix Plant (STPH)	Hour	10.00	1000.00 Rupees One Thousand Only	10,000.00 Rupees Ten Thousand Only
					511000.00 Rupees Five Lakh Eleven Thousand Only
D318	Allow 25% (Twenty-five percent) of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				127750.00
Total-Dayworks-Equipments					638750.00 Rupees Six Lakh Thirty Eight Thousand Seven Hundred Fifty Only