

AGREEMENT No- 5 of 2008 - 09



**GOVERNMENT OF ORISSA**  
**WORKS DEPARTMENT**

**CIVIL WORKS CONTRACT**

[PACKAGE No. OSRP-CW-ICB-Y1-P01]

**For**

*Widening & Strengthening of existing carriageway to 2-lane road from  
Bhawanipatna to Khariar  
(Km. 2/0 to 70/0 of SH – 16)*

*under  
Orissa State Roads Project*

between

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

and

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

[ VOLUME – I ]

**Agreement Value: Rs. 105,51,39,120.00**

*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: 3<sup>rd</sup> December, 2008**

## CONTENTS of CONTRACT

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


## CONTENTS of VOLUME I

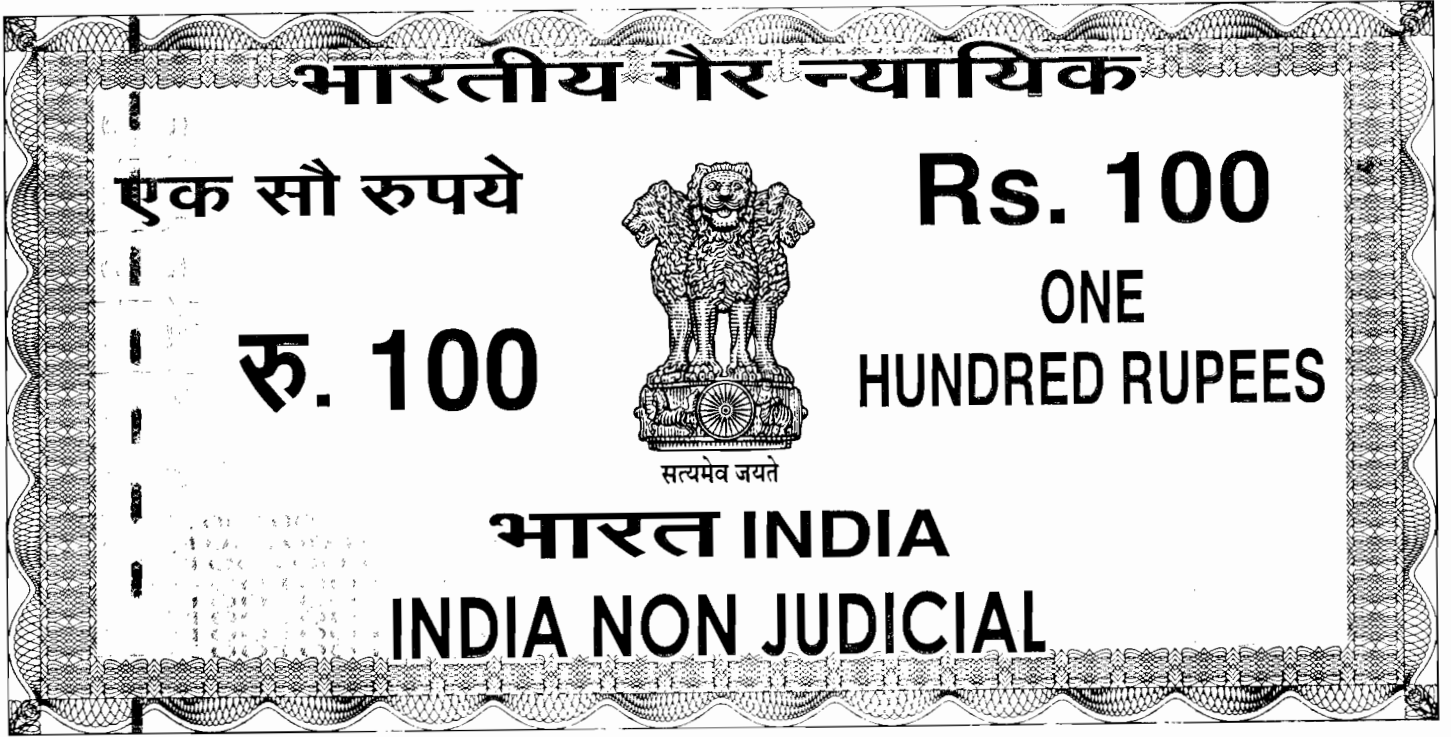
Sl.	Description	Page No.
1	Contract Agreement	1
2	Approval of Government of Orissa to the Tender and Authorization of Contract Signatory on behalf of Government of Orissa.	4
3	No Objection of World Bank to Award	5
4	Notification of Award	7
5	Letter of BID and Addenda	8-119
6	Bank Guarantee and Performance Security	120
7	Other Documents & Standard Formats	124-127
8	Authorisation of Patel Engineering Ltd.	128



PATEL - ARSS JV  
CONTRACTOR



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



उड़ीसा ORISSA

A 228258

**CIVIL WORKS CONTRACT**

For

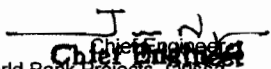
Widening & Strengthening of existing carriageway to 2-lane road from Bhawanipatna to Khariar (Km. 2/0 to 70/0 of SH – 16 ) under Orissa State Roads Project

THIS AGREEMENT made the 3<sup>rd</sup> day of December, 2008, between the Chief Engineer, World Bank Projects, Orissa, office of the Engineer-in-Chief(Civil), Orissa, Nirman 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 M/S PATEL-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. 105,51,39,120.00 ( Indian Rupees One Hundred Five Crore Fifty One Lakh Thirty Nine Thousand One Hundred Twenty ) only:

WHEREAS the Employer desires that the Works known as "Widening and Strengthening of existing carriageway to 2-lane road from Bhawanipatna to Khariar (Km. 2/0 to 70/0 of SH – 16 )" 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



Volume - I Page 1

  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa,  
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**

- (i) the Letter of Acceptance
- (ii) of the Letter Bid
- (iii) the addenda 110 Pages

**Volume - II**

- (iv) the Particular Conditions
- (v) the General Conditions;

**Volume - III**

- (vi) the Specification

**Volume - IV**

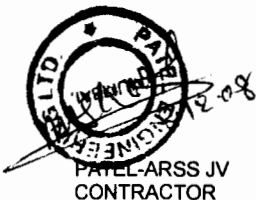
- (vii) the Drawings; and

**Volume - V**

- (viii) the completed Schedules,

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.

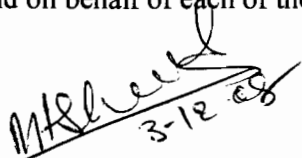


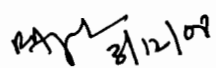
IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of INDIA on the day, month and year indicated above.

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

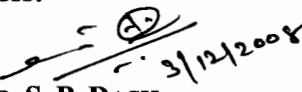

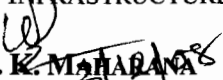

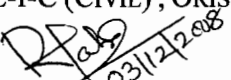
  
**Er. J.M. Nayak**  
Chief Engineer, World Bank Project, Orissa

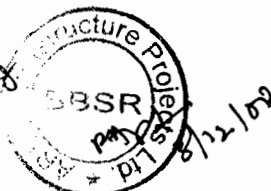
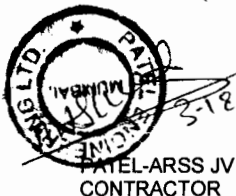
For and on behalf of each of the Partners of the Joint Venture PATEL – ARSS JV

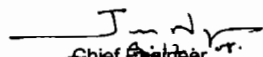
  
**Mr. Ashwin Shah**  
General Manager (Projects)  
PATEL Engineering Limited

  
**Mr. Rajesh Agarwal**  
Managing Director  
ARSS Infrastructure Projects Limited

*Witness:*

-   
1. **MR. S. P. DASH,**  
GENERAL MANAGER, CONTRACTS,  
ARSS INFRASTRUCTURE PROJECTS
-   
2. **MR. SYAMITANU DATTA**  
PROJECT MANAGER,  
ARSS INFRASTRUCTURE PROJECTS
-   
3. **MR. P. K. MAHARANA**  
EXECUTIVE ENGINEER, PROJECT MANAGEMENT UNIT,  
ORISSA STATE ROADS PROJECT
-   
4. **MR. M. B. ACHARYA**  
ACCOUNTS OFFICER-I  
O/O E-I-C (CIVIL), ORISSA .
-   
5. **MR. RAMESH KU. PATRA**  
HIGHWAY-CUM-PAVEMENT ENGINEER,  
SMEC (INDIA) PVT. LTD



  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa,  
Bhubaneswar:

1/85

Government of Orissa  
Works Department

\*\*\*\*

2199  
27-9-08 No 16548/W Dated the Bhubaneswar, 27<sup>th</sup> September-2008  
II-T-WBP-3/2008  
From:

To  
Sri P.K.Patnaik.  
F.A-cum-Addl Secretary to Govt.  
The Chief Engineer, World Bank Projects.  
Orissa, Bhubaneswar.

Sub: Tender for work "Widening & strengthening of existing carriageway to 2 Lane Road from Bhawanipatna to Khariar (2/0 km to 70/0 km of SH-6).  
Package No-OSRP-CW-ICB-Y1-PO1

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 1<sup>st</sup> lowest tender of M/S Patel-ARSS (JV) amounting to Rs.105,51,39,120=00 (Rupees one hundred five crore fifty one lakh thirty nine thousand one hundred twenty)only including 10% discount which is 2.01% excess over the corresponding estimated cost of Rs. 103,,43,94,251=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.

EE II, P2V / Sr. DAO  
for immediate action  
J. N. S. or

Yours faithfully,

F.A-cum-Addl. Secretary to Government

*[Signature]*  
27-9-08



PATEL-ARSS JV  
CONTRACTOR



Chief Engineer  
World Bank Projects  
Orissa  
to the E.I.C (WB)  
Bhubaneswar

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-Bhadrak-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***

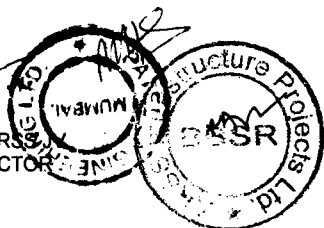
Thank you for your letter of July 31, 2008 regarding the above.

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

J  
17-8-08  
PATEL-ARUN  
CONTRACTOR



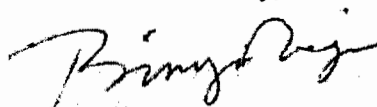
August 18, 2008

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**



PATEL-ARSS JV  
CONTRACTOR



  
Chief Engineer  
World Bank Project in Orissa  
EMPLOYER  
to the E.T.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 - P01 - E - 44276

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: [pluosrp@gmail.com](mailto:pluosrp@gmail.com)

To

M/s Patel- 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-P01 under the proposed Orissa State Roads Project with World Bank Assistance

- Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna to Khariar (2/0 km to 70/0 km of SH- 16 )"

**LETTER OF ACCEPTANCE**

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

Sir,

This is to notify you that, your Bid dated 30<sup>th</sup> January, 2008 for execution of the Civil Works ICB Package OSRP-CW-ICB-Y1-P01 under the proposed Orissa State Roads Project with World Bank Assistance for "Widening & Strengthening of existing carriageway to 2-lane from Bhawanipatna to Khariar ( Km. 2/0 to Km. 70/0 of SH - 16 ) amounting to Indian Rs.105,51,39,120 ( Indian Rupees One hundred five crore fifty one lakh thirty nine thousand one hundred twenty) 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 30<sup>th</sup> April, 2012, amounting not less than Indian Rs.5,27,56,956 ( Indian Rupees five crore twenty seven lakh, fifty six thousand nine hundred fifty six) 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



Volume-I Page 7

  
Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
to 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-ICB-Y1-P01

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 two lane from Bhawanipatna to Khariar ( Km 2/0 to Km 70/0 of SH-16) ;**
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is: **Rs. 117,23,26,799.50 ( Rupees One Hundred Seventeen Crore Twenty three Lakh Twenty six Thousand Seven Hundred Ninety nine and Paise Fifty only )** including specified provisional sums of Rs. 4,50,000/-;
- (d) The discounts offered and the methodology for their application are: **10% (Ten 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, the validity of bid had been extended till 30.09.2008 vide our Letter No- P-ARSS JV/ CE/ WBP/ 08-09/ 1817 Dt- 28.08.2008.
- (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;



Chief Engineer  
World Bank Project  
Civil Engineer  
EMPLOYER  
World Bank Projects  
to the E. I. C (Civil) Orissa,  
Bhubaneswar:

- (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;<sup>1</sup>
- (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 **S.P.Dash** In the capacity of **Power of Attorney Holder**

Signed Sd/- (S.P.Dash)

Duly authorized to sign the bid for and on behalf of **PATEL-ARSS J.V.**

Dated on **30<sup>th</sup> day of January,2008**



PATEL-ARSS J.V.  
CONTRACTOR

<sup>1</sup> Bidder to use as appropriate



Chief Engineer  
Chief Engineer  
World Bank Projects, Orissa  
to the (Civil) Orissa  
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				0.35
B	Steel (Bars and Rods)	Office of Economic advisor	258.30 Jan-2008		0.08
C	Cement	Office of Economic advisor	221.10 Jan-2008		0.07
D <sub>1</sub>	Bitumen 60/70 (Bulk)	IOCL at Haldia	24700/MT 16.01.2008 (Basic Rate)		0.10
D <sub>2</sub>	CRMB-55 (Bulk)	IOCL at Haldia	25110/MT 16.01.2008 (Basic Rate)		0.05
E	Labour	Labour & Employment Department, Orissa	Rs. 70.00 Per Day Jan-2008		0.06
F	POL	HPCL Price at Bhawanipatna, Orissa	33.98/ Ltr Jan-2008		0.12
G	Other Materials	Office of Economic advisor	218.10 Jan-2008		0.17
<b>Total</b>					<b>1.00</b>



# 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



PATEL-ARSSU  
CONTRACTOR



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

# REFERENCE 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
<b>2008</b>	221.1	220.9	221	221.4	222.4	221.7						
<b>2007</b>	198.4	200.5	210.7	211.6	211.9	213.3	215.1	215.6	219.8	220	219.6	219.7
<b>2006</b>	168.2	174.1	181.8	191.2	193.5	193.6	194.5	195	194.6	196.8	198.8	198.6
<b>2005</b>	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



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

# REFERENCE BASE INDEX FOR BITUMEN Indian Oil Corporation Limited

304, BHOI NAGAR, BHUBANESWAR-751022  
TEL: 0674-2543381, 2546821, FAX: 2541638, 2543381  
E Mail: brmohantyioc@gmail.com, bikashmohantv@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



PATEL-ARSS JV  
CONTRACTOR



# REFERENCE BASE INDEX FOR LABOUR

28

Government of Orissa  
Labour & Employment Department

## NOTIFICATION

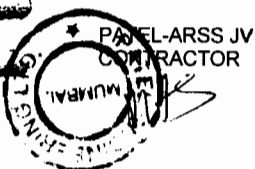
Dated, Bhubaneswar, the 27<sup>th</sup> April, 2007

No.LL-I (AR)-12/2007 <sup>11/06/2006</sup> 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 10<sup>th</sup> 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 8<sup>th</sup> 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

Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa,  
Bhubaneswar:





286

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

d  
ur  
h

(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 assure 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;

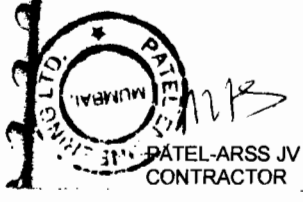
(9) The minimum rates of wages for disabled persons shall be same as payable to the workers of the appropriate category ;

(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



Chief Engineer  
World Bank Chief Engineer  
World Bank EMPLOYER Projects  
to the E. I. C (Civil) Orissa  
Bhubaneswar:

REFERENCE 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@hpcil.co.in / rghosh@

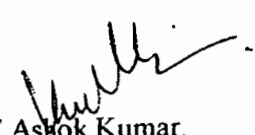
TO WHOM SO EVER IT MAY CONCERN.

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.



PATEL-ARSS JV  
CONTRACTOR



# 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



PATEL-ARSS JV  
CONTRACTOR



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

### 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	1,172,326,799.50	1.00	1,172,326,799.50	100 INR
Foreign currency #1				Not Applicable
Foreign currency #2				NA
Foreign currency #				NA
Net Bid Price				1,172,326,799.50
Discount				(-)11,71,87,679.95
Provisional sums expressed in local currency	Rs.0.45 M			450,000.00
<b>BID PRICE</b>				<b>1,055,139,119.55</b> <b>SAY: 1,055,139,120.00</b>



### ELI - 1: Bidder's Information Sheet

Bidder's Information	
<b>Bidder's legal name</b>	<b>PATEL-ARSS (J.V)</b>
<b>In case of JV, legal name of each partner</b>	<b>Patel Engineering Limited ( Lead Partner) ARSS Infrastructure Projects Limited (Partner)</b>
<b>Bidder's country of constitution</b>	<b>India</b>
<b>Bidder's year of constitution</b>	<b>2008</b>
<b>Bidder's legal address in country of constitution</b>	<b>Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa.</b>
<b>Bidder's authorized representative</b> (name, address, telephone numbers, fax numbers, e-mail address)	<b>Mr. S.P.Dash</b> <b>Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa.</b> <b>Tel: 0674-2588552, 2588554</b> <b>Fax: 0674-2585074</b> <b>Email: response@arssgroup.in</b>
<b>Attached: 1) Joint Venture Agreement</b> <b>2) Power of Attorney</b>	



PATEL-ARSS JV  
CONTRACTOR



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



66

~~CONFIDENTIAL~~

05.01.2008

NOTARY, BHIMDAYEWAR  
 CHIEF ENGINEER  
 World Bank Projects, Group  
 World Bank  
 To the EIC (Civil) (Civil)  
 Bhubaneswar

conveyance way to E line for Bhawanipatna to Kharma (Kms. 20 to 30 of 500 feet) ... (where applicable).

WHEREAS it is found that the Joint Venture is successful as tender and the tender is accepted. The Parties have agreed to perform the above project in accordance with the agreed terms and conditions and to make the joint venture for the purpose of the Joint Venture.

NOW, all said, the Joint Venture is constituted of the following partners and other conditions and covenants hereinafter set forth. The terms of the Joint Venture are as follows:

**Article 1. Form of Agreement**

- 1.1 The Parties shall jointly prepare and execute the tender documents for the project and shall jointly submit the project proposals to the Joint Venture.
- 1.2 Any alterations of this Agreement shall not be permitted without prior written consent of all Parties.
- 1.3 The provisions herein of the Parties shall be binding and enforceable upon the Contract in accordance with the terms of the Agreement and nothing in this Agreement shall entitle either of the Parties to any other rights.

**Article 2. Joint Venture**

- 2.1 The Joint Venture is awarded the Project, both Parties agreed to form a Joint Venture office at site of project for the performance of the Project.
- 2.2 The name of the Joint Venture shall be **PATEL-ARSS (J.V.)** and its permanent office at Plot No. 10, Sector A, Zone II, Bhubaneswar, Odisha, India. Telephone No. 06741121.
- 2.3 The share of each of the partners in the Joint Venture shall be as follows:
  - PATEL 40% (Twenty Percent) of the Project Value
  - ARSS 60% (Sixty Percent) of the Project Value

**Article 3. Lead Company**

- 3.1 The Parties have agreed to appoint **PATEL** as the Lead Company of the Joint Venture for performance of the Contract.
- 3.2 The Lead Company of the Joint Venture shall provide suitable experienced personnel for the conduct of general planning, site management, and plant operations during the execution of Contract activities.
- 3.3 The Lead Company shall be responsible for the day-to-day management of the Joint Venture and shall be authorized to execute all the necessary documents for and on behalf of the Joint Venture, whether parties are present and the execution of the



Bhimdayewar

Chief Engineer  
 World Bank Projects, Group  
 World Bank  
 To the EIC (Civil) (Civil)  
 Bhubaneswar

*S. D. Patil*  
05.01.2008  
Notary *Ramesh Babu*  
NOTARY BHUBANESWAR  
Govt. of Orissa (India)  
Registration No.-43/2003

...through *patil@43/2003*

4.4. In connection with the contract, the parties to the contract shall make a decision by mutual consent.

**Article 4. Tender/Estimation Work**

- 4.1. Estimation for the tender shall be prepared by the contractor by **PATEL** as contractor.
- 4.2. Both Parties shall appoint an expert and a valuer for the project.
- 4.3. Any estimates and bills of materials to be submitted and a certificate with the estimates shall be submitted separately for the benefit of the project shall be borne separately and shall be the responsibility of the contractor who shall be responsible for the same.
- 4.4. The cost of the estimates, the cost of the materials shall be...

**Article 5. Qualification**

5.1. A Mutual Project Board shall be formed with **Four (4)** members (comprised of a Chairman) to be nominated by **PATEL**, and the other three to be nominated by **ARSS** and one Director each to be appointed by **PATEL** and **ARSS** respectively.

**Article 6. Execution of the Project**

- 6.1. The parties shall be jointly and severally liable for the execution of the Contract in accordance with the terms of the contract.
- 6.2. The works, equipment and materials to be supplied by the parties jointly in accordance with the contract.
- 6.3. A system of joint management shall be established under the following system of management to be established for the project. The responsibility of each party shall be in terms of physical and financial and cost as stated below.

Participation	Lead Party (PATEL)	Partner (ARSS)
Design	50%	50%
Planning	50%	50%
Construction	50%	50%
Supervision		
Key Personnel	Project: Planning, Design and Construction; Management, Planning and Staff; Material and Staff	Project: Planning, Design and Construction; Planning and Staff; Management and supporting staff
Execution of Work	All parts of work required for the project and supporting staff for the project.	All parts of work required for the project and supporting staff for the project.



*S. D. Patil*  
World Bank Projects, Orissa Projects  
EMPLOYER  
to the E.I.C (Civil) (Orissa)  
Bhubaneswar



05.01.2008

NOTARY GURJANESWAR

- 5.1 Neither party of the JV shall be allowed to sell, pledge, or in otherwise dispose of its respective interest in JV to any party including existing partner of the JV, the employee assigned for any subsequent work (including bank and financial institution JV partner) or to assign to other firm/agent.
- 5.2 In the event of default by any partner in the JV, as stated in the Contract, the Employer will be satisfied with the JV partner in Charge, or in case of absence of partner in Charge being the defaulting partner, the partner in Charge of the JV, or the JV partner in Charge, as they all days of the said JV, and in case of defaulting partner in JV, an equally competent party acceptable to the Employer to ensure the resolution of that part of the Contract.

**Article 7. Bank Account**

- 7.1 All bank charges related to the JV shall be borne by the JV partner in Charge and the JV partner in Charge shall be responsible for the payment of the same. The JV partner in Charge shall be responsible for the payment of the same.
- 7.2 The JV partner in Charge shall be responsible for the payment of the same.

**Article 8. Validity**

- 8.1 This Agreement shall remain in effect from the date of signing and remain valid until and unless terminated, provided for in this JV Agreement.
- 8.2 The JV partner in Charge shall be responsible for the payment of the same.
- 8.3 Cancellation of the Project by the Employer.
- 8.4 Failure of the JV to win the Project shall be a breach.
- 8.5 In case of termination of the Agreement, as provided for in the Article 8.1, the JV partner in Charge shall be responsible for the payment of the same.

**Article 9. Confidentiality**

Both parties shall use this Agreement as a document supplied by the other party for any project other than intended by the Employer. The JV partner in Charge shall be responsible for the payment of the same.

**Article 10. Governing Law**

This Agreement shall be governed by and construed in accordance with the laws of the Republic of India.

**Article 11. Arbitration**

- 11.1 All disputes or differences arising out of or in connection with this Agreement shall be settled by arbitration in accordance with the rules of the International Chamber of Commerce.



World Bank Project  
Chief Engineer  
World Bank Project  
to the F.I.C. (Civil) Office  
Bhubaneswar

*Shriya*  
 05-01-2008  
 Satul Kumar Shriya  
 NOTARY BHUJANEWAR  
 Govt. of Orissa (India)  
 Regd. No.-41/2003

However, in the any dispute or difference which subsists, each Party may refer the matter to arbitration for final settlement in conformity with the Rules of Arbitration and Conciliation Act of India 1996.

- 11.2 The work shall be done at site in Mumbai and the cost shall be in Indian Rupee.
- 11.3 This JV shall be bound to carry out under the direction of the competent authority of Government.
- 11.4 None of the signatories shall be held liable for the performance or the contract merely by reason of a default in any of the parties to the obligation.

**IN WITNESS WHEREOF**, The within said signatories of the Parties have hereunto set their hands and seals on this 5th day of January 2008.

*Ashtin Shah*  
 Ashwin Shah  
 General Manager (Projects)  
 For and on behalf of  
**PATEL ENGINEERING LIMITED**

*Rajesh Agarwal*  
 Rajesh Agarwal  
 Managing Director  
 For and on behalf of  
**ARSS INFRASTRUCTURE PROJECTS LIMITED**

WITNESS:

1. *Ashtin Shah*  
 (For **PATEL ENGINEERING LTD**)  
**PATEL ENGINEERING LTD**  
 PATEL INSTITUTE, S.V. ROAD,  
 BULSAR, GUJARAT (WEST),  
 MUMBAI-400 102

*A. H. Astud*  
*Shriya*  
 05-01-2008  
 Satul Kumar Shriya  
 NOTARY BHUJANEWAR  
 Govt. of Orissa (India)  
 Regd. NO.-41/2003



*J. S. Chatterjee*  
 Chief Engineer  
 World Bank  
 World Bank Projects  
 to the E.I.C (Civil) Orissa  
 Bhudaneswar

भारतीय गैर न्यायिक

गैर रुपये

Rs. 100

100

ONE HUNDRED RUPEES



सत्यमेव जयते

भारत INDIA  
INDIA NON JUDICIAL

05-01-2008

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

A 588531

उड़ीसा ORISSA

POWER OF ATTORNEY

TO ALL THOSE WHOM THESE PRESENTS SHALL COME may know that I, the Power of Attorney, do hereby authorize this 5<sup>th</sup> day of January Two Thousand and 08.

WE, PATEL ENGINEERING LIMITED, a company registered under the Companies Act, 1956, having its office at Patel Nagar, Jharkh, Jageswar (W), District - Cuttack (Pin Code - 751002) (hereinafter referred to as "PATEL") do hereby appoint full power and sole authority to the person named in the second part hereof, his successors or assigns of the FIRST PART.

AND

ARSS INFRASTRUCTURE PROJECTS LTD, a Company registered under the Companies Act 1956, having its registered office at Sector A, Zone-D, Plot No.28, Marhassa, Indraprastha Estate, B-Block, New Delhi (hereinafter referred to as "ARSS"), which is presently shareless company, do hereby authorize, empower, full power and sole authority to the person named in the SECOND PART hereof, referred to as Party and the said Parties.

I do hereby appoint acting Party to the name and style of PATEL (ARSS CIV) (hereinafter referred to as "Acting Joint Venture Agency") on 5<sup>th</sup> day of January 2008.

For PATEL

For ARSS



World Bank Projects, Orissa  
World Bank Projects  
Of the F. I. C. (Civil) Orissa  
Bhubaneswar

*S. Dharma*  
05.01.2008

*Vijay Kumar Bhunia*  
NOTARY BHUBANESWAR  
Govt. of Orissa (India)  
Regd. No.-43/2003

WHEREAS the joint venture (JV) ARSS (JV) is formed exclusively for bidding and executing the project "Construction for Widening & Strengthening of existing carriage way to 2 lane for Bhawanipatna to Khariar (Km. 20 to 700 of SH-16)" floated by Chief Engineer, World Bank Project, Norman Soudra, Ground Floor, Bhubaneswar;

WHEREAS for smooth functioning of the said bidding and its execution, we both the parties jointly do hereby constitute, appoint and authorize Mr. S.P. Dash who is presently employed with M/s ARSS Infrastructure Projects Limited, Plot No.-3B, Sector-A, Zone-D, M.E.E, Bhubaneswar-III and holding the position of General Manager as our attorney, in our own name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the work of "Construction for Widening & Strengthening of existing carriage way to 2 lane for Bhawanipatna to Khariar (Km. 20 to 700 of SH-16)", including signing and submission of all documents and providing information / responses to Chief Engineer, Orissa World Bank Projects representing us in all matters dealing with World Bank Project of Tender for the said project.

WHEREAS this Power of Attorney does not permit the Attorney to sign and execute and/or appoint any other persons and/or proxies as an Attorney on behalf of the said JV

WHEREAS this Power of Attorney does not permit the Attorney to sign and execute and/or generate any financial liabilities for and on behalf of the parties to this JV and/or the JV

WHEREAS this Power of Attorney will automatically stand terminated if the said project is not awarded to the JV and/or withdrawn on completion of the execution of the Project

WHEREAS any action arising out of this Power of Attorney would be taken to the best interests of our joint venture in Mumbai only

For ARSS Infrastructure Projects Limited  
*MKS*  
Authorized Signatory



*S. Dharma*  
Chief Engineer  
World Bank Project, Orissa  
World Bank Projects  
to the E.I.C (Civil) Office  
Bhubaneswar

*[Signature]*

05.01.2008  
Sarat Kumar Bhaugya  
NOTARY BHUBANESWAR  
State of Orissa (India)  
Regd. No. 43/2003

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney  
pursuant to his Power of Attorney and that all acts, deeds and things done by our  
aforesaid attorney shall and shall always be deemed to have been done by us

SIGNED AND DELIVERED FOR AND ON BEHALF OF:

*[Signature]*  
Signature of Mr. S.P. Dash

For PATEL INFRASTRUCTURE LIMITED

*[Signature]*  
Ajaywan Shaha  
General Manager (Projects)

For ARSS INFRASTRUCTURE PROJECTS LTD.

*[Signature]*  
TRAJESH AGARWAL  
MANAGING DIRECTOR

Witness:

Witness 1 *[Signature]*  
Name: PRANIT JOSHI  
Address: *[Address]*  
Occupation: Service

Witness 2 *[Signature]*  
Name: Jyotiransu Pattnayak  
Address: *[Address]*  
Occupation: Service



Attested

*[Signature]*

05.01.2008  
Sarat Kumar Bhaugya  
NOTARY BHUBANESWAR  
State of Orissa (India)  
Regd. No. 43/2003



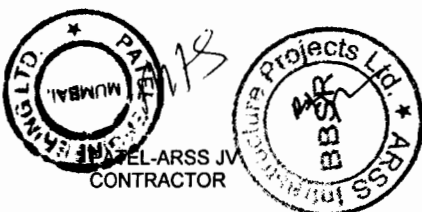
PATEL ARSS IV  
CONTRACTOR




World Bank Project Under  
Water Supply and Sewerage  
Sector Sub-project  
of the EIC (Civil) Orissa,  
Bhubaneswar

## ELI - 2: JV Information Sheet

JV / Specialist Subcontractor Information	
Bidder's legal name	PATEL-ARSS (J.V)
JV Partner's or Subcontractor's legal name	PATEL ENGINEERING LTD. ( LEAD PARTNER)
JV Partner's or Subcontractor's country of constitution	India
JV Partner's or Subcontractor's year of constitution	1999
JV Partner's or Subcontractor's legal address in country of constitution	Patel Engineering Limited , Patel Estate Road, Jogeswari (W), Mumbai-400102 , India.
JV Partner's or Subcontractor's authorized representative information <small>(name, address, telephone numbers, fax numbers, e-mail address)</small>	Mr. S.P.Dash Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa. Tel: 0674-2588552, 2588554 Fax: 0674-2585074 Email: response@arssgroup.in
Attached the Following Documents	
<ul style="list-style-type: none"> <li>• Certificate of Incorporation</li> <li>• Resolution to sign the documents</li> </ul>	



PATEL-ARSS JV  
CONTRACTOR

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









**PATEL ENGINEERING LTD.**

**EXTRACT FROM THE MINUTES OF THE MEETING OF THE BOARD OF DIRECTORS OF PATEL ENGINEERING LIMITED HELD ON DECEMBER 07, 2007 AT THE REGISTERED OFFICE OF THE COMPANY IN MUMBAI.**

“RESOLVED THAT approval of the Board be and is hereby granted to Mr. Ashwin Shah, General Manager - Projects, to enter into Joint Venture Agreement on behalf of the Company with ARSS Infrastructure Pvt. Ltd. having its registered office at Sector-A, Zone-D, Plot No.38, Mancheswar Industrial Estate, Bhubaneswar - 751010 (Orissa) to jointly bid in the name and style of “PATEL-ARSS J.V.” for “Widening & Strengthening of existing Carriageway to 2-Lane Road from Bhawanipatna to Khariar (Km. 2/0 to 70/0 of SH-16)” for Chief Engineer, World Bank Projects, Nirman Soudha, Bhubaneswar. (Orissa State Road Projects).”

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

CERTIFIED TRUE COPY  
For PATEL ENGINEERING LTD.

*Hosha Metty*  
Company Secretary.

*[Handwritten signature]*



PATEL-ARSS JV  
CONTRACTOR



REGD OFFICE :

Patel Estate Road, Jogeshwari (W), Mumbai - 400 102. India

Phone +91 22 26767500, 26782916 • Fax +91 22 26782455, 26781505

E-mail headoffice@pateleng.com

www.pateleng.com

*[Handwritten signature]*  
Chief Engineer

World Bank Projects, Orissa  
EMPLOYER

to the E.I.C (Civil) Orissa  
Bhubaneswar:

## ELI - 2: JV Information Sheet


JV / Specialist Subcontractor Information	
<b>Bidder's legal name</b>	<b>PATEL - ARSS (J.V)</b>
<b>JV Partner's or Subcontractor's legal name</b>	<b>ARSS INFRASTRUCTURE PROJECTS LTD. (PARTNER)</b>
<b>JV Partner's or Subcontractor's country of constitution</b>	<b>India</b>
<b>JV Partner's or Subcontractor's year of constitution</b>	<b>2000</b>
<b>JV Partner's or Subcontractor's legal address in country of constitution</b>	<b>Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa.</b>
<b>JV Partner's or Subcontractor's authorized representative information</b> <small>(name, address, telephone numbers, fax numbers, e-mail address)</small>	<b>Mr. S.P.Dash</b> <b>Plot No-38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar- 751010, Orissa.</b> <b>Tel: 0674-2588552, 2588554</b> <b>Fax: 0674-2585074</b> <b>Email: response@arssgroup.in</b>
<b>Attached the Following Documents</b>	
<ul style="list-style-type: none"> <li>• <b>Certificate of Incorporation</b></li> <li>• <b>Resolution to sign the documents</b></li> </ul>	



PATEL-ARSS JV  
CONTRACTOR



Volume-I Page 32

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



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

कॉर्पोरेट पहचान संख्या: U141G3OR2000PLC006230

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

मेरे हस्ताक्षर द्वारा कदक 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 : U141G3OR2000PLC006230

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.



*Bibekanta*  
(MOHANTY BIBEKANANDA)  
Registrar of Companies  
Orissa  
World Bank Project  
Uttara  
Orissa  
On the E.I.C. (India) Project  
Phone No. 240



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 20<sup>th</sup> May, 2005 having passed necessary resolution on 15<sup>TH</sup> 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.

  
(B. MOHANTY)  
REGISTRAR OF COMPANIES, ORISSA.

कम्पनी रजिस्ट्रार  
Registrar of Companies  
उड़ीसा / Orissa





**M/S. ARSS INFRASTRUCTURE PROJECTS PRIVATE LIMITED.**

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

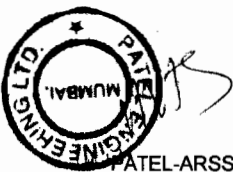
(SECTION 18(1) OF THE COMPANIES ACT, 1956).

**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 *26<sup>TH</sup> 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*  
( **B. MOHANTY** )  
**REGISTRAR OF COMPANIES,**  
**ORISSA**

कम्पनी रजिस्ट्रार  
Registrar of Companies  
उड़ीसा / Orissa



PATEL-ARSS JV  
CONTRACTOR



Volume-I Page 35

Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa  
Rhubaneswar



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 19<sup>th</sup> 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 20<sup>th</sup> 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



PATEL-ARSS JV  
CONTRACTOR



Volume-I Page 36

*J. ...*  
Chief Engineer  
World Bank Projects, Orissa  
Water & Power Projects  
to the E.I.C. (Civil) Group  
Bhubaneswar

**GOVERNMENT OF INDIA**  
**MINISTRY OF COMPANY AFFAIRS**  
**OFFICE OF THE REGISTRAR OF COMPANIES, ORISSA**  
**CHALACHITRA BHAWAN, 2<sup>ND</sup> FLOOR, BUXI BAZAR,**  
**CUTTACK : 753 001**

NO.TS/S.21/6230/410

DATED, THE 20<sup>th</sup> May, 2005.

To,

M/s. Arss Stones Private Limited,  
Plot No. 38, Sector : A, Zone : D,  
Manchoawar, Bhubaneswar.

**Sub: Change of name – Approval of the Central Government Under Section 21 of the Companies Act, 1956.**

Sir,

With reference to the correspondence resting with your intimation/letter No. Nil dated 20.05.2005 I hereby approve and signify in writing under Section 21 of the Companies Act, 1956 read with Government of India, Ministry of Company Affairs's Notification No. GSR 507(E) dated 24<sup>th</sup> June, 1986, the change of the name of the company from \* ARSS STONES PRIVATE LIMITED" to "ARSS INFRASTRUCTURE PROJECTS PRIVATE LIMITED". I have, however, to point out that the compliance with the provisions of Section 23(1) of the Act will continue to be necessary for effecting the change of name and I have accordingly to advise you to take necessary action in this behalf.

Yours faithfully,

  
(B. MOHANTY)  
REGISTRAR OF COMPANIES, ORISSA

Endorsement No. TS/S.21/6230/411(2) Dated, the 20<sup>th</sup> MAY, 2005.

Copy forwarded for information to :

1. The Regional Director, Eastern Region, Ministry of Company Affairs, Kolkata : 700 020.
2. The Secretary to the Government of India, Ministry of Company Affairs, Shastri Bhawan, "A" Wing, 5<sup>th</sup> floor, Dr. B. P. Road, New Delhi: 110 001.

REGISTRAR



ARSS STONES PRIVATE LIMITED  
CONTRACTOR



Volume-I Page 37

  
World Bank  
World Bank  
to the E I C (Civil) Group  
Bhubaneswar



# 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 4<sup>TH</sup> JANUARY, 2008 AT 11.00 A.M.**

**"RESOLVED THAT** approval of the Board be and is hereby granted to enter into a Joint Venture Agreement with **PATEL ENGINEERING LTD.**, Patel Estate Road, Jogeswari (W), Mumbai - 400 102. in the name and style of "PATEL - ARSS J.V." with effect from 8<sup>th</sup> January, 2008 for the DAMODAR VALLEY CORPORATION for **"Widening & Strengthening of existing Carriageway to 2-Lane Road from Bhawanipatna to Khariar (Km. 2/0 to 70/0 of SH-16)."**

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

**"RESOLVED FURTHER THAT** Mr. S.P. Dash, General Manager of the company be and is hereby authorized to sign and execute the said Joint Venture Agreement and do all such acts, deeds and things as may be necessary to give effect or any matter incidental or ancillary in this regard.

Certified true copy,

For ARSS INFRASTRUCTURE PROJECTS LTD.

*[Signature]*  
Managing Director

PATEL-ARSS (J.V.)

*[Signature]*  
Authorised Signatory



*[Signature]*  
Chief Engineer



## Technical Proposal

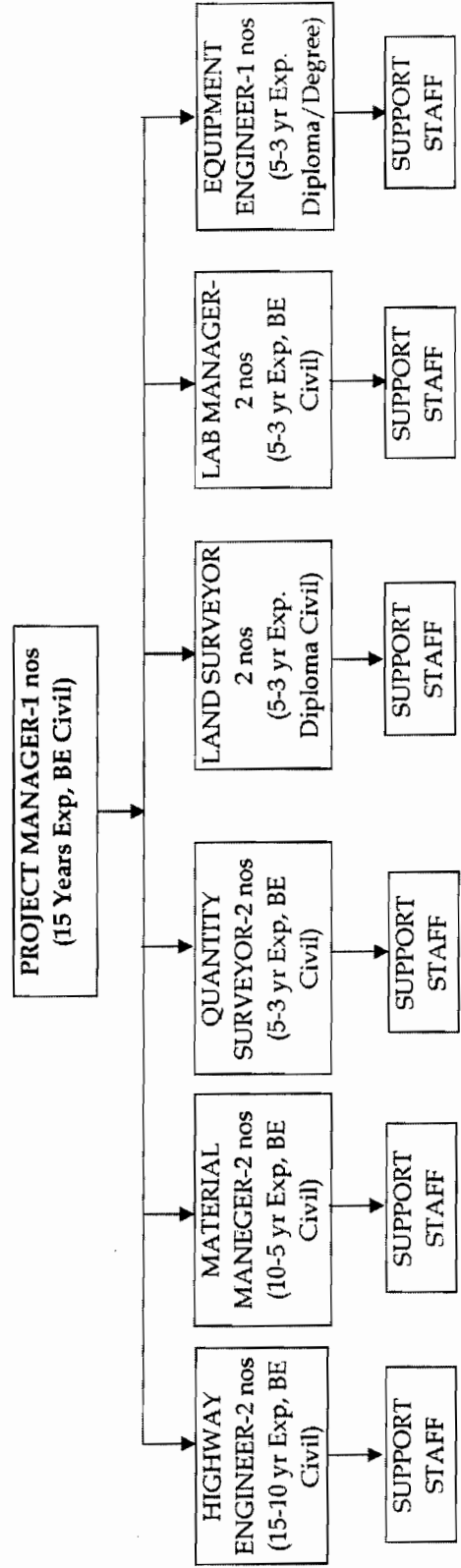
- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **Equipment**
- **Others**



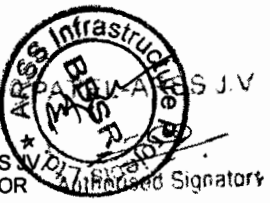
Widening & Strengthening of existing carriageway to 2-lane road from Bhawanaipatna to Khariar (Km. 2/0 to 70/0 of SH-16)

SITE ORGANISATION

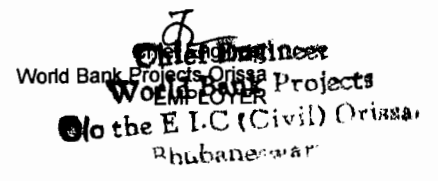
PATEL - ARSS I.V



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



PATEL-ARSS CONTRACTOR



## Method Statement

### 1. Introduction:-

The section of Bhawanipatna to Khariar from chainage 2/000 KM to 70/000KM of SH-16 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 sub-grade, providing GSB, WMM, DBM, and BC including widening of CD works and Bridges. 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, Concrete Mixer, Vibrators, De-watering pump, Concret Batch mix plants, Staging materials. 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.
- (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

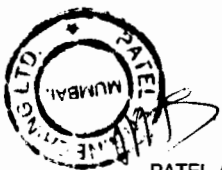


codes. The detail methodology for execution of this item shall be prepared separately in consultation with the Engineer.

- (iii) **Construction of Granular Sub base:** Granular sub base shall be done with approved close graded materials of grading-I of clause 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 And Bridges-** The Culvert and Bridges shall be given top priority and advance planning shall be done to test the materials , prepare design mix, arranges adequate staging and shuttering materials etc. . All works shall be carried out as per technical specification and MoR&TH guidelines.
- (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



PATEL-ARSS JV  
CONTRACTOR



Chief Engineer  
World Bank Projects, Mumbai  
World Bank EMPLOYER Project  
to the E.I.C (Civil) Office  
Rhubaneswar

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.



*[Handwritten Signature]*  
PATEL-ARSS J  
CONTRACTOR



*[Handwritten Signature]*  
Chief Engineer  
World Bank Projects, Orissa  
WORLD BANK PROJECTS  
to the E.I.C (Civil) Orissa  
Rhubaneswar

## Mobilization Schedule

### PATEL ARSS JV

<b>Man Power</b>	<b>Start Date</b>	7 days from Signing Agreement
	<b>Completion Date</b>	50 days from Signing Agreement
<b>Machinery</b>	<b>Start Date</b>	15 days from Signing Agreement
	<b>Completion Date</b>	90 days from Signing Agreement

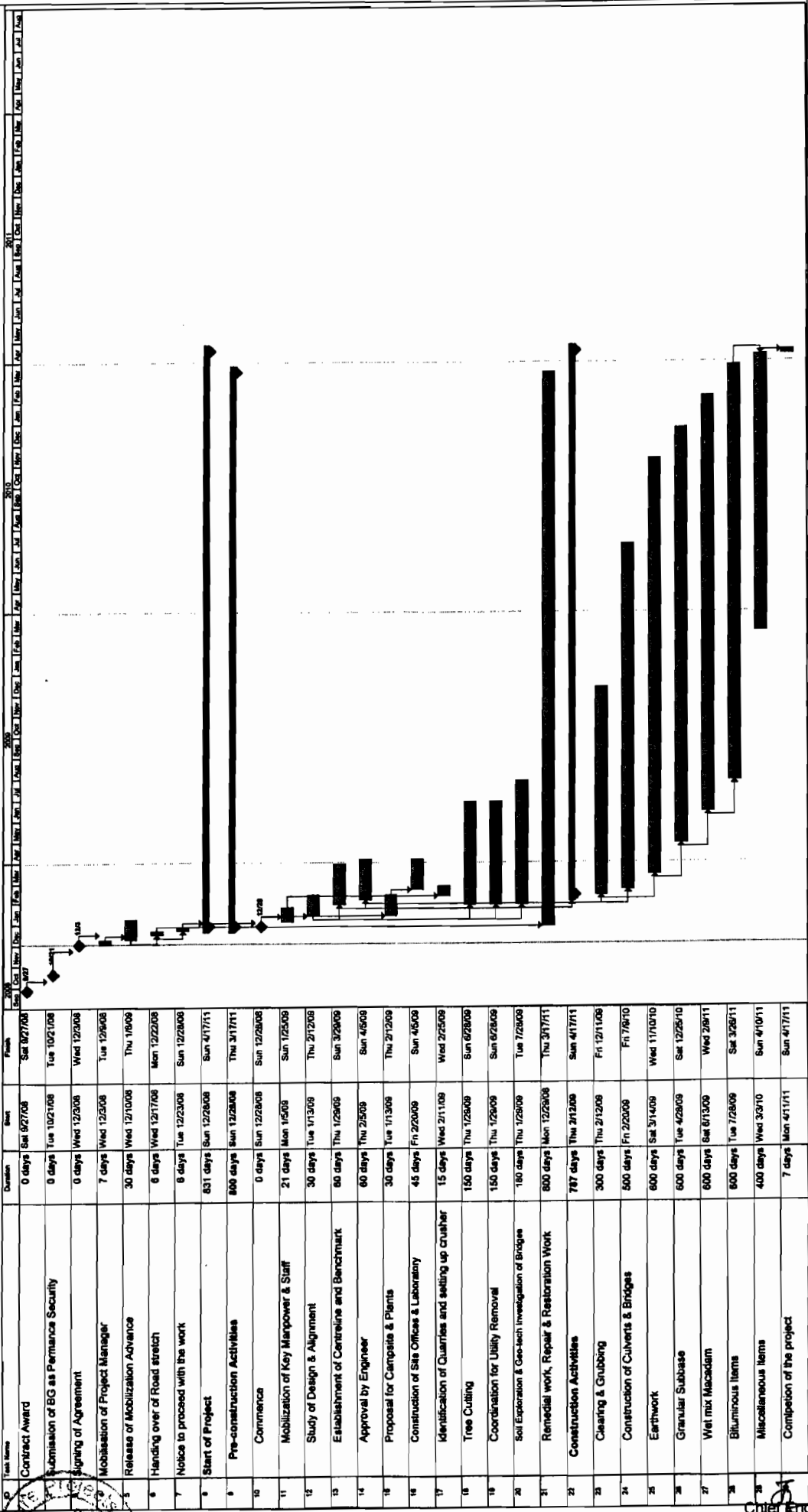


Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa,  
Bhubaneswar



**PATEL ARSS JV**  
CONTRACTOR

**WORK PROGRAMME FOR CIVIL WORKS PACKAGE No. OSRP-CW-ICB-Y1-P1 - " BHAWANIPATNA - KHARIAR ROAD"**



Start	End	Duration	Task Name
Sat 02/01/08	Sat 02/01/08	0 days	Contract Award
Tue 10/02/08	Tue 10/02/08	0 days	Submission of BG as Performance Security
Wed 12/03/08	Wed 12/03/08	0 days	Signing of Agreement
Tue 12/04/08	Tue 12/04/08	7 days	Mobilisation of Project Manager
Thu 18/05/08	Thu 18/05/08	30 days	Release of Mobilization Advance
Mon 12/06/08	Mon 12/06/08	6 days	Handing over of Road stretch
Sun 12/06/08	Sun 12/06/08	6 days	Notice to proceed with the work
Sun 4/11/11	Sun 4/11/11	631 days	Start of Project
Thu 3/11/11	Thu 3/11/11	800 days	Pre-construction Activities
Sun 12/08/08	Sun 12/08/08	0 days	Commence
Sun 12/05/09	Sun 12/05/09	21 days	Mobilization of Key Manpower & Staff
Thu 2/12/08	Thu 2/12/08	30 days	Study of Design & Alignment
Sun 3/28/09	Sun 3/28/09	80 days	Establishment of Centreline and Benchmark
Sun 4/05/09	Sun 4/05/09	60 days	Approval by Engineer
Thu 2/12/09	Thu 2/12/09	30 days	Proposal for Campsite & Plants
Sun 4/05/09	Sun 4/05/09	45 days	Construction of Site Offices & Laboratory
Wed 2/25/09	Wed 2/25/09	15 days	Identification of Quarries and setting up crusher
Sun 6/28/09	Sun 6/28/09	150 days	Tree Cutting
Sun 6/28/09	Sun 6/28/09	150 days	Coordination for Utility Removal
Tue 7/26/09	Tue 7/26/09	180 days	Soil Exploration & Geo-tech Investigation of Bridges
Thu 3/17/11	Thu 3/17/11	800 days	Remedial work, Repair & Restoration Work
Sun 4/17/11	Sun 4/17/11	787 days	Construction Activities
Fri 12/11/09	Fri 12/11/09	300 days	Clearing & Grubbing
Fri 7/8/10	Fri 7/8/10	500 days	Construction of Culverts & Bridges
Wed 11/10/10	Wed 11/10/10	600 days	Earthwork
Sat 12/25/10	Sat 12/25/10	600 days	Granular Subbase
Wed 29/11	Wed 29/11	600 days	Wet mix Macadam
Sat 3/26/11	Sat 3/26/11	600 days	Bituminous Items
Sun 4/10/11	Sun 4/10/11	400 days	Miscellaneous Items
Sun 4/17/11	Sun 4/17/11	7 days	Completion of the project

*Handwritten signature or initials.*

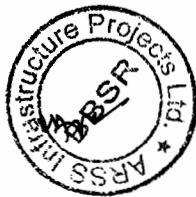


## Minimum Requirement of Equipment


No.	Equipment Type and 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



PATEL-ARSS JV  
CONTRACTOR



Volume-I Page 47

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

## Equipment

### PLANTS AND EQUIPMENTS PROPOSED FOR THE PROJECT BY M/s PATEL ENGINEERING LTD, MUMBAI

1.

<b>Item of equipment:- Motor Grader- 1 No</b>		
Equipment information	Name of manufacturer: KOMATSU	Model and power rating 120H SR.NO.5FM 01953
	Capacity 120 H	Year of manufacture 2001
Current status	Current location VAPI	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

2.

<b>Item of equipment:- Motor Grader-1No</b>		
Equipment information	Name of manufacturer: KOMATSU	Model and power rating GD 511A -1
	Capacity 200 Cum/Hr.	Year of manufacture 2001
Current status	Current location KRISHANAGIRI	
	Details of current commitments <b>Free.</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

3.

<b>Item of equipment: Hydraulic Excavator- 1 No</b>		
Equipment information	Name of manufacturer HITACHI	Model and power rating EX 200-1-145-44787
	Capacity 60 Cum/Hr.	Year of manufacture 1999
Current status	Current location NELLORE	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



PATEL-ARSS JV  
CONTRACTOR



4.

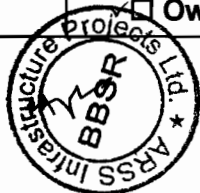
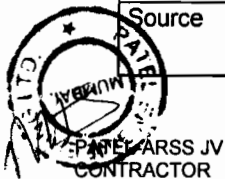
Item of equipment: <b>Vibratory Roller- 1 No</b>		
Equipment information	Name of manufacturer INGERSOLL-RAND	Model and power rating ISD 100
	Capacity 10 Ton	Year of manufacture 2002
Current status	Current location KRISHANAGIRI	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

5.

Item of equipment: <b>Vibratory Roller- 1 No</b>		
Equipment information	Name of manufacturer INGERSOLL-RAND	Model and power rating ISD 100
	Capacity 10 Ton	Year of manufacture 2001
Current status	Current location NELLORE	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

6.

Item of equipment: <b>Pneumatic Roller – 1 Nos</b>		
Equipment information	Name of manufacturer INGERSOLL RAND	Model and power rating RTR 220
	Capacity RTR - 220	Year of manufacture 2002
Current status	Current location NELLORE	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



7.

Item of equipment: <b>Front End Loader – 1 No</b>		
Equipment information	Name of manufacturer ESCORT	Model and power rating L 700
	Capacity 0.5 Cum/Hr.	Year of manufacture 1979
Current status	Current location PANVEL	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

8.

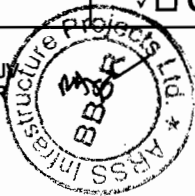
Item of equipment: <b>Dozer – 1 No</b>		
Equipment information	Name of manufacturer KOMATSU	Model and power rating D 60
	Capacity 150 Cum/Hr.	Year of manufacture 2001
Current status	Current location NELLORE	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

9.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating VSE 410482
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location VAPI	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



PATEL-ARSS JV  
CONTRACTOR



Chief Engineer  
World Bank Projects Office  
Mumbai  
To the E.I.C (Civil) Office  
Bhubaneswar

10.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating WSE 409595
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location VAPI	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

11.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating SXE 383484
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

12.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating BZE 383787
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



PATEL-ARSS JV  
CONTRACTOR



13.

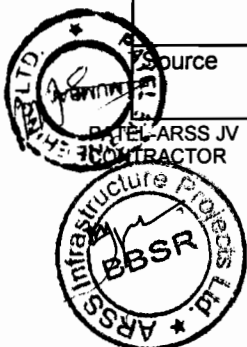
Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating BZE 386232
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

14.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating CZE 386615
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

15.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating MXE 374806
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



16.

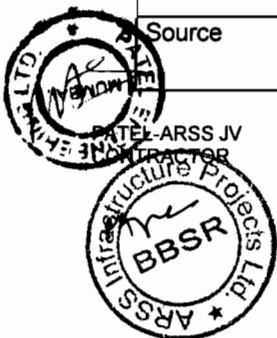
Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating LXE 372520
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

17.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating DZE 383746
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

18.

Item of equipment: <b>Tipper- 1 No</b>		
Equipment information	Name of manufacturer ASHOK LEYLAND	Model and power rating CZE 386499
	Capacity 5 Cum	Year of manufacture 1998
Current status	Current location SRISAILAM	
	Details of current commitments <b>Free</b>	
Source	Indicate source of the equipment <input checked="" type="checkbox"/> <b>Owned</b> <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.

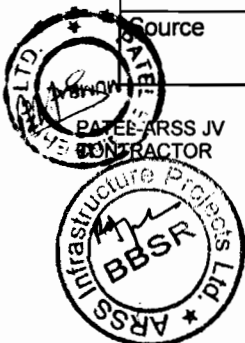
Item of equipment: <b>Mechanical Bitumen Sensor Paver- 1 No</b>		
Equipment information	Name of manufacturer:-	Model and power rating
	Capacity 100 TPH	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

2.

Item of equipment: <b>Motor Grader- 1 No</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>200 Cum/ Hr</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
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: <b>Hydraulic Excavator- 1 No</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>60 Cum/Hour</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



Chief Engineer  
 World Bank Project, Bhubaneswar  
 EMPLOYER  
 World Bank Projects  
 to the E.I.C (Civil) Office  
 Bhubaneswar



4.

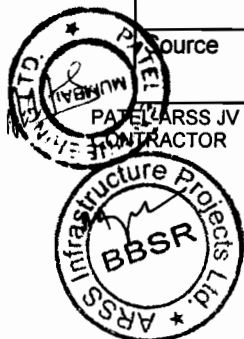
Item of equipment: <b>Vibratory Roller- 1 No</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>100 Cum/Hr</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
Source	Indicate source of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

5.

Item of equipment: <b>Pneumatic Roller-2 No.</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>25Cum/Hr</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
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: <b>Hot Mix Plant – 1 No</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>100 TPH</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



7.

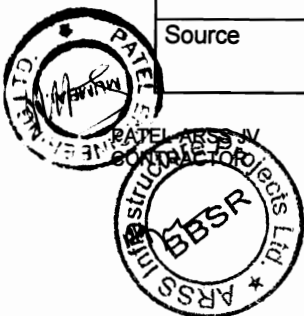
Item of equipment: <b>Concrete Batch-mix Plant – 1 No</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 75 Cum/Hr.	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

8.

Item of equipment: <b>Transit Mixer- 1 No</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity 4.5 Cum/Hr.	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
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: <b>Front End Loader-1 No.</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>4 Cum/Hour</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED</b>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

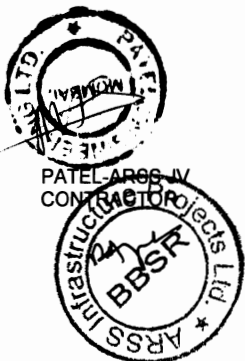


10.

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

11.

Item of equipment: <b>Tipper-10 Nos</b>		
Equipment information	Name of manufacturer	Model and power rating
	Capacity <b>5 Cum</b>	Year of manufacture
Current status	Current location <b>TO BE PURCHASED</b>	
	Details of current commitments <b>TO BE PURCHASED.</b>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	



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

### 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.



## PERSONNEL

### PERSONNEL PROPOSED FOR THE PROJECT BY M/S PATEL-ARSS JV.

1.	Title of position* PROJECT MANAGER
	Name – Mr. Suryakant Wali
2.	Title of position* HIGHWAY ENGINEER
	Name –Shri K Palanichamy
	Name – Shri Gambher Singh
3.	Title of position* MATERIAL & QUALITY CONTROL ENGINEER
	Name – Shri U. Vasantharao
	Name – Shri Jitendra Kumar Singh
4.	Title of position* QUANTITY SURVEYOR
	Name – Shri Rajnish Malik
	Name – Shri Santosh Sharma
5.	Title of position* LAB MANAGER/ TECHNICIAN
	Name – Shri M.Saviour Raj
	Name – Shri Deepak Jesudas A
6.	Title of position* LAND SURVEYER
	Name – Shri Ashok Kumar
	Name – Shri Sudhanshu Bhusan Jena
7.	Title of position* MACH./ EQUIP.MAINT.ENGINEER
	Name – Shri Krishna Mohan Mund

\*As listed in Section III.



## Form PER-2: Resume of Proposed Personnel

Name of Bidder : **PATEL - ARSS (J.V.)**

<b>Position : Project Manager</b>		
Personnel information	Name : <b>Mr. Suryakant Wali</b>	Date of Birth: <b>01.08.1960</b>
	Professional qualifications : <b>Degree in Civil Engineering</b>	
Present employment	Name of employer	<b>Patel Estate, S.V. Road,</b>
	Address of employer	<b>Patel Estate, S.V. Road, Jogeswari (W), Mumbai - 400102</b>
	Telephone <b>022- 2678 2916/2560/4410</b>	Contact : <b>022- 2678 2916/2560/4410</b>
	Fax: <b>022-2678 2455/1505</b>	E-mail: <b><u>headoffice@pateleng.com</u></b>
	Job title: <b>Project Manager</b>	Years with present employer: <b>12 Years</b>

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

From	To	Company/Project/Position/Relevant technical and management experience
		DETAIL BIO DATA ENCLOSED



PATEL-ARSS JV  
CONTRACTOR

*[Handwritten signature]*

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

## CURRICULUM VITAE

NAME OF THE STAFF	MR. SURYAKANT K. WALI
NAME OF THE FIRM	PATEL ENGINEERING LIMITED.
DATE OF BIRTH	1 <sup>ST</sup> AUGUST 1960
NATIONALITY	INDIAN
CORRESPONDENCE ADDRESS:	Sangam Agencies, 10-6/5, N.V. Complex, Opp. Sangameshwar Sabhagraha, S.B. Temple Road, Gulbarg 585 103, Karnataka
CONTACT NUMBER:	+91 99671 09179
YEARS WITH PRESENT FIRM	12 YEARS
TOTAL EXPERIENCE IN YEAR:	18 YEARS.
EDUCATIONAL QUALIFICATION:	B.E (CIVIL) FIRST CLASS FROM, GULBARGA UNIVERSITY (1989)
LICENSES	BMC, License (Bombay) for quality checking of construction work in Municipal area of Mumbai city

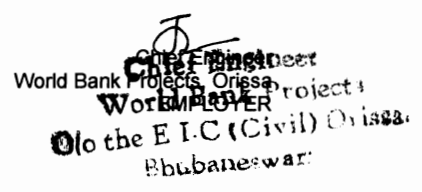
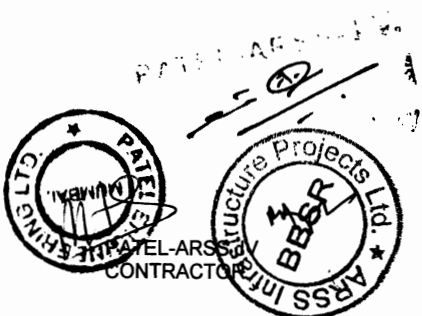
**EXPERIENCE**  
**2007 ONWARDS**  
DEPUTY PROJECT MANAGER, PATEL ENGINEERING LTD, AT PUNE FOR CONSTRUCTION OF ROAD PROJECT UNDER PMC. RESPONSIBLE FOR THE PLAINING & EXECUTION OF THE WORK AT SITE.

**2005-2006**  
CHIEF ENGINEER, PATEL ENGINEERING LIMITED AT SRISALAIM L.B.H.E SCHEME SITE, ANDHRA PRADESH Srisailam Concrete Dam & Irrigation Project (Bhima Lift Irrigation Project).

**2001-2005**  
ASSISTANT CHIEF ENGINEER, PATEL ENGINEERING LIMITED AT SURAT - MANOR TOLL PROJECT, NH-8, National Highway Road Works as Incharge Earthwork to B.T. Work. - Project Cost Rs. 200 Crore.

**1995-2001**  
SENIOR ENGINEER, PATEL ENGINEERING LIMITED, AT SRISAILAM HYDROELECTRIC PROJECT  
Project involves civil works from HRT to TRT, 9.7km of tunneling dia. Varing from 6.0m to 16.1m, power house cavern, transformer cavern and Surge chamber, 6 nos. inclined pressure shaft. Overall supervision & monitoring of the power house  
Work profile included right from procuring of contract till handling over of total project to clients, taking care of intermeadiay for successfully execution of the timely work of the total project with the cost saving.  
Extensive experience in the infrastructure project of different kind & totally responsible person handling medium to the large project

Also worked in Hydro project, Highway project, Mass housing project & provision of the utilities of the Metro politian cities with expertise of project management, material management, team work



**1992-1995**

EXECUTIVE ENGINEER, PATEL ENGINEERING LIMITED.

Worked as Executive Engineer in Koyna H.E. Project. Supervision of shaft at Koyna 21m finished dia. & 131m deep.

**March-1990-1992**

ORIENTAL STRUCTURE INDIA LTD.

Worked as Project Engineer road works projects from Allapur to Ankola State Highway. Project Cost Rs. 100.00 Crores

**Nov-1989-Feb-1990**

Assistant Civil Engineer in Thampi & Sons Constructions, Bombay (Chembur)

Work profile includes preparation of Estimate of Building Works, factory. Supervision of execution of Building Works.

PATEL-ARSS  
Authorized Signatory



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



## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

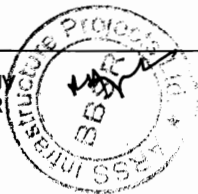
Position : <b>Highway Engineer</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name : <b>Shri K Palanichamy</b></td> <td style="width: 50%; padding: 2px;">Date of Birth : <b>20.04.1966</b></td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications : <b>B.E. Civil</b></td> </tr> </table>	Name : <b>Shri K Palanichamy</b>	Date of Birth : <b>20.04.1966</b>	Professional qualifications : <b>B.E. Civil</b>							
Name : <b>Shri K Palanichamy</b>	Date of Birth : <b>20.04.1966</b>										
Professional qualifications : <b>B.E. Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name of employer :</td> <td style="width: 50%; padding: 2px;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 2px;">Address of employer</td> <td style="padding: 2px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 2px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 2px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 2px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 2px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 2px;">Job title: <b>Highway Engineer</b></td> <td style="padding: 2px;">Years with present employer <b>From 30<sup>th</sup> October 2008</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Highway Engineer</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Highway Engineer</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



PATEL-ARSS JV  
CONTRACTOR



NAME: K Palanichamy  
DATE OF BIRTH: 20.04.1966  
NATIONALITY: Indian  
EDUCATION: Bachelor of Civil Engineering.

PASSPORT DETAILS: Pass port No: E3507825.

E-mail Id: [kpchamy@hotmail.com](mailto:kpchamy@hotmail.com), [kpvalli@yahoo.com](mailto:kpvalli@yahoo.com)

Contact No: 09424203302 , 044 424866726(Residence),0919840187788

#### KEY QUALIFICATIONS

I am having 19 years of professional experience in the field of civil engineering. Out of 19years, I have more than 16 years experience mainly in construction of highway construction for external aided projects in India and abroad.

At Present I am working as a Project Manager in ADB funded project at Chattisgarh state, Contract Value of the Project Rs 130 Crs. Previously I had been an Asst General Manager (Planning & Monitoring) for a Malaysian Infrastructure subsidiary company at Chennai during that period I was handling ten projects spread all over India. Before joining Malaysian Infrastructure subsidiary company I worked as construction Manager for New Doha International Airport project (Roads), Doha, Qatar. Before leaving to Qatar I have been assigned as Quality control Engineer for Information Technology corridor Road Project in Chennai - Tamil Nadu. I have worked as Material Engineer for Improvements contracts of state Highways in Kerala funded by World Bank Prior to this I was involved in quality auditing of road works in Karnataka. I have more than 3 years of experience in technical audit of roads. Well conversant with FIDIC contract provisions, relevant IRC, IS and MORTH and international specifications. I have more than 3 years of international experience in prestigious road construction projects in Oman that were subject to total quality management procedures.

PATEL 1190-IV.



PATEL-ARSS JV  
CONTRACTOR



Volume-I Page 84

(Page 1 of 6)

World Bank Project  
World Bank Project  
Of the E I C (Civil) Division  
Pune, India

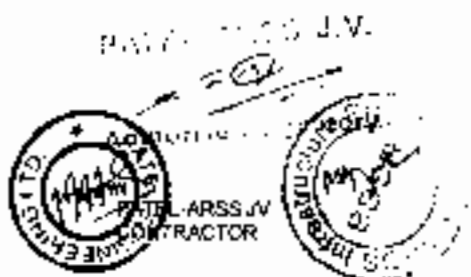
## EMPLOYMENT RECORD

Sept-2007 to till date	Project Manager, Progressive Constructions Ltd, Hyderabad, India.
August 2006 to Sept - 2007	Asst-General Manager (Planning & Monitoring) SAAG RR Infra Ltd, Chennai -04, India
January 2006 to August 2006	Construction Manager, MIDMAC CONTRACTING CO. WLL, Doha, Qatar.
Jun 2001 -December 2005	Principal engineer, Withur Smith Associates, India
April 1997- April 2001	Project Manager, Sindhu Construction Company. Chennai, India
Feb 96 -Mar 97	Project Engineer, Galfar Engineering Contracting LLC for Development of Sur Town Phase A3, Muscat
April 1995- Feb 1996	Site Engineer, Galfar Engineering & Contracting LLC, Dualization of Hamaria Road in Muscat
Dec 1993- Mar 1995	Roads Engineer, Galfar Engineering & Contracting LLC, Muscat
1988- Dec 1993	Site Manager, Tarmac Construction Company. Chennai

## PROFESSIONAL EXPERIENCE

### August 2006 to Sept 2007:

Asst-General Manager (Planning & Monitoring)- my responsibility are preparing all planning schedule for all projects , co-coordinating with clients , monitoring all projects with planning schedule and resource management. Preparing the weekly and monthly reports regarding progress of all projects.



January 2006 to August 2006:

As a Construction manager -New Doha International Airport, my responsibility are Preparing all construction Schedule and preparation of method statement, liaises with consultants and monitoring all site activities as per project master programme.

Jun 2001 to December 2005:

I worked as Highway Engineer cum Quality control Engineer for Information Technology corridor Road Project in Chennai- Tamil Nadu, Which costs Rs 120 Crores. My Responsibility are checking all drawing and contract specifications given in contract documents. Supervising all works and approving the same, monitoring contractors work progress. Approving all construction materials and coordinating for Design of concrete, Asphalt mix.

Kerala Highways Improvement contract - Funded by World Bank, Which costs Rs 100 Crs As Material Engineer my responsibility are preparing the project Quality Assurance and Quality control plans, Work methodology, Quality control test reports, testing of all construction materials and approval, and overall Supervision of Work. Training to PWD Engineers.

Design of concrete mix,

- Checking all Individual and combined grading of aggregates and sand
- Checking the cement properties (consistency, Initial, Final setting time, 28days strength)
- Arriving the Proportions of aggregates, sand and cement
- Conducting laboratory trial to ascertain the slump requirement (for workability) and cast cubes for checking 28 days strength.

Design of Asphalt mix (Dense bitumen Macadam, Bituminous concrete)

- Approving the source by conducting Impact value and Abrasion test.
- Checking the Flakiness and Elongation indices of all aggregates
- Checking the individual grading of aggregates and filler material
- Checking Sp.Gravity of all aggregates and filler material.
- Fixing proportions of aggregates and filler based on the grading requirement of Project specifications
- Conducting laboratory trial by Marshal method and arriving the asphalt content.
- Checking Plant trial with lab results and adjusting the grading, asphalt content if any variations observed.
- Finally checking Site trial like compaction, surface finish.

As Team Leader DFID-APUSP Civil Works Detailed Design in Kukkatpally and Malgajjiri Municipalities (Andhra Pradesh Urban Services for the poor-APUSP)

The project includes preparation of detailed designs, drawings and tender documents for Kukkatpally and Malgajjiri municipalities. The works includes roadways, drains, water supply, sewerage lines etc. and total cost is about 7.8 crores. Road designs were carried out using MX and water supply using LOOP software, I was responsible for coordinating and scheduling the whole project checking all draft reports and drawing and Bid documents. Training the Municipal engineers in design and quality checking at fields during construction.



Quality consultants for Maintenance contracts of Highways in Karnataka (HUDCO aided).

It is an independent quality consultancy to oversee the maintenance contracts for 6 divisions. It is a 500 km length of State Highways. Check the quality of work on random sample basis covering twenty-five percent of the work executed.

*The duties involved are:*

- Performance Evaluation of the Road.
- Condition of Pavement
- Getting the materials retested by the contractor wherever found necessary.
- Verification for Adherence to standards.

**Dec. 1997 To Jun 2001**

As Project Manager for Development of satellite town near Chennai cost of the project was 10.0 crores and Gauge conversion (Indian Railway) work from Chengalpattu to Kanchipuram the cost of the work was 30.0 crores.

*The duties involved are:*

- Getting all government approval for taking borrow material.
- Testing all materials for filling and leveling
- Coordinating with clients and consultants
- Quality control tests during constructions
- Preparing running bills
- Monitoring daily and monthly progress of work.

**Dec. 1993 - March 1997**

*Roads Engineer in Galfar Engineering & Contracting LLC, Muscat (An ISO 9002 Company)*

*Duties Involved are:*

- As a Lab In charge of Nizwa Industrial estate Project (1 Lac Cum Filling)
- Selection of Borrow Pits
- Materials testing (Proctor Test, CBR, Test, Sieve Analysis and P.L. Tests)
- Getting materials approvals from Consultants
- Conducting all field tests with consultants
- Testing of aggregates and sand for concreting purpose (Crushing Value, Impact value and Abrasion test for aggregate)



**Site Engineer for Dualization of Hamarlya Road in Muscat R.O. 3 Million**

**Duties Involved are:**

- Giving alignment for excavation to 1 km long storm water pipe line (Dia. 1.4)
- Checking all bottom levels of trench
- Marking and Construction of Manholes at the intervals of 50 M
- Maintaining all invert levels of pipe in all Manholes.
- Refilling in layers (20cm) and taking compaction tests with Consultants

**Project Engineer for Development of Sur Town Phase A3 - Cost 2 Million (RIALS)**

**Duties Involved are:**

- Getting all work permit from local Ministries such as MEW, GTO, ROP and Municipality
- Coordination between Consultant and Client
- Preparing all weekly and monthly programmes
- Monitoring and quality & Safety
- Supervising the site work
- Raising Monthly Bills

**May 1988 -Nov 1993**

**Site Manager for a Reputed Road Construction Company in Chennai.**

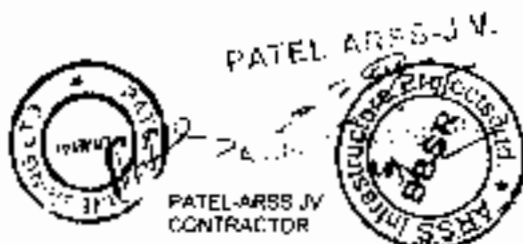
**Duties involved are:**

- Checking the levels and setting out.
- Supervising the work
- Quality Control.
- Preparing & Checking the Running Bills
- Preparing monthly construction program & monitoring
- Checking all contractors Monthly Bills
- Responsible for getting all clearance from local Govt. Departments

**LANGUAGES KNOWN:**

	Speak	Read	Write
English	Excellent	Excellent	Excellent
Tamil	Excellent	Excellent	Excellent
Hindi	Excellent		
Arabic	Good		

Valid Qatar light vehicle Driving license up to March 2011.



**PASSPORT DETAILS:**

Pass port No	E3507B25
Date of Issue	14/11/2002
Date of Expiry	13/11/2012
Place of Issue	Chennai

Address for communication:

K. Palanschamy,  
4D, 6<sup>th</sup> Block, CEFAROS PARK,  
New No 1 Di, Radhakrishnan Salai,  
Palaniappa Nagar,  
Valasaravakkam, Chennai.  
Contact: 9424203302 0914424866726(Resi).  
0919840187788.

**CERTIFICATION**

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describes my qualifications, my experience and me.

PATEL-ARSS-J.V.  
Contractor's Signatory



PATEL ARSS  
CONTRACTOR



## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

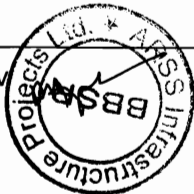
Position : <b>Highway Engineer</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Name : <b>Shri Gambher Singh</b></td> <td style="width: 50%; padding: 5px;">Date of Birth : <b>01.06.1973</b></td> </tr> <tr> <td colspan="2" style="padding: 5px;">Professional qualifications : <b>B.E. Civil</b></td> </tr> </table>	Name : <b>Shri Gambher Singh</b>	Date of Birth : <b>01.06.1973</b>	Professional qualifications : <b>B.E. Civil</b>							
Name : <b>Shri Gambher Singh</b>	Date of Birth : <b>01.06.1973</b>										
Professional qualifications : <b>B.E. Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Name of employer :</td> <td style="width: 50%; padding: 5px; text-align: right;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 5px;">Address of employer</td> <td style="padding: 5px;"> <b>ARSS Infrastructure Projects Limited</b>                      Plot No.38, Sector-A, Zone-D,                      Mancheswar Industrial Estate,                      Bhubaneswar, Orissa                 </td> </tr> <tr> <td style="padding: 5px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 5px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 5px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 5px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 5px;">Job title: <b>Highway Engineer</b></td> <td style="padding: 5px;">Years with present employer <b>From 20<sup>th</sup> May 2008</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Highway Engineer</b>	Years with present employer <b>From 20<sup>th</sup> May 2008</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Highway Engineer</b>	Years with present employer <b>From 20<sup>th</sup> May 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



PATEL-ARSS JV  
CONTRACTOR



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



# Gambher Singh

Contact: 00 91 9414782226/ 0091-141-2312784

Email: gsingh504@gmail.com

Passport: F2404470

Address: C-8, Duffood house, Hawa Sarak, 22 Godam, Jaipur

Seeking assignments in Seeking Senior Level assignments in Highway/ Real state Engineering with an organisation of repute.

## Synopsis

- A masters in environmental engineering with rich and qualitative experience of more than 10 years in the field of Highway construction, Environment & building construction, supervision, project planning, quantity survey and quality control.
- Currently working with **TDM Infrastructure P Ltd., Malaysia as Construction Manager**
- Worked on three major Highway projects involving four lining on National Highway and having good exposure of latest Highway construction technology & equipments. Experiences in project funded by multilateral funding agencies like World Bank and NHAI.
- Adept in planning, executing & spearheading construction projects involving Method engineering, development, contract administration, resource planning with a flair for adopting modern construction methodologies in compliance to ISF and Quality standards.
- Deft in swiftly ramping up projects with competent cross functional skills & ensuring on time deliverables.
- Proficient with the usage of computer aided design and drafting (CAD) tools.
- Compliance of environmental management plan and ensure that construction methodologies and construction process adopted incorporating provisions made in environmental management plan proposed in the contract documents. He will associate in different stages of the construction to ensure that the stipulations made in EMP are added to. Tackle day-to-day problems and suggest corrective measures, follow procedural requirements and interact with different agencies like NGOs, World Bank, MOEF, State Regulatory Authorities, Contractors, NHAI etc and responsible for the environmental issues. Will attend environmental issue and report of the implementation of the EMP.

## Core Competencies

### Project Planning

- Conceptualize detailed project reports and project execution plan after thorough discussion with clients, selection of sites, project evaluation in terms of outlays and profits attached
- Establish time span of project execution as per client specifics
- List down the resource needs for projects, after considering the budgetary parameters set
- Monitor project status during the course of periodic project review meetings.
- Prepare Method Statements including inspection and test plans
- Evaluate Designs, coordinate with Consultants and Sub Contractors for changes in the same.

### Site & Construction Management

- Supervise all construction activities including providing technical inputs for methodologies of construction & coordination with site management activities.
- Interact with Site Purchasers and Suppliers for achieving cost effective purchase of equipment, accessories, material with timely delivery so as to minimize project cost.
- Coordinate with Main Contractors; monitor their performance in view of project schedule. Settle all techno-commercial disputes / clarifications during execution of project.
- Implement QA / QC procedures, Total Quality Management principles and checks. Adherence to Quality and Safety norms across the entire course of project execution.

### Team Management

- Lead, mentor & monitor the performance of team members to ensure efficiency in process operations and meeting of individual & group targets
- Create and sustain a dynamic environment that fosters development opportunities and motivates high performance amongst team members.



PATEL-ARSS-J.V.

PATEL-ARSS-J.V.  
CONTRACTOR



## Occupational Contour

Since Sept '05 TDM Infrastructure P Ltd., Malaysia Construction Manager

### Key Deliverables:

- Involved in construction supervision for widening to 4 lane and strengthening of existing 2 lane from Mahua to Jaipur (km 120 to km 228) on Jaipur- Agra Section of NH-11 in the state of Rajasthan on BOT basis, Cost of the project Rs. 1850 million.
- Responsible for construction Plan as provided in the contract. Planning & Execution of project construction work. Overall site management including material, Labour & machine estimation, cost analysis, Tender work Prepare, review and update project report.

Dec '03 – Aug '05 SHILADIA Consultancy joint with SNC- Lavalin International INC (Canada) Field Engineer

### Key Deliverables:

- Engaged in construction Supervision for widening to 4 lane and strengthening of existing 2 lane from Gulabpura to Ghuwara Bypass km 70-Km 120 on NH 79 in the state of Rajasthan (Package cost of the project Rs. 1850 Million)
- Responsible for supervision of different activities related with highways construction like Embankment construction, subgrade GSB, WMM, Rigid and flexible pavement.

Dec '01 – Nov '03 M/s Theme Engineering Service Pvt. Ltd. Assistant Resident Engineer

### Key Deliverables:

- Client: National Highway Authority of India (NHAI)
- Role: Engaged in construction supervision of rural roads of about km 76 km in the district of Raipur.
- Client: MHRDA, World Bank Project, Cost of The Rs. 630 Million
- Role: Responsible for construction supervision of Earthwork, Sub Grade, GSB, Asphalt work, Bitum work and verification of contractor work, liaison with client.

Jun '01 – Nov '01 M/s S. Satya Prakash & Brothers, Delhi Senior Engineer

### Key Deliverables:

- Liable for construction supervision for Routine Maintenance & Rehabilitation work of NH-8 Between Kotputli to Kishangarh in the state of Rajasthan, Cost of The Rs. 780 Million
- Responsible for laying of B.M., D.B.M., S.O.R.C. & Mastic Asphalt. Built up spray Grout (BUSG), GSB, Milling & cold In place recycling of distressed surface. Thermoplastic Road Marking Paint, pitching work, fixing of kerbstone & Traffic Signboards. Roads Delineators & Crash Barrier's. Familiar with all type of soil, aggregate, bitumen.

### Previous Assignments:

Aug '02 – May '01 M/s Giriraj Sharan Singhal Site Engineer

Mar '97 – Jun '99 M/s Aryan Association, Jaipur Environment Engineer / Construction Engineer

Aug '95 – Feb '97 M/s Anurag Enterprises, Jaipur Site Engineer

## Academic Credentials

2002	Master of Engineering (Environment Engg.)	Malaviya National Institute of Technology (MNIT), Jaipur
1995	Bachelor of Engineering (Civil Engg.)	Pune University
2005	LL B (Bachelor of Law)	University Law College, Rajasthan University, Jaipur

PATEL-ARSS-J.V.

Authorised Signatory



PATEL-ARSS JV  
CONTRACTOR



**Technical Membership**

Asian Road Congress

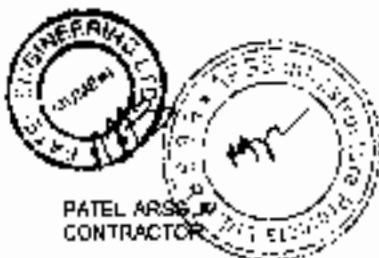
**Computer Proficiency**

Windows	:	Window 98, 2000
Office Automation	:	MS Word, MS Excel
Programming Language	:	C
Other Software	:	Auto Cad

**Personal Details**

Languages Known	:	English, Hindi
Date of Birth	:	01-06-1973

**PATEL-ARSS J.V.**

  
**Authorised Signatory**

PATEL ARSS J.V.  
CONTRACTOR

Chief Engineer, Road  
World Bank Project No. 1869  
W&A Dept.  
To the E.T.C. (P) Office  
Bhubaneswar

STATE OF PUNJAB



NO. 169014

13 MAR 1995

...

...

...

...

...

...

NOVEMBER 1994

...

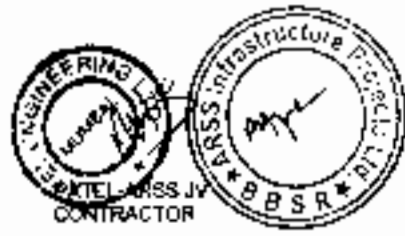
*[Handwritten signature]*

080695

...

*[Handwritten signature]*

...  
Authorisation Signature



World Bank Project: Punjab  
Water Supply and Sewerage  
Employment  
to the E.I.C. (Punjab) Private  
Bhubaneswar

## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Material Engineer</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 5px;">Name : <b>Shri U. Vasantharao</b></td> <td style="padding: 5px;">Date of Birth : <b>25.05.1975</b></td> </tr> <tr> <td colspan="2" style="padding: 5px;">Professional qualifications : <b>B. Tech Civil</b></td> </tr> </table>	Name : <b>Shri U. Vasantharao</b>	Date of Birth : <b>25.05.1975</b>	Professional qualifications : <b>B. Tech Civil</b>							
Name : <b>Shri U. Vasantharao</b>	Date of Birth : <b>25.05.1975</b>										
Professional qualifications : <b>B. Tech Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 5px;">Name of employer :</td> <td style="padding: 5px;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 5px;">Address of employer</td> <td style="padding: 5px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 5px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 5px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 5px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 5px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 5px;">Job title: <b>Material Engineer</b></td> <td style="padding: 5px;">Years with present employer <b>From 1<sup>st</sup> November 2008</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Material Engineer</b>	Years with present employer <b>From 1<sup>st</sup> November 2008</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Material Engineer</b>	Years with present employer <b>From 1<sup>st</sup> November 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



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

## CURRICULUM VITAE

U. Vasantharao

Phone: +91-9989882144

House: 0883-2460364

E-mail: [vasanth.r.u@gmail.com](mailto:vasanth.r.u@gmail.com)

Applied for the Post : Deputy Project Manager

Work Experience : 12 years.

1. Dec. 2007 to till date

Name of the Project

: Bidding/Package C-8, Construction of Four Laning of  
3+Lakshadon on section [MP] of NH-26 from Ch  
1000 to 351+000[54 Kms]

Client

: National Highways Authority of India [NHAI]

Consultant

: M. Renardet S.A in [JV] ICT & FTE.

Contractor

: Jayang Engineering & Construction Com. Ltd.,

[JV] Yograj Infrastructure Ltd.,

Cost of the Project

: 12 Crores

Period of the Project

: 12 months

Job Profile

: Material Manager

Responsibilities

: Actively Involved in testing of earth works, Cutting,  
Blanket, Sub Grade and preparation of GSB,  
Road Beds & Layer wise level checking, Slope  
Maintenance at Cutting camber Maintenance &  
Drainage Maintenance for road beds as per MORTH  
Specifications Monitoring progress schedule for  
Early completion of the project completion, Having  
Discussions on technical queries with the engineer's  
Representative to maintain the quality and achieve the  
progress preparation of daily progress report, to  
prepare staff duty allotments to maintain machinery  
equipment in proper directions, Condition the field  
by Density test to achieve. The compaction of road  
beds by the sand replacement method & Nuclear  
Density Meter [NDM] and find out the optimum  
moisture content [OMC] with rapid moisture meter  
[RM]

2. Aug. 2006 to Dec. 2007

Name of the Project

: Bidding/Package C-5, Construction of four-lane sugar  
cross [MP] of NH-26 from ch: 187 to 214 [27Kms]

Client

: National Highways Authority of India [NHAI]

Consultant

: Lighton International & [JV] CEG



**Contractor** : Ssangyong Engineering and Construction Company Ltd.,  
**Cost of the Project** : 180 Crores  
**Period of the Project** : 30 months  
**Job Profile** : Asst. Project Manager  
**Responsibilities** : Actively Involved in Earth works, cutting, Embankment, Sub Grade & preparation of GSB, WMM Road Beds & layer wise level checking, slope maintenance at cutting camber maintenance & tolerance maintenance for road beds as MORTH Specifications. Monitoring progress schedule for timely completion of the project completion, having discussions on technical queries with the Engineer's Representative to maintain the quality and achieve the progress & preparation of daily progress report, to prepare staff duty allotments & to maintain machinery equipment in proper directions.

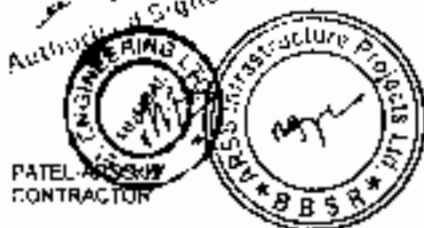
**3. Dec.2003 to July.2006**

**Name of the Project** : BOT/Package, AP-15 construction of four lane by pass of rajahmundry to dharmavarani of NH-5 from KM 200+000 to 233+000(33Kms).  
**Client** : National Highways Authority of India [NHAI]  
**Contractor** : Gammon India Ltd.  
**Consultant** : Artefact  
**Period of the Project** : 30 months  
**Cost of the Project** : 260 Crores  
**Job Profile** : Sr. Material Manager  
**Responsibilities** : Embankment, Subgrade, GSB, WMM, BM, DBM & RC as per MORTH specifications. Calculation of super elevation details. Layer wise preparation of level sheets conducting the field dry density test to achieve the compaction of roadbeds by the sand replacement method.

**4. Sep.2001 to Oct.2003**

**Name of the Project** : Construction of Four Lane of NH-5 from Km 3-000 to 49+000 (46Kms).  
**Client** : National Highways Authority of India  
**Contractor** : NCC LTD. JV UNITECH  
**Consultant** : Sheladia JV RITES  
**Period of the Project** : 32 months  
**Cost of the Project** : 230 Crores  
**Job Profile** : Sr. Engineer (Quality Control)  
**Responsibilities** : Testing of earth, sub grade, GSB, WMM, DBM, BC, concrete etc.  
 Experienced in mix design of concrete and all bituminous activities. Experienced in calibrating all types of plant as concrete, Batching, HMP, WMM Plant etc.

PATEL ARSHAD V.  
 Authorised Signatory



**5. May, 1999 to July, 2001**

**Name of the Project**

: Construction of NTPC Plant roads of length 30kms [WBM Roads].

**Client**

: NTPC

**Contractor**

: Patel Engineering Co. Ltd.

**Consultant**

: BHFL

**Cost of the Project**

: 230 Crores

**Job Profile**

: **Site Engineer**

**Responsibilities**

: Taking of original Ground levels [OGL] Responsible for Execution of earth works SG, Sub base, water bound Macadam, Prime Coat, Tack Coat, DBM & BC

**6. March, 1997 to Feb, 1999**

**Name of the Project**

: Construction of Jetty

**Client**

: Hindustan Shipyard Ltd

**Contractor**

: SAN INTERPRISES

**Job Profile**

: **Site Engineer**

**Responsibilities**

: Conducting of pile boring with bailer, checking of soundness, Collection of different strata of samples [Soft rock, Hard rock] to find out the strength & pouring of concrete with trimmy pipes, preparation of BBS to the beams, columns and super structure. & Preparation of running account bills.

**7. July, 1994 to Oct, 1996**

**Name of the Project**

: Construction of two lanes between Ongole and Chirala of State Highway, A.P of length 40kms

**Client**

: R & B Department

**Contractor**

: Engineers and Contractors Co.

**Cost of Project**

: 50 Crores

**Job Profile**

: **Jr. Engineer**

**Responsibilities**

: Preparation of road beds with HRG Metal, Gravel [WBM Roads] Taking of OGL. Responsible for execution of earth works, SG, Sub base, Water Bound Macadam, Prime Coat, Tack Coat, DBM & BC, Layer wise preparation of levels sheets.

**Other Activities**

Preparing the Mix Design as per MORT & H, I S Code

- Bituminous Concrete
- Dense Grade Bituminous Macadam(60/70 Grade Bitumen)
- Bituminous Macadam
- Wet mix macadam





- Granular Sub Base
- Sub Grade
- Embankment

### **WET MIX PLANT HANDLING:**

APPOLA (Made in India) 200 TPH Capacity Calibration cold bin gate opening and Control the grading as per Laboratory design.

### **BATCHING PLANT HANDLING:**

Capacity 30 cum /H each batch mixing capacity 0.5 cum calibration of materials, water, cement as per lab design required and control the quality product.

### **HOT MIX PLANT HANDLING:**

SPECO (Made in Korea) 160 TPH capacity 2 Tone each batch, Calibration of Cold Bin, Bitumen, Filler, Dust & Temperature of Drayer Drum Preparing.

The Graph & Control the Quality product as per design of Laboratory required.

APPOLO (Made in India) capacity 80 TPH Calibration Cold Bin Gate opening & Drayer Drum Preparing.

The Graph & Control the Quality product as per design of Laboratory required.

### **PRIMER/TACK COAT TANKER:**

Calibration of Vehicle speed due to Quality per 10 sqm[sq] required as per MOST table No 500-1

#### **Responsibilities:**

- Supervising the construction of road works such as Earth work excavation, Embankment, Sub grade, GSB, WMM, BM, and DBM & BC per MOST Specifications.
- Responsibilities for execution of earth works, embankment, Sub grade, GSB, WMM, BM, DBM, BC & Taking of cross section drawings in addition to the field exposure.
- Responsible for planning, organizing and monitoring of the road works as per approval drawings and MORTH specifications using modern plant and equipment.
- Verification of the Contractor's source of materials.
- Review of the quality assurance and quality control during the construction period
- Responsible for fixation of Temporary bench Mark, Proposed alignment and curve of roads.
- Preparation of the roadbeds as per MOST specifications.

PATEL - ARSS - J. V.



- Supervision of the work activities.
- Monitoring of the progress schedule for timely completion of the project.
- Verification of lines and levels, inspection of works.
- Checking of layouts of cross drainage structures.
- Preparation of weekly and monthly programme according to the available resources.
- Testing of various construction materials and testing of the constructed work to ensure the required quality of the work.
- Coordination between laboratory and field QC teams for specified quality control tests.
- Maintenance of the quality work.
- Coordinate and interaction with different agencies involved and advise the employer on certain issues.
- I got myself familiarized like study of drawings, specifications, methodology and guidelines for smooth and systematic progress of the work

### EDUCATIONAL & TECHNICAL QUALIFICATION

- B.E. in Civil Engg. From Andhra University College of Engg., Visakhapatnam
- Diploma in Civil Engg. From GMR Polytechnic College, padaru [A.P]
- SSC from Board of Secondary School Education.

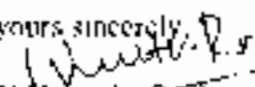
### PERSONAL PROFILE

Name : U. Vasantha Rao  
 Father's Name : Sri Nagaohushanam  
 Marital Status : Married  
 Nationality : Indian  
 Languages Known : English, Hindi & Telugu  
 Key Strengths : Self Confidence, Hard Working and Optimism, Passion for achievements.

Address for communication: C/o I Yesudanam  
 Raja apartments-1, 2nd floor, Flat no; B-1  
 Syamalanagar, Rajahmundry, E G Dist  
 Andhra Pradesh, 533103

I here by declare that the above-mentioned details are true and correct to the best of my knowledge.

Thanking you,  
 Place:  
 Date:

yours sincerely,  
  
 (U. Vasantha Rao)



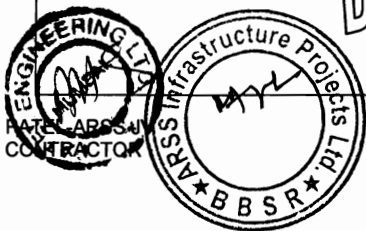
## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Material Engineer</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name : <b>Shri Jitendra Kumar Singh</b></td> <td style="width: 50%; padding: 2px;">Date of Birth : <b>02.10.1965</b></td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications : <b>B. E. Civil</b></td> </tr> </table>	Name : <b>Shri Jitendra Kumar Singh</b>	Date of Birth : <b>02.10.1965</b>	Professional qualifications : <b>B. E. Civil</b>							
Name : <b>Shri Jitendra Kumar Singh</b>	Date of Birth : <b>02.10.1965</b>										
Professional qualifications : <b>B. E. Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 2px;">Name of employer : <b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="width: 50%; padding: 2px;">Address of employer</td> <td style="width: 50%; padding: 2px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 2px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 2px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 2px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 2px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 2px;">Job title: <b>Material Engineer</b></td> <td style="padding: 2px;">Years with present employer <b>From 24<sup>th</sup> July 2008</b></td> </tr> </table>	Name of employer : <b>ARSS Infrastructure Projects Limited</b>		Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Material Engineer</b>	Years with present employer <b>From 24<sup>th</sup> July 2008</b>
Name of employer : <b>ARSS Infrastructure Projects Limited</b>											
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Material Engineer</b>	Years with present employer <b>From 24<sup>th</sup> July 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



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

## CURRICULAM VITA

### Present Address

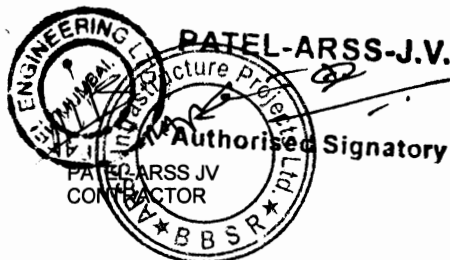
House No. 100-H  
Near Shiv Mandhir  
Darampura, Najafgarh  
New Delhi – 110043  
Mob: 9910150587,  
9215325468  
9953946691

### JITENDER KUMAR SINGH

Proposed position : Project Engineer  
Profession : Civil Engineer  
Date of Birth : 02-Aug.-1965  
Father's Name : Late Ram Bilas Singh  
Nationality : Indian  
E-mail Address : [jitender\\_kumar2u@rediffmail.com](mailto:jitender_kumar2u@rediffmail.com)  
Countries of work experience : India

### Key Qualification:

I am an dedicated civil engineer with an overall experience of 15 yrs of in Highways, Structure & Infrastructures project founded by international bounded agencies in varies part of India like World Bank, Asian Development Bank etc. in full track of experience includes project preparation construction, construction supervision and rehabilitation and improvement of National Highways of infrastructure projects. Means areas of work are construction structure of pipe culvert, slab culvert minor a Major bridges and other from structure Building works experience in the filling for billing, project planning supervision and quality control of works pavement design, testing of material and co-ordination with the consultant, client and the sub-contractor checking of sub-contractor bills inclusive of all shorts of measurements for each item of works my experience on Road and



Chief Engineer  
World Bank Projects  
EMPLOYER  
World Bank Projects  
O/o the E.L.C (Civil) Office  
Hubbaniwar

Infrastructure projects ranges from quantity surveying quality control preparation of various report to project.

**EMPLOYMENT:**

From : Aug. 2006 to till date.  
**Name of the Firm D.S. construction Ltd. New Delhi.**

Project : Development of 4/6 lane KMP Expressways in the State of Haryana India on both basis from KM 0.00 to KM 135.650. Project Cost Rs. 300 Crores.

Location : Haryana-India

Period : From Aug.-2006 to continue.

Employer : DSC Ltd. New Delhi

Client : Haryana State Industrial & Infrastructure Development Corporation Ltd.

Position held : Senior Engineer Structure.

From : Feb-2006 to July-2006  
**Name of the Firm Mehtra Buildcon Pvt. Ltd.**

Project : Frame structure Building MCD civic centre Minto Road, New Delhi.

Location : New Delhi

Period : Feb. 2006 to July-2006

Employer : MBPL Pvt. Ltd. Santa (M.P.)

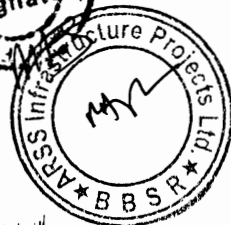
Client : IJM Infrastructure Ltd. Malaysia


Position held : Sr. Engineer

PATEL-ARSS J.V.

Authorised Signatory

PATEL-ARSS JV  
CONTRACTOR



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

**Job Responsibility:**

Construction of Multi-storied Building RCC Frame structure and the worked involved Co-ordination of construction activities at site and side super vision.

From : April-2003 to June-2006.  
**Name of the Firm Delta Construction System Ltd..**

Project : D.M.R.C under ground Metro station Mandi House, New Delhi.

Location : Delhi.

Period : April-2005 to January-2006.

Employer : Delta Construction System Ltd.

Client : DMRC New Delhi.

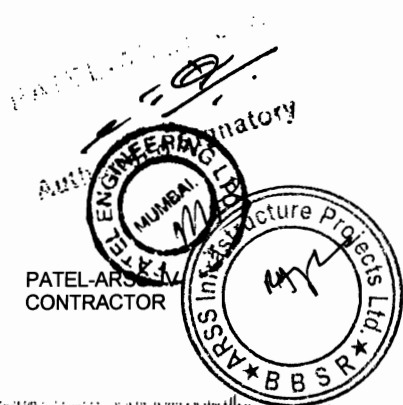
Position held : Sr. Engineer

**Job Responsibility:**

Preparation of the detailed work programme for the timely completion of the project and its approval from consultant and client submission of various related to project as per agreement and requirement, monitoring the various activities of the project as per approved work programme, co-ordination with the concerned client of sub-contractor timely completion of the items of work in relation to the planned programme set up for the project, Every items of works accordingly implementation at side.

Having good experienced in the followings:

- i) Mix design for concrete, DBM, BC etc.
- ii) Job mix formulate for GSB, WMM etc.
- iii) Well conversant with all type tests procedure.
- iv) Well conversant with IS codes, IRC codes & North specifications.



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

From : Feb-2001 to April-2004  
(Name of the firm Majestic Construction,  
Patna Bihar)

Location : Patna Bihar

Bihar : Feb-2001 to April-2004

Employer : Majestic Construction

Position held : Sr. Engineer

**Job Responsibility:**

The job involved preparation of client bill re-conciliation of Material and site supervision with stress on quality control

From : Feb-1997 to 2000  
Name of the Firm Chankiya Tech. Pvt. Ltd.

Project : NHAI

Location : Chandil, Jharkhand

Period : 1997 to 2000

Client : NHAI

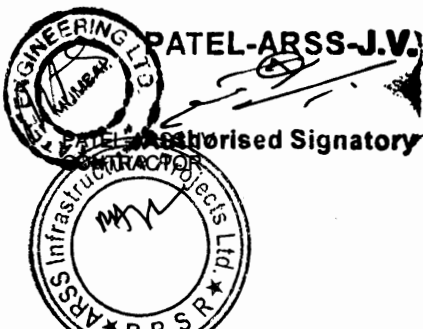
Position held : Site Engineer

**Job Responsibility:**

RCC bridge construction site having space about 25 meters. Simply support single lane. The work involved co-ordination of construction activities at site as per scheduled programme.

From : Jan 1992 to 1996  
Name of the Firm Engineer architect Builder  
Darbhanga, Bihar

Location : Darbhanga



*J*  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
EMPLOYER  
Of the E I C (Civil) Orissa.  
Bhubaneswar

Period : 1992 to 1996

Position held : Site Engineer

**Job Responsibility:**

Construction of multi stored Building RCC Frame structure and the work involved co-ordination of activities at site and site supervision.

**Qualification**

B.E. (Civil) First Class with Dist.

Hobbies : Badminton, Traveling and Reading

**Language of Proficiency:**

	Speak	Read	Write
English :	Excellent	Excellent	Excellent
Hindi :	Excellent	Excellent	Excellent

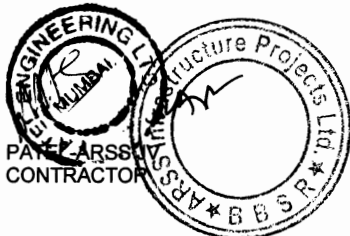
**Certificate:**

1. The undersigned certify to the best of my knowledge and belief, that these data correctly describe my qualification, my experience and me.

*Jitender Kumar Singh*  
**(JITENDER KUMAR SINGH)**

PATEL-ARSS-J.V.

*[Signature]*  
Authorized Signatory



PATEL-ARSS  
CONTRACTOR

*[Signature]*  
Chief Engineer  
World Bank Projects Engineer  
EMPLOYER  
World Bank Projects  
Office of the E.I.C (Civil) Orissa,  
Bhubaneswar



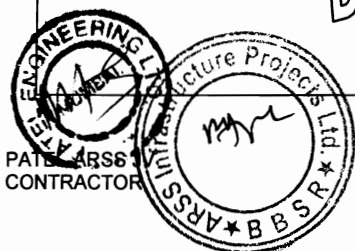
## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Quantity Surveyor</b>		
Personnel information	Name : <b>Shri Rajnish Malik</b>	Date of Birth : <b>03.07.1972</b>
	Professional qualifications : <b>B.E. Civil</b>	
Present employment	Name of employer : <b>Patel Engineering Ltd.</b>	
	Address of employer	<b>Patel Estate, S.V. Road, Jogeswari (W), Mumbai – 400102</b>
	Telephone <b>022 – 2678 2916,2676 7500</b>	Contact : <b>022 – 2678 2916,2676 7500</b>
	Fax : <b>022 – 2678 2455/ 1505</b>	E-mail: <b><u>headoffice@pateleng.com</u></b>
	Job title: <b>Quantity Surveyor</b>	Years with present employer <b>10 Years</b>

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



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

B.E CIVIL-2000- 8 Yrs Experience

Proposed Position : Quantity Surveyor  
Name of Firm : Feedback Ventures Pvt. Ltd.  
Name of Staff : Rajnish Malik  
Profession : Civil Engineering  
Date of Birth : 3<sup>rd</sup> July 1972  
Years with Firm / Entity : Nil Nationality Indian

Membership in Professional Societies:

- Nil

Detailed Task Assigned:

- Review of BOQs and Contract Documents
- Field Surveys and Measurements
- Site Meetings
- Measure and Certify Quantities
- Review Variation in Quantities and Costs
- Rate analysis

Key Qualification:

Mr. Malik is Graduate Civil Engineer with 08 years of experience in the field of Roads / Highways involving project planning, costing, contract management, construction supervision of bridges and application of modern construction technology. His spectrum of expertise covers preparation of contract and tender documents, preparation of estimates, checking of measurements, preparation and issue of project reports and working drawings. He has thorough understanding of the preparation of progress reports, estimates and is fully conversant with the MOST. His experience on the road works includes revision of work programme and Site Inspection, Data Collection and Investigation, Construction and Supervision of Earth Work, Sub-grade, G.S.B., W.M.M., D.B.M., and B.C. work, Materials selections with source identification, knowledge of code of practice for materials selection and quality. Assisted in preparation of Digital Terrain Modeling (DTM) using MX (MOSS).

Education:

- B.E. (Civil Engineering) from Pune University, 2000

Training:

- Attended 5 days training on MX Road Highway Designing Software conducted by Bentley System

Employment Record:

Aug 2006 to till date Feedback Ventures Pvt. Ltd.

Project:

- Feasibility Study and Detailed Project Report (Detailed Design) for four/ six laning of Gonde and Pimpalgaon, NH - 3, length 68 km.
- Feasibility Study and Detail Design for Nagpur Bypass, The total length of bypass is 30.230 kms, Client National Highways Authority of India
- Preparation of Detailed project Report for Development of State Highways In the State of Bihar under Rashtriya Sam Vikas Yojana (RSVY), Client Central Public Works Department

Description of Duties:

As a Quantity Surveyor responsible for estimating of quantities, preparing of cost estimate, BOQ, Rate Analysis, Technical Specification and scrutiny of cost estimates, rate analysis, BOQ technical specification contract and bidding document, checking of final bills, variation orders and contractor's claims and preparation of progress reports, estimating quantity survey and supervision for execution of necessary up gradation works of widening, surfacing and resurfacing including strengthening / construction of minor and major bridges. Ensuring compliance to contract BOQ and preparation of variation statements. As a Project Manager responsible for preparing and submission of reports like Inception and QAP reports, interim reports and train reports etc. up to DPR. . Assisted in preparation of Digital Terrain Modeling (DTM) using MX



Authorised Signatory

(MOSS).

Nov 2001 to June 2005

Arch Consultancy Services Pvt. Ltd., Delhi

**Project:**

**4/6 laning of Dharmavaram-Tuni section (47 km) of NH-5**

**Description of Duties:**

Review of past data and Documents, Reconnaissance survey, Monitoring various site activities in collecting topographical data, Conducted Topographical Survey using auto level and Total Station, Familiar with feature codes to collect topographical features and directed survey team in using feature codes. Assisted in preparation of Digital Terrain Modeling (DTM) using MX (MOSS), Staking of centerline alignment at site, established reference pillars

**Project:**

- Preparation of DPR for 4/6-laning of Kurnool to Anantpur section on NH-7 Km 211.000 to Km 336.000 in the state of Andhra Pradesh, Client National Highways Authority of India
- Preparation of DPR for 4/6-laning of NH-7 from Km 64.000 to Km 94.000 near Nagpur in the state of Maharashtra, Client National Highways Authority of India

**Description of Duties:**

Responsible for estimating of quantities, preparing of cost estimate, BOQ, Rate Analysis, Technical Specification and scrutiny of cost estimates, rate analysis, BOQ technical specification contract and bidding document, checking of final bills, variation orders and contractor's claims and preparation of progress reports, estimating quantity survey and supervision for execution of necessary up gradation works of widening, surfacing and resurfacing including strengthening / construction of minor and major bridges. Ensuring compliance to contract BOQ and preparation of variation statements. Preparation of star rates for Non-BOQ items.

**Project:**

- Strengthening and Widening of Jabalpur – Narsinghpur – Piparia Section of SH-22 on B.O.T. basis on behalf of Concessionaire M/s Tapi Prestressed Product Ltd. for Govt. of Madhya Pradesh
- Strengthening and Widening of Dewas- Ujjain section of SH-18 Km 112 in the state of Madhya Pradesh on B.O.T. basis on behalf of Concessionaire M/s Reddy Verrana construction Ltd. for Govt. of Madhya Pradesh
- Strengthening & Widening of Chowdagra-Bhogniapur Section of SH-22 km 82 in the State of UP on BOT basis.
- Strengthening and widening of City Road Project in Thiruvananthapuram, Kerala

**Description of Duties:**

Review of past data and Documents, Reconnaissance survey, Monitoring various site activities in collecting topographical data, Conducted Topographical Survey using auto level and Total Station, Familiar with feature codes to collect topographical features and directed survey team in using feature codes. Assisted in preparation of Digital Terrain Modeling (DTM) using MX (MOSS), Staking of centerline alignment at site, established reference pillars  
Responsible for planning & design including approval of topographic surveys, preparation of cost estimates, BOQ, tender documents & inviting tenders.

**Project:**

- 4/6 laning from Kondhall to Talegaon (Km 50.000 to Km 100.000) near Nagpur in the state of Maharashtra
- 4/6 laning from Jhansi-Lakhnadon section of (NH-26) in the State of UP and MP
- 4/6 laning of Kotta katta to Kurnool (NH-7) Km 133 to Km 211 in the state of Andhra Pradesh
- 4/6 laning from Armur to kamajiwadi of (NH-7)
- 4/6 laning from Banlore-Mulbagal section of (NH-4)
- 4/6 laning from Meerut- UP Uttaranchal border km 52 km 152 of (NH-58)

**Description of Duties:**

Responsible for execution with checking of work programme, monitoring the progress in respect of programme, review & suggest the modifications in programme. Responsible for estimating of quantities, preparing of cost estimate, BOQ, Rate Analysis, Technical Specification and scrutiny of cost estimates, rate analysis, BOQ technical specification contract, estimating quantity survey and supervision for execution of necessary up gradation works of widening, surfacing and resurfacing including strengthening / construction of minor and major bridges. Ensuring compliance to contract BOQ and preparation of variation statements. Preparation of star rates for Non-BOQ items



Authorized Signatory

**Project:**

**Detailed Project Preparation for Improvement and up-gradation of 150 km road in Madhya Pradesh under PMGSY in Dist. Guna, Sidhi & Bhopal-Sehore**

**Description of Duties:**

Responsible for estimating of quantities, preparing of cost estimate, BOQ, Rate Analysis, Technical Specification and scrutiny of cost estimates, rate analysis, BOQ technical specification contract, checking of final bills estimating quantity survey and supervision for execution of necessary up gradation works of widening, surfacing and resurfacing including strengthening / construction of minor and major bridges. Ensuring compliance to contract BOQ and preparation of variation statements.

**Project:**

**Feasibility Study on Development of Highway Project on BOT from Phalodi to Ramji ki Gol in the state of Rajasthan**

**Description of Duties:**

He was also responsible for material identification & testing of materials and burrow area, physical works on ground related to all items of works as per Bill of Quantities for both road & structural works, preparation of construction supervision manuals, approval of method statements Quality Assurance Programmes & Manuals, construction methods, maintenance manuals, monitoring progress and preparation of progress reports, issuing site instructions & contractual notices on price adjustment, attend measurement, scrutinizing/ checking/ certification of advances, interim bills/ invoices and contract management. He was also responsible for periodic quality checks at site and for general administration, guiding the key professional at site to ensure timely completion of the project.

**Project:**

- 4-laning and Strengthening of existing 2-lane from Chandigarh-Ropar-Kirtatpur of (NH-21)
- 4-laning and Strengthening of existing 2-lane from Zirakpur to Parwanoo of (NH-22)
- 4-laning from Jorabat-Shillong section of (NH-40)
- 4-laning from Jhansi-Lakhnadon section of (NH-26)
- Improvement Durg-Nagpur section of (NH-6)
- Gorkhpur Bypass
- Agra bypass
- Punjab ROBs at Bhatinda

**Description of Duties:**

Responsible for Checking & finalizing site measurement as per specification, Preparation of abstract of quantity and abstract of cost based on site measurement, conducting audit of the engineering surveys, measurement of works, analysis of rates, quantity surveying, preparation of cost estimates, measurement and certification of certificates of payments of bills, assisting and resolving contractual problems, Checking of embankment, sub-grade, GSB, WMM, BM, DBM, STBC, BC, Base Courses with approved material as per layout, alignment.

Dec 2000 to Nov 2001

Site Engineer

S. P. Singla Constructions Pvt. Ltd.

**Project:**

**Railway Over Bridge on Firozpur Delhi Rail line at Bhatinda, Punjab, Project Cost was Rs 10 Crores**

**Description of Duties:**

The project was consists of Pile foundation and simply supported RCC Slabs. I had to guide my juniors about the entire project and have to work done from them. To get the approval for casting any element of the Fly-Over was sole my responsibility.

Dec 1998 to Nov 2000

Site Engineer

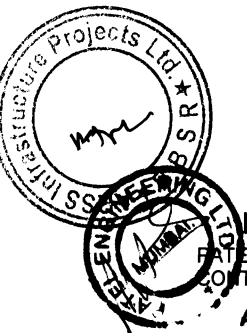
TCI Bhoruka Projects Ltd.

**Project:**

**Railway Over Bridge including 4000m of Service & Approach roads on Delhi Agra Rail line at Bata Chowk, Faridabad, Haryana, Project Cost Rs. 24 Crores**

**Description of Duties:**

Here we construct a Four Lane ROB this was a BOT project. Our company was the client and it wears all the construction cost of the project. This project consists of pile foundation and simply supported RCC slabs. The company had given the contract to the other company named as HBHL Ltd., Chandigarh. My duty was to check the things with the coordination of PWD and consultant Engineer to get them approved for further execution. Our own company has constructed three deck slabs by our own and I was fully in charge of these.



PATEL-ARSS-J.V.

PATEL-ARSS J.V.  
CONTRACTOR

Authorised Signatory

Volume-I Page 90

Page 3 of 4

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

**Languages:**

	<b>Speaking</b>	<b>Reading</b>	<b>Writing</b>
Hindi	Excellent	Excellent	Excellent
English	Good	Good	Good

**Undertaking:**

I, the undersigned certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experience, and me.

*Rajnish Malik*

Date: 15/11/08  
Day / Month / Year

PATEL-ARSS-J.V.

*[Signature]*  
Authorised Signatory



## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Quantity Surveyor</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name : <b>Shri Santosh Sharma</b></td> <td style="width: 50%; padding: 2px;">Date of Birth : <b>29.12.1974</b></td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications : <b>B. E. in Civil</b></td> </tr> </table>	Name : <b>Shri Santosh Sharma</b>	Date of Birth : <b>29.12.1974</b>	Professional qualifications : <b>B. E. in Civil</b>							
Name : <b>Shri Santosh Sharma</b>	Date of Birth : <b>29.12.1974</b>										
Professional qualifications : <b>B. E. in Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name of employer :</td> <td style="width: 50%; padding: 2px;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 2px;">Address of employer</td> <td style="padding: 2px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 2px;">Telephone <b>0674 - 2588552 / 2588554</b></td> <td style="padding: 2px;">Contact : <b>0674 - 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 2px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 2px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 2px;">Job title: <b>Quantity Surveyor</b></td> <td style="padding: 2px;">Years with present employer <b>From 1<sup>st</sup> November 2008</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 - 2588552 / 2588554</b>	Contact : <b>0674 - 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Quantity Surveyor</b>	Years with present employer <b>From 1<sup>st</sup> November 2008</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 - 2588552 / 2588554</b>	Contact : <b>0674 - 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Quantity Surveyor</b>	Years with present employer <b>From 1<sup>st</sup> November 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



Chief Engineer  
 World Bank Project Consultant  
 EMPLOYER  
 World Bank Projects  
 to the E.I.C (Civil) Orissa  
 Bhubaneswar

## **CURRICULAM VITAE**

**PROPOSED POSITION** :- **Billing Engineer / M. Q.S.**

**NAME** :- **SANTOSH SHARMA**

**FATHER'S NAME** :- **Shri SITARAM SHARMA**

**PERMANENT ADDRESS** :- **HOUSE NO-117 A , ADARSHA NAGAR  
NEAR BOBADE COLONY  
POST - KHAMGAON  
DIST – BULDHANA  
STATE – MAHARASHTRA  
PIN – 444303  
Mobile No. – 9860934520  
Resi Telephone No 07263-250395**

**ADDRESS FOR  
CORRESPONDANCE** :- **Santosh Sharma  
As Above**

**E-MAIL ADDRESS** :- **santosh\_29\_12@rediffmail.com**

**CATEGORY** :- **GENERAL**

**DATE OF BIRTH** :- **29<sup>th</sup> DECEMBER -1974**

**NATIONALITY** :- **INDIAN**

**MEMBERSHIP OF  
PROFESSIONAL SOCIETIES**

### **KEY QUALIFICATION :-**

I Santosh Sharma is a B. E. Civil 1<sup>st</sup> class, passed in 1997 and has more than 11 years professional experience in the field of construction of highway projects including National Highways and State Highways and other civil works ensuring the quality of construction as per approved drawings and specifications. Survey works including setting out alignments, Reviewing working drawing and methodology proposed to be adopted for execution of works, measurement of works executed & preparation of progress reports, preparation of bill, certification of bill, reconciliation of materials, handling of Sub contractors, liasoning of clients and consultants, planning and budget monitoring also. Project carried out includes

- 1) From Dec 2007 to onwards, Billing Engineer for Construction of Transformer Factory Building and other Allied Civil Works at Kotambi Village ( Areva PTR Project ) at Vadodara, Gujrat
- 2) From March 2007 to Nov-2007, Tender Working at Head Office Ahmednagar
- 3) From March 2006 to Feb-2007 Road Maintains work for composite Bhopal-Sehore bye pass road project including widening & strengthing of existing road & construction of ROB etc. complete for MPPWD.
- 4) From Jan-2006 to Feb-2006, Final Bill Preparation & Certification from MPPWD for composite Bhopal-Sehore bye pass road project including widening & strengthing of existing road & construction of ROB etc. complete for MPPWD.



PATIL  
Authorised  
Signature

Volume-I Page 93

Chief Engineer  
World Bank Project  
EMPLOYER  
World Bank Project  
to the E.I.C (Civil) Office  
Ahmednagar

- 5) From September 2001 to Dec-2005, composite Bhopal-Sehore bye pass road project including widening & strengthening of existing road & construction of ROB etc. complete for MPPWD.
- 6) March 1999 to August 2001 -Improvement of Ahmednagar – Karmala road S.H. 141KM-80.64 –through private financing.
- 6) May 1997 to Feb 1999 :-Supervision of Residential Building at Khamgaon, Dist :- Buldhana-Estimating & Costing, Line Out, Supervision, Architectural View , Valuation etc.

**EDUCATION** :- B. Eng. Civil- First Class, Passed in 1997 with  
Diploma in Civil Eng.-First Class, Passed in 1994

**EMPLOYMENT RECORDS :-**

**PERIOD** :- From Dec 2007 to till Date  
**EMPLOYER** :- **M/S Rajdeep Buildcon Pvt Ltd, Ahmednagar**  
**POSITION HELD** :- **Manager Q. S.**

**DESCRIPTION OF DUTIES** :-  
Working as a Client Billing Engineer, Preparation of Bill, Certification from PMC etc for Construction of Transformer Factory Building and other Allied Civil Works at Kotambi Village ( Areva PTR Project ) at Vadodara, Gujrat

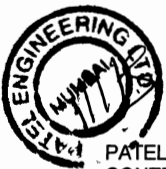
**PMC :- M/S Feedback Ventures P. Ltd, New Delhi, Cost of Project – 66.64 Crores**

**PERIOD** :- From March 2007 to Nov-2007  
**EMPLOYER** :- **M/S Rajdeep Buildcon Pvt Ltd, Ahmednagar**  
**POSITION HELD** :- Resident Engineer

**DESCRIPTION OF DUTIES** :-  
Working at Head Office for Tender quoting, Preparing of Tender, Site Visit etc & final submission of the tender.

**PERIOD** :- From January 2006 to Feb 2007  
**EMPLOYER** :- **M/S Rajdeep Buildcon Pvt Ltd, Ahmednagar**  
**POSITION HELD** :- Resident Engineer

**DESCRIPTION OF DUTIES** :-  
Working as a Maintains Engineer & Complete the Final Bill from MPPWD for Construction of Bhopal-Sehore bye pass road including widening, strengthening of Existing and construction of R.O.B. etc complete ( Group-1) project for MPPWD. (2-Lane, length 40 km & 4-Lane, length 3.60 km),  
**Consultant :- Shrikande Consultant Pvt. Ltd. Mumbai , Cost of Project – 32.19 Crores**



PATEL-ARSS  
CONTRACTOR



Chief Engineer  
World Bank Project  
Chief Engineer  
World Bank Project  
EMPLOYER  
to the E.I.C (Civil) Orissa,  
Bhubaneswar



**PERIOD** :- From November 2004 to Decmber 2005  
**EMPLOYER** :- M/S Rajdeep Buildcon Pvt Ltd, Ahmednagar  
**POSITION HELD** :- Resident Engineer

**DESCRIPTION OF DUTIES** :-

Working as a project Manager for Construction of Bhopal-Sehore bye pass road including widening, strengthing of Existing and construction of R.O.B. etc complete ( Group-1) project for MPPWD. (2-Lane, length 40 km & 4-Lane, length 3.60 km),  
**Consultant :- Shrikande Consultant Pvt. Ltd. Mumbai , Cost of Project – 32.19 Crores**

Construction Activities:- Hard Rock Cutting, Construction of embankment, GSB, WBM, WMM, Surface Dressing, BUSG, PCC, B.M., S.D.B.C. , M.S.S. for Roads, Concrete works for Bridges & Culverts, Prestressing work for R.O.B. Cross-Drainages & Drains in road.

Monitering of overall site execution activity's for roads, bridges and ROB and liasing with client, consultant, handling of sub-contractors and suppliers Planning and implement the construction activities. Coordination between supply of material and mechanical dept, Preparation of weekly and monthly construction program matching the available resources and considering Safety Program. Having discussion on technical quarries with the engineer's representative for maintaining balance between quality and progress. Measurement & preparation of bills of work executed, preparing material reconciliation statement etc. Also participating in Tendering.

=====  
**PERIOD** :- From September 2001 to October 2004  
**EMPLOYER** :- M/S Rajdeep Buildcon Pvt Ltd, Ahmednagar  
**POSITION HELD** :- Quantity Surveyor

**DESCRIPTION OF DUTIES** :-

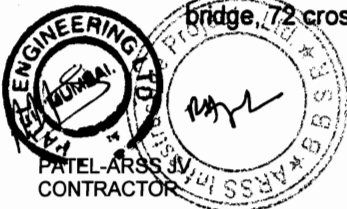
Working as a Billing Engineer for Construction of Bhopal-Sehore bye pass road including widening, strengthing of Existing and construction of R.O.B. etc complete ( Group-1) project for MPPWD. (2-Lane, length 40 km & 4-Lane, length 3.60 km),  
**Consultant :- Shrikande Consultant Pvt. Ltd. Mumbai , Cost of Project – 32.19 Crores**

Monitering of overall site execution activity's for roads, bridges and ROB and liasing with client, consultant, Planning of construction activities. Preparation of weekly and monthly construction program matching the available resources. Measurement & preparation of bills of work executed; preparing material reconciliation statement etc. Also participating in Tendering.

=====  
**PERIOD** :- From March 1999 to August 2001  
**EMPLOYER** :- M/S Ashoka Info Pvt Ltd. Pune  
**POSITION HELD** :- Quantity Surveyor

**DESCRIPTION OF DUTIES** :-

Working as a Billing Engineer for Improvement of Ahmednagar – Karmala road S.H. 141, KM-80.64 –through private financing in Maharashtra. With two major bridge & 11 minor bridge, 12 cross drains in four Phases.



Auth: [Signature]  
Volume-I Page 95

Chief Engineer  
World Bank Project, Ahmednagar  
EMPLOYER  
World Bank Project  
O/o the E.I.C (Civil) Office  
Ahmednagar

- for phase 1<sup>st</sup> responsible for 6 nos minor bridges & its approaches, Activates – concrete work for bridges, Earthworks, GSB WBM, Surface Dressing, LBM, SDBC for Road Works.
- for phase 2<sup>nd</sup> responsible for 0-40 Km Built Up Gutter, BBM, SDBC & Hard Shoulder for Road Works
- for phase 3<sup>rd</sup> responsible for 0-80.60 Km Pitched Gutter, Earthen Gutter, Road Side Furniture and Road Maintenance

=====

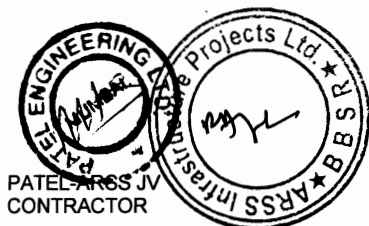
**PERIOD** :- From May 1997 to Feb 1999  
**EMPLOYER** :- M/S Chabra & Associates  
**POSITION HELD** :- Engineer

**DESCRIPTION OF DUTIES** :-  
 1 & ½ Years Experience of Residential Building at Khamgaon, Dist :-Buldhana,-  
 Estimating & Costing, Line Out, Supervision, Architectural View , Valuation etc.

Date :- 10 / 11 / 2008  
 Day / Month/Years



**SANTOSH S. SHARMA**  
 ( B. E. Civil, D.C.E. )



Chief Engineer  
 World Bank Project  
 Chief Engineer  
 World Bank Project  
 EMPLOYER  
 Old the E.I.C (Civil) Office  
 Buldhana

## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

<b>Position : Lab Manager / Technician</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 5px;">Name : <b>Shri M.Saviour Raj</b></td> <td style="padding: 5px;">Date of Birth : <b>20.03.1978</b></td> </tr> <tr> <td colspan="2" style="padding: 5px;">Professional qualifications : <b>M.E. in Civil</b></td> </tr> </table>	Name : <b>Shri M.Saviour Raj</b>	Date of Birth : <b>20.03.1978</b>	Professional qualifications : <b>M.E. in Civil</b>							
Name : <b>Shri M.Saviour Raj</b>	Date of Birth : <b>20.03.1978</b>										
Professional qualifications : <b>M.E. in Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 5px;">Name of employer : <b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 5px;">Address of employer</td> <td style="padding: 5px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 5px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 5px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 5px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 5px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 5px;">Job title: <b>Lab Manager / Technician</b></td> <td style="padding: 5px;">Years with present employer <b>From 30<sup>th</sup> October 2008</b></td> </tr> </table>	Name of employer : <b>ARSS Infrastructure Projects Limited</b>		Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Lab Manager / Technician</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>
Name of employer : <b>ARSS Infrastructure Projects Limited</b>											
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Lab Manager / Technician</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



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

## **RESUME**

**Name** : M. Saviour Raj

**Father's Name** : M. Manuel Raj

**Age & Date of Birth** : 29 Yrs & 20.03.1978

**Martial Status** : Married

**Nationality** : Indian

**Permanent Address** : 305/0 K.P Road,  
Parvathipuram,  
Nagercoil-3,  
KanyaKumari Dist.

**Phone** : 04652-230078

**Mobile** : 9789998371

**E-Mail Id** : saviour\_r@yahoo.Com

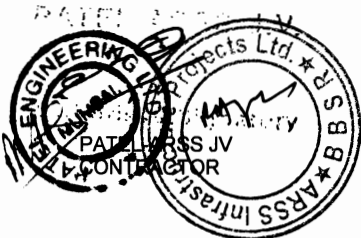
**Educational Qualification** :-

**B.E (Civil)** : 1995-1999 at **Karunya Institute of Technology**  
Coimbatore

**M.E (Structures)** : 2001-2002 at **Annamalai University**  
Chidambaram.

**M.B.A (Int. Business)** : Currently pursuing (Correspondence Course)  
at **Annamalai University**

**Language Known** : English, Tamil, Hindi & Malayalam



## EMPLOYMENT RECORD

### 1) Jan 2008 Till Date: Material Engineer (Manager)- GMR Group Pvt Ltd

**Design , Engineering Construction, Development , Finance, Operation and Maintenance of 4 laning the existing 2 Lane section from Km:121 to Km:192.25 on NH-45 in the state of Tamilnadu on BOT basis.(Package TN - VI A)**

Client : National Highways Authority of India

Consultant : ICT Pvt. Ltd.

Concessionaire : GMR Ulundurpet Expressway Pvt. Ltd.

EPC Contractor : GMR Projects Pvt. Ltd.

Sub Contractor : NAPC & SPL

Project Cost : INR 4750 millions

### 2) July 2006 to Dec 2007: Quality Control Engineer – Scott Wilson (India) Pvt Ltd

**Four laning and Strengthening of existing two lane of Km80/000 to Km120/000  
Madurai – Kanyakumari (NH-7)**

Client : National Highways Authority of India

Contractor : IVRCL Infrastructures and Project Limited

Project Cost : INR 1735 millions

### 3) Aug 2005 to June 2006: Material Engineer -- M/S PBA Infrastructure Ltd.

**Four laning and Strengthening of existing two lane of Km 203/000 to Km233/600  
Madurai – Kanyakumari (NH-7)**

Client : National Highways Authority of India

Consultant : Sheladia Associates & Consultants (India) Pvt. Ltd.

Project Cost : INR 1100 millions



Chief Engineer  
World Bank Projects, Chennai  
EMPLOYER  
World Bank Projects  
To the E.I.C (Civil) Office  
Rhubaneswar

**4) Jan 2003 – July 2004: Senior Engineer –M/S PBA Infrastructure Ltd.**

**Construction of Segment of Lucknow By-pass Connecting NH -25 and NH – 28 Via –  
56 Passing Through Lucknow City, UP.**

Client : National Highways Authority of India  
Consultant : Consulting Engineering Service (India) Pvt Ltd.  
Project Cost : INR 1600 millions

**5) August 1999 – Dec 2001 : Site Engineer – M/s. Srinivasulu & Co., Chitoor .**

**Maintenance and Rehabilitation work NH-45 at km 11/7 to 122/0. (110.3 kms)**

Client : National Highways Authority of India  
Consultant : STUP  
Project Cost : INR 120 millions

**Duties and Responsibilities**

- Responsible for identifying the quarries and procured materials and testing in the laboratory for their suitability for road and concrete works.
- Evaluating the condition of existing pavement for improvements and soil investigations at ROB's & Bridges.
- Responsible for all field and laboratory tests of soils, aggregate, concrete, GSB, WMM, DBM and BC materials ensuring that the work performed and materials used in the work confirm to required specifications.
- Involved in Mix Design of GSB, WMM, DBM, Bituminous Concrete and cement concrete by following MoRT&H specifications.

PATEL-ARSS-J.V.

Authorized Signatory  
PATEL-ARSS JV  
CONTRACTOR



Page 3 of 4

Volume-I Page 100

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

- Carrying out the required tests in laboratory and in the field during construction of the above said pavement layers.
- Organize and installation of field laboratory, crusher, wet mix plant and DBM Plant.
- And also responsible for maintaining of all records required in regular course of construction.
- Preparation of Quality Assurance Plans, Quality Control and Material Management.
- Testing and engineering evaluation of all materials and quality of completed works.
- Finalizing formats for record keeping, maintaining the record of all materials at site.
- Guiding technicians for testing and recording test results including preparation of documents

**DECLARATION:**

I, the undersigned, herewith certify that to the best of my knowledge and belief, these data correctly describes my qualifications and experience.

PATEL-ARSS-J.V.

  
Authorized Signatory

  
(M.SAVIOUR RAJ)

## Form PER-2: Resume of Proposed Personnel

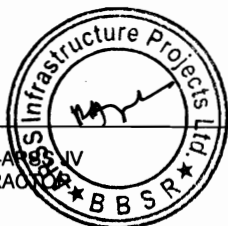
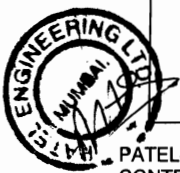
Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Lab Manager / Technician</b>
--

Personnel information	Name : <b>Shri Deepak Jesudas A</b>	Date of Birth : <b>03.12.1979</b>
	Professional qualifications : <b>B.E. in Civil</b>	
Present employment	Name of employer : <b>ARSS Infrastructure Projects Limited</b>	
	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa
	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>
	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>
	Job title: <b>Lab Manager / Technician</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



PATEL-ARSS JV  
CONTRACTOR

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



# RESUME

## PERSONAL DETAILS

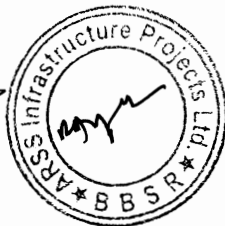
**Name** Deepak Jesudas A  
**Permanent Address** 6, Deepak Nivas, 1<sup>st</sup> C Main, N.R. Layout, Konena  
Agrahara, H.A.L Post. Bangalore - 560017. India.  
**EMail Address** deepakjesudas@hotmail.com  
**Phone Number** 080 25220772, 9880299051  
**Date of Birth** 03<sup>rd</sup> December 1979  
**Nationality** Indian  
**Passport Number** E4156915  
**Marital Status** Married

## EDUCATION

**Qualification** Bachelor in Engineering -2002  
**University** Bangalore University  
**Diploma** 1.) Interior Design from IDEA- Bangalore  
2.) Auto CAD and Architectural Desktop from CADD Center  
**College** Bangalore Institute of Technology – Bangalore.  
**Schooling** St Joseph Indian High School – Bangalore.

PATEL-ARSS-J.V.

  
Authorised Signatory



**Experience: -**

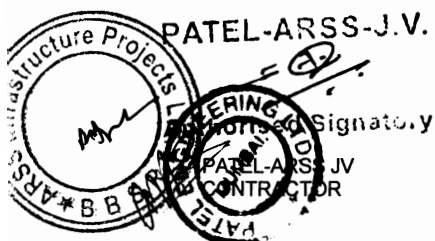
**Current Assignment: QA/QC Engineer**

Organisation : Mfar Constructions (P) Ltd.

Duration : 1<sup>st</sup> August 2006 onwards

Work profile :

1. To ensure that all the activities relating to the project are carried out as per client requirements, contract specifications, drawings and the project quality plan (PQP).
2. Provide guidance and assistance to fulfill Quality Assurance Standard requirements to the execution team.
3. Obtain approval of materials from Client during constructions.
4. Ensure copies of PQP, approved method statements for execution, relevant IS Codes, Architectural specifications, QCP's and WI's are available at pertinent locations.
5. Identification of product and system non-conformances during the execution of the project and take corrective actions.
6. Assess the quality requirements of the project.
7. Carry out proper inspections/ tests, and maintain records of the same.
8. Ensure proper functioning of site laboratory, maintain record and submission of test results to the Client and H.O through PL.
9. Maintain list of applicable codes and standards.
10. Collect the results of site tests and also from the laboratories/ suppliers and forward the same to Client through the PL.
11. Organise testing of cubes in site laboratory or ant laboratory as instructed by the Client.
12. Submission and maintenance of all quality documents, concrete pour cards, and quality checklists for various construction activities.



13. Submission of material approval sheets to Client, collection of sample, catalogues, literature, test results through PL and record the same.
14. Checking of all materials before preparation of Goods Receipt Note by the storekeeper, identification of non-conformances, and take appropriate corrective action.
15. Organise to display all approved samples at site for any reference.

Project executed : 1. Construction of 'Adarsh Software Park' at Adarsh Tech Park, Sarjapur, Bangalore, with total built up area of around 6,50,000 SqFt. Value of Work: Rs. 18,00,00,000.

2. Construction of a commercial building for 'Subex Software' at Adarsh Tech Park, Bangalore, with total built up area of 6,00,000 SqFt. Value of Work: Rs. 12,80,00,000.

**Previous Assignment: Junior Engineer**

Organisation : Synergy Property Development Services Pvt Ltd

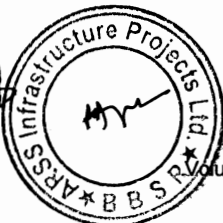
Duration : From 15<sup>th</sup> December 2005 to 30<sup>th</sup> June 2006

- Work Profile :
1. Preparing Master Schedule using MS-Projects
  2. Coordinating with Architects, service consultant, clients & different Contractors for smooth execution of works
  3. To check the quality of work such as grade of concrete, slump, cube strength, reinforcement etc.,
  4. To check whether the project is according to the schedule
  5. To check and clear the bills given by the contractors
  6. Preparing the monthly development report of the project
  7. To monitor the work at site
  8. Preparing check lists for different activities of Building work

PATEL-ARSS-J.V.

Authorised Sign

PATEL-ARSS JV  
CONTRACTOR



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

9. Proof checking the Tender documents including compilation of specifications, quality takeoff, and schedule of items.

Project executed : Construction of Commercial building and internal roads for IBM at Manyata Embassy Business Park, with built up area 53000 Sq M.

Value of work: Rs. 60,00,00,000

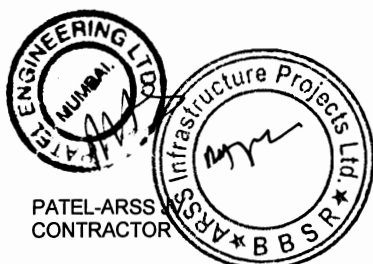
**Previous Assignment : Site Engineer.**

Organization : M/s V.S Reddy Engineers and Contractors is a proprietary organization specializing in Industrial and Commercial Complexes along with internal roads for Government of India and Private Buildings.

Duration : From 02<sup>nd</sup> October 2002 to 02<sup>nd</sup> December 2005

Work profile : Detailed Engineering, Procurement and Site Supervision.  
Liaison with Department Engineers and Consultants.  
Project planning and implementation.

Projects Executed : 1. Construction of a small apartment at Bangalore.  
Value of Work: Rs.6800000  
2. Construction of Administrative Building at Shimoga, Karnataka.  
Department of Telecommunications.  
Value of work: Rs. 8100000.  
3. Construction of Ground Level Reservoir at Bangalore.  
Department of Space. Value of Work: Rs. 2800000.  
4. Construction of Load side Sub Station at Bangalore. Department of Space. Value of Work: Rs. 2400000.



PATEL-ARSS  
CONTRACTOR

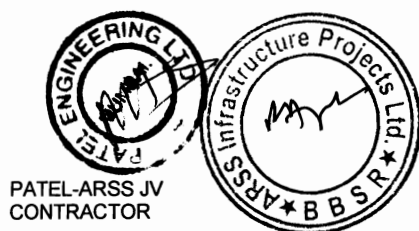
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
Office of the E. I. C (Civil) Orissa,  
Bhubaneswar.

**Computer Skills** : MS Office, AutoCAD and Architectural Desktop

**References** : Can be provided on Request.

*Deepak Jesudas A.*  
**Deepak Jesudas. A**

PATEL-ARSS-J.V.  
  
Authorised Signatory



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

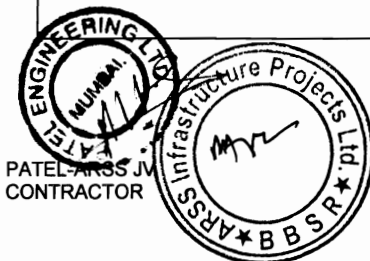
## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Land Surveyor</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name : <b>Shri Ashok Kumar</b></td> <td style="width: 50%; padding: 2px;">Date of Birth : <b>05.10.1980</b></td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications : <b>Diploma in Civil</b></td> </tr> </table>	Name : <b>Shri Ashok Kumar</b>	Date of Birth : <b>05.10.1980</b>	Professional qualifications : <b>Diploma in Civil</b>							
Name : <b>Shri Ashok Kumar</b>	Date of Birth : <b>05.10.1980</b>										
Professional qualifications : <b>Diploma in Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name of employer :</td> <td style="width: 50%; padding: 2px;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 2px;">Address of employer</td> <td style="padding: 2px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 2px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 2px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 2px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 2px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 2px;">Job title: <b>Land Surveyor</b></td> <td style="padding: 2px;">Years with present employer <b>From 30<sup>th</sup> October 2008</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Land Surveyor</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Land Surveyor</b>	Years with present employer <b>From 30<sup>th</sup> October 2008</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
<p style="font-size: 2em; opacity: 0.5; transform: rotate(-10deg);">DETAIL BIO DATA ENCLOSED</p>		



PATEL-ARSS JV  
CONTRACTOR

Volume-I Page 108

Chief Engineer  
 World Bank **Chief Engineer**  
 EMPLOYER  
 World Bank Projects  
 to the E.L.C (Civil) Orissa  
 Bhubaneswar

# CURRICULUM VITAE

## Address for correspondence:

RZ-1-A, H.No. 643-E, Gali no. 29  
Gopal Nagar, Ph- II Najafgarh,  
New Delhi - 110043  
E-mail: [ashokjalwal@yahoo.com](mailto:ashokjalwal@yahoo.com)  
Phone Number: 09968221679

Date of Birth: 5<sup>th</sup> September, 1980  
Language: English, Hindi, Arabic  
Passport No.: E 2597103, India  
Marital Status: Married  
Modified on: 05.11.08

ASHOK KUMAR



## Objective:

To possess the aesthetic as well as practical considerations, adequate skill and knowledge SURVEY and plan reasonably be asked to carryout or offer services as a **Specialist** and as a **Chief Land Surveyor**.

## Summary:-

- Outstanding problem solving skills related to surveying activities.
- Excellent project management skills. Study operational problems and recommend changes.
- Solid personnel management experience, including technical evaluation of staff, conflict resolution skills and initiative.
- Excellent communications skills in working with other disciplines, clients and outside agencies.
- Skilled at prioritizing and planning work activities; using time efficiently; setting goals and objectives; organizing and scheduling other people and their task plans.
- Ability to meet productivity standards; complete work in timely manner; strive to increase productivity and efficient work.
- Diligently follow safety and security procedures; use equipment and materials properly.
- Handle all types of total stations like (Leica Motorised TCRA1200+), Sokkia Lecia, Pentax, Nikon, Top Con etc. Proficient at performing surveys using Global Positioning System (GPS).

## Field Expertise: -

- Topographic Survey, Setting Out, Triangulations, Traversing, Mine Surveying, Geological Survey, Setting Out for Construction, Road Survey, Rivers Survey and Survey for Alignment.
- Establishing of Bench Marks & Preparation of Layout and Survey Drawing in AutoCAD.

## Instrument Handled: - Total Station

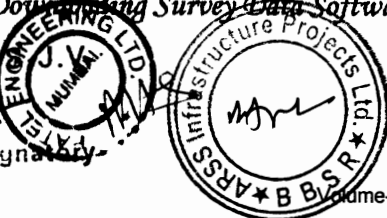
Leica (TCRA 1200+, TC 303, TC 307, TC 405, TC 504, TC 802, TC 1100, TCRA 1100),  
Topcon (GTS 211D, GTS 212D, GTS 225, GTS 226, GTS 601, GPT 701)  
Sokkia (Set 2B II, Set 3B II, Set 4B II, Set 3C, Set 210, Set 610, (Power set), Set 1030 R,  
Nikon (NPL-362, DTM-352, DTM 820, DTM, 821 with FM 700 Software),  
Pentax R-322NX,

Digital Level, Rotating Laser Level with standard accessories and GPS.

Computer Proficiency: - Intergraph civil engineering, AutoCAD 14, 2002, 2005, 2007, MS Office and Downloading Survey Data Software

PATEL-ARSS

Authorized Signatory  
PATEL-ARSS JV  
CONTRACTOR



Page 1 of 1

Chief Engineer  
World Bank Projects, Orissa, projects  
World EMPLOYER  
Of the ETC (Civil) Orissa,  
Bhubaneswar

**Total Work Experience: - 8 years 2 months**

**Foreign Experience: - 3 years and 4 months**

**Employment Record:-**

March 2008 to June 2008 Shapoorji Pallonji & Co. Ltd.

Start with Deputy Manager Land Survey released with Deputy Manager Land Survey.

March 2007 to March 2008 G P Zachariades Overseas Ltd. Bahrain.

Start with Land Surveyor released with Land Surveyor

Oct.2005 to March 2007 Punj Lloyd Ltd.

Start with Land Surveyor released with Sr. Land Surveyor

April 2003 to May 2005 Strength and Support Builders International (Ltd).

Start with Sr. Land Surveyor released with Chief Land Surveyor.

Feb. 2003 to April 2003 Larson & Toubro ( ECC Construction Group).

Start with Land Surveyor released with Land Surveyor.

Aug. 2000 to Feb.2003 Allied Engineers Pvt. Ltd.

Start with as a Land Surveyor and released with Sr. Land Surveyor.

**Detailed of Experience: -**

**July 2008 to Till Date.**

**Presently working with M/s. Sembawang Infrastructure (India) Pvt. Ltd. (A Punj Lloyd Company) 77 – A, IFFCO Road, Sector – 18, Gurgaon (H.R) 122015, based on ISO – 9001:2000 as a Deputy Manager Land Survey.**

**Company Profile:-**

Punj Lloyd Limited is an Indian multinational engineering construction company providing turnkey solutions in the global market for onshore and offshore pipelines, cryogenic tanks and terminals, process plants, highways, bridges, railways and infrastructure services, turnkey solutions for telecom, plant & facility management and power plants. With the single-minded dedication to world standards of quality, safety, health and environment, PLL has, developed a client list that is impressive. The company's quality certifications include ISO-9001, ISO-14001, OHSAS-18001. The spirit of the PLL Quality Commitment underlines the fact that the company is geared towards achieving " maximum possible customer satisfaction, with unerring regularity, on a lasting basis".

March 2008 to July 2008

Project: -Up- gradation renovation of Jawaharlal Nehru Stadium for commonwealth games 2010.

Detailed Tasks Assigned: - Responsible of all setting out, preparation of drawings as per requirement of client.

Agency: -**Shapoorji pallonji and Co. Ltd.**

Position: Deputy Manager Land Survey.

**March 2007 to 10<sup>th</sup> Feb. 2008 G P ZACHARIADES OVERSEAS LTD. Civil Engineers and Building Contractors in Bahrain**

**Company Profile:-**

G P Zachariades Overseas Ltd. is a Cyprus (Europeans) Company providing turnkey solution in the Bahrain since 30 years for civil engineers and building contractors. With the single minded dedication to worked standards of quality, safety, health and environment. The spirit of the company is geared towards achieving maximum possible customer satisfaction with unerring regularity, on a lasting basis.

**Project:-Durrat Al Bahrain Resorts (360 villas in the sea included roads and under grounded services).**

**My Role and Responsibility in the Project**

**Setting Out:-**

To carry out the setting out of 360 villas roads and under grounded services.

**Coordination: -**

Coordination with construction and site manager to maintained the proper documentation

PATEL-ARSS JV

CONTRACTOR'S SS-

PATEL-ARSS JV

CONTRACTOR'S SS-

PATEL-ARSS JV

CONTRACTOR'S SS-

PATEL-ARSS JV

CONTRACTOR'S SS-



Chief Engineer  
World Bank Projects  
EMPLOYER  
Rhubaneswar



**Keeping Drawings: -**

Studding the drawings before setting out and discussed with consultant.

Position: Land Surveyor

October 2006 to March 2007

Project: -Medicity (Institute of integrated medical sciences & holistic therapies) in Gurgaon.

16 floor with 3 basements (80,000 m2) each floors.

Detailed Tasks Assigned: - Setting Out, Resection, Point to Line Measurements and Triangulations.

Agency: -**Punj Lloyd Ltd.**

Position: Sr. Land Surveyor

April 2005 to May 2006

Project: - Arab Union Contracting Company Cement Plant in **Libya**. (4,200 ton/day)

Detailed Tasks Assigned: - Topographic Survey, Setting Out, Resection, Triangulations, Establishing of Bench Marks, Mines Surveying, Geological Survey and Leveling for settlement.

Agency: - Strength and Support Builders International (Ltd).

Client: - FLsmidth from **Denmark**

Main Contractor: - **Arab Union Contracting Company**

Position :Chief Land Surveyor

Feb. to April 2005

Project: - Under Ground Metro Rail in New Delhi (INDIA). 8km.

Detailed Tasks Assigned: - Setting Out, Resection, Alignment Survey, Triangulations and Leveling for settlement of structure.

Agency: - **Larson & Toubro Ltd. (L&T). ECC Construction Group**

Client: - **International Metro Civil Contractor (IMCC).**

Position : Land Surveyor

Nov.2002 to Feb. 2003

Project: - City Roads Development in New Delhi (INDIA)

Detailed Tasks Assigned: - Detailed Project Report, Traverse Control, Topographical Survey, Center Line Staking, Location of Bridge, Location for Subway.

Agency: - **Allied Engineers Pvt. (Ltd).**

Client: - **Public Work Department (PWD).**

Position :Sr. Land Surveyor

Jul to Oct. 2004

Project: - 3 nos. of Hydro Power Project in Himachal Pardesh (INDIA).

(1). Chamba 13 km (2). Manali 4 km (3). Kullu 9 km. 5000m above from MSL.

Detailed Tasks Assigned: - Survey Work for catchments Rivers Cross – Section and Contour Survey.

Agency: - **Allied Engineers Pvt. (Ltd)**

Client: - **Small Hydro Power Project.**

Position: Sr. Land Surveyor

Jan.2004 to July 2004

Project: - Kosi River in **INDIA and NEPAL**. (56km long and 7.5 km width survey work for over briades).



Detailed Tasks Assigned: - Traversing, Topographic Survey, L-Section, Cross – Section, Establishing of Bench Marks, Leveling and Setting Out.

Agency: - **Allied Engineers Pvt. (Ltd)**

Client: - **Wapcos Ltd**

Position: Sr. Land Surveyor

PATEL-ARSS  
CONTRACTOR  
Authorised Signatory



Volume Page 111

Chief Engineer  
World Bank Projects, Orissa  
Water Power Projects  
Office of the E.I.C (Civil) Orissa.  
Bhubaneswar

Jan. 2001 to Jan. 2004

Project: - 4/6 Leaning of Elevated National Highway No. 4 in Karnatka 77 Km Length from Belgaum to Kolhapur (INDIA).

Detailed Tasks Assigned: - Traversing, Topographic Survey, Center Line Staking, Cross – Section.

Agency: - **Allied Engineers Pvt. (Ltd)**

Client: - **Punj Lloyd Ltd.**

Position: Land Surveyor

Aug. to Nov. 2000

Project: - 4/6 Leaning of Elevated National Highway No. 5 in Andhara Pardesh 49 km Length from Dharmavarm to Tuni (INDIA).

Detailed Tasks Assigned: - Traversing, Topographic Survey, Center Line Staking, Cross – Section.

Agency: - **Allied Engineers Pvt. (Ltd)**

Client: - **Punj Lloyd Ltd.**

Position: Land Surveyor

### Professional Qualification:

“Diploma in Civil Engineering from (International Council for Management and Studies CHENNAI) in November 2007.

July 1998 to July 2000: “Diploma in Land Surveyor from Industrial Training Institute Rohtak (Haryana)” from July 1998 to August 2000.

Percentage: 79.80 % (First Class)

March 2002 to Aug. 2002: “Diploma in AutoCAD from IEC Institute Najafgarh (New Delhi)”

Rank: (First Class)

### Academic Qualification:

10+2 passe from Bhiwani board (Haryana) in 1998.

### Professionals Distinctions/Achievements:

- Secured First Class throughout the Career.
- Secured Distinction in Diploma of Land Surveyor

### Extra-Curricular Activities:

- Member of organizational team for CSA Management by AUCC in North Africa (Libya).
- Photographes in PUNJ LLOYD LTD. monthly magazine.

### Important Features of my Personality:

- Punctuality is To Increase My Efficiency (TIME),
- Quick learner. Adaptable, Pro-Active, Processed Thinker and innovative
- Strong built. easy mingling with people. General talkative nature of mine makes me easily accessible person.
- As far as the job life is concerned, I feel that I have good leadership qualities. Further, I may make mistake but I try to never repeat it.

### Personal Interests & Hobbies:

Have a special liking for Cleanness, Photography and Swinming.

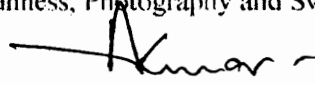
PATEL-ARSS-J.V.




PATEL-ARSS JV  
CONTRACTOR



Volume-I Page 112

  
(ASHOK KUMAR)

  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa  
Phubane-war

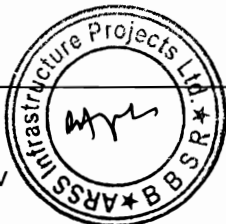
## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

<b>Position : Land Surveyor</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 2px;">Name : <b>Shri Sudhanshu Bhusan Jena</b></td> <td style="width: 60%; padding: 2px;">Date of Birth : <b>27.03.1978</b></td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications : <b>Diploma in Civil</b></td> </tr> </table>	Name : <b>Shri Sudhanshu Bhusan Jena</b>	Date of Birth : <b>27.03.1978</b>	Professional qualifications : <b>Diploma in Civil</b>							
Name : <b>Shri Sudhanshu Bhusan Jena</b>	Date of Birth : <b>27.03.1978</b>										
Professional qualifications : <b>Diploma in Civil</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 2px;">Name of employer :</td> <td style="padding: 2px;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 2px;">Address of employer</td> <td style="padding: 2px;"><b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</td> </tr> <tr> <td style="padding: 2px;">Telephone <b>0674 – 2588552 / 2588554</b></td> <td style="padding: 2px;">Contact : <b>0674 – 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 2px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 2px;">E-mail: <b>pate-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 2px;">Job title: <b>Land Surveyor</b></td> <td style="padding: 2px;">Years with present employer <b>From 8<sup>th</sup> January' 2004</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa	Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>pate-arssjv@arssgroup.in</b>	Job title: <b>Land Surveyor</b>	Years with present employer <b>From 8<sup>th</sup> January' 2004</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited</b> Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa										
Telephone <b>0674 – 2588552 / 2588554</b>	Contact : <b>0674 – 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>pate-arssjv@arssgroup.in</b>										
Job title: <b>Land Surveyor</b>	Years with present employer <b>From 8<sup>th</sup> January' 2004</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
<p style="font-size: 2em; font-weight: bold; transform: rotate(-5deg);">DETAIL BIO DATA ENCLOSED</p>		



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

**Address :**  
**37-Surya Nagar, Unit-7,**  
**Bhubaneswar-751 010.**  
**Phone-9938233022**  
**9238602548**

## **SUDHANSHU BHUSAN JENA**

**OBJECTIVE :** To pursue a career in the field of Civil Engineering and to seek an organization where my effort and ideas are valued for an environment with professionalism and self-improvement.

**EDUCATION :**

- Diploma in Civil Engineering placed in Second Division, 1995-1998, State Council for Technical Education and Vocational Training, Orissa.
- +2 Science in the year 1995 - Third Division, From Council of Higher Secondary Education, Bhubaneswar, Orissa.
- Matriculation in the year 1993 - First Division, From Council of Higher Secondary Education, Bhubaneswar, Orissa.

**EXPERIENCE :**

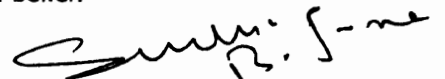
- 1 (One) year i.e. November, 1999 to November, 2000. - Practical Training at Capital Maintenance Division No.-2, Bhubaneswar.
- November 2000 to January, 2002 - Metro Builders (O) Pvt. Ltd. At Kendrapara Project under RITES Ltd.
- February 2002 to June 2003 - S.D. Road widening Project : Khurda to Bolangir under P.C.P. Construction, Bhubaneswar, Orissa.
- June 2003 to 2003 Dec. - N.H. - 215 Road widening project : Jajpur Road to Anandapur, Keonjhar under P.C.P. Construction, Bhubaneswar, Orissa.
- 8 Jan - 2004 to till date in survey work, Cuttack-Paradip, Tomka-Mongalpur, Chorda Duburi, State PWD Work etc.

Date of Birth : 27.03.1978  
Father's Name : Bhagaban Jena  
Marital Status : Married  
Nationality : Indian  
Religion : Hinduism  
Permanent Address : At/Po. Palasingha  
Dist - Kendrapara  
Orissa - 754211  
Phone # 06729-274738

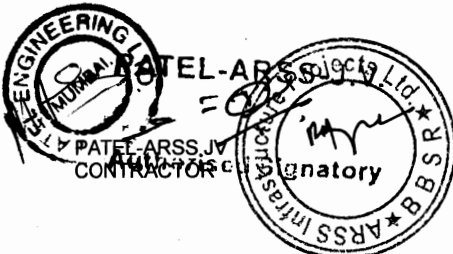
**DECLARATION:** I do hereby declare that the above statements are true and correct to the best of my knowledge and belief.

**Date :** 08.01.04

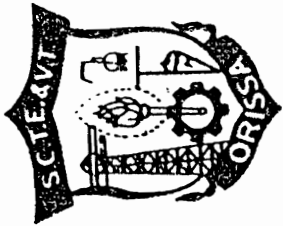
**Place :** Bhubaneswar



**(SUDHANSHU BHUSAN JENA)**



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



Diploma

SUDHANSU BHUSAN JENA

This is to certify that Shri/Kumari

son/daughter of BHAGABAN JENA

having undergone the prescribed course of studies for a period of THREE YEARS in CIVIL ENGINEERING

at INSTITUTE OF ENGINEERING AND MANAGEMENT, JEYPORE

has been declared passed and placed in

SECOND

Division

in the SUPPLEMENTARY, 1998

Examination.

(Signature)

Secretary

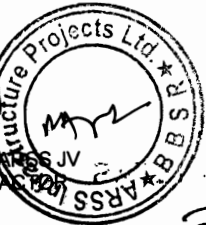
State Council for Technical

Education & Vocational Training, Orissa

Chairman

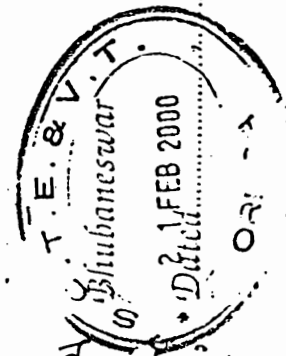
State Council for Technical

Education & Vocational Training, Orissa



Authorised Signatory

J.V.



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



**M/S METRO BUILDERS (ORISSA), PVT. LTD.**  
 CORPORATE OFFICE: SAHAYAGARH ROAD, Bhubaneswar - 751005  
 BRIDGE METRO ROAD, VUDA CAMPUS, CHANDANPUR, NEW ROAD, Bhubaneswar - 751005  
 PH: 966101226, 966101227, 966101228 | www.metrobuilders.orissa.com

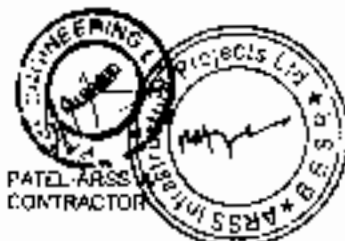
TO WHOM EVER IT MAY CONCERN

THIS IS TO CERTIFY THAT SRI SUBHANSHU BEHRA (S/O. JENA S/O. BABUVAHAN JENA) AT NO. PALASINGHA, DIST. KENDRAPARA WAS WORKING AS A SITE ENGINEER SINCE (NOVEMBER 2000 TO JANUARY 2002) IN OUR KENDRAPARA PROJECT NAMED CONSTRUCTION OF CYCLONE SHELTER cum SCHOOL BUILDING IN THE DISTRICT OF KENDRAPARA FOR AND ON BEHALF OF STATE GOVERNMENT OF JHARKHAND. HE IS SINCERE, LABOURIOUS, HONEST IN PERFORMING HIS ASSIGNED DUTIES. WE WISH HIM ALL GOOD WISHES IN HIS NEAR FUTURE.

FOR METRO BUILDERS (ORISSA), PVT. LTD.  
 S. J. Patil  
 PROJECT MANAGER

PATEL-ARSS-J.V.

Authorized Signatory



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

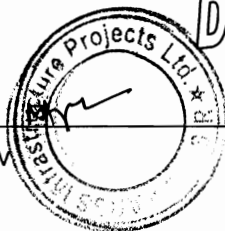
## Form PER-2: Resume of Proposed Personnel

Name of Bidder : <b>PATEL - ARSS (J.V.)</b>
---

Position : <b>Mech / Equip. Maint. Engr.</b>											
Personnel information	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name : <b>Shri Krishna Mohan Mund</b></td> <td style="width: 50%; padding: 2px;">Date of Birth : <b>20.08.1946</b></td> </tr> <tr> <td colspan="2" style="padding: 2px;">Professional qualifications : <b>B.E. in Mechanical</b></td> </tr> </table>	Name : <b>Shri Krishna Mohan Mund</b>	Date of Birth : <b>20.08.1946</b>	Professional qualifications : <b>B.E. in Mechanical</b>							
Name : <b>Shri Krishna Mohan Mund</b>	Date of Birth : <b>20.08.1946</b>										
Professional qualifications : <b>B.E. in Mechanical</b>											
Present employment	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Name of employer :</td> <td style="width: 50%; padding: 2px;"><b>ARSS Infrastructure Projects Limited</b></td> </tr> <tr> <td style="padding: 2px;">Address of employer</td> <td style="padding: 2px;"><b>ARSS Infrastructure Projects Limited Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</b></td> </tr> <tr> <td style="padding: 2px;">Telephone <b>0674 - 2588552 / 2588554</b></td> <td style="padding: 2px;">Contact : <b>0674 - 2588552 / 2588554</b></td> </tr> <tr> <td style="padding: 2px;">Fax : <b>0674 - 2585074</b></td> <td style="padding: 2px;">E-mail: <b>patel-arssjv@arssgroup.in</b></td> </tr> <tr> <td style="padding: 2px;">Job title: <b>Mech / Equip. Maint. Engr.</b></td> <td style="padding: 2px;">Years with present employer <b>From 7<sup>th</sup> August' 2007</b></td> </tr> </table>	Name of employer :	<b>ARSS Infrastructure Projects Limited</b>	Address of employer	<b>ARSS Infrastructure Projects Limited Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</b>	Telephone <b>0674 - 2588552 / 2588554</b>	Contact : <b>0674 - 2588552 / 2588554</b>	Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>	Job title: <b>Mech / Equip. Maint. Engr.</b>	Years with present employer <b>From 7<sup>th</sup> August' 2007</b>
Name of employer :	<b>ARSS Infrastructure Projects Limited</b>										
Address of employer	<b>ARSS Infrastructure Projects Limited Plot No.38, Sector-A, Zone-D, Mancheswar Industrial Estate, Bhubaneswar, Orissa</b>										
Telephone <b>0674 - 2588552 / 2588554</b>	Contact : <b>0674 - 2588552 / 2588554</b>										
Fax : <b>0674 - 2585074</b>	E-mail: <b>patel-arssjv@arssgroup.in</b>										
Job title: <b>Mech / Equip. Maint. Engr.</b>	Years with present employer <b>From 7<sup>th</sup> August' 2007</b>										

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

From	To	Company/Project/Position/Relevant technical and management experience
DETAIL BIO DATA ENCLOSED		



## Bio-Data

### Personal Profile

Name : Krishna Mohan Mund

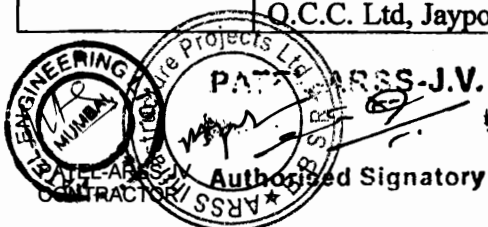
Qualification : B.Sc Engg. (Mechanical) ✓

Year Of Pass : 1970

Experience : 37 years in different fields ✓

### PROFESSIONAL PROFILE

Period	Project	Brief Description of Work
1970-1972	Balimela Power House Project	i) Batching Plant Erection & Operation ii) Bridge over Tail Race channel (Civil works)
1972-1974	Haridaspur Quarry	Drilling & Blasting Quarry operations, compression cranes, Dumper and Stone crushers maintenance work.
1975-1977	Central work shop BBSR	Fabrication shop and Machine shop for Construction of High Hydraulic gates of different projects in Orissa.
1979-1979	Different Projects Such as Khadkhai Potteru, Rengali	For Erection of Hydraulic gates
1980-1981	Subaranarekha Bridge Project	Launching of Girders (cast in Situ) Over Subaranarekha Bridge.
1981-1985	Indravati Project	i) In Charge of Field Machinery works and maintenance of Poklain, Dozer, Compressor, Rollers ii) Erection of Tower crane Erection of Calam Pump and Excavation of Power House, Pit by Mechanical Means, Quality control work of penstock welding and Erection of Penstock segments from valve House to Power House of Indravati Project.
1986-1987	Halhi Barrage Project O.C.C. Ltd Upper Indravati Project	Civil Works including excavation of foundation over spill way. Construction of spill way and Bridge over Spill way. Construction of Head Regulators Mechanical works Erection of Under Sluice, Spill way and Regulator gates.
1968-1989	Central Barrage Project O.C.C. Ltd, Jaypore	Fabrication of Penstock Pipes to UIPP.



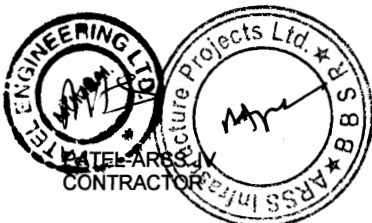


1990-1997	Indravati Project Govt. Dept and O.C.C. Ltd	Batching Plant operation of Power House Project, Derrick Crane operation for mock clearance in Power House Project. Inspection of erection works or pen Stock pipes UIPP. i) Inspection of welding Quality Control Testing ii) In charge of central Store for Procurement of cement and other materials.
1998-2000	Central workshop O.C.C. Ltd.	Machine shop and Fabrication Shop
2000-2004	S & M Dim BBSR	Fabrication and Erection of Medium Gate Project through out Orissa. Maintenance of Munduli weir Gates and Renovation works. In charge of Jobra workshop and W/S. Erection at Site of Works
2004-2005	Office of The EIC	i) P.A to Chief Engineer (Mech) All Tenders of Procurement and works All Establishment matters All Estimates of Gate Projects and vehicles. ii) Deputy Director Design (Cell) Design of all gates in Orissa under Govt. of Orissa
2005-2006	S & M Dim	i) Disposal of Scrap (Steel Scraps) through out Orissa of Water Resource Department ii) Centralized System was Introduced through web site.
2006-2007	Jindal Stainless Steel Jajpur Plant Under gangotri Project	Construction of four lane roads as Project Manager and Planning of M/C deployment for the road works 10 Km in Jindal Stainless Steel Project.

PATEL-ARSS-J.V.

  
Authorised Signatory

*Krishna Mohan Mund*  
03/08/07  
Krishna Mohan Mund



**Patel**

# Patel – ARSS JV



PATEL ENGINEERING

Sector A, Zone-D, Plot No. 18, Manchewar Industrial Estate,  
Bhubaneswar - 751 011 (Orissa); Ph: 106741 2588552, 2588554 Fax: 0674) 2545074

No: P-ARSSJV/CE/WBP/08-09/ 2061

Date: 21/10/08

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

2353  
21/10/08

**Sub:** Civil Works ICB, Package OSRP-CW-ICB-Y1-P01 under the proposed Orissa State Roads Project with World Bank Assistance - Widening & Strengthening of Existing Carriageway to 2 lane road from Bhanwanipatna to Kharar (270 Km to 70/0 Km. of SH-16).

**Ref :** i) SFB 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-P01-E-44276 dt. 27.09.2008.

Dear Sir,

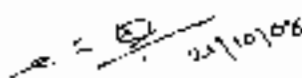
Inviting kind reference to the above letters on noted subject and in accordance with your instructions vide your letter at serial iii) of reference, we furnish herewith Bank Guarantee bearing No. **0665708860000317 dtd. 20.10.08** from State Bank of India, Commercial Branch, Bhubaneswar for **Rs. 5,27,57,000/-** (Rupees Five Crore Twenty Seven Lakh Fifty Seven Thousand Only) towards Performance Security in accordance with conditions of contract and in the prescribed BG format in section IX for further necessary action at your end.

We would request you to kindly scrutinize the BG furnished herewith and process contract agreement.

Thanking you and assuring best of our services always

Thanking you  
Yours faithfully,

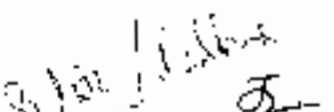
For **PATEL-ARSS (JV)**

  
(Authorised Signatory)

BAB, PMU  
EE IV, PMU  
for immediate action



Volume-4 Page 120/1

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

THE CHIEF ENGINEER  
ARSS BANK PROJECTS  
LTD

CHENNAI



20/10/2008

1931/20-10-08

GUARANTEE NO : 0663708BG0000327  
AMOUNT OF GUARANTEE : INRS, 27,57,000.00  
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 NARAINA POINT, MUMBAI AND AMONGST OTHER PLACES, A BRANCH AT BHIMANAGAR COMMERCIAL BRANCH. HEREIN AFTER REFERRED TO AS 'THE BANK'. IN FAVOUR OF THE CHIEF ENGINEER, ARSS Bank Projects, Chennai (HEREIN AFTER REFERRED TO AS 'BENEFICIARY') FOR AN AMOUNT NOT EXCEEDING INRS, 27,57,000.00 (two crore twenty seven lakh fifty seven 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 INRS, 27,57,000.00 (two crore twenty seven lakh fifty seven 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 LIABILITIES THEREUNDER.

ADMITTED SIGNATORY

ADMITTED SIGNATORY



World Bank Projects Office  
World Bank Projects  
to the E.I.C (Civil) Office  
Ebubene

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

रु. 100



सत्यमेव जयते

ONE  
HUNDRED RUPEES

भारत INDIA  
INDIA NON JUDICIAL

उड़ीसा ORISSA

B 142713

Enclosure to BG No. 0665708 BG 0000327

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: 20.10.2008

Performance Guarantee No: 0665708 BG 0000327

We have been informed that PATEL - ARSS JV, Plot No. 19,  
Sector-A, Zone - D, Mancheswar Industrial Estate,  
Bhubaneswar - 751010. (Hereinafter called "the Contractor")



has entered into Contract No OSRP-CW 81 P01-44276 dated 27.09.2009 with you, for the execution of **Widening & Strengthening of existing carriageway to 2 lane road from Bhawanipatna to Kharlar (Km. 2/0 to 70/0 of SH-16)** (hereinafter called "the Contract");


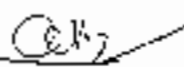
Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

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 5,27,57,000/- (Rupees Five Crore Twenty Seven Lakh Fifty Seven 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 5,27,57,000/- (Rupees Five Crore Twenty Seven Lakh Fifty Seven 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 are forfeited and we shall be relieved and discharged from all liabilities thereunder.

S. K. PATIL (Signature)  
14064



# 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.

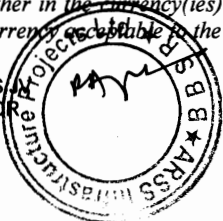
At the request of the Contractor, we \_\_\_\_\_ [name of Bank] hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of \_\_\_\_\_ [amount in figures] ( \_\_\_\_\_ ) [amount in words] upon receipt by us of your first demand in writing accompanied by a written statement 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 \_\_\_\_\_,



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



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

2 \_\_\_\_,<sup>2</sup> whichever is earlier. 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.**

<sup>2</sup> 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 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."



# 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])<sup>1</sup> 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

<sup>1</sup> 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.





demand for payment under this guarantee must be received by us at this office on or before that date.

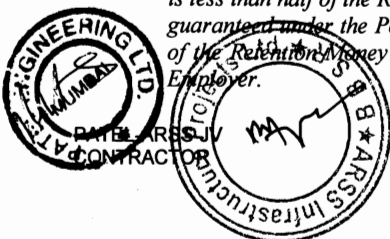
This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

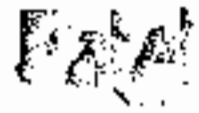
\_\_\_\_\_  
[signature(s)]

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

not exceeding in total an amount of \_\_\_\_\_ [amount in figures] (\_\_\_\_\_) [amount in words]<sup>1</sup> 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.

<sup>1</sup> 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.





**PATEL ENGINEERING LTD**

**EXTRACT FROM THE MINUTES OF THE MEETING OF THE BOARD OF DIRECTORS OF THE COMPANY HELD ON 01 OCTOBER 2018 AT THE REGISTERED OFFICE OF THE COMPANY IN MUMBAI.**

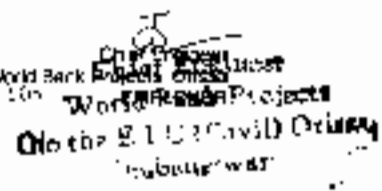
The Board has approved the following resolution with effect from 01 October 2018: **Mr. Anwarul Karim, Managing Director of the company, on behalf of the company, the contract for execution of the civil works (L1 Package No. 258K/CW/E-1-1-2018) under the proposed Cross State Road project for Widening & Strengthening of the Existing Carriage way to Bling road from Bhayandrapur to Khairi (2.0 km to 7.0 km) of -Hided which has been awarded to PATEL ENGINEERING LTD. Civil Engineer, World Bank Project, Crossa, via their letter of acceptance dated 27.09.2018.**

**CERTIFIED TRUE COPY  
For PATEL ENGINEERING LTD.**

**DIRECTOR**



REGD OFFICE  
Patel Estate Road Jogeshwar (W) Mumbai - 400 103 India  
Phone - 91 22 26767500 Fax - 91 22 26767501  
E-mail - info@pateleng.com  
E-mail - anand@pateleng.com www.pateleng.com



AGREEMENT No-5 of 2008 - 09



**GOVERNMENT OF ORISSA  
WORKS DEPARTMENT**

**CIVIL WORKS CONTRACT**

[ PACKAGE No. OSRP-CW-ICB-Y1-P01 ]

**For**

*Widening & Strengthening of existing carriageway to 2-lane road from  
Bhawanipatna to Kahriar  
(Km. 2/0 to 70/0 of SH – 16)*

*under  
Orissa State Roads Project*

between

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

and

**PATEL – 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. 105,51,39,120.00**

*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: 3<sup>rd</sup> December, 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	<b>PARTICULAR CONDITIONS</b>	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	<b>GENERAL CONDITIONS</b>	18



J  
Chief Engineer  
World Bank Projects, Orissa  
Chief Engineer  
World Bank Projects  
to the E.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.



PATEL - ARSS JV  
CONTRACTOR

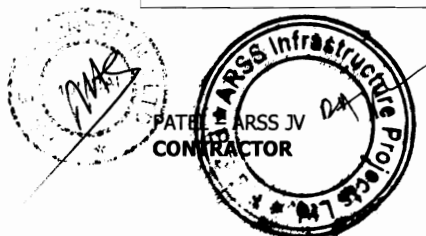


Volume - II - Page No. 1

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

## Part A - Contract Data

Conditions	Sub-Clause	Data
<b>Employer's name and address</b>	1.1.2.2 & 1.3	Works Department, Government of Orissa Orissa Secretariat, Bhubaneswar – 751 001
<b>Engineer's name and address</b>	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
<b>Bank's name</b>	1.1.2.11	International Bank for Reconstruction and Development, ( The World Bank )
<b>Borrower's name</b>	1.1.2.12	Government of Orissa through Government of India
<b>Time for Completion</b>	1.1.3.3	<u>30 Months</u> <i>Refer to Table: Summary of Sections below</i>
<b>Defects Notification Period</b>	1.1.3.7	365 days.
<b>Sections</b>	1.1.5.6	<i>Refer to Table: Summary of Sections below</i>
<b>Electronic transmission systems</b>	1.3	Email
<b>Governing Law</b>	1.4	Law in force in the Union of India.
<b>Ruling language</b>	1.4	English
<b>Language for communications</b>	1.4	English




Conditions	Sub-Clause	Data
Time for the Parties entering into a Contract Agreement	1.6	28 days
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: <u>15</u> 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.



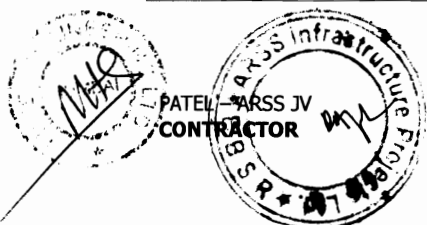
PATEL  
CONTRACTOR



Volume – II - Page No. 3

  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
EMPLOYER  
Office of the E.T.C. (Civil) Orissa  
Phubaneswar

Conditions	Sub-Clause	Data
<b>Total advance payment</b>	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.
<b>Repayment amortization rate of advance payment</b>	14.2(b)	10 %
<b>Percentage of Retention</b>	14.3	10 %
<b>Limit of Retention Money</b>	14.3	5 % of the Accepted Contract Amount
<b>Plant and Materials</b>	14.5(b)	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.
<b>Minimum Amount of Interim Payment Certificates</b>	14.6	3 % of the Accepted Contract Amount.
<b>Publishing source of commercial interest rates for financial charges in case of delayed payment</b>	14.8	State Bank Of India.
<b>Maximum total liability of the Contractor to the Employer</b>	17.6	The accepted contract amount.
<b>Periods for submission of insurance:</b> a. evidence of insurance. b. relevant policies	18.1	14 days 28 days
<b>Maximum amount of deductibles for insurance of the Employer's risks</b>	19.2(d)	<i>US\$ 5000 or Rs. 200,000 per occurrence</i>
<b>Minimum amount of third party insurance</b>	18.3	<i>Rs. 10,000,000 per occurrence with unlimited number of occurrences</i>



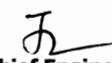


Conditions	Sub-Clause	Data
Date by which the DB shall be appointed	20.2	28 days after the Commencement date
The DB shall be comprised of	20.2	Three Members
List of potential DB sole members	20.2	None
Appointment (if not agreed) to be made by	20.3	President, Indian Roads Congress, New Delhi.
Rules of 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 18/0 to Km. 46/0 Km. of SH – 16	10 Months from Commencement of Works	<u>IRs. 200,000 per day</u>
Km. 46/0 to Km. 70/0 Km of SH – 16	20 Months from Commencement of Works	<u>IRs. 200,000 per day</u>
Completion of Whole of the Stretch	30 Months from Commencement of Works	<u>IRs. 150,000 per day</u>



  
 Chief Engineer  
 World Bank Projects, Orissa  
 Chief Engineer  
 World Bank Projects  
 Orissa  
 P. B. Banerjee

## Part B - Specific Provisions

### Sub-Clause 14.1

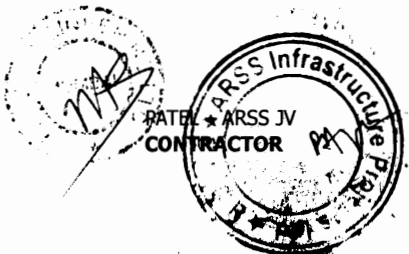
#### The Contract Price

*(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 of Contractor's Equipment and spare parts remaining in the Country after completion of the Contract. Upon payment of such duties 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 5<sup>th</sup> Paragraph.  
Working Drawings / fabrication drawings for temporary works (such as form work, staging, centring, 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-



Chief Engineer  
World Bank Projects  
O to the EMPLOYER (Civil) Orissa,  
Bhubaneswar:

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;

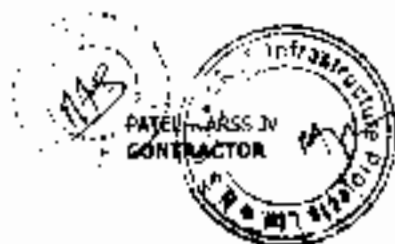
- (c) "In case, any operation connected with traffic necessitated diversion, obstruction or closure of any road, railway or any other Right of Way, the approval of the Engineer or the Engineer's Representative and the concerned authorities shall be obtained well in advance by the Contractor."
- (d) The 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...

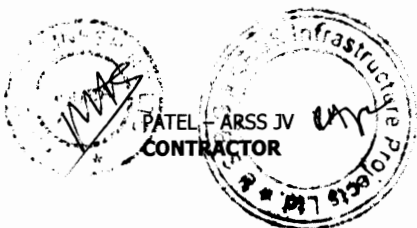
**17.2 Contractor’s  
Care of the Works**

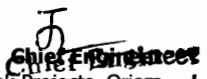
Add the following after end of para:

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 along with 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  
World Bank Projects  
EMPLOYER  
Office of the E.I.C (Civil) Orissa,  
Bhubaneswar:

## Annexure-AI

### **Sufficient 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 at 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**

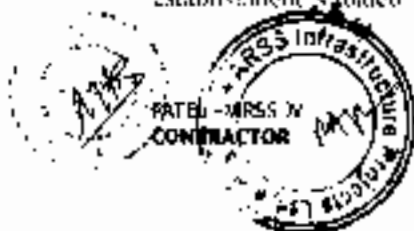
The Act lays down the procedure for registration of trade unions of workmen and employees. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

**(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 in



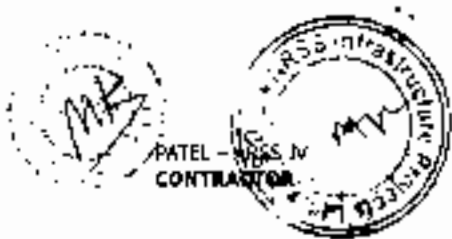
which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back, etc.

**(xx) 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.

**(xxi) 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.



*J*  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
Office to the E. I. C. (Civil) Orissa  
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.

**I. 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 tapes.

(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 material. 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 (vi) 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.

(xv) 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.

(xvi) 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 30 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 further 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.

(xvii) 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.

(xviii) 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 overlaid with debris or materials as to render it unsafe.

(xix) 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.

(xx) 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.

(vii) 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 hoods, 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.

(viii) 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.

(ix) 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.

(x) 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.

(xi) Notwithstanding anything contained in condition (i) to (x) above, the Contractor shall remain liable to comply with the provisions of all acts, rules, regulations and by-laws 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 out. 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 12 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 tared 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.

**(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 sqm 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 maid-servant in attendance. Sanitary utensils shall be provided to the satisfaction of local medical, health or 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.



(vii) Planning, design 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.

**(viii) 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.

**(ix) Awareness and Education of HIV/AIDS**

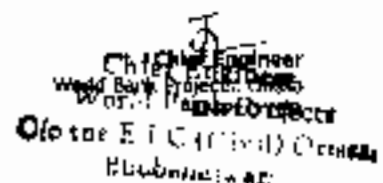
The contractor shall provide/carry out HIV/AIDS awareness and training programme to its labour and management, at least twice per year during the construction period.

**(x) 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.

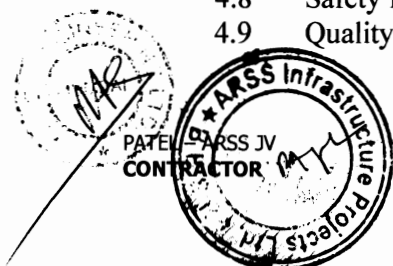
**(xi) Amendments:**


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.



# General Conditions (GC)

<b>1.</b>	<b>General Provisions .....</b>	<b>24</b>
1.1	Definitions.....	24
1.2	Interpretation.....	30
1.3	Communications .....	30
1.4	Law and Language .....	31
1.5	Priority of Documents.....	31
1.6	Contract Agreement.....	32
1.7	Assignment .....	32
1.8	Care and Supply of Documents .....	32
1.9	Delayed Drawings or Instructions .....	32
1.10	Employer's Use of Contractor's Documents .....	33
1.11	Contractor's Use of Employer's Documents .....	34
1.12	Confidential Details .....	34
1.13	Compliance with Laws .....	34
1.14	Joint and Several Liability .....	35
1.15	Inspections and Audit by the Bank .....	35
<b>2</b>	<b>The Employer .....</b>	<b>35</b>
2.1	Right of Access to the Site.....	35
2.2	Permits, Licences or Approvals .....	36
2.3	Employer's Personnel .....	37
2.4	Employer's Financial Arrangements .....	37
2.5	Employer's Claims.....	37
<b>3</b>	<b>The Engineer .....</b>	<b>38</b>
3.1	Engineer's Duties and Authority .....	38
3.2	Delegation by the Engineer.....	40
3.3	Instructions of the Engineer.....	41
3.4	Replacement of the Engineer .....	41
3.5	Determinations.....	41
<b>4</b>	<b>The Contractor.....</b>	<b>42</b>
4.1	Contractor's General Obligations .....	42
4.2	Performance Security .....	44
4.3	Contractor's Representative.....	44
4.4	Subcontractors.....	45
4.5	Assignment of Benefit of Subcontract.....	46
4.6	Co-operation .....	46
4.7	Setting Out .....	47
4.8	Safety Procedures.....	47
4.9	Quality Assurance.....	48



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

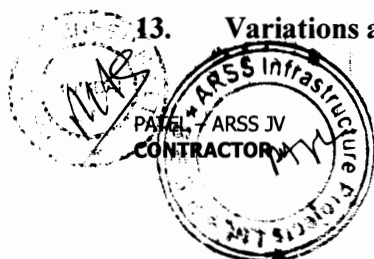
4.10	Site Data.....	48
4.11	Sufficiency of the Accepted Contract Amount.....	49
4.12	Unforeseeable Physical Conditions .....	49
4.13	Rights of Way and Facilities.....	50
4.14	Avoidance of Interference.....	51
4.15	Access Route.....	51
4.16	Transport of Goods .....	51
4.18	Protection of the Environment.....	52
4.19	Electricity, Water and Gas .....	52
4.22	Security of the Site.....	55
4.23	Contractor's Operations on Site.....	55
4.24	Fossils .....	55
<b>5</b>	<b>Nominated Subcontractors .....</b>	<b>56</b>
5.1	Definition of "nominated Subcontractor" .....	56
5.2	Objection to Nomination.....	56
5.3	Payments to nominated Subcontractors .....	57
5.4	Evidence of Payments.....	57
<b>6.</b>	<b>Staff and Labour .....</b>	<b>58</b>
6.1	Engagement of Staff and Labour .....	58
6.2	Rates of Wages and Conditions of Labour .....	58
6.3	Persons in the Service of Employer .....	58
6.4	Labour Laws .....	58
6.5	Working Hours.....	58
6.6	Facilities for Staff and Labour .....	59
6.7	Health and Safety .....	59
6.8	Contractor's Superintendence.....	61
6.9	Contractor's Personnel.....	61
6.10	Records of Contractor's Personnel and Equipment.....	61
6.11	Disorderly Conduct.....	61
6.12	Foreign Personnel .....	61
6.13	Supply of Foodstuffs.....	62
6.14	Supply of Water .....	62
6.15	Measures against Insect and Pest Nuisance .....	62
6.16	Alcoholic Liquor or Drugs.....	62
6.17	Arms and Ammunition .....	62
6.18	Festivals and Religious Customs .....	62
6.19	Funeral Arrangements.....	63
6.20	Prohibition of Forced or Compulsory Labour .....	63
6.21	Prohibition of Harmful Child Labour .....	63
6.22	Employment Records of Workers.....	63
<b>7.</b>	<b>Plant, Materials and Workmanship .....</b>	<b>63</b>
7.1	Manner of Execution.....	63
7.2	Samples .....	63
7.3	Inspection.....	64
7.4	Testing.....	64



PATEL ARSS JWA  
CONTRACTOR



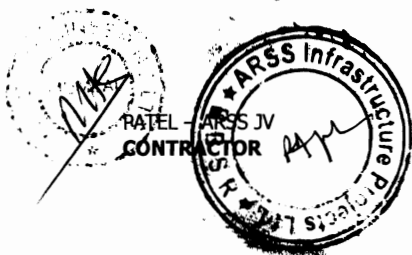
7.5	Rejection .....	65
7.6	Remedial Work .....	65
7.7	Ownership of Plant and Materials.....	66
7.8	Royalties .....	66
<b>8.</b>	<b>Commencement, Delays and Suspension.....</b>	<b>66</b>
8.1	Commencement of Works .....	66
8.2	Time for Completion.....	67
8.3	Programme .....	67
8.4	Extension of Time for Completion .....	69
8.5	Delays Caused by Authorities.....	69
8.6	Rate of Progress .....	69
8.7	Delay Damages .....	70
8.8	Suspension of Work.....	71
8.9	Consequences of Suspension .....	71
8.10	Payment for Plant and Materials in Event of Suspension.....	71
8.11	Prolonged Suspension.....	71
8.12	Resumption of Work.....	72
<b>9.</b>	<b>Tests on Completion .....</b>	<b>72</b>
9.1	Contractor's Obligations.....	72
9.2	Delayed Tests.....	72
9.3	Retesting .....	73
9.4	Failure to Pass Tests on Completion.....	73
<b>10.</b>	<b>Employer's Taking Over.....</b>	<b>73</b>
10.1	Taking Over of the Works and Sections .....	73
10.2	Taking Over of Parts of the Works .....	74
10.3	Interference with Tests on Completion.....	75
<b>11.</b>	<b>Defects Liability .....</b>	<b>76</b>
11.1	Completion of Outstanding Work and Remedying Defects .....	76
11.2	Cost of Remedying Defects .....	76
11.3	Extension of Defects Notification Period .....	77
11.4	Failure to Remedy Defects.....	77
11.5	Removal of Defective Work .....	78
11.6	Further Tests .....	78
11.7	Right of Access .....	78
11.8	Contractor to Search .....	78
11.9	Performance Certificate .....	78
11.10	Unfulfilled Obligations .....	79
11.11	Clearance of Site .....	79
<b>12.</b>	<b>Measurement and Evaluation.....</b>	<b>79</b>
12.1	Works to be Measured .....	79
12.2	Method of Measurement.....	80
12.3	Evaluation .....	80
12.4	Omissions.....	82
<b>13.</b>	<b>Variations and Adjustments .....</b>	<b>82</b>




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




13.1	Right to Vary.....	82
13.2	Value Engineering .....	83
13.3	Variation Procedure .....	84
13.4	Payment in Applicable Currencies.....	84
13.5	Provisional Sums .....	84
13.6	Daywork.....	85
13.7	Adjustments for Changes in Legislation.....	86
13.8	Adjustments for Changes in Cost .....	86
<b>14.</b>	<b>Contract Price and Payment.....</b>	<b>88</b>
14.1	The Contract Price .....	88
14.2	Advance Payment .....	89
14.3	Application for Interim Payment Certificates.....	90
14.4	Schedule of Payments.....	91
14.5	Plant and Materials intended for the Works .....	92
14.6	Issue of Interim Payment Certificates.....	93
14.7	Payment.....	94
14.8	Delayed Payment .....	94
14.9	Payment of Retention Money .....	95
14.10	Statement at Completion.....	96
14.11	Application for Final Payment Certificate .....	96
14.12	Discharge .....	97
14.13	Issue of Final Payment Certificate.....	97
14.14	Cessation of Employer's Liability .....	98
14.15	Currencies of Payment.....	98
<b>15.</b>	<b>Termination by Employer.....</b>	<b>99</b>
15.1	Notice to Correct.....	99
15.2	Termination by Employer .....	99
15.3	Valuation at Date of Termination .....	101
15.4	Payment after Termination .....	101
15.5	Employer's Entitlement to Termination for Convenience.....	101
15.6	Corrupt or Fraudulent Practices.....	102
<b>16.</b>	<b>Suspension and Termination by Contractor.....</b>	<b>103</b>
16.1	Contractor's Entitlement to Suspend Work .....	103
16.2	Termination by Contractor.....	104
16.3	Cessation of Work and Removal of Contractor's Equipment .....	105
16.4	Payment on Termination.....	106
<b>17.</b>	<b>Risk and Responsibility.....</b>	<b>106</b>
17.1	Indemnities.....	106
17.2	Contractor's Care of the Works .....	107
17.3	Employer's Risks.....	107
17.4	Consequences of Employer's Risks.....	108
17.5	Intellectual and Industrial Property Rights .....	109
17.6	Limitation of Liability.....	109
17.7	Use of Employer's Accommodation/Facilities.....	110



  
**Chief Engineer**  
 World Bank Projects, Orissa  
**EMPLOYER**  
 Projects  
 Of the E. I. C. (Civil) Orissa,  
 Bhubaneswar:

<b>18.</b>	<b>Insurance .....</b>	<b>110</b>
18.1	General Requirements for Insurances .....	110
18.2	Insurance for Works and Contractor's Equipment .....	112
18.3	Insurance against Injury to Persons and Damage to Property .....	114
18.4	Insurance for Contractor's Personnel.....	115
<b>19.</b>	<b>Force Majeure .....</b>	<b>115</b>
19.1	Definition of Force Majeure .....	115
19.3	Duty to Minimise Delay.....	116
19.4	Consequences of Force Majeure .....	116
19.5	Force Majeure Affecting Subcontractor .....	117
19.6	Optional Termination, Payment and Release.....	117
19.7	Release from Performance .....	118
<b>20.</b>	<b>Claims, Disputes and Arbitration.....</b>	<b>118</b>
20.1	Contractor's Claims .....	118
20.2	Appointment of the Dispute Board .....	120
20.3	Failure to Agree on the Composition of the Dispute Board .....	121
20.4	Obtaining Dispute Board's Decision .....	122
20.5	Amicable Settlement.....	123
20.6	Arbitration.....	123
20.7	Failure to Comply with Dispute Board's Decision.....	124
20.8	Expiry of Dispute Board's Appointment .....	124



  
 Chief Engineer  
 World Bank Projects, Orissa  
 Chief Engineer  
 World Bank Projects  
 Chief Engineer  
 World Bank Projects  
 Chief Engineer  
 World Bank Projects, Orissa  
 Chief Engineer  
 World Bank Projects, Orissa

# 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-P01]**

For

**Widening & Strengthening of existing carriageway to 2-lane road from  
Bhawanipatna to Kahriar  
(Km. 2/0 to 70/0 of SH – 16 )  
under Orissa State Roads Project  
[Name of Contract]**


The General Conditions that follow are the Bank Harmonized Edition of the Conditions of Contract for Construction prepared and copyrighted by the International Federation of Consulting Engineers (*Fédération Internationale des Ingénieurs-Conseils*, or FIDIC), FIDIC 2005-All rights reserved. This publication is exclusive for the use of Bank Borrowers and their project implementing agencies as provided under the License Agreement dated March 11<sup>th</sup>, 2005, between the IBRD and FIDIC, and, consequently, no part of this publication may be reproduced, translated, adapted, stored in a retrieval system or communicated, in any form or by any means, whether mechanical, electronic, magnetic, photocopying, recording or otherwise, without prior permission in writing from FIDIC, except by the Employer identified above and only for the exclusive purpose of preparing these Standard Bidding Documents for the Contract also identified above.



PATEL ARSS JV  
CONTRACTOR



Volume – II - Page No. 23

  
Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
Projects  
to the E.I.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].

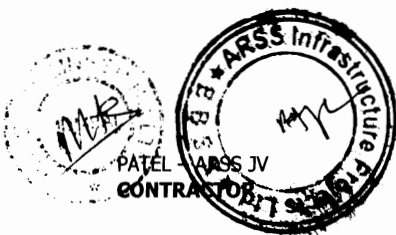
1.1.1.3 “Letter of Acceptance” means the letter of formal acceptance, signed by the Employer, of the Letter of Tender, including any annexed memoranda comprising agreements between and signed by both Parties. If there is no such letter of acceptance, the expression “Letter of Acceptance” means the Contract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

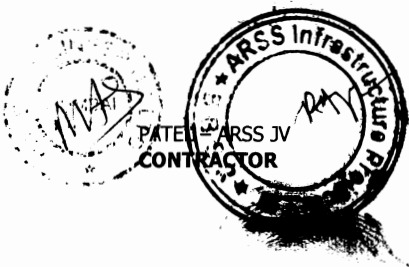
1.1.2.2 “Employer” means the person named as employer in the Contract Data and the legal successors in title to this person.

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).

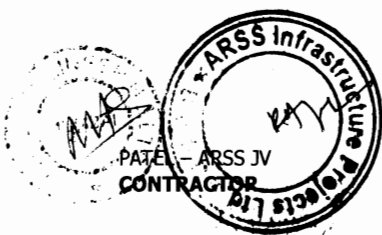
1.1.2.4 “Engineer” means the person appointed by the Employer to act as the Engineer for the purposes of the Contract and named in the Contract Data, or other person appointed from time to time by the Employer and notified to the Contractor under Sub-Clause 3.4 [Replacement of the Engineer].

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.

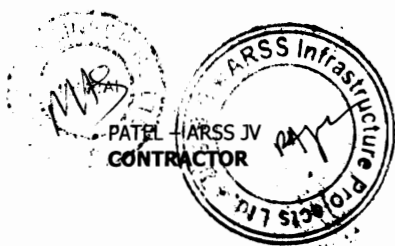


- 1.1.2.7 “Contractor’s Personnel” means the Contractor’s Representative and all personnel whom the Contractor utilises on Site, who may include the staff, labour and other employees of the Contractor and of each Subcontractor; and any other personnel assisting the Contractor in the execution of the 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].



#### 1.1.4 Money and Payments

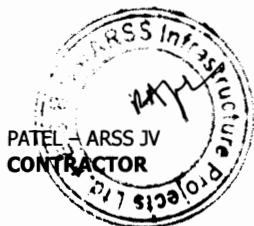
- 1.1.3.6 “Tests after Completion” means the tests (if any) which are specified in the Contract and which are carried out in accordance with the Specification after the Works or a Section (as the case may be) are taken over by the Employer.
- 1.1.3.7 “Defects Notification Period” means the period for 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.
- 1.1.4.1 “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.



PATEL - ARSS JV  
CONTRACTOR



  
Chief Engineer  
World Bank Project  
Orissa  
EMPLOYER  
Oto the E I C (Civil) Orissa  
Bhubaneswar

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"

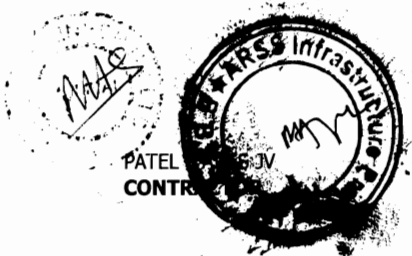
The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

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.



PATEL – ARSS IV  
CONTRACTOR



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

**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.

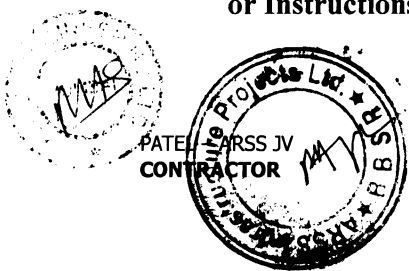
Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.


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



  
Chief Engineer  
World Bank Project Engineer  
EMPLOYER  
World Bank Project  
Office of the E.I.C (Civil) Orissa  
Bhubaneswar:

particular time, which shall be reasonable. The notice shall 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.

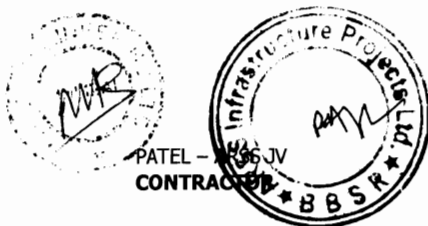
However, if and to the extent that the Engineer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit


#### 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



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

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

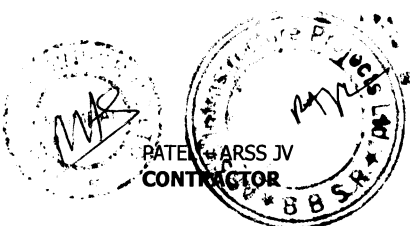
The Contractor's and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify the Contractor's compliance with the Contract and allow its proper implementation.


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



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

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.

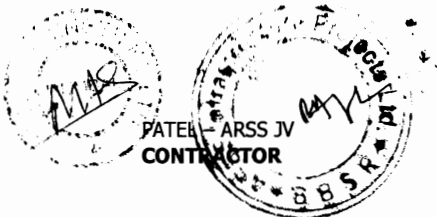
**1.15 Inspections and Audit by the Bank**

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



*JH*  
Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
World Bank Projects  
Office of the E.I.C (Civil) Orissa,  
Bhubaneswar.

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.

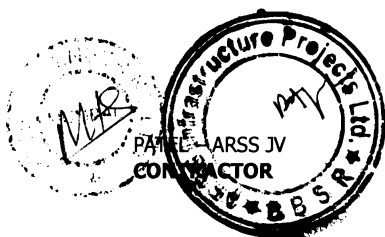
After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

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**

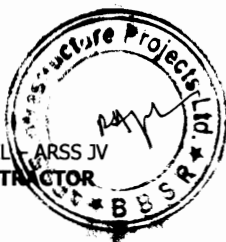
The Employer shall submit, before the Commencement Date and thereafter within 28 days after receiving any request from the Contractor, reasonable evidence that financial arrangements have been made and are being maintained which will enable the Employer to pay the Contract Price punctually (as estimated 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

PATEL ARSS JV  
CONTRACTOR



  
Chief Engineer  
World Bank Projects  
EMPLOYER  
World Bank Projects  
Office of the E.I.C (Civil) Orissar  
Bhubaneswar:

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 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

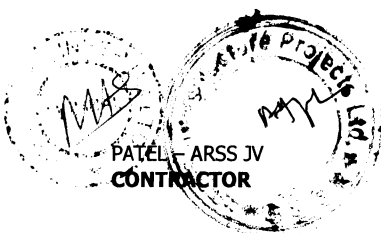
#### 3.1 Engineer's Duties and Authority

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.



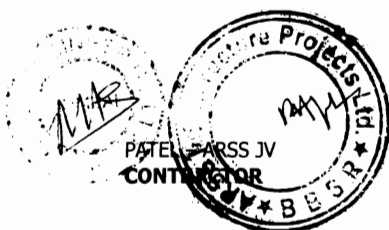
Except as otherwise stated in these Conditions:

- (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 [Paument 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 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

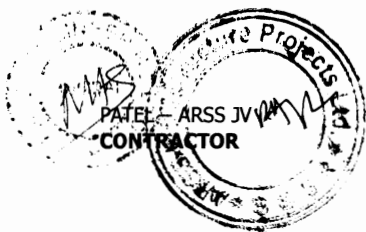
The Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or Materials. The assignment, delegation 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

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

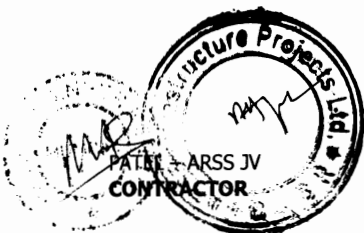
### 3.4 Replacement of the Engineer

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.

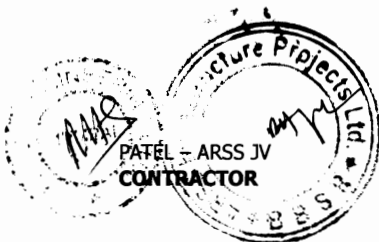
All equipment, material, and services to be incorporated in or required for the Works shall have their origin in any eligible source country as defined by the Bank.

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.

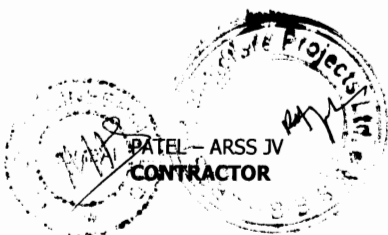
If the Contract specifies that the Contractor shall design any part of the Permanent Works, then unless otherwise stated in the Particular Conditions:

- (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  
World Bank Projects  
EMPLOYER  
O/o the E.I.C (Civil) Orissa  
Bhubaneswar:

**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**

The Contractor shall appoint the Contractor's Representative



*J*  
Chief Engineer  
World Bank Projects, Orissa  
Chief Engineer  
EMPLOYER  
World Bank Projects  
Office of the E.I.C (Civil) Orissa  
Bhubaneswar



**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].

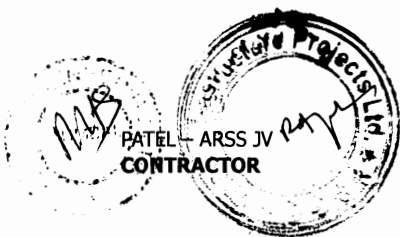
The Contractor's Representative may delegate any powers, functions and authority to any competent person, and may at any time revoke the delegation. Any delegation or revocation shall not take effect until the Engineer has received prior notice signed by the Contractor's Representative, naming the person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



  
Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
World Bank Projects  
Of the ETC (Civil) Orissa  
Bhubaneswar

- (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:

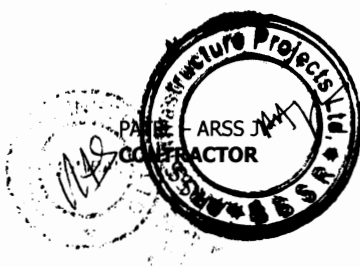
- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

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.

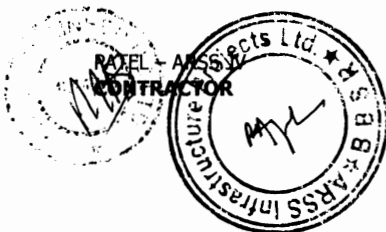
Upon receiving such notice and inspecting and/or investigating these physical conditions, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) whether and (if so) to what extent these physical conditions were Unforeseeable, and (ii) the matters described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



  
Chief Engineer  
World Bank Projects, Orissa  
Chief Engineer  
World Bank Projects  
Orissa  
E. I. C. (Civil) Orissa  
Bhubaneswar

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.

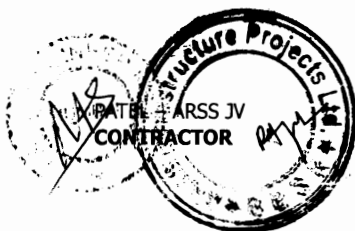
Except as otherwise stated in these Conditions:

- (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.

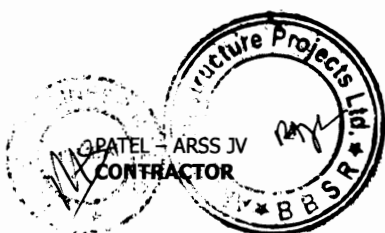
The Contractor shall ensure that emissions, surface discharges and effluent from the Contractor's activities shall not exceed the values stated in the Specification or prescribed by applicable Laws.

#### 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**

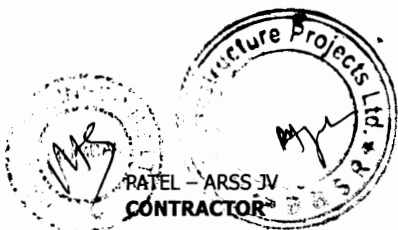
The Employer shall make the Employer's Equipment (if any) available for the use of the Contractor in the execution of the Works in accordance with the details, arrangements and prices stated in the Specification. Unless otherwise stated in the Specification:


- (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.



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

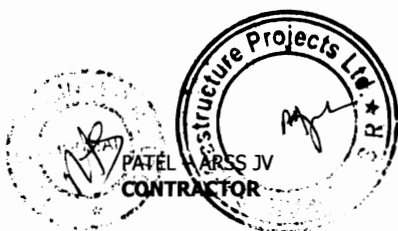
#### 4.21 Progress Reports

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

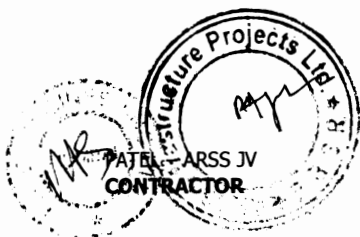
The Contractor shall confine his operations to the Site, and to any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working areas. The Contractor shall take all necessary precautions to keep Contractor's Equipment and Contractor's Personnel within the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

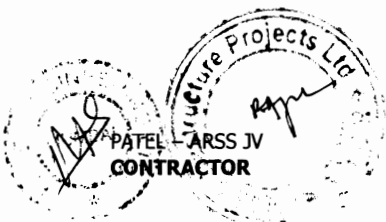
In the Contract, "nominated Subcontractor" means a Subcontractor:

- (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**

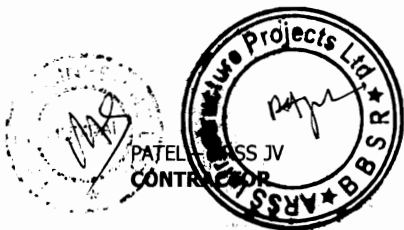
The Contractor shall pay to the nominated Subcontractor the amounts shown on the nominated Subcontractor's invoices approved by the Contractor which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance 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



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

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.

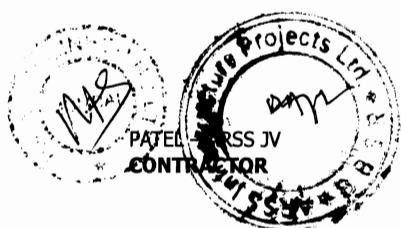
**6.7 Health and Safety**

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,



*J*  
Chief Engineer  
World Bank Projects, Orissa  
Chief Engineer  
World Bank Projects  
Of the E.I.C (Civil) Orissa  
Bhubaneswar

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 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.



  
Chief Engineer  
World Bank Projects, Orissa  
Chief Engineer  
World Bank Projects  
Oto the E I C (Civil) Orissa  
Bhubaneswar



**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  
Personnel**

The Contractor's Personnel shall be appropriately qualified, 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**

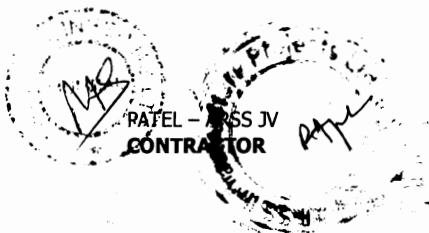
The Contractor shall submit, to the Engineer, details showing the number of each class of Contractor's Personnel and of each type of Contractor's Equipment on the Site. Details shall be submitted each calendar month, in a form approved by the Engineer, until the Contractor has completed all work which 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**

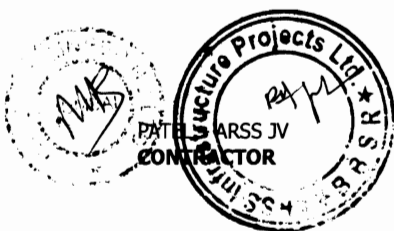
The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal thereto by Contractor's Personnel.

**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**

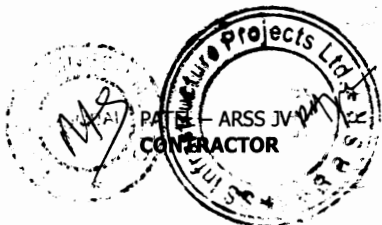
The Contractor shall carry out the manufacture of Plant, the production and manufacture of Materials, and all other execution of the Works:


- (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



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

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 access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

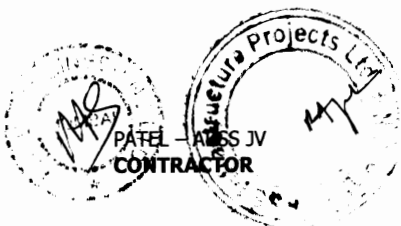
The Contractor shall give notice to the Engineer whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice 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,



Chief Engineer  
World Bank Projects  
Orissa  
the E. I. EMPLOYER  
Rhubaneswar

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.

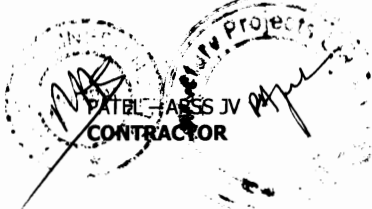
## 7.5 Rejection

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

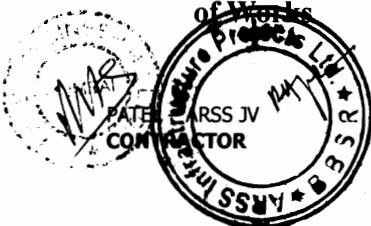
Unless otherwise stated in the Specification, the Contractor shall pay all royalties, rents and other payments for:

- (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 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.

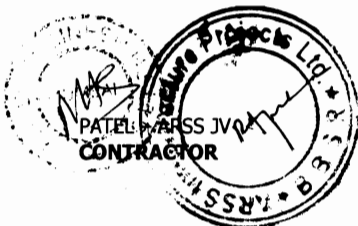
## 8.2 Time for Completion

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-



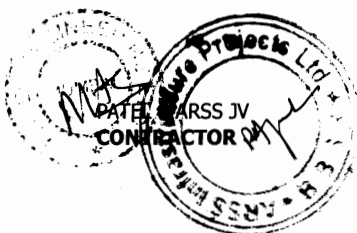
Clause 8.1 [Commencement of Works]. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include:

- (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-







- (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.



  
 Chief Engineer  
 World Bank Projects, Orissa  
 World Bank Projects  
**EMPLOYER**  
 Of the E.I.C (Civil) Odisha  
 Bhubaneswar

**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



  
Chief Engineer  
World Bank Projects Office  
World Bank Projects Office  
O/o the E.I.C (Civil) Office  
Rhubaneswar

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 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:

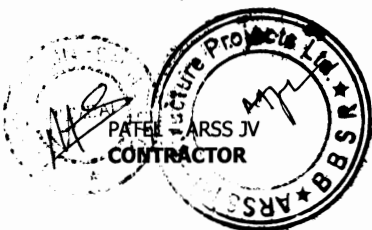
- (a) order further repetition of Tests on Completion under Sub-Clause 9.3;
- (b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided 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



Chief Engineer  
World Bank Projects  
World Bank Projects  
EMPLOYER  
to the E.I.C (Civil) Office  
Bhubaneswar

(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.

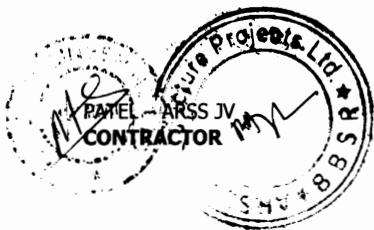
If the Engineer fails either to issue the Taking-Over Certificate or to reject the Contractor's application within the period of 28 days, and if the Works or Section (as the case may be) are substantially in accordance with the Contract, the Taking-Over Certificate shall be deemed to have been issued 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 Remediating Defects

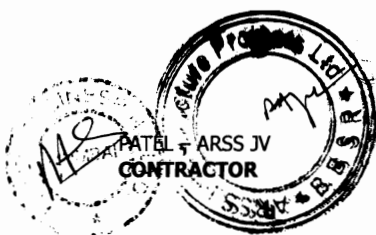
In order that the Works and Contractor's Documents, and each Section, shall be in the condition required by the Contract (fair wear and tear excepted) by the expiry date of the relevant Defects Notification Period or as soon as practicable thereafter, the Contractor shall:

- (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 Remediating Defects

All work referred to in sub-paragraph (b) of Sub-Clause 11.1 [Completion of Outstanding Work and Remediating 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.

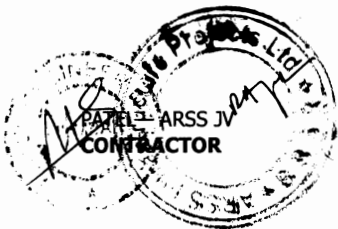
If delivery and/or erection of Plant and/or Materials was suspended under Sub-Clause 8.8 [Suspension of Work] or Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work], the Contractor's obligations under this Clause shall not apply to any defects or damage occurring more than two years after the 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



  
**Chief Engineer**  
 World Bank Project Office  
**EMPLOYER**  
 Office of the E.I.C. (Civil) Orissa  
 Bhubaneswar

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.

#### 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

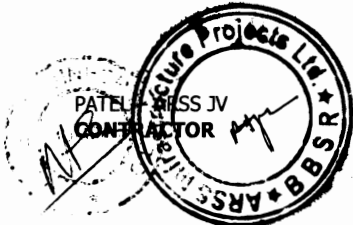
Until the Performance Certificate has been issued, the Contractor shall have such right of access to the Works as is reasonably required in order to comply with this Clause, except as may be inconsistent with the Employer's reasonable security restrictions.

#### 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

Performance of the Contractor's obligations shall not be



## Certificate

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.

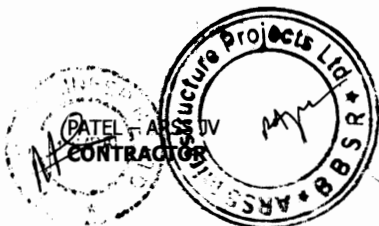
Any balance of the moneys from the sale shall be paid to the Contractor. If these moneys are less than the Employer's costs, the Contractor shall pay the outstanding balance to the Employer.

## 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

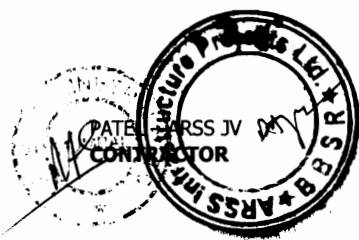
Except as otherwise stated in the Contract and notwithstanding local practice:

- (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:

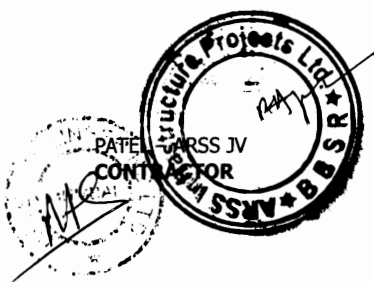
- (a)
- (i) the measured quantity of the item is changed by more than 25% from the quantity of this item in the Bill of Quantities or other Schedule,
  - (ii) this change in quantity multiplied by such specified rate for this item exceeds 0.25% of the Accepted Contract Amount,
  - (iii) this change in 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

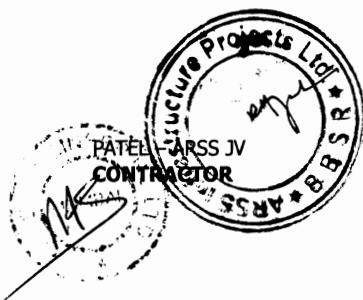
#### 13.1 Right to Vary

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.

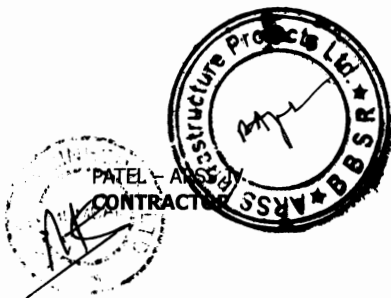
### 13.2 Value Engineering

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.

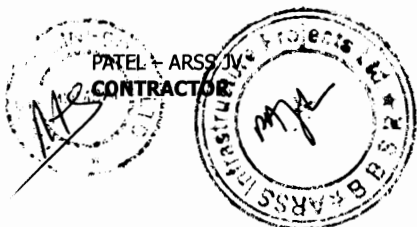
Each Variation shall be evaluated in accordance with Clause 12 [Measurement and Evaluation], unless the Engineer instructs or approves otherwise in accordance with this Clause.

### 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

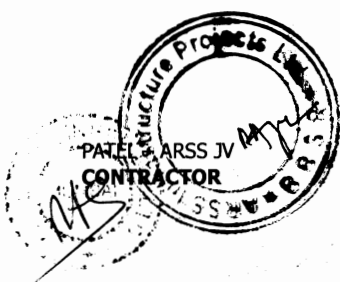
For work of a minor or incidental nature, the Engineer may instruct that a Variation shall be executed on a daywork basis. The work shall then be valued in accordance with the Daywork Schedule included in the Contract, and the following procedure shall apply. If a Daywork Schedule is not included in 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



Chief Engineer  
 World Bank Project Engineer  
 World Bank EMPLOYER Projects  
 Olo the E. I. C. (Civil) Office  
 Phubane-war

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.

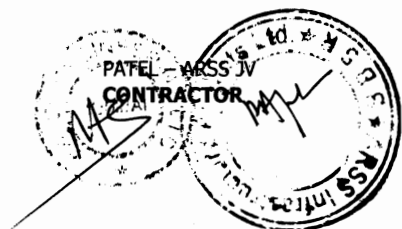
After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.

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<sub>n</sub>” 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;

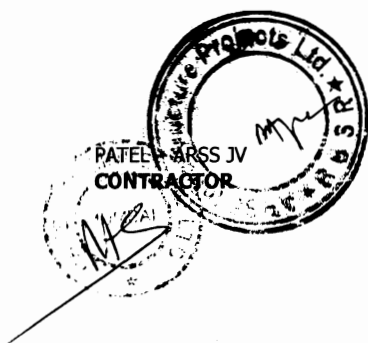
“b”, “c”, “d”, ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works, as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

“L<sub>n</sub>”, “E<sub>n</sub>”, “M<sub>n</sub>”, ... 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

“L<sub>o</sub>”, “E<sub>o</sub>”, “M<sub>o</sub>”, ... 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.

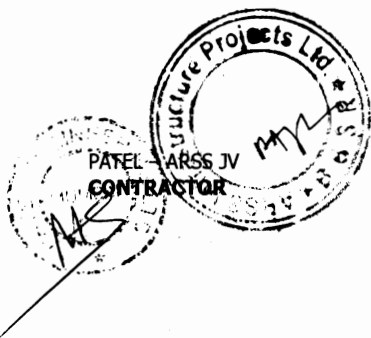
The weightings (coefficients) for each of the factors of cost stated in the table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations.

#### 14. Contract Price and Payment

##### 14.1 The Contract Price

Unless otherwise stated in the Particular Conditions:

- (a) the Contract Price shall be agreed or determined under 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.

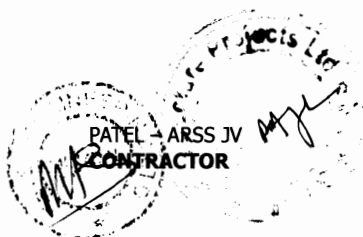
If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [Termination by Employer], Clause 16 [Suspension and Termination by Contractor] or Clause 19 [Force Majeure] (as the case may be), the whole of the balance 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 Certificates

The Contractor shall submit a Statement in six copies to the Engineer after the end of each month, in a form approved by the 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 subparagraph (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



**14.5 Plant and Materials intended for the Works**

issued 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.

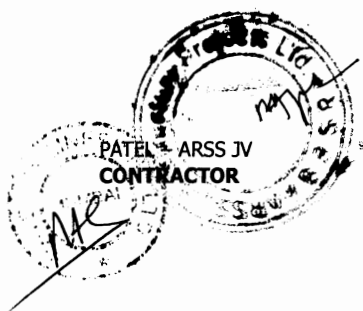
#### 14.6 Issue of Interim Payment Certificates

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**

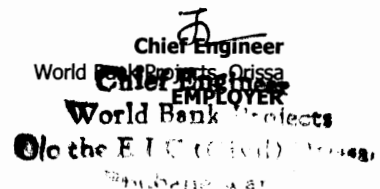
The Employer shall pay to the Contractor:

- (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

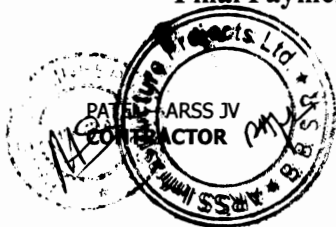
Within 84 days after receiving the Taking-Over Certificate for the Works, the Contractor shall submit to the Engineer six copies of a Statement at completion with supporting documents, in accordance with Sub-Clause 14.3 [Application for Interim Payment Certificates], showing:

- (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

Within 56 days after receiving the Performance Certificate, the Contractor shall submit, to the Engineer, six copies of a draft



## Certificate

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:

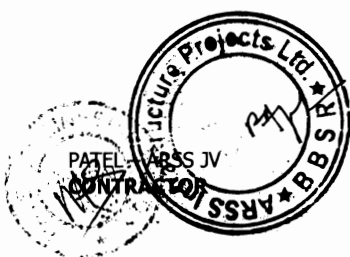
- (a) in the Final Statement and also
- (b) (except for matters or things arising after the issue of the Taking-Over Certificate for the Works) in the Statement at completion described in Sub-Clause 14.10 [Statement at Completion].

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

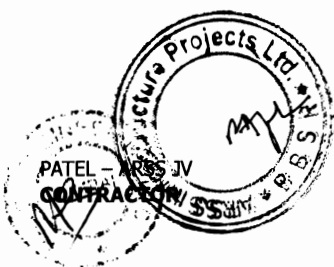
### 15.1 Notice to Correct

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,

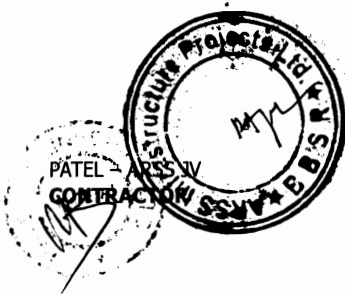
or if any of the Contractor's Personnel, agents or Subcontractors gives or offers to give (directly or indirectly) to any person any such inducement or reward as is described in this sub-paragraph (f). However, lawful inducements and rewards to Contractor's Personnel shall not entitle termination.

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 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.

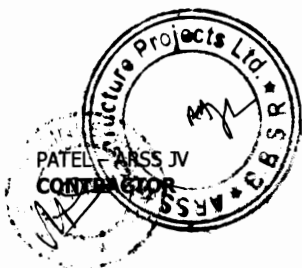
**15.4 Payment after Termination**

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"<sup>1</sup> is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- (ii) "fraudulent practice"<sup>2</sup> 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"<sup>3</sup> is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

<sup>1</sup> "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.

<sup>2</sup> 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.

<sup>3</sup> "parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.



- (iv) “coercive practice”<sup>4</sup> 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**

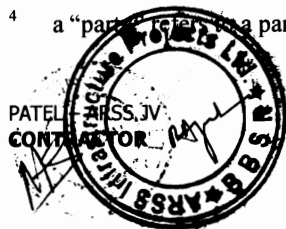
**16.1 Contractor’s Entitlement to Suspend Work**

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 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]

<sup>4</sup> a “part” is a participant in the procurement process or contract execution.



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

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:

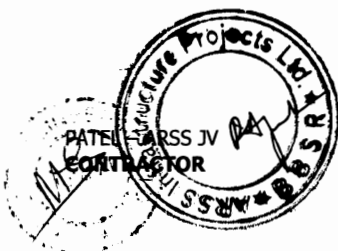
- (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and
- (b) payment of any such Cost plus profit, which shall be included in the Contract Price.

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,

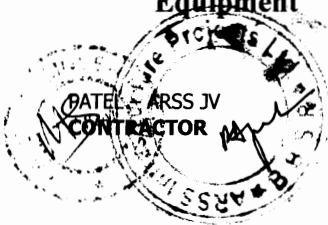
- (e) the Employer fails to comply with Sub-Clause 1.6 [Contract Agreement] or Sub-Clause 1.7 [Assignment],
- (f) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [Prolonged Suspension], or
- (g) the Employer becomes bankrupt or insolvent, goes into liquidation, has 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, 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:

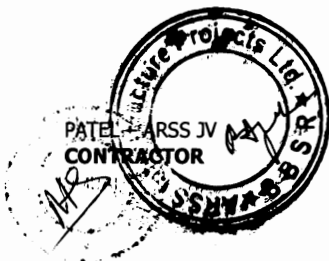
- (a) return the Performance Security to the Contractor,
- (b) pay the Contractor in accordance with Sub-Clause 19.6 [Optional Termination, Payment and Release], and
- (c) pay to the Contractor the amount of any loss or damage sustained by the Contractor as a result of this termination.

### 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.

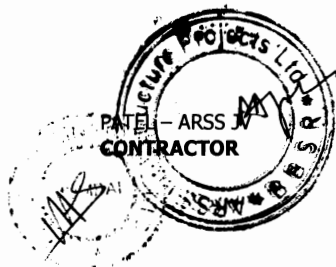
If any loss or damage happens to the Works, Goods or Contractor's Documents during the period when the Contractor is responsible for their care, from any cause not listed in Sub-Clause 17.3 [Employer's Risks], the Contractor shall rectify the loss or damage at the Contractor's risk and cost, so that 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.

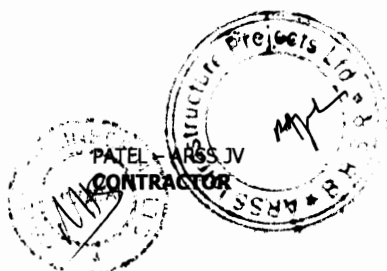
#### 17.4 Consequences of Employer's Risks

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:

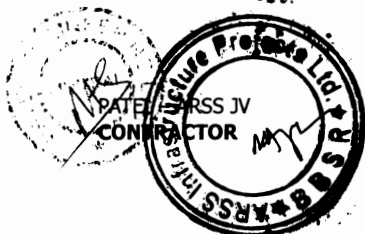
- (a) an unavoidable result of the Contractor’s compliance with the Contract, or
- (b) a result of any Works being used by the Employer:
  - (i) for a purpose other than that indicated by, or reasonably to be inferred from, the Contract, or
  - (ii) in conjunction with any thing not supplied by the Contractor, 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



Chief Engineer  
World Bank Projects  
ENPQ/825  
the E.I.C (Civil) Orissa.  
Bhubaneswar

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.

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.



*J*  
Chief Engineer  
World Bank Projects  
World Bank Projects  
the E.I.C. (Civil) Office  
P. B. D. S. S. S. S.

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.

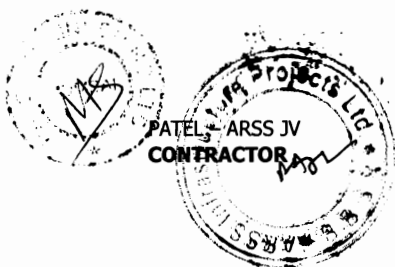
The relevant insuring Party shall, within the respective periods stated in the Contract Data (calculated from the Commencement Date), submit to the other Party:

- (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.

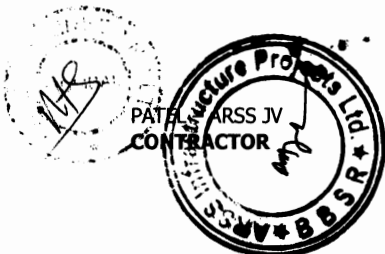
Payments by one Party to the other Party shall be subject to Sub-Clause 2.5 [Employer's Claims] or Sub-Clause 20.1 [Contractor's Claims], as applicable.


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



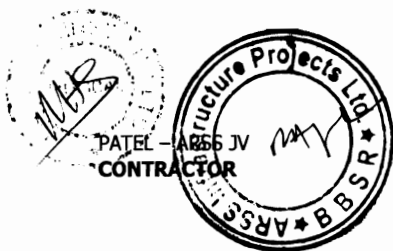
  
Chief Engineer  
World Bank Projects, Orissa  
**EMPLOYER**  
World Bank Projects  
to the E.L.C (Civil) Orissa  
Bhubaneswar

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].

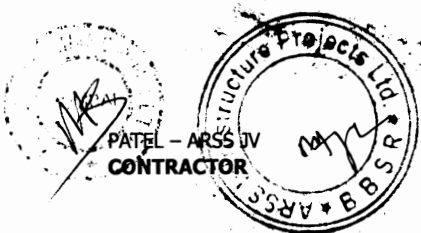
**18.3 Insurance against Injury to Persons and Damage to Property**

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.

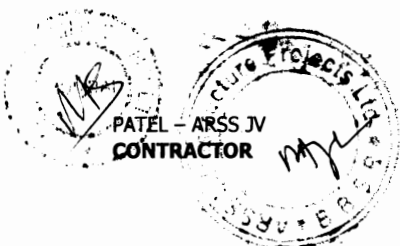
The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the Works. For a Subcontractor's employees, the insurance may be effected by the Subcontractor, but the Contractor shall be responsible for compliance with this Clause.

#### 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,
- (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.

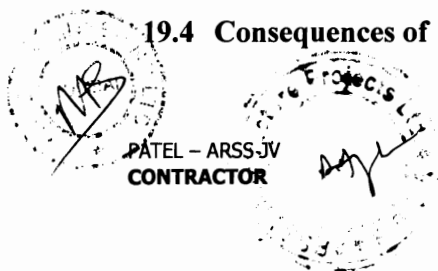
### 19.3 Duty to Minimise Delay

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

If the Contractor is prevented from performing its substantial





## Force Majeure

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

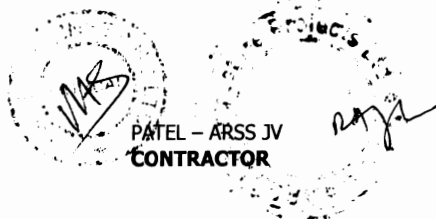
If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's non-performance 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

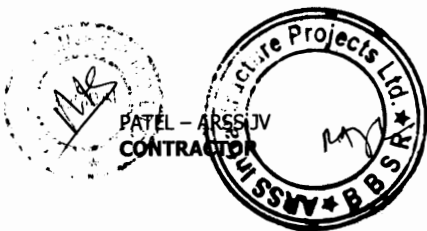
Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises which makes it impossible or unlawful for either or both Parties to fulfil its or their contractual obligations or which, under the 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



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.

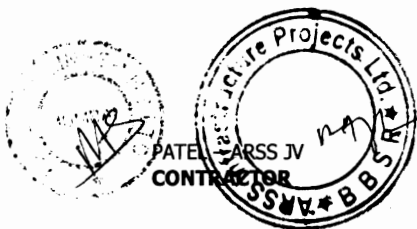
The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

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.

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

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



**Board**

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 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.

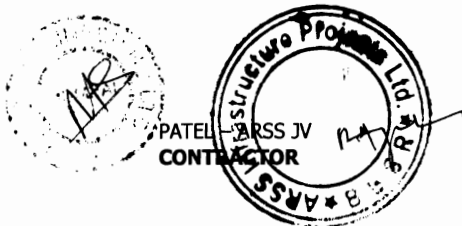
**20.4 Obtaining  
Dispute Board's  
Decision**


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



  
Chief Engineer  
World Bank Projects, Orissa  
Chief Engineer  
EMPLOYER  
World Bank Projects  
to the E.I.C (Civil) Orissa,  
Rhubaneswar.

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 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.

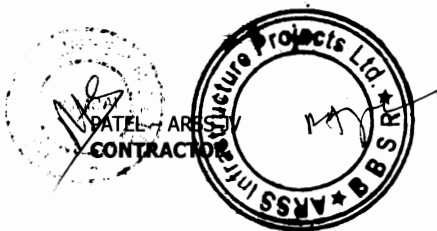
**20.7 Failure to Comply with Dispute Board's Decision**

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].





## 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

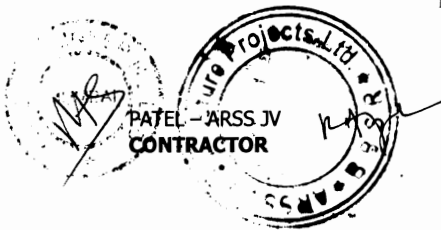
Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:

- (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 Project, Orissa  
EMPLOYER  
World Bank Project  
Of the E.L.C (Civil) Orissa,  
Bhubaneswar.

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

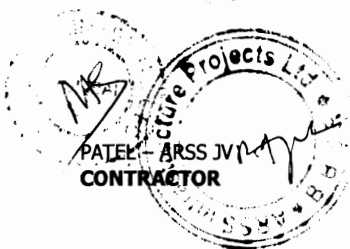
The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (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.

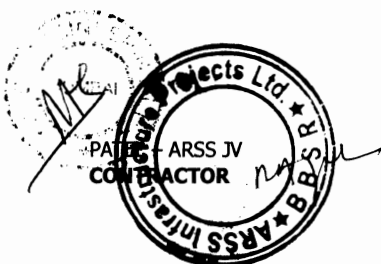
If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the Contract Data shall determine the amount of the fees to be used.

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.

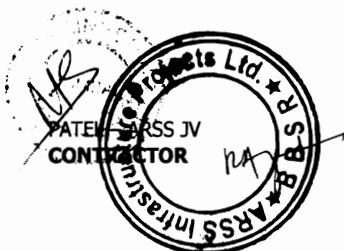
## 8. Default of the Member

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.

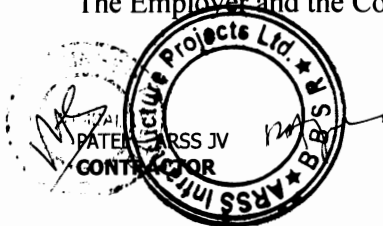
If any dispute is referred to the DB in accordance with Sub-Clause 20.4 of the Conditions of Contract, the DB shall proceed in accordance with Sub-Clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DB shall:

- (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.

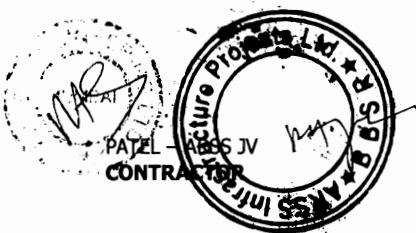
The Employer and the Contractor empower the DB, among other things, to:



- (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.





AGREEMENT No 5 of 2008 - 09



**GOVERNMENT OF ORISSA  
WORKS DEPARTMENT**

**CIVIL WORKS CONTRACT**

[ PACKAGE No. OSRP-CW-ICB-Y1-P01 ]

**For**

***Widening & Strengthening of existing carriageway to 2-lane road from  
Bhawanipatna to Khariar  
(Km. 2/0 to 70/0 of SH – 16)***

***under***

***Orissa State Roads Project***

between

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

and

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

**[ VOLUME – III: SPECIFICATIONS ]**

**Agreement Value: Rs. 105,51,39,120.00**

***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: 3<sup>rd</sup> December, 2008**

## CONTENTS of CONTRACT

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


## CONTENTS of VOLUME III

Sl.	Description	Page No.
1	<b>SCOPE OF WORKS</b>	1
2	<b>SPECIFICATIONS</b>	4
	Part – I: General Technical Requirements	5
	Part – II: Supplementary Technical Specifications	7
	Part – III: Technical Specifications for Building Works	66
3	<b>ENVIRONMENTAL MANAGEMENT PLAN</b>	60
	Pre-Construction Stage	60
	Construction Stage	87
	Operation Stage	129
4	<b>BIODIVERSITY MANAGEMENT PLAN</b>	135
	Pre-Construction Stage	135
	Construction Stage	139
	Operation Stage	147



PATEL-ARSS JV  
CONTRACTOR



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

# Scope of Works

## 1. 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 Management Unit (PMU) exclusively to be in-charge of the Orissa State Road Project. The PMU 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-P01	Bhawanipatna to Khariar ( SH 16) [ Km. 2/0 – 70/0]	68 kms	30 Months

### Geographical & Climatic Information

#### 1.3.1 Bhawanipatna- Khariar Corridor

This road located in the South Western part of Orissa and having a total length of 70 Km, takes off from NH 201 at 140/0 km and terminates on 355/0 km on NH 217 at Khariar. The road passes through Kalahandi district and Nuapada district. This area experiences rainfall of average 900mm to 1200mm 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 47 degree Celsius and the temperature dips to the lowest of 6 degree Celsius during winter season. This road passes through the towns of Bhawanipatana and Khariar. Bhawanipatana is the district head quarter of Kalahandi district. Major river in the area are river Tel, which crosses the project road at 29<sup>th</sup> Km and river Under at 59<sup>th</sup> km.



## 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

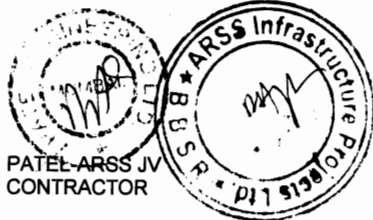
The Chief Engineer, World Bank Projects, Orissa, hereinafter the “Employer’s Representative”, on behalf of the Government of Orissa in Works Department, hereinafter the “Employer”, now wishes to engage a contractor/Joint venture of construction firms of multi-disciplinary international and local expertise, 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 month after commencement of Works.
6	Sectional/Substantial Completion Reports	5	After substantial completion



a. **MONTHLY REPORT:**

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.

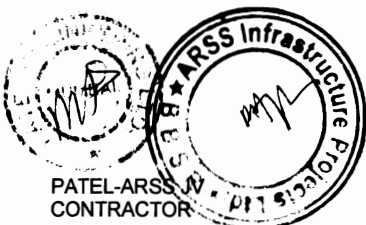
The monthly progress report shall also include one chapter each on environmental, signage, safety utility and community asset shifting, tree felling, details of initial rectification, routine maintenance and traffic diversion during construction. The PERT chart in Microsoft Project for all activities 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.



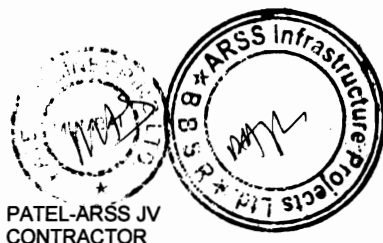
# Specification

## 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

(AMENDMENTS/ 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.



PATEL-ARSS JV  
CONTRACTOR



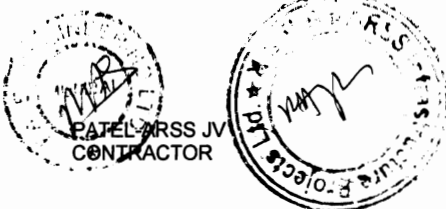
### 1.2.6 Additional Specifications

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**  
**(AMENDMENTS/ MODIFICATIONS/ ADDITIONS TO EXISTING CLAUSES OF**  
**GENERAL TECHNICAL SPECIFICATIONS-PART-I)**

**SECTION 100**  
**Clause 102**

**GENERAL**  
**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**  
**Clause 108.4**

#### **Site Information**

#### **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**  
**Clause 109.8**

#### **Setting Out**

#### **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**

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 compiled 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.

Temporary diversions will be constructed only with the approval of the Engineer.





**Clause 112.2**

**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



PATEL ARSS JV  
CONTRACTOR



  
Chief Engineer  
World Bank Projects, Orissa  
EMPLOYERS  
Office of the E.I.C (Civil) Orissa  
Bhubaneswar

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



PATEL ARSS JV  
CONTRACTOR



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

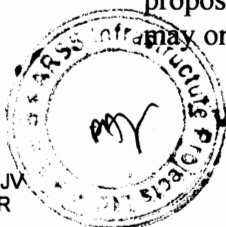
(v) Maximum gradient 5 percent and minimum camber of 2.5 percent

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



PATEL ARSS JV  
CONTRACTOR



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**



PATEL ARSS JV  
CONTRACTOR



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**

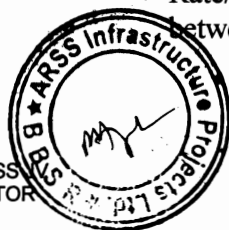
A detailed resource based construction programme (using Microsoft Project software) in a form, which facilitate control of the progress of the works and consequences of any changes in terms of time. The programme shall also include detailed network activities for the submission and approval of materials, 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**

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,



PATEL ARSS JV  
CONTRACTOR



pavements, piles, concreting procedures, details of proprietary process and products (e.g. details of proprietary piling 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.

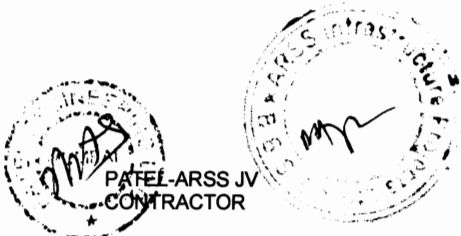
Contractor shall arrange to maintain the laboratory in satisfactory manner and will carry stocks of spare equipment and laboratory consumables until the issue of Taking Over Certificate.

**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 1 No.

ELECTRONIC

1 No.

MECHANICAL

- b) 500 gm capacity – Accuracy 0.01 gm 1 No.

ELECTRONIC

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.

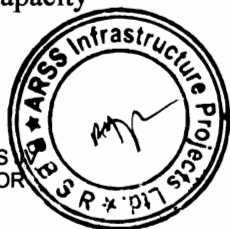
vi) Stop watches 1/5 sec. accuracy 2 Nos.



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)	<b>Liquid limit and plastic limit</b>	
	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 :
- 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.



PATEL ARSS JV  
CONTRACTOR



- 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 with base plate, collars, specimen extractor, compaction hammer 4.53kg x 457mm fall, (excluding constant temperature bath) 1 Set  
 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.

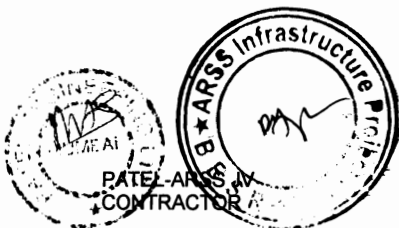


**E. For Cement, Cement Concrete and other Materials**

- |       |  |         |
|-------|--|---------|
| i)    | Vicat needle apparatus for setting time with plungers, as per IS-269-1968                                  | 1 Set   |
| 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 confirm 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 1<sup>st</sup> 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.



PATEL-ARSS  
CONTRACTOR



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

**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**

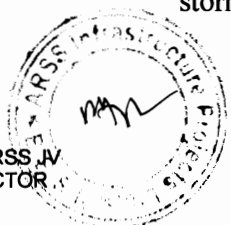
These will also include removal of stumps of trees of any girth left after cutting of trees carried out by any agency, removal of sign boards, hoarding boards, concrete post, km stones including their foundation, excavation and back filling to required density, where necessary and handling, salvaging 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.



PATEL-ARSS JV  
CONTRACTOR



*J.*  
Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
Of the E. I. C. (Civil) Orissa  
3/10/2011



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**

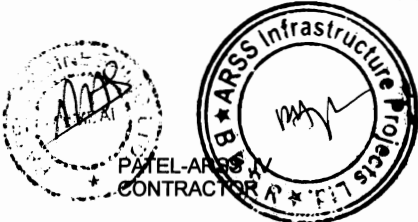
**Replace the last para**

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**  
**Clause 301.9.2**

**Rates**

**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**  
**Clause 305.2**

**Embankment Construction**

**Materials and General Requirements**

**Clause 305.2.1**  
**Clause 305.2.1.1**

**Physical requirements**

**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**  
**Clause 305.2.1.5**

**Delete the second & third sentence of the clause.**

**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**

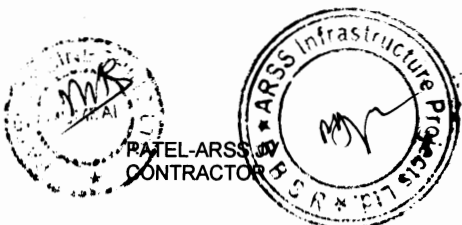
**Borrow materials**

**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,”

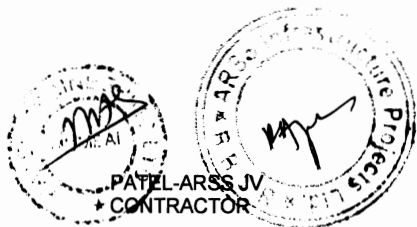
**Clause 305.4.3 Earth work over existing road surface**

**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**

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**

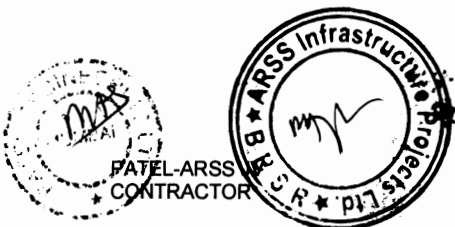
“ All temporary sedimentation and pollution control works shall be deemed as incidental to the earthwork and other items of work and as such no separate payment shall be made for the same.”

**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**

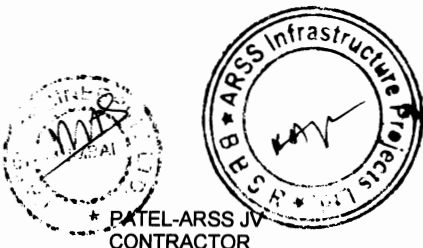
404.3.1 shall be applicable by replacing the work "Water Bound Macadam" by "Wet Mix Macadam".

**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 2<sup>nd</sup> 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.

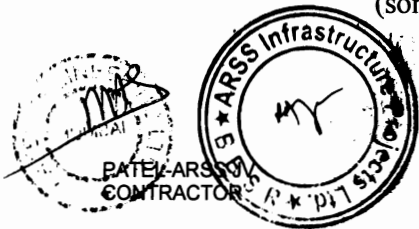
**CLAUSE 502.2**                      **MATERIALS**

**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/m<sup>2</sup>.

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 10<sup>0</sup>C.

**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



PATEL-ARSS JV  
CONTRACTOR

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 10<sup>0</sup>C.

#### 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

#### Clause 503.1

#### Tack Coat

##### 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 confirming 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 10<sup>0</sup>C.

The surface should be totally dry. However, when using bitumen emulsion as tack coat, the surface should be slightly damp, but not wet.



PATEL ARSS JV  
CONTRACTOR





**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 0.25 to 0.35
iii)Granular surfaces treated with primer	
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**

**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 /m<sup>2</sup>. with 0.30 kg/m<sup>2</sup> in fourth line.

**Clause 509.1 Add the following after 2<sup>nd</sup> line of this para.**

Where modified bitumen is specified to be used as a binder shall have a softening point not less than 60<sup>0</sup> 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**



M. PATEL-ARSS JV  
CONTRACTOR



**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.



PATEL-ARSS JV  
CONTRACTOR



## 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.”

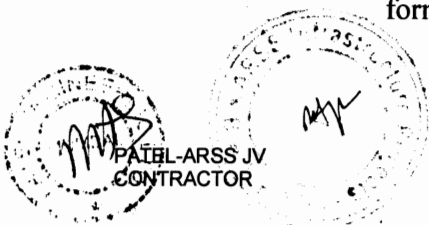
**Clause 602.8.**

**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.**  
**Clause 602.9.1:**

**Construction**

**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 WBMIWMM 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.



PATEL-ARSS JV  
CONTRACTOR

**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:**

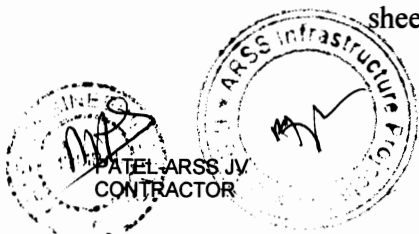
"In general, traffic shall be excluded from the newly constructed pavement for a period of 28 days where Ordinary Portland Cement, Portland Blast Furnace Slag Cement and Portland Pozzolana Cement are used or for a period of 7 days where Rapid Hardening Cement is used. In all cases, before the pavement 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 unmetalised 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**

**Clause 903**

**Clause 903.4**

#### **QUALITY CONTROL FOR ROAD WORKS**

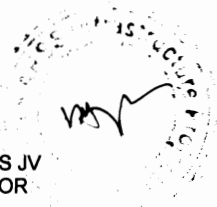
##### **Quality Control Tests During Construction**

##### **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:



RATEL-ARSS JV  
CONTRACTOR



"10% of the density tests shall be done within 300mm width from edges."

**Clause 903.4.3**

**Add new sub clause as 903.4.3 as follows**

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.**

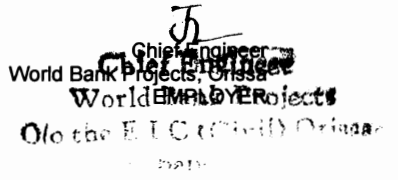
The result of tests shall be compared with the prescribed acceptable values. The payment of all such works executed shall be based on the test results. In case test results for parameters (b) & (c) above fall below the required values in accordance with specification, deductions as specified below here 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):**

<b>Core Density</b>	<b>Deduction in the payable rate</b>
- 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, regardless of any other consideration, the minimum deduction shall not be less than one lane-km (3500 m<sup>2</sup>)

## 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



PATEL-ARSS JV  
CONTRACTOR



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

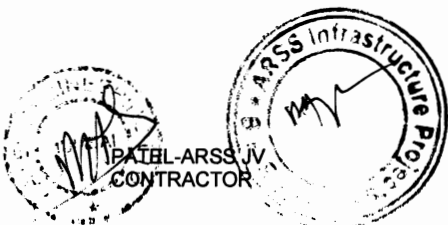
#### **Clause 1503**

#### **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 (UNTESIONED)**

**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 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**

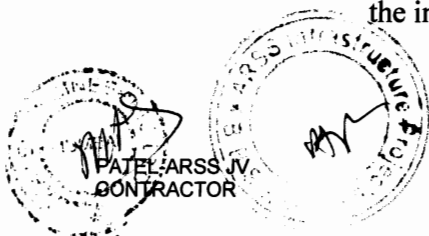
**STRUCTURAL CONCRETE**

**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."**

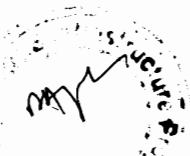
**Clause 2009**

**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**

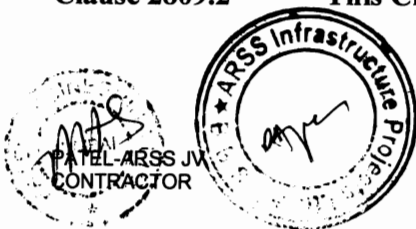
**Clause 2804 Epoxy Mortar for Replacement of Spalled Concrete**

**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.

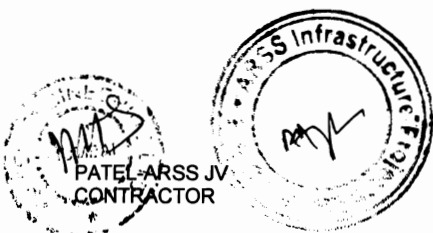
**Clause 2815**

**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**

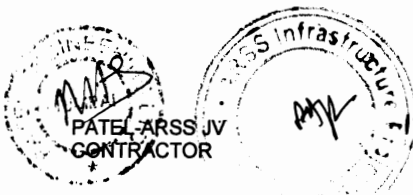
For existing bridge decks drainage spouts shall be replaced and new drainage spouts shall be provided as shown in the drawings.

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  $30 \pm 1$  percent. The particle shall be of nearly spherical shape with a diameter of  $0.35 \pm 0.05$  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
- c)

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**

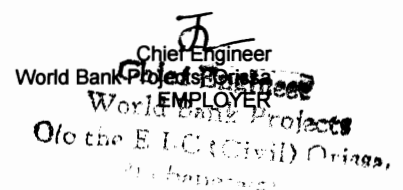
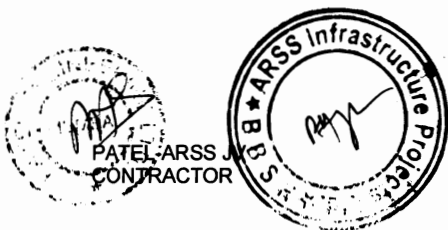
This specification describes the curing procedures to be followed for PMC Repair Mortar & Slurry.

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.



PATEL ARSS JV  
CONTRACTOR



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.



PATEL-ARSS J.  
CONTRACTOR



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.

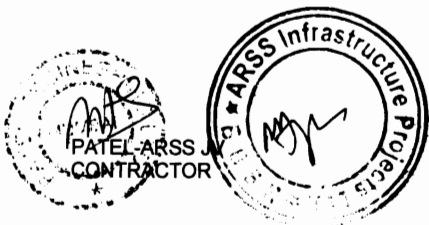
Pour all the liquid polymer latex into the mixing container. Shake the latex to disperse the solids uniformly throughout the liquid before use.

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

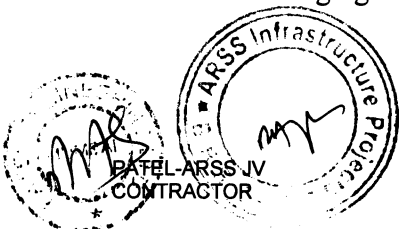
The sapling of trees shall be of good quality as directed by the Engineer.

##### 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 be manured with powdered neem/ castor oil cake at the specified rate along with 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**

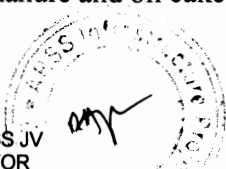
Trees shall be maintained for a period of 12 (twelve) months which require watering applying insecticides, replacing, pruning, watch and ward of the plant as directed by the Engineer.

### **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.



PATEL-ARSS JV  
CONTRACTOR



**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.




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

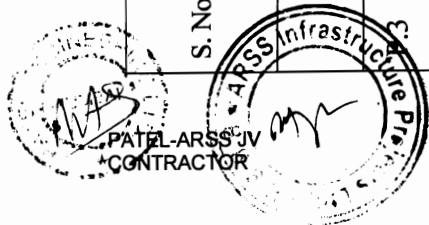
Table 3.1

ENVIRONMENTAL MANAGEMENT PLAN

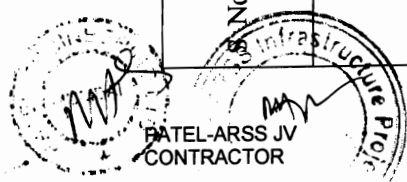
Pre-Construction Stage

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 PMU 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.	PMU, Revenue Dept., NGOs, Collaborating Agencies	PMU /OWD /District Collectors
P.2	EMP Preparation of Resettlement Sites	<p>All R &amp; R activities will be undertaken in accordance with the RAP document. It will be ensured that all R&amp;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</p>	R&R Policy and RAP of OSRP.	PMU, Revenue Dept., NGOs, Collaborating Agencies	PMU /OWD /District Collectors





S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
	Tree Cutting	<p>include specific actions in relation to basic services, health, hygiene and plantation.</p> <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 plantation outside forest areas, a joint enumeration of the trees to be cut shall be conducted by the PMU/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, 4000 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 PMU as these figures are available upon completion of joint enumeration exercises for such sites.</p>	<p>Orissa Forest Act, 1972; Orissa Timber and Other Forest Produce Rules, 1980; MoRTH Framework Arrangements with the Forest Department for OSRP</p>	<p>EMU of PMU /OWD, Site Engineer /Supervision Consultant</p>	

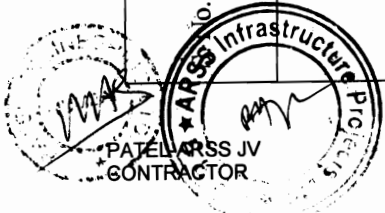



PATEL-ARSS JV  
CONTRACTOR

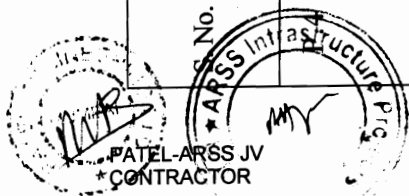
S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>Activities pertaining to tree felling, logging, stacking of fire wood and passing of timber and removal are to be synchronized and removal of the converted materials shall 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 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</p>			

Chief Engineer  
World Bank Project Orissa  
Work on the E.I.C.O. Orissa  
EMPLOYER  
Bhubaneswar

Environmental Issue	Management Measures	Reference	Responsibility	
			Planning and Execution	Supervision and Monitoring
	<p>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/PMU 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 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>			

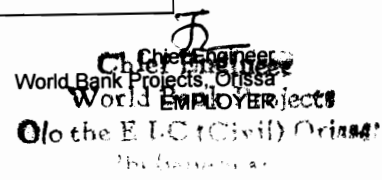

  
 PATIL ARSS JV  
 CONTRACTOR

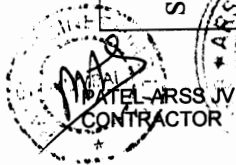
  
 Chief Engineer  
 World Bank Projects  
 World Bank Projects  
 EMPLOYER  
 Office: E.T.C (Civil) Office,  
 Hyderabad



PATEL-ARSS JV  
CONTRACTOR

Environmental Issue	Management Measures	Reference	Responsibility	
			Planning and Execution	Supervision and Monitoring
Relocation of Community Utilities and Common Property Resources	<p>All community utilities and common property resources such as stand posts, bore 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 PMU 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 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</p>	EMP Annexure 2 and RAP document of OSRP.	OWD/PMU; Concerned Agencies/Departments ; Contractor	PMU/OWD, Site Engineer/Super vision Consultant





S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.5	Relocation of affected	<p>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 PMU/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 pollutants can enter such openings.</p> <p>All religious structures, statues (idols), mandaps and boundaries coming within the corridor of impact will be</p>	EMP Annexure 2; RAP document of	EMU of PMU /OWD; EMU of PMU /OWD; Contractor; /OWD,	

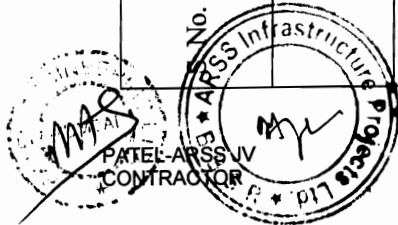


S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
	Cultural and Religious Properties	<p>relocated after alternative sites are selected for relocation of these structures in consultation with the concerned communities, management committee/trust/endowment authority and after disbursement of the due payments are made or construction is taken up and completed by the PMU /Contractor as per the design and specification approved by the community /endowment.</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 PMU 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</p>	OSRP	Concerned Community	Site Engineer /Supervision Consultant



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

No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.6	Orientation of Implementing Agencies	drains etc. at/near relocated structures. Garbage collection bins, soaks pits or other appropriate measures will be provided apart from simple enhancement of such sites.  The OWD/PMU 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 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.	Training Plan (EMP) – Chapter 4	EMU OF PMU/OWD, Site Engineer/Supervision Consultant	EMU OF PMU/OWD
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	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.  In all such cases the interested organization/representatives, authority, expert (as required for a specific situation), executing and supervising		Contractor, Environmental Officer of SC	PMU/OWD



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>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 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 PMU/OWD for approval.</p> <p>The PMU 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 PMU/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	PMU/OWD

MAA PATIL ARS JV  
 CONTRACTOR  
 07/08/2019

Chief Engineer  
 World Bank Projects, Orissa  
 World Bank EMPLOYEES  
 E.L.C. (Civil) Orissa,  
 Bhubaneswar

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
	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"> <li>• 6.00km Narayanpur</li> <li>• 7.2 to 8.3km Kamthana</li> <li>• 9.00 to 9.40km Sankharimala</li> <li>• 15.0 to 15.3km Pastipada</li> <li>• 20.5 to 21.5km Karlapada</li> <li>• 26.100km Borthopada</li> <li>• 27.100km Turkel</li> <li>• 30.200km Saipui</li> <li>• 33.100km Borbhata</li> <li>• 35.100km Salipada</li> <li>• 39.900km Borda</li> <li>• 43.600km Kursud</li> <li>• 50.000 to 51.400km Gandharla</li> <li>• 53.000km Tureikela</li> <li>• 57.500km Dohelpada</li> <li>• 61.500km Tukla</li> <li>• 62.500km Rishigaon</li> <li>• 65.000km Lachhipur</li> <li>• 69.000km Khariar</li> <li>• 4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to</li> </ul>	MoRTH 111.1; Air Pollution Control Act; Noise Rules; EMP document of OSRP	Contractor	Environmental Officer of SC; PMU/OWD

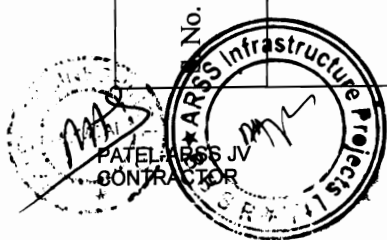


PATEL ARS & CO. CONTRACTORS

Chief Officer  
World Bank Projects, Orissa  
World Bank Projects  
EMPLOYER  
to the E.I.C (Civil) Orissa,  
Bhubaneswar.

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>facilitate movement of wildlife across the road by providing traffic calming measures.</p> <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 PMU/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 windcreens, 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 PMU/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 PMU/OWD and the SC.</p>			
P.9	Other Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery to be procured for construction will conform 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	Contractor	Environmental Officer of SC ; EMU of PMU /OWD




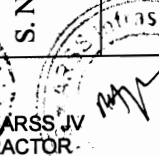
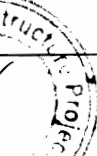


Environmental Issue	Management Measures	Reference	Responsibility	
			Planning and Execution	Supervision and Monitoring
	<p>Efficient and environment friendly equipment confirming to the latest noise and effluent emission control measures available in the market should be used in the project.</p> <p>The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period, which shall be produced to the PMU/OWD and the Supervision Consultant for verification whenever required.</p>	OSRP		
<b>P.10 Identification and Selection of Material Sources</b>				
P.10.1	<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 PMU/OWD.</p> <p>4.100, 18.850, 22.150, 54.35, 65.100, 67.850 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</p>	<p>IRC Guidelines; Borrow Area Management Framework given in the EMP of OSRP</p>	<p>Contractor</p>	<p>Supervision Consultant; EMU of PMU /OWD</p>

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>environmental requirements prior to issuing approval for use of such sites.</p> <p>No borrow areas shall be opened within 500 mts. from wildlife movement zones and forest areas. The borrow areas shall be atleast 300 mts. 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 PMU/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</p>			




S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>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 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 PMU/OWD in writing.</p>			

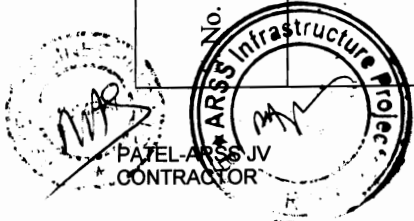



  
**PATEL ARSS JV**  
**CONTRACTOR**



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.10.2	Quarry	<p>Contractor will finalize the quarry for procurement of construction materials after assessment of the availability of sufficient materials and other logistical arrangements. 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 PMU/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 PMU/OWD through the Environmental Officer of SC prior to initiating and operation of quarry sites for the project.</p> <p>No quarry and/or crusher units shall be selected or used, which is within 1000 mts. 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 1000 mts. from the following locations:</p> <ul style="list-style-type: none"> <li>• 6.00km Narayanpur</li> <li>• 7.2 to 8.3km Kamthana</li> <li>• 9.00 to 9.40km Sankharimala</li> <li>• 15.0 to 15.3km Pastipada</li> <li>• 20.5 to 21.5km Karlapada</li> </ul>	MoRTH 111.3; Quarry Area Management Framework given in the EMP of OSRP	Contractor	Supervision Consultant; PMU/OWD


  
 PATEL ARSS JV
   
 CONTRACTOR

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




PATEL ARSS JV  
CONTRACTOR

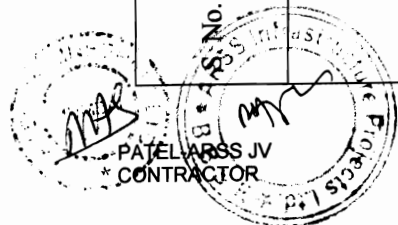
Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
Office of the E.I.C (Civil) Orissa  
Bhubaneswar

Environmental Issue	Management Measures	Reference	Responsibility	
			Planning and Execution	Supervision and Monitoring
	<ul style="list-style-type: none"> <li>• 26.100km Borthopada</li> <li>• 27.100km Turkel</li> <li>• 30.200km Saipui</li> <li>• 33.100km Borbhata</li> <li>• 35.100km Salipada</li> <li>• 39.900km Borda</li> <li>• 43.600km Kursud</li> <li>• 50.000 to 51.400km Gandharla</li> <li>• 53.000km Tureikela</li> <li>• 57.500km Dohelpada</li> <li>• 61.500km Tukla</li> <li>• 62.500km Rishigaon</li> <li>• 65.000km Lachhipur</li> <li>• 69.000km Khariar</li> <li>• 4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to facilitate movement of wildlife across the road by providing traffic calming measures.</li> </ul> <p>Contractor will also work out haul road network and report to Environmental Officer of Supervision Consultant who shall inspect and in turn report to PMU/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.</p>			

		Responsibility	
Environmental Issue	Management Measures	Reference	Planning and Execution Supervision and Monitoring
Sand (all river and stream beds used directly or indirectly for the project)	<p>Quality sand can be procured from riverbeds adjacent to the corridors i.e. from River Tel and Sunder free from silt and other impurities. This procurement shall be made only after declaration of sand quarry sites by the local Tahasildar Borda, Titlagarh and Khariar with the concurrence of the 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 PMU/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</p>	MoRTH 111.3; Miner Mineral Concession Rules, 2004	Supervision Consultant; EMU of PMU /OWD  Contractor

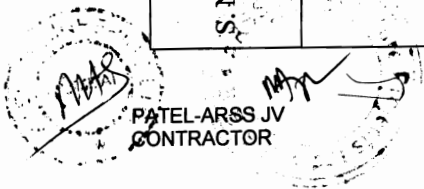

  
 PATEL-ARSS JV  
 CONTRACTOR

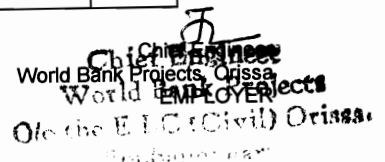
Chief Engineer  
 World Bank Projects, Orissa  
 World Bank Projects  
 EMPLOYER  
 (to the E.I.C (Civil) Orissa)  
 Bhubaneswar



	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>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 damaged and destroyed such structures. Instead alternative haul 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.10.4	Arrangement for Construction Water	<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 PMU/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 nallas and water scarcity areas, the possibility/</p>	State Norms and Water Policy	Contractor	Environmental Officer of SC ; PMU/OWD

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.11	Labor	<p>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 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>The Contractor preferably will use unskilled labor drawn from local areas to provide maximum benefit to the local</p>	General Conditions of the Contract	Contractor	Supervision Consultant;


  
 PATIL-ARSS JV  
 CONTRACTOR


  
 Chief Engineer  
 World Bank Projects, Orissa  
 World Development Projects  
 Of the E.I.C (Civil) Orissa.

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
P.12	Construction Camp Locations – Selection, Design and Lay-out	<p>community especially to the SC and ST population along the corridor.</p> <p>Construction camps will not be proposed within 500 mts. from the nearest settlement and 1000 mts. 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 godowns shall be at least 500 mts. 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 submitted by the Contractor prior to their establishment and will be approved by the Environmental Officer of SC and OWD/PMU. 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</p>	Document	Contractor	PMU/OWD
			Framework for Construction Camps; General Conditions of Contract Document		Supervision Consultant; PMU/OWD

*MAR*  
 RAJEL-ARSS JV  
 CONTRACTOR

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

S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		<p>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.13	Arrangements for Temporary Land Requirement	<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 (use and clean-up operations) shall have to be submitted to the Supervision Consultant and PMU/OWD.</p>	Contract Document	Contractor	Supervision Consultant; PMU/OWD
P.14	Orientation of Implementing Agencies	<p>The OWD/PMU 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>	Training Plan (EMP) – Chapter 4	PMU/OWD, Site Engineer/Supervision Consultant	PMU/OWD



S. No.	Environmental Issue	Management Measures	Reference	Responsibility	
				Planning and Execution	Supervision and Monitoring
		These sessions shall involve staff of the Site Engineer/Supervision Consultant and the contractor/s. Refer details in Chapter 4.			

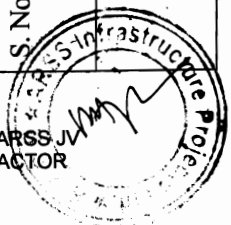

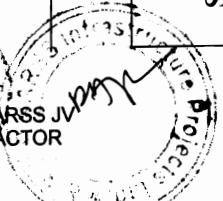






Table 3.2  
ENVIRONMENTAL MANAGEMENT PLAN

Construction Stage					
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
<b>Activities to be Carried Out by the Contractor</b>					
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</p>	MoRTH 201.2	Contractor	Supervision Consultant; PMU/OWD


  
 PATEL ARSS J  
 CONTRACTOR

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>the permanent works or necessary temporary 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/PMU'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> <ul style="list-style-type: none"> <li>➤ Eighty percent (80%) 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.</li> </ul>	<p>Framework for Waste Management (EMP);</p> <p>Guidelines of Orissa State Pollution Control Board.</p>	Contractor	Supervision Consultant; PMU/OWD

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>➤ 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.</p> <p>➤ 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.</p> <p>➤ The Contractor will suitably dispose off unutilized non-toxic debris either through filling up of borrows areas located in wasteland 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</p>			



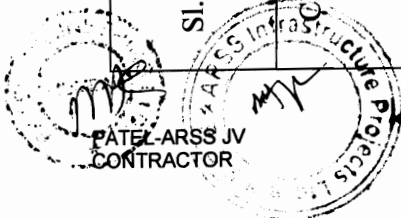
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>Plan to be prepared by Contractor in consultation and with approval of Environmental Officer of SC and approval local competent authority.</p> <p>All arrangements for 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/PMU.</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 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/PMU through Environment Officer of SC.</p>			




PATEL-ARSS  
CONTRACTOR

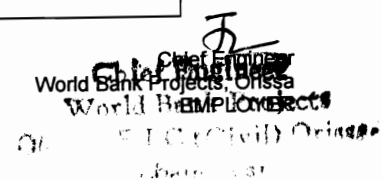


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.1.3	Other Construction Wastes Disposal including Fly Ash	<p>The pre-identified disposal locations will be a part of Comprehensive Waste Disposal &amp; Solid Waste Management 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 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</p>	<p>Framework for Waste Management (EMP);</p> <p>Guidelines of Orissa State Pollution Control Board.</p>	Contractor	Supervision Consultant; PMU/OWD



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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-bitumen 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 Alstonea, Zizyphus, Bel, Papal, Banyan, Babool, Chirounji, Arjuna, Karanja, Samania etc.</p> <p>No disposal site shall be created as part of the project, without prior approval of the Environmental Officer of SC, OWD/PMU and Local Competent Authority. SC will keep strict vigil on this aspect and ensure that work is not</p>			


  
 RAJESH ARSS JV  
 CONTRACTOR


  
 Chief Engineer  
 World Bank Projects, Orissa  
 World Bank Project  
 S. K. SINGH  
 Chief Engineer  
 World Bank Projects, Orissa

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		permitted without appropriate Solid Waste Disposal Plan in place. 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.			
C.1.4	Stripping, stacking and preservation of top soil	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. 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 preserve the stockpiles till they are re-used: (a) Stockpile will be such that the slope does not exceed 1:2 (vertical to horizontal), and height is restricted to 2 m. (b) To retain soil and to allow percolation of	MoRTH: 301.3.2; MoRTH: 301.7; MoRTH: 301.3.3; MoRTH: 305.3; Framework for Borrow Areas	Contractor	Supervision Consultant; PMU/OWD



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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"> <li>➤ Covering reclamation sites or other disturbed areas including borrow areas (not those in barren areas)</li> <li>➤ Top dressing of road embankment and fill slopes</li> <li>➤ Filling up of tree pits and</li> <li>➤ In the agricultural fields of farmers, acquired temporarily that need to be restored.</li> </ul> <p>Residual topsoil, if there is any, will be utilized for the plantation works along the road corridor.</p> <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</p>			





Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		carefully inspected, closely supervised and properly recorded by the SC.			
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; PMU/OWD
C.1.6	Planning for Traffic Diversions and Detours	<p>Detailed traffic control plans will be prepared and submitted to the Resident Engineer of SC for approval, minimum seven days prior to 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</p>	MoRTH: 112; IRC SP:55	Contractor	Supervision Consultant; PMU/OWD




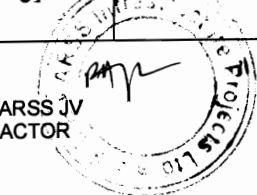
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>traffic arrangement after cessation of work each day, safety measures undertaken for transport of hazardous materials and arrangement of flagmen etc. to regulate traffic 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 arrangements with assistance from SC and OWD.</p>			
C.2	Construction Material				




PATEL ARSS JV  
CONTRACTOR

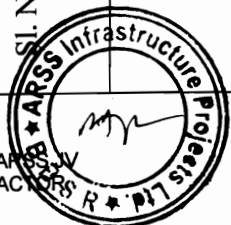


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.2.1	Earth from Borrow Areas for Construction	<p>No borrow area will be opened without permission of the Environmental Expert of Supervision Consultant. The location, shape 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 numbers of sprinkling depending on the local requirements.</p> <p>Contractor will rehabilitate the borrow areas as</p>	MoRTH: 305.2; Framework for Borrow Area Management	Contractor	Supervision Consultant; PMU/OWD

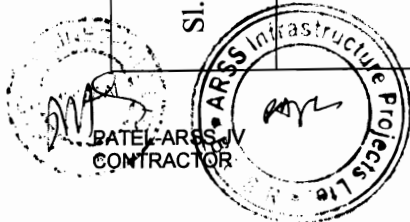


  
**PATEL ARSS JV**  
**CONTRACTOR**


  
**Chief Engineer**  
**World Bank Project**  
**World Bank Project**  
**Of the E.L.C (Civil) Orissa**  
**Project**

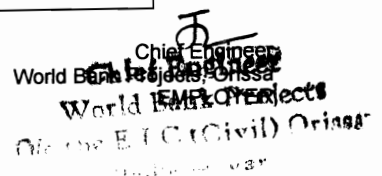
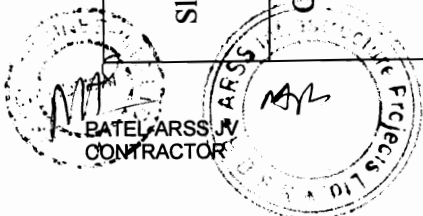
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.2.2	Quarry Operations	<p>soon as borrowing is over from a particular borrow area in accordance with the Framework for Borrow Area Management (refer Framework – 4) or as suggested by Environmental Expert of Supervision Consultant.</p> <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/PMU 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; PMU/OWD
C.2.3	Transporting Construction Materials and Haul Road Management	<p>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 machineries.</p> <p>All vehicles delivering goods to the site shall be covered to avoid spillage of materials and air</p>	MoRTH specifications	Contractor	Supervision Consultant; PMU/OWD



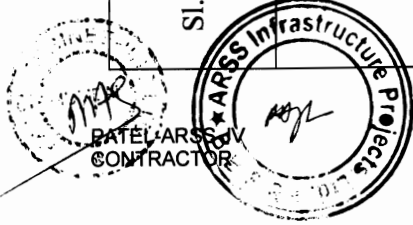
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>pollution.</p> <p>It shall be the responsibility of the Contractor to ensure that highways and other roads used for transportation of construction materials are clear 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 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 minimize the wastage of water in the construction process and related operations.</p>	State Water Policy; Water Act and Rules	Contractor	Supervision Consultant; PMU/OWD
C.3	Construction Work				




Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
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> <p>Wherever excavation for diverting water flow will be required as per the engineering designs, the Contractor will ensure that such diversion channels</p>	MoRTH:304.3.2 ; Water Rules and Policy of the State	Contractor	Supervision Consultant; PMU/OWD

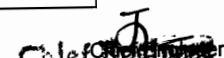


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>have no steeper slopes than 1:2 (V to H). Proper slope protection measures have to be taken as approved by the Environmental Officer of SC and OWD/PMU.</p> <p>The Contractor will take prior approval of the River Authority or Irrigation Department and SC for any such activity. The OWD/PMU 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 bail out accumulated water from construction sites, camp sites, storage yard, excavation areas are to be</p>	MoRTH:305.3.7 ; MoRTH:306	Contractor	Supervision Consultant; PMU/OWD



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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/PMU.</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 PMU/OWD will be conducted to identify all such areas which need to be cleared and restored before the onset of rains.</p>			


  
 PATEL ARSS JV  
 CONTRACTOR


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



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
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; PMU/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 mats, mulches, grasses, slope drains and other</p>	MoRTH: 305.2.2.2; MoRTH: 306.2; Framework for Soil Erosion and	Contractor	Supervision Consultant; PMU/OWD

PATEL-ARSB JV  
 CONTRACTOR

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>devices as required under specific local conditions.</p> <ul style="list-style-type: none"> <li>➤ 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.</li> </ul> <p>Contractor will ensure the following:</p> <ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ Terfing works will be taken up as soon as possible provided the season is favorable for the establishment of grass sods.</li> <li>➤ 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.</li> <li>➤ Regular watering shall be provided at such</li> </ul>	Sedimentation Control		


  
 PATEL ARSS JV  
 CONTRACTOR

Chief Engineer  
 World Bank Projects, Orissa  
 World Bank Projects  
 EMPLOYER  
 O/o the EIC (Civil) Orissa.

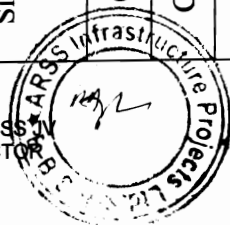
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>locations as required. In all these cases, seeds of Banachakunda (Cassia tora), Banakolthi (Tephrosia), Bala (Sida species), Vetiver grass, Pamarosa grass, Croton bonplandianus (Gandha tulasi), Jatropha gossypifolia etc. will be used.</p> <ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ 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.</li> <li>➤ Stabilization of the embankment with appropriate technique/s shall commence soon after the embankment formation.</li> <li>➤ Any existing drainage channel or body shall not be obstructed during filling operations.</li> <li>➤ The embankment slope shall be maintained as per IRC specifications.</li> </ul>			



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</p>	<p>MoRTH: 111.4; MoRTH: 111.1; Water Act, 1974</p>	Contractor	Supervision Consultant; PMU/OWD, SPCB


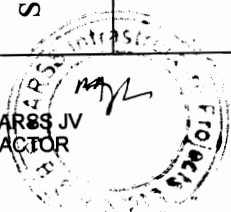



PATEL-ARSS  
\* CONTRACTOR



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

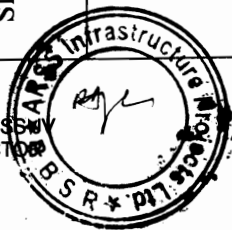
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>contaminated waste water is to be released in the settlement areas, water bodies, forests and wildlife habitats or grazing areas. All waste arising from the project 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/PMU.</p>			
C.4.1.2	Water Pollution from Fuel, Lubricants and Chemicals	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,	MoRTH: 111.4; MoRTH: 111.1; Petroleum Act and Rules; MoEF/CPCB Notifications;	Contractor	Supervision Consultant; PMU/OWD, SPCB



  
**PATEL ARS JV**  
**CONTRACTOR**

  
 Chief Engineer  
 World Bank Projects, Orissa  
 World Bank EMPLOYER  
 O/o the EIC (Civil) Orissa  
 Bhubaneswar



PATEL-ARORA & CO.  
CONTRACTORS



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

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>forests and ground water sources.</p> <p>If such areas are located on agricultural land, top 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 100 mts. 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</p>	Framework for Construction Camps		

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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, 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/PMU) 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	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,	MoRTH:111.1; MoRTH:111.5;	Contractor	Supervision Consultant; PMU/OWD,



M/S. PATEL-ARORA & CO. CONTRACTORS



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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 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/m<sup>3</sup>.</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/PMU through</p>	<p>MoRTH:111.9; MoRTH:111.10; Air Act; SPCB Rules and Guidelines</p>		SPCB



PATEL-ARISS JV  
CONTRACTOR



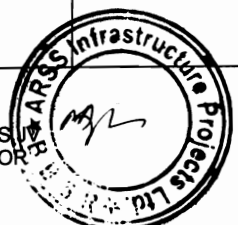
World Bank Projects, Orissa  
EMPLOYER  
Orissa E.I.C (Civil) Orissa.

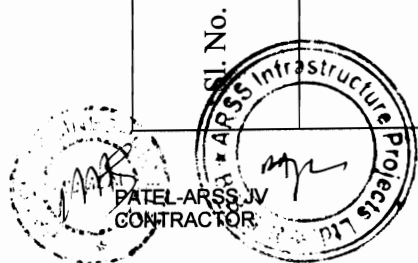


Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.4.2.2	Emission from Construction Vehicles, Equipment and Machineries	Environment Officer of SC prior to the procurement of material from such units. The Resident Engineer will ensure that the necessary documents have been submitted by the contractor before material procurement permission is issued by the Materials Engineer of SC.  Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm 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/PMU as per the Pollution Monitoring Plan in the specified format.	Motor Vehicles Act	Contractor	Supervision Consultant; PMU/OWD, SPCB
C.4.3	Noise Pollution				
C.4.3.1	Noise Pollution: Noise from Vehicles, Plants	The Contractor will ensure the following: ➤ All plants and equipment used in construction	Noise Rules, 2002	Contractor	Supervision Consultant; PMU/OWD;



RATEL-ARSS CONTRACTOR

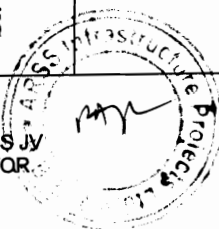




Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
			Execution / Civil Work	Supervision/ Monitoring
and Equipment	<p>(including those of sub-Contractors and/or suppliers such as aggregate crushing plants) shall strictly conform to the MoEF/CPCB noise standards and shall have latest noise suppression mountings.</p> <ul style="list-style-type: none"> <li>➤ All vehicles and equipment used in construction will be fitted with exhaust silencers.</li> <li>➤ 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.</li> <li>➤ 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.</li> <li>➤ Maintenance of equipment, machinery and vehicles (including proper lubrication, tuning, checks for muffler effectiveness) shall be regular and upto the satisfaction of the Environmental Officer of SC to keep noise</li> </ul>		SPCB,  Affected Communities ; PRJs; NGOs; Staff at Schools and Health Centres	



PATEL-ARSS JV  
CONTRACTOR



Chief Engineer  
World Bank Project, Orissa  
O/o the EIC (Orissa)  
Rhubaneswar  
EMPLOYER

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>levels under control .</p> <ul style="list-style-type: none"> <li>➤ Construction activity at sites within 100m habitations and hospitals shall not be carried out during night (10:00 pm to 06:00 am).</li> <li>➤ Construction activity at sites within 500m from wildlife movement zones, reserved and protected forest areas shall not be carried out between 06:00 pm to 06:00 am.</li> <li>➤ 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.</li> <li>➤ 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.</li> </ul> <p>These locations include 5 temples (6.310,27.150,43.400,57.000,62.700) Bhawanipatana To Khariar, 18 schools and college (7.335,20.550,20.800,22.720,26.110,33.000,33.000,35.500,43.600,43.720,46.750,47.500,51.050,57.000,62.760,65.910,67.680,69.540) on</p>			

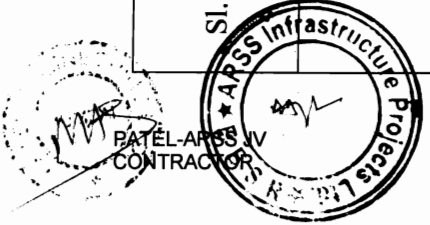
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>Bhawanipatana- Khariar, 8 govt. buildings (6.100,20.650,25.690,22.800,39.800,43.946,50 .81) Blasting operations, if any shall be carried out with full safety precautions 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/PMU.</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; PMU/OWD



BATEL-ARSS JV  
CONTRACTOR

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

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, 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,</p>	1996		



Chief Engineer  
World Bank Projects, Orissa  
World Bank EMPLOYER  
Office of the EIC (Civil) Orissa  
Bhubaneswar

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>trenches and safe means of entry and egress.</p> <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</p>			



PATEL-ARSS IV  
CONTRACTOR



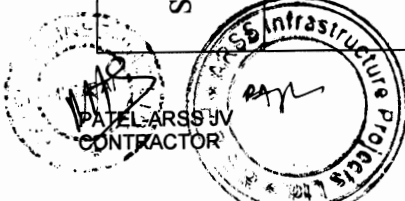
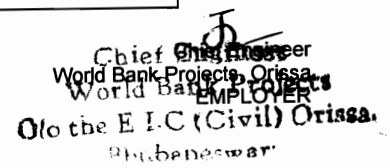
Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>inhaling toxic fumes and dust.</p> <p>'No smoking' and other 'high risk' areas are to be provided with warning signage besides strict enforcement of PPE with zero tolerance 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/PMU 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</p>	MoRTH specifications and IRC guidelines	Contractor	Resident Engineer; Bridge Engineers PMU/OWD



PATEL ASSOCIATES  
CONTRACTORS



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.5.3	Risk from Electrical Equipment(s)	<p>existing lanes of the highway, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Officer of SC and local administrative authorities including traffic police.</p> <p>All power transmission lines whether clawed 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"> <li>➤ 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.</li> <li>➤ 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.</li> <li>➤ 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</li> </ul>	-	Contractor	Supervision Consultant; PMU/OWD



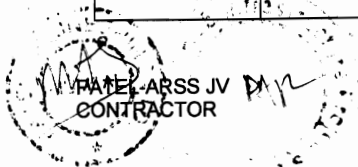
SI. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>the wildlife.</p> <ul style="list-style-type: none"> <li>➤ The contractor shall ensure proper maintenance of electrical supply lines/points.</li> <li>➤ All such electrical operating units shall be switched off before operations are closed every day or night as the case may be.</li> <li>➤ All electrical equipment/cables/wires to be used in the construction shall have to conform to the relevant BIS specifications/codes.</li> <li>➤ 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.</li> </ul>			
C.5.4	Risk Force Measure	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	-	Contractor	Supervision Consultant; PMU/OWD



PATEL ARSS JV  
CONTRACTOR



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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-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 Supervision Consultant and the Environmental Officer of the OWD/PMU 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"> <li>➤ A readily available first aid unit including an</li> </ul>	Building and the other	Contractor	Supervision Consultant;



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.6	Cultural Property	<p>adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone with life saving first aid kits.</p> <ul style="list-style-type: none"> <li>➤ Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital.</li> <li>➤ Equipment and trained nursing /paramedical staff at construction camps.</li> <li>➤ Periodic health checks for workers</li> </ul>	Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996		PMU/OWD
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</p>	Central and State Laws	Contractor	Supervision Consultant; PMU/OWD, State Archeological Department




Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		Archaeological Department before instructing the contractor to recommence the work in the site. Till such time, the site and the findings shall be under strict watch and ward of the contractor, SC and local administration to prevent any pilferage, alteration of the findings by the workmen or locals as the case may be.			
C.7	Labor Camp Management				
C.7.1	Accommodation	<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</p>	<p>Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996</p>	Contractor	Supervision Consultant; PMU/OWD



PATEL ARSS JV  
CONTRACTOR



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.7.2	Potable Water	<p>made good by the contractor at his own cost.</p> <p>The contractor will also provide availability of potable water within the precincts of every workplace in a cool and shaded area, which is 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</p>	<p>Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996</p>	Contractor	Supervision Consultant; PMU/OWD

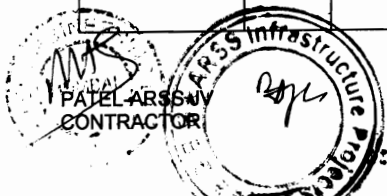

  
 PATEL ARSS JV
   
 CONTRACTOR

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

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>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 power and potassium permanganate 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</p>			



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
C.7.3	Sanitation and Sewage System	<p>The contractor will ensure that -</p> <ul style="list-style-type: none"> <li>➤ The sewage system for the camp are designed, 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.</li> <li>➤ Separate toilets and bathrooms for women workers wherever required, screened from those of men, are provided with markings in vernacular language.</li> <li>➤ All such facilities must have adequate water supply with proper drainage and disposal facility.</li> <li>➤ 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.</li> <li>➤ 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</li> </ul>	<p>Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996</p>	Contractor	Supervision Consultant; PMU/OWD



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<p>prevent pollution of the surrounding areas.</p> <p>➤ 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.</p> <p>All these facilities shall be inspected on a weekly basis to check the hygiene standards.</p>			
C.7.4	Waste Disposal	<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</p>	Environment Protection Act, 1986 and Rules	Contractor	Supervision Consultant; PMU/OWD, SPCB, Local Authorities



PATEL ARSS JV  
CONTRACTOR





Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		will be sold / given out for recycling.			
C.8	Contractor's Demobilization and Decommissioning of Established Setup				
C.8.1	Clean-up Operations, Restoration and Rehabilitation	<p>Contractor will prepare site restoration plan, which 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.' 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>	-	Contractor; Resident Engineer of SC; Environment Officer of SC	OWD/PMU

M/S. PATEL ARSS JV  
 CONTRACTOR  
 12/05/2017

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference	Responsibility	
				Execution / Civil Work	Supervision/ Monitoring
		<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 Environmental Officer of SC and OWD/PMU.</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/PMU shall ensure thorough site inspection that the Contractor and SC have complied with all these provisions.</p>			



  
 M.P.A.
   
 PATEL-ARSS JV
   
 CONTRACTOR

Table 3.3  
ENVIRONMENTAL MANAGEMENT PLAN

Operation Stage

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
<b>OPERATION STAGE</b>					
Activities to be Carried Out by the OWD					
0.1	Monitoring and Evaluation of Operational Performance of Environmental Mitigation Measures provided in the Project	<p>The OWD/PMU 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"> <li>➤ Tree preservation and plantation</li> <li>➤ Biodiversity Works</li> <li>➤ Construction Camp Management</li> <li>➤ Top Soil Preservation</li> <li>➤ Borrow and Quarry Area Management</li> <li>➤ Traffic Safety and Management</li> <li>➤ Pollution Control and Waste Management</li> <li>➤ Site enhancements etc.</li> </ul>	-	OWD Field Divisions; OWD/PMU	OWD/PMU; Concerned Departments/Agencies



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		<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 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/ PMU 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/PMU 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/PMU
O.3	Pollution Monitoring	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 (EMP)	Pollution Monitoring Agency; OWD/PMU	OWD/PMU

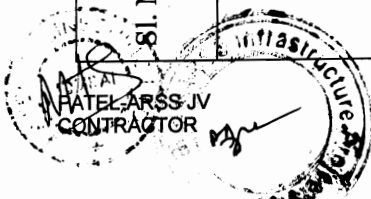


BATEL-ARSS JV  
CONTRACTOR

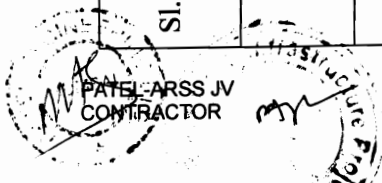


Chief Engineer  
World Bank Project - Damsa  
EMP Project  
Of the E.I.C (Civil) Division

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
O.3.1	Atmospheric Pollution	<p>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 works. OWD/PMU will appoint specific pollution monitoring agency for this purpose.</p> <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/PMU	OWD/PMU
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>	Pollution Monitoring Plan (EMP)	Pollution Monitoring Agency; OWD/PMU	OWD/PMU




Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
O.4.	Soil Erosion and Monitoring of Borrow Areas	Monitoring the effectiveness of the pollution attenuation barriers will be taken up thrice in the operation period.  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/PMU	OWD/PMU
O.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	Legal Provisions under Prevention and Control of Ribbon Development Act	OWD/PMU, Local Authorities, Revenue Department and Local Civic Bodies, District Administration	OWD/PMU; Govt. of Orissa



Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
		<p>controlling such unbridled activity, which are self destructive and distressful for the poor farmers and a drain on the state's economic resources.</p> <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</p>			


  
 M. R. PATEL ARSS JV  
 CONTRACTOR

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

Sl. No.	Environmental Aspect/Issue	Management Measures	Reference Document	Responsibility	
				Execution/Civil Work	Supervision /Monitoring
O.6	Road Safety and Maintenance of Assets	<p>may be made to control the ribbon development along project road.</p> <p>No advertisement/hoardings shall be allowed within the Right of Way limits of the project road.</p> <p>Regular maintenance and cleaning of assets such as sign boards, bus stops, drains etc. shall be undertaken.</p>	-	OWD Divisions (and its contractors, if any), District Administration/ Local Authorities, Local Police	. OWD/PMU; Govt. of Orissa





Table 3.4

BIODIVERSITY MANAGEMENT PLAN

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
<b>PRE-CONSTRUCTION STAGE</b>				
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 4000 trees will be cut along Bhawanipatna- Khariar 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 664 trees shall be preserved in this contract package. The location, no. and side to be saved as per the fringe benefit of retension given to all sound and healthy plants above 30 cm girth at BH coming on the toe margin as per the horizontal drawing.</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</p>	<p>PMU/OWD; DPR consultants; Tree Felling Contractor; Supervision Consultant</p>	<p>Project Director, PMU/OWD</p>





Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<p>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 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 PMU/OWD and the SC. Documentation of such exercises shall be maintained by the EMU of PMU /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/PMU.</p> <p>As necessary, separate proposals for felling of such trees will be submitted to the concerned Divisional Forest Officer 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 PMU. A separate list will be maintained by the PMU/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</p>		

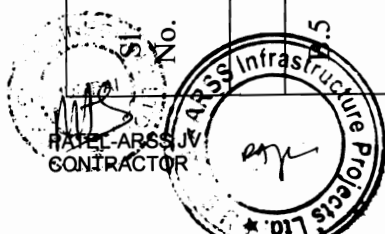
Chief Engineer  
 World Bank Projects, Orissa  
 World Bank Projects  
 to the E.L.C. (Civil) Orissa  
 Ambuneswar

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		removed from the corridor.		
	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 with stand the shock of up rooting and relocation. A list of such species is there in the <b>Annexure - 2</b> .	PMU/OWD; Forest Dept., GoO; OFDC; Tree Felling Contractor	Project Director, PMU/OWD
B.3	Tree Cutting	Trees with bird nesting sites, 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.	PMU/OWD; Forest Dept., GoO; OFDC; Tree Felling Contractor	PMU/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. The type, size and treatment of saplings shall be as per	PMU/OWD; Forest Dept., GoO	PMU/OWD; Forest Dept., GoO Supervision Consultant



PATEL ARS JV  
CONTRACTOR





Environmental Aspect/Issue	Management Measures	Responsibility	
		Execution/Civil Work	Supervision /Monitoring
	the tree plantation strategy attached in <b>Annexure 4</b>		
Compensatory Afforestation	No forest land involved in acquisition.	District Administration, DFO, Executive Engineer having jurisdiction over the area so identified in the district, Forest Department Govt. of Orissa, MoEF, PMU of OWD	PMU/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	PMU/OWD; Supervision Consultant	PMU/OWD

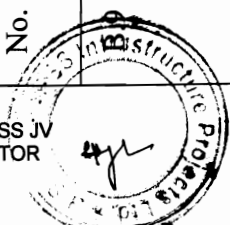
Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		drainage alterations resulting from such exercises shall not affect the forest and water ecosystems of the region.		
B.7	Water holes for wildlife and birds	The existing water holes located deep within the forest areas on either side of the package beside the river Tel and Sunder, which are the perennial sources of water the wildlife and domesticated live stock 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 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.	PMU/OWD; Forest Dept., GoO	PMU/OWD; Forest Dept., GoO
<b>CONSTRUCTION STAGE</b>				
Activities to be Carried Out by the OWD/Forest Department, GoO/Contractor				
B.8	Construction and management 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	PMU/OWD; Supervision Consultant




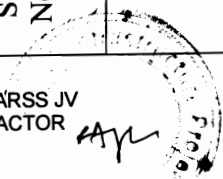
STATE ROAD & TRANSPORT CORPORATION  
Bhubaneswar




Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
	Preservation of Trees and Vegetation	<p>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.</p> <p>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.</p>	Contractor	PMU/OWD; Supervision Consultant
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 turfing to give it a natural look, so that the wildlife movement is continue after the construction activities are over. The minimum slope should be 1:6 and where reserved forests are involved it should be 1:4, so that Elephants, Bears, Ungulates can move about freely across such roads in course of their migration for food and shelter. 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 50X100mtr on such sites at 2.5mtr spacing from plant to plant with the help of forest department by use of indigenous spices of plants preferred by wildlife. This work should be taken up by the EMU wing of the PMU for implementation by Forest department.</p> <ul style="list-style-type: none"> <li>• 4.100, 18.850, 22.150, 54.35, 65.100, 67.850kms</li> </ul> <p>The sequencing of construction activity for wildlife underpasses will be</p>	Contractor	PMU/OWD; Forest Dept., GoO ; Supervision Consultant



Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.11	Material Stacking and Debris Management	<p>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> <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> <ul style="list-style-type: none"> <li>• 6.00km Narayanpur</li> <li>• 7.2 to 8.3km Kamthana</li> <li>• 9.00 to 9.40km Sankharimala</li> <li>• 15.0 to 15.3km Pastipada</li> <li>• 20.5 to 21.5km Karlapada</li> <li>• 26.100km Borthopada</li> <li>• 27.100km Turkel</li> <li>• 30.200km Saipui</li> <li>• 33.100km Borbhata</li> <li>• 35.100km Salipada</li> <li>• 39.900km Borda</li> <li>• 43.600km Kursud</li> <li>• 50.000 to 51.400km Gandharla</li> <li>• 53.000km Tureikela</li> </ul>	Contractor	PMU/OWD; Forest Dept., GoO ; Supervision Consultant

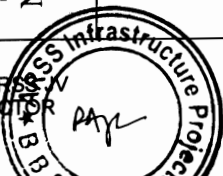


  
 PATEL-ARSS JV  
 CONTRACTOR

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

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<ul style="list-style-type: none"> <li>• 57.500km Dohelpada</li> <li>• 61.500km Tukla</li> <li>• 62.500km Rishigaon</li> <li>• 65.000km Lachhipur</li> <li>• 69.000km Khariar</li> <li>• 4.100, 18.850, 22.150, 54.35, 65.100, 67.850 to facilitate movement of wildlife across the road by providing traffic calming measures.</li> </ul> <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>		
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	Contractor	PMU/OWD; Supervision

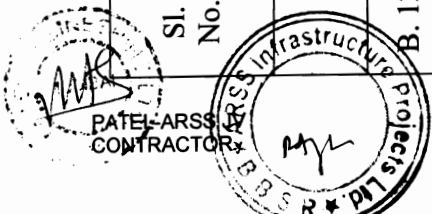


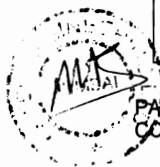
PATEL ARUN  
CONTRACTOR



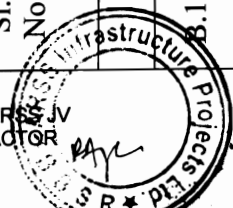


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B. 13	Damage to aquatic life in ponds	non-compliance of EMP since these may affect the eco-flow, aquatic life and livelihoods of people dependent on such resources.  The construction 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	PMU/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	PMU/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 : ➤ 47.375km ➤ 49.490km	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 <span style="background-color: black; color: black;">XXXXXXXXXX</span> subject to any addition or alteration that may be effected by the forest department, while issuing the release order for non forest	Contractor	PMU/OWD; Forest Dept.; Supervision Consultant



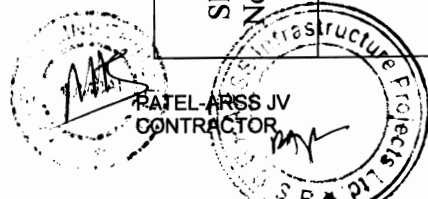


PATEL ARUN J V  
CONTRACTOR



Chief Engineer,  
World Bank Projects, Orissa  
EMPLOYEES  
Office of the E.I.C (Civil) Orissa,  
Bhubaneswar

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.17	Avenue Road or side Plantation Strategy	<p>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 3610 trees are going to be removed from the avenue to be replaced by 3 times the number 10830 plants and replanted along the avenue over 20km, covering 8000 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 2830 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 Table on costing on Chapter - 5. A minimum of 75 percent survival rate of the saplings shall be required for the clearance of payments at the end of the 3<sup>rd</sup> year of maintenance. Any damage beyond</p>	Contractor	Supervision Consultant; PMU/OWD

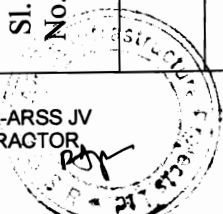


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
B.18	Site Enhancement Plantation	<p>this threshold shall be made good by the contractor at his own cost. The contractor will maintain the plantation for a minimum of three years beyond 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/PMU(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>	Contractor; PRIs; Local Communities/S HG's/	PMU/OWD; Supervision Consultant

Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		<p>areas. The final plantation number will depend upon the interest and involvement of local communities /groups / individuals.</p>	Individuals	
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 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, Bhawanipatna North, Bolangir and Khariar respectively and Forest Range Office or local Wildlife Warden and as per their advice will take appropriate steps/measures, if required in consultation with the Forest</p>	Contractor; Supervision Consultant	PMU/OWD; Supervision Consultant; Forest Dept., GoO



PATEL-ARSS JV  
CONTRACTOR

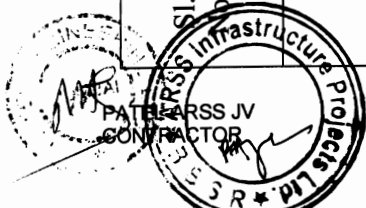


Sl. No.	Environmental Aspect/Issue	Management Measures	Responsibility	
			Execution/Civil Work	Supervision /Monitoring
		Officials – this could include rescue, first-aid or sending back the animal towards the forest as would be decided.		
B.20	Involvement of Local Communities	As far as possible, employment 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	PMU/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.	PMU/OWD; Supervision Consultant	PMU/OWD
<b>OPERATION STAGE</b>				
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 communicable diseases.	Forest Department, GoO (District Level); Animal Husbandry Wing	Forest Department, GoO
B.23	Monitoring and Evaluation of Operational Performance of	<ul style="list-style-type: none"> <li>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</li> </ul>	PMU/OWD; Forest Department, GoO	EMU of PMU/OWD; Forest Department, GoO


  
 PATEL ARSS JV  
 CONTRACTOR

Chief Engineer  
 World Bank Project No. 100010  
 World Bank EMPLOYER  
 District Forest Officer (Wild) Oriasa

		Responsibility	
		Execution/Civil Work	Supervision /Monitoring
Management Measures			
Environmental Aspect/Issue	<p>Biodiversity Protection Measures provided under the Project</p> <p>shall be closely monitored and evaluated.</p> <ul style="list-style-type: none"> <li>○ Monitoring of the wildlife movement (type, frequency and season) along the identified wildlife corridors shall be undertaken at fixed intervals.</li> <li>○ The function and stability of water holes provided to remove distress to the wildlife shall be monitored for five years.</li> <li>○ 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.</li> </ul> <p>All these observations and data (including number, condition/status and utility/benefits) shall be systematically recorded for assessment and evaluation.</p>		



Chief Engineer  
World Bank Project  
EMPLOYER  
World Bank Projects  
To the E. L. C. (Civil) Office  
"Subanwar"

AGREEMENT No-5 of 2008 - 09



**GOVERNMENT OF ORISSA**  
**WORKS DEPARTMENT**

**CIVIL WORKS CONTRACT**

[ PACKAGE No. OSRP-CW-ICB-Y1-P01 ]

**For**

***Widening & Strengthening of existing carriageway to 2-lane road from  
Bhawanipatna to Khariar  
(Km. 2/0 to 70/0 of SH – 16)***

***under***

***Orissa State Roads Project***

between

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

and

**PATEL – ARSS JV**

**Plot No. 38, SECTOR – A, Zone – D  
Mancheswar Industrial Estate, Mancheswar, Bhubaneswar – 751010 [INDIA]**

**[ VOLUME – IV: DRAWINGS ]**

**Agreement Value: Rs. 105,51,39,120.00**

***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: 3<sup>rd</sup> December, 2008**


**CONTENTS of CONTRACT**

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

**CONTENTS of VOLUME IV**

<b>Sl.</b>	<b>Description</b>	<b>Page No.</b>
<b>1</b>	<b>Plan and Profile</b>	<b>1</b>
<b>2</b>	<b>Drawings of Bridges and Culverts</b>	<b>108</b>
<b>3</b>	<b>Standard Drawings for Highways</b>	<b>183</b>



  
**Chief Engineer**  
World Bank Project Office  
Orissa  
**EMPLOYER**  
World Bank Projects  
Office of the E.I.C (Civil) Orissa,  
Bhubaneswar.



# 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

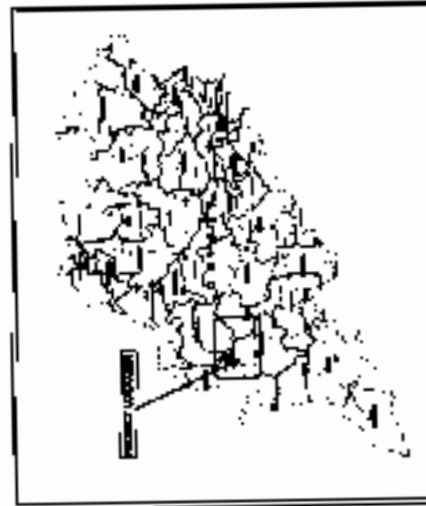
FOR  
BHAWANIPATNA TO KHARIJAR  
(SH - 16) FROM KM 2 / 000 TO 70 / 000  
PLAN AND PROFILE

### INDEX

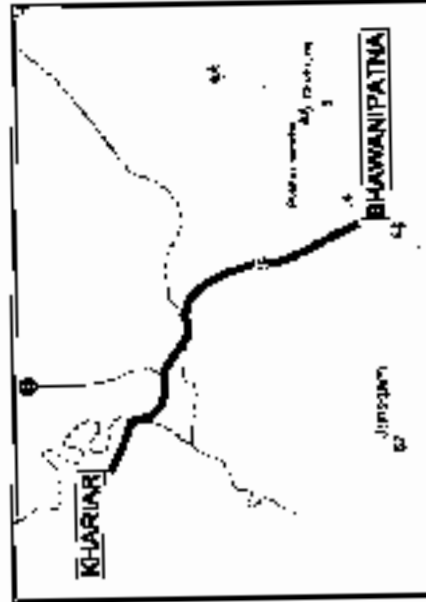
- (1) - COVER SHEET
- (2) - INDEX OF DRAWINGS
- (3) - LIST OF STRUCTURES
- (4) - PLAN AND PROFILE SHEETS
- (5) - SCHEDULING

Volume

LEGEND	
	EXISTING CIRCUIT MAP
	66KV, 33KV, 11KV LINES
	OVERHEAD POWER LINE
	ELECTRIC POWER LINE
	TELEPHONE LINE
	WATER TOWER
	WATER LINE
	ROAD/BRIDGE/STRUCTURE
	EXISTING FARM BOUNDARY
	PROPOSED FARM BOUNDARY
	BOUNDARY SURVEY
	VILLAGE
	SCHOOL
	HEALTH CENTRE
	BUS STOP
	BUS STOP SHELTER
	TREE
	WATER BEAM



ORISSA STATE ROAD NETWORK



**C O N S U L T I N G  
ENGINEERS GROUP LTD.**  
B-12, Mohi Colony, Malabar Nagar, Cuttack-75  
Toll: +91-141-2520899, 2521899, 2520856  
Fax: 2521348, E-mail: [ceeg@engineersgroup.com](mailto:ceeg@engineersgroup.com)

PATEL - AREA  
CONTRACTOR



Dr. the E.C. (Civil) Orissa  
Bhubaneswar

**INDEX OF DRAWINGS**

Sl.No.	Description	Drawing No.
A	Cover sheet	ORR/PC/EG/SH-16/PC/01
B	Index of Plan and Profile sheets	ORR/PC/EG/SH-16/INDEX
C	List of Structures (SHEET 1 OF 2)	ORR/PC/EG/SH-16/LOC01
D	List of Structures (SHEET 2 OF 2)	ORR/PC/EG/SH-16/LOC02
E	Horizontal Curve Details (SHEET 1 OF 2)	ORR/PC/EG/SH-16/HCD01
F	Horizontal Curve Details (SHEET 2 OF 2)	ORR/PC/EG/SH-16/HCD02
G	Vertical Curve Details (SHEET 1 OF 4)	ORR/PC/EG/SH-16/VCD01
H	Vertical Curve Details (SHEET 2 OF 4)	ORR/PC/EG/SH-16/VCD02
I	Vertical Curve Details (SHEET 3 OF 4)	ORR/PC/EG/SH-16/VCD03
J	Vertical Curve Details (SHEET 4 OF 4)	ORR/PC/EG/SH-16/VCD04
	<b>PLAN &amp; PROFILE</b>	
01	Plan & Profile km 200 to km 200	ORR/PC/EG/SH-16/P/01
02	Plan & Profile km 300 to km 400	ORR/PC/EG/SH-16/P/02
03	Plan & Profile km 400 to km 500	ORR/PC/EG/SH-16/P/03
04	Plan & Profile km 500 to km 600	ORR/PC/EG/SH-16/P/04
05	Plan & Profile km 600 to km 700	ORR/PC/EG/SH-16/P/05
06	Plan & Profile km 700 to km 800	ORR/PC/EG/SH-16/P/06
07	Plan & Profile km 800 to km 900	ORR/PC/EG/SH-16/P/07
08	Plan & Profile km 900 to km 1000	ORR/PC/EG/SH-16/P/08
09	Plan & Profile km 1000 to km 1100	ORR/PC/EG/SH-16/P/09
10	Plan & Profile km 1100 to km 1200	ORR/PC/EG/SH-16/P/10
11	Plan & Profile km 1200 to km 1300	ORR/PC/EG/SH-16/P/11
12	Plan & Profile km 1300 to km 1400	ORR/PC/EG/SH-16/P/12
13	Plan & Profile km 1400 to km 1500	ORR/PC/EG/SH-16/P/13
14	Plan & Profile km 1500 to km 1600	ORR/PC/EG/SH-16/P/14
15	Plan & Profile km 1600 to km 1700	ORR/PC/EG/SH-16/P/15
16	Plan & Profile km 1700 to km 1800	ORR/PC/EG/SH-16/P/16
17	Plan & Profile km 1800 to km 1900	ORR/PC/EG/SH-16/P/17
18	Plan & Profile km 1900 to km 2000	ORR/PC/EG/SH-16/P/18
19	Plan & Profile km 2000 to km 2100	ORR/PC/EG/SH-16/P/19
20	Plan & Profile km 2100 to km 2200	ORR/PC/EG/SH-16/P/20
21	Plan & Profile km 2200 to km 2300	ORR/PC/EG/SH-16/P/21
22	Plan & Profile km 2300 to km 2400	ORR/PC/EG/SH-16/P/22
23	Plan & Profile km 2400 to km 2500	ORR/PC/EG/SH-16/P/23
24	Plan & Profile km 2500 to km 2600	ORR/PC/EG/SH-16/P/24
25	Plan & Profile km 2600 to km 2700	ORR/PC/EG/SH-16/P/25
26	Plan & Profile km 2700 to km 2800	ORR/PC/EG/SH-16/P/26
27	Plan & Profile km 2800 to km 2900	ORR/PC/EG/SH-16/P/27
28	Plan & Profile km 2900 to km 3000	ORR/PC/EG/SH-16/P/28
29	Plan & Profile km 3000 to km 3100	ORR/PC/EG/SH-16/P/29
30	Plan & Profile km 3100 to km 3200	ORR/PC/EG/SH-16/P/30
31	Plan & Profile km 3200 to km 3300	ORR/PC/EG/SH-16/P/31
32	Plan & Profile km 3300 to km 3400	ORR/PC/EG/SH-16/P/32
33	Plan & Profile km 3400 to km 3500	ORR/PC/EG/SH-16/P/33
34	Plan & Profile km 3500 to km 3600	ORR/PC/EG/SH-16/P/34
35	Plan & Profile km 3600 to km 3700	ORR/PC/EG/SH-16/P/35
36	Plan & Profile km 3700 to km 3800	ORR/PC/EG/SH-16/P/36
37	Plan & Profile km 3800 to km 3900	ORR/PC/EG/SH-16/P/37
38	Plan & Profile km 3900 to km 4000	ORR/PC/EG/SH-16/P/38
39	Plan & Profile km 4000 to km 4100	ORR/PC/EG/SH-16/P/39
40	Plan & Profile km 4100 to km 4200	ORR/PC/EG/SH-16/P/40
41	Plan & Profile km 4200 to km 4300	ORR/PC/EG/SH-16/P/41
42	Plan & Profile km 4300 to km 4400	ORR/PC/EG/SH-16/P/42

NOTE: FOR DETAILED SCHEDULE OF SL.NO. 75 TO 96, "ENVIRONMENTAL MANAGEMENT PLAN OF BHAWANIPATNA - KHARIAR" MAY BE REFERED

Sl.No.	Description	Drawing No.
43	Plan & Profile km 4400 to km 4500	ORR/PC/EG/SH-16/P/43
44	Plan & Profile km 4500 to km 4600	ORR/PC/EG/SH-16/P/44
45	Plan & Profile km 4600 to km 4700	ORR/PC/EG/SH-16/P/45
46	Plan & Profile km 4700 to km 4800	ORR/PC/EG/SH-16/P/46
47	Plan & Profile km 4800 to km 4900	ORR/PC/EG/SH-16/P/47
48	Plan & Profile km 4900 to km 5000	ORR/PC/EG/SH-16/P/48
49	Plan & Profile km 5000 to km 5100	ORR/PC/EG/SH-16/P/49
50	Plan & Profile km 5100 to km 5200	ORR/PC/EG/SH-16/P/50
51	Plan & Profile km 5200 to km 5300	ORR/PC/EG/SH-16/P/51
52	Plan & Profile km 5300 to km 5400	ORR/PC/EG/SH-16/P/52
53	Plan & Profile km 5400 to km 5500	ORR/PC/EG/SH-16/P/53
54	Plan & Profile km 5500 to km 5600	ORR/PC/EG/SH-16/P/54
55	Plan & Profile km 5600 to km 5700	ORR/PC/EG/SH-16/P/55
56	Plan & Profile km 5700 to km 5800	ORR/PC/EG/SH-16/P/56
57	Plan & Profile km 5800 to km 5900	ORR/PC/EG/SH-16/P/57
58	Plan & Profile km 5900 to km 6000	ORR/PC/EG/SH-16/P/58
59	Plan & Profile km 6000 to km 6100	ORR/PC/EG/SH-16/P/59
60	Plan & Profile km 6100 to km 6200	ORR/PC/EG/SH-16/P/60
61	Plan & Profile km 6200 to km 6300	ORR/PC/EG/SH-16/P/61
62	Plan & Profile km 6300 to km 6400	ORR/PC/EG/SH-16/P/62
63	Plan & Profile km 6400 to km 6500	ORR/PC/EG/SH-16/P/63
64	Plan & Profile km 6500 to km 6600	ORR/PC/EG/SH-16/P/64
65	Plan & Profile km 6600 to km 6700	ORR/PC/EG/SH-16/P/65
66	Plan & Profile km 6700 to km 6800	ORR/PC/EG/SH-16/P/66
67	Plan & Profile km 6800 to km 6900	ORR/PC/EG/SH-16/P/67
68	Plan & Profile km 6900 to km 7000	ORR/PC/EG/SH-16/P/68
	<b>SCHEDULES</b>	
69	Schedule of Road Sign	ORR/PC/EG/SH-16/SC/H01
70	Schedule of Road Sign	ORR/PC/EG/SH-16/SC/H02
71	Schedule of Road Sign	ORR/PC/EG/SH-16/SC/H03
72	Schedule of Bus Stops & Extra Widening	ORR/PC/EG/SH-16/SC/H04
73	Schedule of Road Hummer/Footpath	ORR/PC/EG/SH-16/SC/H05
74	Barrenness Protection Crossings	ORR/PC/EG/SH-16/SC/H06
75	Schedule of Junctions	ORR/PC/EG/SH-16/SC/H07
76	Schedule of Guard Posts and Road Delimitations	ORR/PC/EG/SH-16/SC/H08
77	Detailed Pavement Schedule and Cross Section Type	ORR/PC/EG/SH-16/SC/H09
	<b>ENVIRONMENTAL DRAWINGS</b>	
78	Typical Animal Pass	EM/BC/AN/CAS/001/01
79	Site Enhancement Design for 4 Legged Jn	ORR/PC/EG/SH-ENV - 01A
80	Feeder Road Junction	ORR/PC/EG/SH-ENV - 01B
81	Site Enhancement Design for 3 Legged Jn	ORR/PC/EG/SH-ENV - 01C
82	Passenger Shed at Bus Stop	ORR/PC/EG/SH-ENV - 02
83	POC Top wall for Water Bodies	ORR/PC/EG/SH-ENV - 03
84	RCC Boundary Wall-Temples and Statues	ORR/PC/EG/SH-ENV - 04A
85	Noise & Dust Barrier	ORR/PC/EG/SH-ENV - 04B
86	Approaches of Educational & Medical Institutions	ORR/PC/EG/SH-ENV - 05
87	Ornamental Gate Design for Educational & Medical Institutions	ORR/PC/EG/SH-ENV - 05A
88	Typical Sanitary	ORR/PC/EG/SH-ENV - 06
89	Typical Sanitary & Drainage - Hair drains & Gullies	ORR/PC/EG/SH-ENV - 07
90	Tree Guard With M.S. Bars	ORR/PC/EG/SH-ENV - 08
91	Typical Bathing Ghats	ORR/PC/EG/SH-ENV - 09
92	Typical Railway Gate	ORR/PC/EG/SH-ENV - 10
93	Soil and Water Conservation Measures	ORR/PC/EG/SH-ENV - 11A
94	Soil and Water Conservation Measures	ORR/PC/EG/SH-ENV - 11B
95	Typical Trap Drain with Hume Pipe	ORR/PC/EG/SH-ENV - 12
96	Schedule for Environmental Aspects	ORR/PC/EG/SH-ENV - 13
97	UTILITY DRAWINGS	
	Typical Arrangement of Utility Duct	ORR/PC/EG/SH-UD - 01

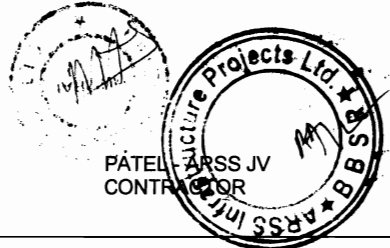
**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.**

**INDEX OF PLAN & PROFILE SHEETS AND SCHEDULING BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)**

DATE	REV	BY	CHKD	APPD
DATE	REV	BY	CHKD	APPD
DATE	REV	BY	CHKD	APPD

SCALE: \_\_\_\_\_

E.M. R.J. R.R.D.K S.G



Chief Engineer  
 World Bank Projects, Orissa  
 Bhubaneswar

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Mof Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520899, 2521889, 2520556  
 Fax: 2521348, e-mail: ceg@ceginfda.com

# LIST OF STRUCTURES

Sl. No.	Existing Chainage	Proposed Chainage	Type of Proposed Structure	Proposed Span Arrangement	Remark
31	18/850	18831	New Single Cell box	1/3/4/0	Environmental Structure
32	19/700	18881	New Single Pipe	1 x 1.0	
33	20/150	20112	New Single Cell box	1/4/3/0	
34	20/400	20337	New Single Cell box	1/4/3/0	
35	21/650	21607	New Single Pipe	2 x 1.0	
36	22/150	22135	New Single Cell box	1/2/3/0	Environmental Structure
37	22/350	22380	New Single Pipe	2 x 1.0	
38	23/100	23061	New Single Cell box	1/2/3/0	
39	23/250	23200	New Single Pipe	1 x 1.0	
40	23/350	23321	New Single Cell box	1/3/4/0	
41	23/650	23538	New Single Pipe	2 x 1.0	
42	24/100	24062	New Single Pipe	1 x 1.0	
43	24/450	24402	To be widened	3 x 1.2	
44	24/550	24513	New Single Pipe	2 x 1.0	
45	25/750	25723	New Single Pipe	2 x 1.0	
46	26/750	26665	New Single Pipe	2 x 1.0	
47	27/100	27045	New Single Pipe	1 x 1.0	
48	27/250	27175	New Single Pipe	1 x 1.0	
49	30/650	30830	New Single Cell box	1/2/3/0	
50	31/250	31300	New Single Cell box	1/2/3/0	
51	32/050	32044	New Single Cell box	1/2/3/0	
52	33/200	33238	New Single Cell box	1/2/3/0	
53	33/600	33600	New Single Cell box	1/2/3/0	Additional Structure
54	34/700	34732	New Single Pipe	2 x 1.0	
55	35/685	36050	New Single Cell box	1/2/2/0	Additional Structure
56	36/600	36961	New Single Cell box	1/3/3/0	
57	37/100	37214	New Single Cell box	1/3/4/0	
58	37/400	37563	New Single Cell box	1/2/3/0	
59	38/400	38383	New Single Cell box	1/2/3/0	
60	39/100	39150	New Single Pipe	2 x 1.0	Additional Structure

Sl. No.	Existing Chainage	Proposed Chainage	Type of Proposed Structure	Proposed Span Arrangement	Remark
1	3/450	3883	New Single Pipe	2 x 1.0	
2	4/100	4112	New Single Pipe	1 x 1.0	Environmental Structure
3	5/450	5494	New Single Pipe	1 x 1.0	
4	5/650	5691	New Single Cell box	1/3/4/0	
5	5/600	5900	New Single Cell box	1/2/2/0	Additional Structure
6	6/550	6333	New Single Cell box	1/3/4/0	
7	6/800	6935	New Single Cell box	1/4/3/0	
8	7/015	7030	New Single Pipe	1 x 1.0	
9	7/800	7615	New Single Cell box	1/2/2/0	
10	8/450	8474	New Single Cell box	1/3/4/0	
11	10/100	10109	New Single Cell box	1/2/3/0	
12	10/180	10147	New Single Cell box	1/2/3/0	
13	10/700	10696	New Single Pipe	1 x 1.0	
14	10/750	10744	New Single Cell box	1/3/4/0	
15	11/650	11700	New Single Pipe	1 x 1.0	Additional Structure
16	12/600	12689	New Single Pipe	1 x 1.0	
17	12/700	12687	New Single Cell box	1/2/3/0	
18	12/750	12746	New Single Pipe	1 x 1.0	
19	12/800	12826	New Single Pipe	1 x 1.0	
20	13/300	13341	To be widened	1 x 1.0	
21	14/050	14055	New Single Cell box	1/2/2/0	
22	14/400	14372	New Single Cell box	1/2/3/0	
23	14/600	14769	New Single Cell box	1/2/2/0	
24	15/005	14990	New Single Pipe	1 x 1.0	
25	15/250	15191	New Single Pipe	1 x 1.0	
26	15/600	15574	New Single Cell box	1/2/2/0	
27	15/850	15830	New Single Cell box	1/4/3/0	
28	16/050	16002	New Single Pipe	2 x 1.0	
29	17/600	17609	New Single Cell box	1/4/5/0	
30	18/100	18047	New Single Pipe	2 x 1.0	

PATEL ARSS JV  
CONTRACTOR

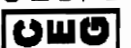
World Bank Project  
Chief Engineer  
EMPLOYER

World Bank Projects  
to the E.I.C (Civil) Office,  
Bhubaneswar:

## PROJECT:

STRUCTURES DETAILS  
BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)  
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, M.J. Colony, Malviya Nagar, Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521345, e-mail: ceg@ceginfolo.com



DRG NO.	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	C	DATE	REV	RO	B.M.	R.J.	R.R.D.K
SCALE	NTS						

S.G

# LIST OF STRUCTURES

S.No.	Existing Chainage	Proposed Chainage	Type of Proposed Structure	Proposed Span Arrangement	Remark
91	56250	55420	New Single Pipe	1 x 1.0	
92	56700	56270	New Single Cell box	1/64/0	
93	56700	56390	New Single Cell box	1/22/0	Additional Structure
94	56400	56587	To be widened	1 x 0.9	
95	56950	57150	New Single Pipe	2 x 1.0	Additional Structure
96	57150	57321	New Single Pipe	1 x 1.0	
97	57500	57360	New Single Pipe	1 x 1.0	
98	57800	57884	New Single Pipe	1 x 1.0	
99	58950	58625	New Single Pipe	1 x 1.0	
100	60700	58915	New Single Cell box	1/33/0	
101	60750	60567	New Single Cell box	1/34/0	
102	61550	61373	New Single Cell box	1/23/0	
103	62250	62100	New Single Cell box	1/33/0	
104	62800	62862	New Single Pipe	1 x 1.0	
105	63200	63300	New Single Cell box	1/23/0	
106	63550	63288	New Single Cell box	1/63/0	
107	63800	63700	New Single Pipe	1 x 1.0	
108	64600	64622	New Single Pipe	1 x 1.0	
109	64825	64891	New Single Pipe	1 x 1.0	Environmental Structure
110	65100	65122	New Single Pipe	1 x 1.0	
111	65350	65430	New Single Pipe	1 x 1.0	
112	65675	65624	New Single Cell box	1/23/0	
113	65800	66027	New Single Cell box	1/22/0	
114	66200	66161	New Single Cell box	1/23/0	
115	66430	66500	New Single Cell box	1/23/0	Additional Structure
116	67300	67100	New Single Cell box	1/22/0	
117	67550	67325	New Single Pipe	1 x 1.0	
118	67850	67820	New Single Cell box	1/23/0	Environmental Structure
119	68200	68010	New Single Cell box	1/23/0	
120	68700	68445	New Single Cell box	1/22/0	

S.No.	Existing Chainage	Proposed Chainage	Type of Proposed Structure	Proposed Span Arrangement	Remark
51	40100	40089	New Single Cell box	1/23/0	
52	40850	41037	New Single Cell box	1/22/0	
53	41300	41409	New Single Cell box	1/23/0	
54	41700	41789	New Single Cell box	1/45/0	
55	42200	42320	New Single Cell box	1/34/0	
56	42550	42635	New Single Pipe	1 x 1.0	
57	43100	43159	New Single Cell box	1/33/0	
58	44150	44281	New Single Cell box	1/22/0	
59	44850	44854	New Single Cell box	1/34/0	
60	45150	45296	New Single Pipe	1 x 1.0	
61	45600	45711	New Single Cell box	1/23/0	
62	45850	46047	New Single Cell box	1/63/0	
63	46200	46325	New Single Pipe	2 x 1.0	Additional Structure
64	46350	46514	New Single Cell box	1/22/0	
65	47050	47165	New Single Cell box	1/22/0	
66	47200	47322	New Single Pipe	1 x 1.0	
67	49600	49726	New Single Cell box	1/23/0	
68	50150	50287	New Single Cell box	1/44/0	
69	50300	50499	New Single Cell box	1/23/0	
70	51025	51174	New Single Pipe	1 x 1.0	
71	51250	51409	New Single Pipe	2 x 1.0	
72	51400	51580	New Single Pipe	2 x 1.0	
73	51600	51780	New Single Cell box	1/34/0	
74	51800	52088	New Single Pipe	1 x 1.0	
75	52100	52296	New Single Pipe	2 x 1.0	
76	52250	52424	New Single Pipe	1 x 1.0	
77	52700	52844	To be widened	4 x 0.9	
78	53500	53679	New Single Pipe	1 x 1.0	
79	53950	54146	New Single Cell box	1/23/0	
80	54350	54606	New Single Cell box	1/44/0	Environmental Structure

## STRUCTURES DETAILS

BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)

DIRG NO. / OSEP/2023/SH-16/10/02	DESIGNED (A) DRAWN (B)	CHECKED (C) APPROVED (D)
SH. NO. / DATE / REV. / RO	B.M.	R.J.
SCALE	NTS	
	R.R.D.K	S.G

PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

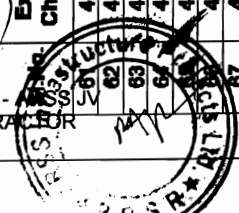
**CONSULTING ENGINEERS GROUP LTD.**

E-12, Nal Colony, Nayaga Neger, Jajpur-17

Tel: +91-141-2520899, 2521899, 2520556

Fax: 2521348, e-mail: ceg@ceginfolo.com

PATEL - CONTRACTOR



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

HORIZONTAL CURVE DETAILS

Table with columns: Curve No, Curve Direction, Transition Start Chainage, Curve Start Chainage, HIP Details (Sighting, Meridians, Northings), Total Deflection Angle, Design Speed, Curve Radius, Transition Length, Greater Curve Length, Tangent Distance, Approx. Distance, SHIR, Super Elevation.



PATEL - ARSS JV CONTRACTOR

World Bank Project Office EMPLOYER World Bank Projects

CEG CONSULTING ENGINEERS GROUP LTD. E-12, Meji Colony, Malviya Nagar Jaipur-17. Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521346, e-mail: ceg@cegindia.com

PROJECT:- CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

Table with columns: Scale, Date, Rev, R.O, B.M., J.P., R.R.D.K, S.G.

HORIZONTAL CURVE DETAILS

SHAWANIPATNA - KHARIAR (SH-16 KM 2/0 TO KM 70/0)

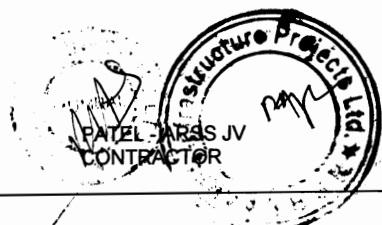
HORIZONTAL CURVE DETAILS

Curve No.	Curve Direction	Transition Start TB	Curve Start Chainage	CS Chainage	HYP Details		Total Deflection Angle D	Design Speed V (km/hr)	Curve Radius R (m)	Transition Length La (m)	Chord Length Lc (m)	Tangent Distances		Apex Distance Ea (m)	Shift S (m)	Superelevation
					Beginning	Ending						Ta (m)	Tb (m)			
66	Right	34708.742	34857.337	42628.954	218080.000	0.4	287.61.5°	100	15000	0	117.19	59.895	0.114	0.0	2.50	
67	Left	36537.887	36449.877	41840.429	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
68	Right	38101.928	38161.928	41822.056	2180504.970	0.4	73.8° 28.9'	100	500	0	28.95	110.045	1.781	0.2	6.00	
69	Left	39678.974	39694.282	41908.979	2180308.690	0.4	33° 18.9'	100	500	0	46.94	22.789	0.062	0.0	3.00	
70	Left	39958.378	39738.974	40933.999	2180599.542	0.4	33° 30' 18.9"	100	500	0	48.09	100.094	7.323	0.8	7.00	
71	Right	37948.181	37785.181	40186.994	2180922.41.9°	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
72	Right	38514.840	38594.840	40186.994	2180922.41.9°	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
73	Left	39428.974	39408.974	40186.994	2180922.41.9°	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
74	Left	39768.974	39768.974	40186.994	2180922.41.9°	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
75	Right	40000.087	40186.994	40186.994	2180922.41.9°	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
76	Right	40781.211	40933.999	41840.429	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
77	Right	41388.918	41388.918	41388.918	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
78	Right	41648.974	41648.974	41648.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
79	Right	42258.974	42258.974	42258.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
80	Right	42948.974	42948.974	42948.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
81	Right	43811.788	43811.788	43811.788	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
82	Right	44300.911	44300.911	44300.911	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
83	Right	44148.974	44148.974	44148.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
84	Left	45040.928	45040.928	45040.928	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
85	Left	45448.974	45448.974	45448.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
86	Left	45857.974	45857.974	45857.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
87	Left	46367.974	46367.974	46367.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
88	Left	46781.974	46781.974	46781.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
89	Left	47304.979	47304.979	47304.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
90	Right	47934.979	47934.979	47934.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
91	Right	47713.929	47713.929	47713.929	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
92	Right	48378.981	48378.981	48378.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
93	Right	48398.981	48398.981	48398.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
94	Right	48908.979	48908.979	48908.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
95	Right	50121.414	50121.414	50121.414	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
96	Right	50811.989	50811.989	50811.989	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
97	Right	50881.974	50881.974	50881.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
98	Right	51208.981	51208.981	51208.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
99	Right	51934.979	51934.979	51934.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
100	Right	52278.928	52278.928	52278.928	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
101	Left	53198.979	53198.979	53198.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
102	Left	53908.948	53908.948	53908.948	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
103	Left	54484.987	54484.987	54484.987	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
104	Left	54884.987	54884.987	54884.987	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
105	Left	55211.717	55211.717	55211.717	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
106	Left	55684.979	55684.979	55684.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
107	Right	56211.981	56211.981	56211.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
108	Right	56787.981	56787.981	56787.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
109	Right	57078.979	57078.979	57078.979	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
110	Right	57748.981	57748.981	57748.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
111	Left	58468.981	58468.981	58468.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
112	Left	58213.112	58213.112	58213.112	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
113	Left	58708.981	58708.981	58708.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
114	Left	59119.981	59119.981	59119.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
115	Right	60384.283	60384.283	60384.283	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
116	Right	60982.142	60982.142	60982.142	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
117	Right	61302.916	61302.916	61302.916	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
118	Right	61728.974	61728.974	61728.974	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
119	Right	62148.981	62148.981	62148.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
120	Right	62568.981	62568.981	62568.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
121	Right	62988.981	62988.981	62988.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
122	Right	63408.981	63408.981	63408.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
123	Right	63828.981	63828.981	63828.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
124	Right	64248.981	64248.981	64248.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
125	Right	64668.981	64668.981	64668.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
126	Right	65088.981	65088.981	65088.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
127	Right	65508.981	65508.981	65508.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
128	Right	65928.981	65928.981	65928.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
129	Right	66348.981	66348.981	66348.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
130	Right	66768.981	66768.981	66768.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	
131	Right	67188.981	67188.981	67188.981	2180752.862	0.4	287.61.5°	80	240	0	43.89	114.091	11.111	0.0	7.00	

PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION  
OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

HORIZONTAL CURVE DETAILS  
BHAWANIPATNA - KHARAR (SH-16 KM 2/0 TO KM 70/0)

SCALE NTS  
J.P. B.M. R.R.D.K S.G  
DESIGNED (A) DRAWN (B) CHECKED (C) APPROVED (D)  
DATE REV RD  
F DATE



CEG  
CONSULTING ENGINEERS GROUP LTD.  
E-12, Meji Colony, Malviya Nagar, Jaipur-17  
Teli: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@ceghdia.com

Chief Engineer  
World Bank Projects - Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa  
Bhubaneswar:

VERTICAL CURVE DETAILS

Curve No.	Curve Type	VIP Details		Curve Length m	K	Curve Start		Curve End		Start Gradient %	End Gradient %	Grade Difference %
		Chainage	Level			Chainage	Level	Chainage	Level			
1	Hog	2780.144	270.672	110	134.088	2735.144	270.661	2845.144	269.941	-0.508	-1.329	-0.820
2	Sag	3028.020	267.510	60	46.146	2998.020	267.908	3058.020	267.510	-1.329	0.000	1.329
3	Sag	3123.174	267.510	60	82.202	3088.174	267.510	3158.174	267.728	0.000	0.728	0.728
4	Hog	3261.315	268.518	60	48.945	3231.315	268.268	3291.315	268.370	0.728	-0.496	-1.225
5	Sag	3595.337	268.862	60	219.200	3585.337	267.011	3625.337	268.795	-0.496	-0.222	0.274
6	Hog	4069.111	265.809	100	137.574	4019.111	265.820	4119.111	265.334	-0.222	-0.949	-0.727
7	Sag	4370.122	262.952	60	63.217	4340.122	263.237	4400.122	262.952	-0.949	0.000	0.949
8	Sag	4555.048	262.952	85	41.960	4515.048	262.962	4585.048	263.815	0.000	2.081	2.081
9	Hog	4800.996	267.946	225	75.349	4888.996	265.862	4913.996	268.871	2.031	-0.955	-2.986
10	Hog	5345.920	262.739	120	138.275	5285.920	268.319	5405.920	261.645	-0.955	-1.823	-0.868
11	Sag	5582.310	258.429	100	44.877	5532.310	259.341	5632.310	258.628	-1.823	0.400	2.223
12	Hog	6084.380	260.357	200	148.188	5984.380	259.957	6164.380	259.408	0.400	-0.950	-1.350
13	Sag	6466.688	256.537	60	83.448	6438.688	256.822	6498.688	256.488	-0.950	-0.231	0.718
14	Sag	7077.639	255.128	235	138.303	6960.138	255.369	7195.138	256.853	-0.231	1.472	1.703
15	Hog	7388.372	259.891	365	138.282	7205.872	257.011	7570.872	257.483	1.472	-1.210	-2.682
16	Sag	7762.105	255.170	60	49.597	7732.105	255.532	7792.105	255.170	-1.210	0.000	1.210
17	Hog	7942.541	255.170	180	134.417	7852.541	255.170	8032.541	253.964	0.000	-1.339	-1.339
18	Hog	8482.888	248.200	120	89.611	8402.888	249.003	8522.888	248.200	-1.339	0.000	1.339
19	Sag	8636.000	248.200	60	77.398	8606.000	248.200	8686.000	248.433	0.000	0.775	0.775
20	Hog	8902.610	250.287	60	438.777	8872.610	250.084	8982.610	250.458	0.775	0.838	-0.188
21	Hog	9216.574	252.284	150	142.744	9143.574	251.805	9283.574	251.975	0.838	-0.412	-1.051
22	Hog	9637.574	249.732	265	137.300	9495.074	250.319	9980.074	248.188	-0.412	-2.487	-2.075
23	Sag	10112.611	242.888	100	50.890	10062.611	244.133	10162.611	242.627	-2.487	-0.523	1.964
24	Sag	10454.588	241.100	60	114.711	10424.588	241.257	10494.588	241.100	-0.523	0.000	0.523
25	Hog	10608.374	241.100	65	133.750	10576.874	241.100	10641.874	240.942	0.000	-0.486	-0.486
26	Sag	10783.880	240.204	90	43.132	10748.880	240.423	10838.880	240.925	-0.486	1.601	2.087
27	Hog	11898.871	257.894	430	138.113	11683.871	254.453	12113.871	254.543	1.601	-1.558	-3.159
28	Sag	12606.286	246.868	75	57.910	12568.786	247.454	12643.786	246.770	-1.558	-0.263	1.295
29	Hog	13044.788	245.714	265	136.905	12902.288	246.088	13187.288	242.372	-0.263	-2.345	-2.081
30	Sag	13309.923	239.496	60	50.728	13278.923	240.200	13339.923	238.148	-2.345	-1.162	1.182
31	Sag	13688.149	235.100	60	51.619	13656.149	235.449	13716.149	235.100	-1.162	0.000	1.162
32	Sag	13918.485	235.100	60	148.973	13868.485	235.100	13948.485	235.221	0.000	0.403	0.403
33	Hog	14866.386	237.713	230	135.761	14460.386	237.260	14690.386	236.228	0.403	-1.281	-1.684
34	Sag	14857.164	233.945	95	43.107	14809.664	234.559	14904.664	234.379	-1.281	0.912	2.203
35	Hog	15074.195	235.826	180	137.751	14984.195	235.104	15164.195	235.571	0.912	-0.394	-1.306
36	Sag	15263.293	235.180	80	42.628	15223.293	235.338	15303.293	235.773	-0.394	1.482	1.876
37	Hog	15522.347	239.020	235	134.549	15404.847	237.278	15639.847	238.710	1.482	-0.284	-1.748
38	Hog	16064.141	237.615	60	133.121	16024.141	237.894	16084.141	237.401	-0.284	-0.715	-0.451
39	Hog	16340.190	235.570	85	134.717	16297.690	235.874	16382.690	234.988	-0.715	-1.346	-0.631
40	Sag	16862.840	226.786	60	44.580	16862.840	227.180	17022.840	228.786	-1.346	0.000	1.346
41	Sag	17083.587	226.786	85	41.329	17051.057	228.786	17138.057	227.660	0.000	2.067	2.067
42	Hog	17297.407	230.979	105	61.841	17244.907	229.899	17349.907	231.164	2.067	0.353	-1.704
43	Hog	17763.662	232.626	110	60.843	17708.662	232.431	17818.662	231.822	0.353	-1.461	-1.814
44	Sag	18058.185	228.324	120	43.455	17998.185	229.200	18118.185	229.104	-1.461	1.301	2.762
45	Hog	18400.461	232.777	250	68.723	18275.461	231.151	18625.461	228.855	1.301	-2.336	-3.638

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, Moj Colony, Malviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@cegroupindia.com

**CEG**

Chief Engineer  
World Bank Projects, Orissa  
World Bank EMPLOYEES

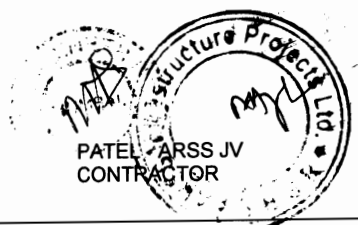
O/o the E.I.C (Civil) Orissa,  
Bhubaneswar

VERTICAL CURVE DETAILS  
BHAWANIPATNA - KHARIAR (SH-16 KM 2/0 TO KM 70/0)

DRG NO. COMP/2009/SH-16/AC/01  
SPL. NO. G DATE REV. NO. NTS

DESIGNED (A) DRAWN (D) CHECKED (C) APPROVED (O)

B.M. J.P. R.R.D.K. S.G.



VERTICAL CURVE DETAILS

Curve No.	Curve Type	VIP Details		Curve Length m	K	Curve Start		Curve End		Start Gradient %	End Gradient %	Grade Difference %
		Chainage	Level			Chainage	Level	Chainage	Level			
46	Sag	18714.524	225.437	100	44.060	18664.524	228.606	18764.524	225.403	-2.336	-0.067	2.269
47	Sag	19088.088	225.187	80	42.419	19048.088	225.214	19128.088	225.914	-0.087	1.819	1.887
48	Hog	19312.266	229.300	210	64.745	19207.266	227.391	19417.266	227.804	1.819	-1.425	-3.244
49	Sag	19838.886	220.371	75	45.602	19901.368	220.908	19976.368	220.454	-1.425	0.220	1.645
50	Hog	20315.925	221.200	80	273.024	20285.925	221.134	20345.925	221.200	0.000	0.000	-0.220
51	Hog	21049.132	221.200	80	297.489	21019.132	221.200	21079.132	221.139	0.000	-0.202	-0.202
52	Sag	21643.758	220.001	80	42.952	21603.758	220.081	21683.758	220.665	-0.202	1.661	1.863
53	Hog	21886.686	224.019	215	60.618	21778.186	222.234	21893.186	221.882	1.661	-1.888	-3.550
54	Sag	22074.948	220.450	90	45.887	22029.948	221.298	22119.948	220.484	-1.888	0.075	1.864
55	Sag	22437.971	220.724	100	44.397	22387.971	220.888	22487.971	221.887	0.075	2.328	2.253
56	Hog	22757.678	228.166	230	60.651	22642.678	225.488	22872.678	228.482	2.328	-1.465	-3.793
57	Sag	23280.213	220.514	200	74.929	23180.213	221.378	23380.213	221.719	-1.465	1.205	2.668
58	Hog	24094.989	230.331	185	82.331	24002.489	229.218	24187.489	228.700	1.205	-1.763	-2.968
59	Sag	24496.554	223.250	150	45.786	24421.554	224.573	24571.554	224.384	-1.763	1.512	3.276
60	Hog	25081.288	231.790	480	135.814	24831.288	228.312	25281.288	227.478	1.512	-1.875	-3.387
61	Sag	25625.468	221.213	350	119.072	25450.468	224.494	25800.468	223.078	-1.875	1.064	2.939
62	Hog	26115.799	228.433	430	138.318	25900.799	224.144	26330.799	221.940	1.064	-2.080	-3.154
63	Sag	26427.356	219.922	60	39.997	26367.356	220.549	26467.356	219.745	-2.080	0.588	1.501
64	Sag	26980.309	219.372	60	78.127	26960.309	218.549	26720.309	218.431	-0.588	0.199	0.788
65	Hog	26871.447	218.731	90	150.598	26826.447	218.642	26916.447	218.552	0.199	-0.399	-0.598
66	Sag	27508.401	216.189	60	150.328	27478.401	216.309	27538.401	216.189	-0.399	0.000	0.399
67	Sag	27718.178	218.189	60	21.022	27688.178	218.189	27748.178	217.045	0.000	2.860	2.860
68	Sag	27784.498	218.139	60	21.022	27754.498	217.283	27814.498	218.139	2.860	0.000	-2.860
69	Sag	28088.404	218.139	60	43.748	28058.404	218.139	28118.404	218.550	0.000	1.377	1.377
70	Hog	28182.525	219.183	80	43.748	28132.525	218.772	28182.525	219.183	1.377	0.000	-1.377
71	Hog	28732.614	219.183	95	34.878	28685.114	219.183	28780.114	217.889	0.000	-2.723	-2.723
72	Sag	28642.535	216.189	115	42.221	28785.035	217.755	28900.035	216.189	-2.723	0.000	2.723
73	Sag	28305.763	216.189	60	126.105	28275.763	216.189	28386.763	216.332	0.000	0.476	0.476
74	Sag	28754.931	218.326	80	124.401	28724.931	218.183	28784.931	218.814	0.476	0.958	0.482
75	Hog	30208.506	222.653	75	152.497	30169.006	222.283	30244.006	222.828	0.958	0.486	-0.482
76	Hog	30561.343	224.261	220	136.819	30441.343	223.748	30661.343	223.005	0.486	-1.142	-1.608
77	Sag	30819.903	221.195	85	43.228	30777.403	221.880	30862.403	221.545	-1.142	0.824	1.968
78	Hog	31054.766	223.131	185	137.513	30982.266	222.388	31147.266	222.650	0.824	-0.521	-1.345
79	Sag	31377.618	221.450	105	41.186	31325.118	221.723	31430.118	222.515	-0.521	2.030	2.551
80	Hog	31682.680	227.842	440	136.820	31472.680	223.378	31812.680	225.230	2.030	-1.187	-3.218
81	Sag	32005.107	224.133	110	42.875	31950.107	224.786	32080.107	224.898	-1.187	1.390	2.577
82	Hog	32501.487	231.035	500	186.682	32251.487	227.598	32751.487	227.815	1.390	-1.288	-2.678
83	Sag	33110.125	223.186	250	202.210	32985.125	224.606	33285.125	223.132	-1.288	0.052	1.236
84	Sag	33491.142	223.000	90	67.995	33461.142	223.015	33521.142	223.249	0.052	0.831	0.883
85	Sag	34109.094	228.135	60	139.905	34079.094	227.885	34199.094	228.513	0.831	1.260	0.429
86	Hog	34373.023	231.460	210	139.906	34298.023	230.137	34478.023	231.207	1.260	-0.241	-1.501
87	Sag	34807.971	230.412	75	39.908	34770.471	230.502	34845.471	231.028	-0.241	1.639	1.880
88	Sag	35213.218	237.051	80	53.560	35183.218	236.590	35243.218	237.878	1.639	2.756	1.120
89	Hog	35473.571	244.233	125	61.777	35411.071	242.508	35536.071	244.893	2.756	0.735	-2.024
90	Hog	35778.847	248.463	230	135.203	35681.847	245.817	35881.847	245.352	0.735	-0.888	-1.701

VERTICAL CURVE DETAILS  
 BHAWANIPATNA - KHARIAR (SH-16 KM 2/0 TO KM 70/0)

DRG NO. CRRP/ESH-16/VC/VE  
 SH. RD. H DATE REV RD  
 SCALE NTS

DESIGNED (A) DRAWN (B) CHECKED (C) APPROVED (D)  
 J.P. B.M. R.R.D.K. S.G.

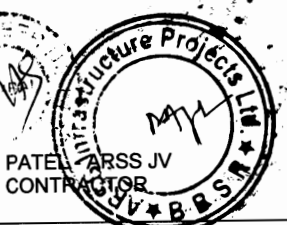
PROJECT:-  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION  
 OF PHASE-(I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
 ASSISTANCE.

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moj Colony, Midvya Nagar, Jajpur-17  
 Tel: +91-141-2520899, 2521889, 2520566  
 Fax: 2521346, e-mail: ceg@cegidia.com

**CEG**

Chief Engineer  
 World Bank Projects, Orissa  
 World Bank EMPLOYEES

to the E.I.C (Civil) Orissa,  
 Bhubaneswar.





VERTICAL CURVE DETAILS

Curve No.	Curve Type	VIP Details		Curve Length m	K		Curve Start		Curve End		Start Gradient %	End Gradient %	Grade Difference %
		Chainage	Level		Chainage	Level	Chainage	Level	Chainage	Level			
91	Sag	36123.485	243.114	130	41.865	36058.485	243.742	36188.485	244.519	-0.988	2.162	3.128	
92	Hog	36608.070	251.427	470	133.550	36273.070	246.348	36743.070	248.357	2.162	-1.306	-3.469	
93	Sag	37018.057	244.790	200	135.550	36916.057	246.097	37118.057	244.982	-1.306	0.191	1.487	
94	Hog	38169.205	246.983	125	145.543	38106.705	246.874	38231.705	246.578	0.191	-0.888	-0.859	
95	Sag	39301.029	239.435	400	139.494	39101.029	240.771	39501.029	243.834	-0.888	2.200	2.868	
96	Hog	39760.833	249.989	410	137.990	39575.833	245.480	39985.833	248.408	2.200	-0.772	-2.973	
97	Sag	40242.276	248.429	300	117.589	40082.276	247.588	40382.276	249.098	-0.772	1.782	2.554	
98	Hog	40542.054	251.754	245	60.818	40419.554	249.584	40564.554	248.018	1.782	-2.242	-4.024	
99	Sag	40827.477	243.123	95	41.851	40879.977	244.188	40974.977	243.141	-2.242	0.039	2.281	
100	Hog	41122.141	243.198	95	135.653	41074.841	243.180	41189.841	242.884	0.039	-0.861	-0.700	
101	Sag	41360.078	241.824	60	53.928	41330.078	241.823	41390.078	241.760	-0.861	0.451	1.112	
102	Hog	42051.494	244.743	435	134.700	41833.994	243.782	42288.994	238.700	0.451	-2.778	-3.229	
103	Sag	42388.987	236.388	95	41.395	42341.487	236.888	42438.487	236.138	-2.778	-0.482	-2.298	
104	Sag	42894.502	233.895	60	188.955	42884.502	234.039	42724.502	233.848	-0.482	-0.181	0.321	
105	Sag	43270.782	232.988	200	139.608	43170.782	233.128	43370.782	234.240	-0.181	1.272	1.432	
106	Hog	43580.238	236.904	150	149.756	43505.238	235.950	43655.238	237.107	1.272	0.270	-1.002	
107	Hog	43918.756	237.818	175	74.966	43931.256	237.582	44006.256	236.013	0.270	-2.063	-2.333	
108	Sag	44283.875	230.265	200	55.788	44183.875	232.348	44383.875	231.807	-2.063	1.519	3.582	
109	Hog	44804.399	235.182	400	135.000	44404.355	232.118	44804.443	232.278	1.519	-1.441	-2.860	
110	Sag	44889.349	231.054	105	42.738	44836.849	231.811	44941.849	231.587	-1.441	1.015	2.456	
111	Hog	45203.764	234.245	60	234.921	45173.764	233.940	45233.764	234.473	1.015	0.789	-0.256	
112	Hog	45432.022	235.978	280	135.539	45302.022	234.881	45582.022	234.472	0.789	-1.159	-1.918	
113	Sag	45788.547	231.870	80	62.008	45758.547	232.218	45818.547	231.813	-1.159	0.000	0.192	
114	Sag	45927.877	231.800	60	313.883	45987.877	231.857	45957.877	231.481	0.000	-0.397	-0.397	
115	Hog	46080.122	231.800	60	181.175	46030.122	231.800	46090.122	231.481	-0.397	0.625	1.022	
116	Sag	46488.173	230.020	60	58.713	46428.173	230.139	46488.173	230.208	-0.397	-0.788	-1.413	
117	Hog	46884.827	232.748	190	134.478	46798.827	232.154	46988.827	232.000	0.625	0.186	0.955	
118	Sag	47108.176	231.096	60	62.910	47078.176	231.302	47138.176	231.115	-0.788	1.535	1.369	
119	Sag	47448.984	231.827	60	43.803	47418.984	231.578	47478.984	232.088	0.186	0.469	-1.096	
120	Hog	47698.632	235.497	120	112.515	47638.632	234.574	47768.632	235.778	1.535	0.234	-0.236	
121	Hog	48081.553	237.340	60	255.009	48061.553	237.189	48121.553	237.410	0.469	0.951	0.717	
122	Sag	48344.880	237.832	60	83.725	48314.880	237.882	48374.880	238.217	0.234	-0.020	-0.970	
123	Hog	48620.248	240.551	135	139.184	48552.748	239.910	48687.748	240.538	0.951	1.117	1.137	
124	Sag	48880.415	240.489	60	52.776	48860.415	240.504	48920.415	240.834	-0.020	-0.563	-1.660	
125	Hog	49176.395	243.883	290	135.912	49060.395	242.388	49280.395	243.036	1.117	3.185	3.757	
126	Sag	49781.084	240.389	300	79.828	49811.084	241.232	49911.084	245.182	-0.563	-1.824	-4.818	
127	Hog	50117.352	251.773	290	60.179	49972.352	247.139	50282.352	249.419	3.185	2.210	3.833	
128	Sag	50549.737	244.754	180	41.781	50489.737	246.052	50629.737	248.520	-1.824	-0.450	-2.660	
129	Hog	50825.441	250.841	360	135.419	50645.441	246.867	51005.441	248.930	2.210	0.685	1.145	
130	Sag	51154.481	249.359	60	52.402	51124.481	249.494	51184.481	248.567	-0.450	-1.115	-1.810	
131	Hog	51810.444	252.528	250	138.154	51485.444	251.858	51735.444	251.132	0.685	1.503	2.918	
132	Sag	52056.214	247.555	115	43.933	51998.714	248.198	52113.714	248.419	-1.115	-1.260	-2.782	
133	Hog	52285.931	251.007	165	59.731	52203.431	249.787	52388.431	249.987	1.503	2.670	3.928	
134	Sag	52850.971	243.888	165	41.991	52768.471	244.927	52883.471	246.090	-1.260	-2.085	-4.755	
135	Hog	53234.778	254.134	450	94.845	53009.778	248.127	53459.778	248.443	2.670	2.870	3.928	

**PROJECT:-**

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

**VERTICAL CURVE DETAILS**

BHAWANIPATNA - KHARIAR (SH-16 KM 2/0 TO KM 70/0)

DRG NO.	DATE	REV	RO	SCALE
SH. NO.	DATE	REV	RO	SCALE
DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)	

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moj Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520898, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@ceginfoc.com

**PATEL ARSS JV**  
CONTRACTOR

World Bank Project  
 Chief Engineer  
 World Bank EMPLOYEES  
 To the E.I.C. (Civil) Office,  
 Bhubaneswar:

VERTICAL CURVE DETAILS

Curve No.	Curve Type	VIP Details		Curve Length m	K	Curve Start		Curve End		Start Gradient %	End Gradient %	Grade Difference %
		Chainage	Level			Chainage	Level	Chainage	Level			
136	Seg	53707.056	244.287	90	44.939	53902.058	246.226	53752.068	244.250	-2.065	-0.082	2.003
137	Hog	54081.563	243.978	60	238.722	54051.563	244.003	54111.563	243.878	-0.082	-0.334	-0.251
138	Seg	54701.738	241.909	60	179.822	54671.738	242.009	54731.738	241.908	-0.334	0.000	0.334
139	Seg	55583.221	241.909	300	105.698	55433.221	241.909	55733.221	248.172	0.000	2.841	2.841
140	Hog	55949.985	262.332	260	69.867	55819.985	246.637	56079.985	250.360	2.841	-1.901	-4.342
141	Seg	56398.097	248.040	100	56.032	56318.097	246.182	56418.097	246.182	-1.501	0.263	1.704
142	Seg	56744.488	247.104	75	71.084	56708.988	246.988	56781.988	247.808	0.263	1.338	1.066
143	Hog	57090.699	251.337	185	137.328	56998.199	250.098	57153.199	251.328	-0.009	-0.009	-1.347
144	Seg	57426.829	251.305	85	41.620	57383.128	251.308	57468.128	252.170	-0.009	2.032	2.040
145	Hog	57893.761	254.821	215	136.292	57478.261	262.386	57691.261	266.012	2.032	0.466	-1.878
146	Hog	57998.895	255.507	100	60.441	57749.895	255.278	57849.895	254.908	0.455	-1.198	-1.854
147	Seg	57945.248	263.765	135	41.388	57877.748	264.574	58012.748	265.188	-1.189	2.065	3.263
148	Hog	58223.647	259.510	335	69.858	58056.147	266.054	58391.147	263.892	2.065	-3.533	-6.597
149	Seg	58621.577	245.451	150	42.458	58548.577	248.101	58998.577	245.451	-3.533	0.000	3.533
150	Seg	58808.175	245.451	60	42.785	58779.175	246.451	58838.175	246.872	0.000	1.400	1.400
151	Hog	58996.459	245.851	85	60.613	58952.959	246.055	58937.959	246.881	1.400	0.000	-1.400
152	Hog	59242.880	248.881	80	60.643	59202.880	248.881	59282.880	248.133	0.000	-1.319	-1.319
153	Seg	59498.308	243.803	60	46.463	59428.308	244.188	59488.308	243.803	-1.319	0.000	1.319
154	Hog	59581.697	243.803	60	409.516	59551.697	243.803	59611.697	243.759	0.000	-0.147	-0.147
155	Seg	60022.098	243.158	100	68.272	59972.098	243.231	60072.098	243.817	-0.147	1.318	1.465
156	Hog	60490.884	248.811	135	137.907	60383.484	247.822	60518.484	249.040	1.318	0.340	-0.978
157	Seg	60723.726	248.737	60	78.530	60689.726	249.635	60753.726	250.074	0.340	1.123	0.783
158	Hog	60865.148	252.449	275	105.425	60827.848	250.904	61102.848	250.474	1.123	-1.466	-2.808
159	Seg	61322.363	247.143	300	118.023	61172.363	249.371	61472.363	248.668	-1.466	1.036	2.822
160	Hog	61688.410	250.933	295	136.281	61540.910	249.408	61835.910	249.287	1.036	-1.130	-2.165
161	Seg	62005.071	247.358	60	59.683	61975.071	247.695	62035.071	247.319	-1.130	0.126	1.005
162	Seg	62171.670	247.149	105	42.848	62119.170	247.214	62224.170	248.378	-0.126	2.338	2.463
163	Hog	62429.931	253.044	215	134.782	62316.331	250.531	62531.331	253.842	2.338	0.743	-1.586
164	Hog	62694.948	254.982	175	135.821	62657.448	254.333	62772.448	254.505	0.743	-0.546	-1.288
165	Hog	62868.011	263.482	75	44.642	62820.511	253.688	62868.011	253.081	-0.546	-1.068	-0.292
166	Seg	63282.066	250.244	60	66.176	63232.066	250.364	63282.066	250.244	-1.068	0.000	1.068
167	Seg	63417.488	250.244	60	304.853	63387.488	250.244	63447.488	250.303	0.000	0.197	0.197
168	Seg	63739.449	250.878	75	45.233	63701.949	250.804	63778.949	251.573	0.197	1.855	1.855
169	Hog	64037.589	258.408	165	135.773	63955.089	254.878	64120.089	258.935	1.855	0.840	-1.218
170	Hog	64782.480	261.044	235	135.558	64644.980	260.293	64678.980	259.799	0.840	-1.094	-1.734
171	Seg	65157.056	256.728	150	93.218	65082.056	257.548	65232.056	257.114	-1.094	0.515	1.510
172	Hog	65689.278	259.300	160	137.747	65576.278	258.888	65738.278	258.783	0.515	-0.646	-1.162
173	Seg	66065.125	258.657	60	92.824	66035.125	258.851	66095.125	258.667	-0.646	0.000	0.846
174	Seg	66188.795	260.657	60	233.280	66158.795	260.657	66218.795	259.734	0.000	0.257	0.257
175	Seg	66642.441	267.567	70	45.143	66607.441	267.477	66677.441	268.189	0.257	1.808	1.950
176	Hog	67267.852	270.683	265	134.783	67135.452	268.287	67400.452	270.473	1.808	-0.158	-1.968
177	Hog	67777.051	269.878	105	138.525	67724.551	269.981	67828.551	269.301	-0.158	-0.927	-0.769
178	Hog	68488.005	263.278	60	69.813	68459.005	263.955	68519.005	262.787	-0.927	-1.587	-0.670
179	Seg	68682.985	260.019	60	51.842	68682.985	260.439	68722.985	259.887	-1.587	-0.439	1.188
180	Seg	68823.582	259.008	60	138.549	68853.582	259.136	68953.582	259.009	-0.439	0.000	0.439
181	Seg	69078.877	268.008	70	44.103	69041.877	269.008	69111.877	269.582	0.000	1.587	1.587
182	Hog	69381.458	263.540	140	138.000	69311.458	262.729	69451.458	264.241	1.587	0.573	-1.014
183	Seg	69078.877	259.008	70	44.109	69041.877	269.008	69111.877	259.581	0.000	1.587	1.587
184	Hog	69422.316	264.488	110	78.898	69387.316	263.815	69477.316	264.874	1.587	0.156	-1.431
185	Seg	69811.985	264.785	70	43.582	69878.985	264.730	69946.985	266.402	0.156	1.782	1.806
186	Hog	69865.225	269.248	130	61.332	69800.225	268.102	69930.225	269.016	1.782	-0.357	-2.120

PROJECT:-

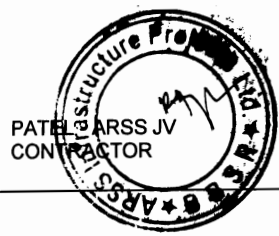
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Meji Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521348, e-mail: [ceg@cegindia.com](mailto:ceg@cegindia.com)



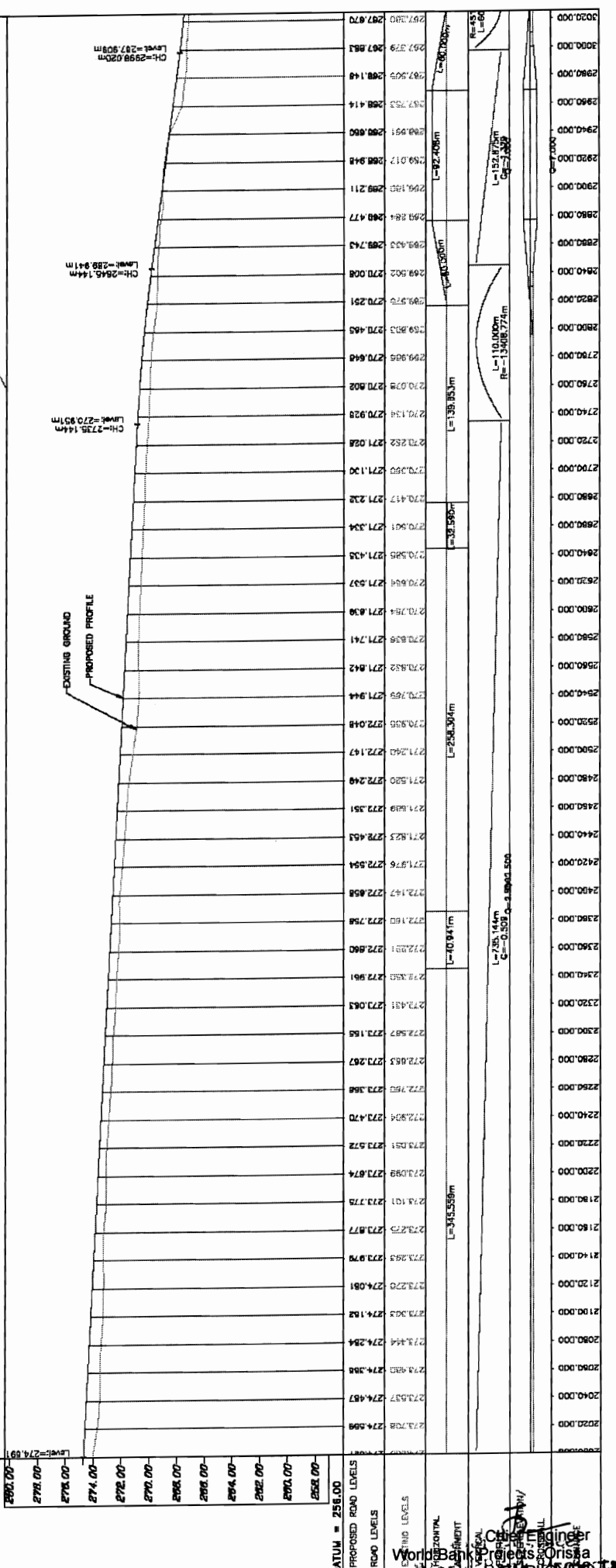
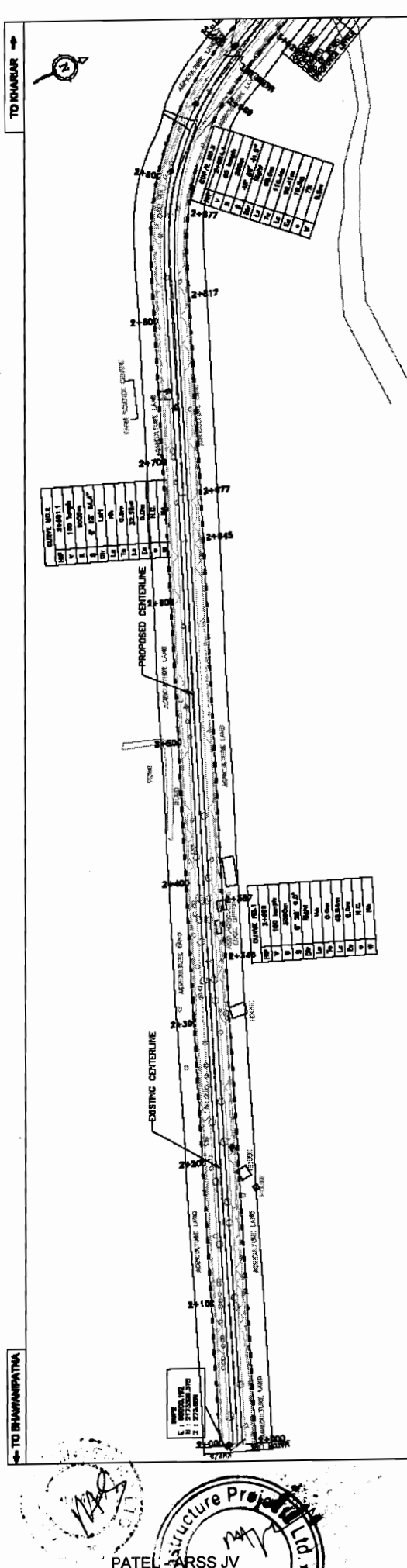
VERTICAL CURVE DETAILS  
 BHAWANIPATNA - KHARIAR (SH-16 KM 2/0 TO KM 70/0)

DRG. NO.	DATE	REV	RD	SCALE	B.M.	J.P.	R.R.D.K	S.C



World Bank Projects  
 Chief Engineer  
 Chief Engineer  
 EMPLOYER

Old No. E.T.C. (Civil) Orissa,  
 Bhubaneswar



**PROJECT:-**  
**WIDENING AND STRENGTHENING TO TWO LANE**  
**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, M of Colony, Indraprastha Nagar, Jodhpur-17  
 Tel: +91-141-2520889, 2521899, 2520556  
 Fax: 2521344, e-mail: ceg@cegindia.com

**LEGEND**

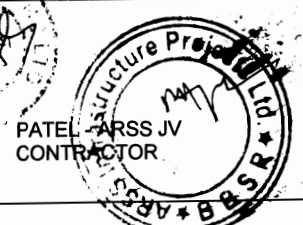
EXISTING ROAD	PROPOSED ROAD
EXISTING CENTERLINE	PROPOSED CENTERLINE
EXISTING GROUND	PROPOSED PROFILE
EXISTING SIDEWALK	PROPOSED SIDEWALK
EXISTING DRAINAGE	PROPOSED DRAINAGE
EXISTING UTILITIES	PROPOSED UTILITIES
EXISTING LAND USE	PROPOSED LAND USE
EXISTING VEGETATION	PROPOSED VEGETATION
EXISTING STRUCTURES	PROPOSED STRUCTURES
EXISTING SERVICES	PROPOSED SERVICES
EXISTING MATERIALS	PROPOSED MATERIALS
EXISTING METHODS	PROPOSED METHODS
EXISTING TOOLS	PROPOSED TOOLS
EXISTING EQUIPMENT	PROPOSED EQUIPMENT
EXISTING PERSONNEL	PROPOSED PERSONNEL
EXISTING PROCEDURES	PROPOSED PROCEDURES
EXISTING STANDARDS	PROPOSED STANDARDS
EXISTING REGULATIONS	PROPOSED REGULATIONS
EXISTING AGREEMENTS	PROPOSED AGREEMENTS
EXISTING CONTRACTS	PROPOSED CONTRACTS
EXISTING BIDDING	PROPOSED BIDDING
EXISTING CONSTRUCTION	PROPOSED CONSTRUCTION
EXISTING MAINTENANCE	PROPOSED MAINTENANCE
EXISTING OPERATION	PROPOSED OPERATION
EXISTING EVALUATION	PROPOSED EVALUATION
EXISTING IMPROVEMENT	PROPOSED IMPROVEMENT
EXISTING OPTIMIZATION	PROPOSED OPTIMIZATION
EXISTING INNOVATION	PROPOSED INNOVATION
EXISTING SUSTAINABILITY	PROPOSED SUSTAINABILITY
EXISTING RESILIENCE	PROPOSED RESILIENCE
EXISTING ADAPTABILITY	PROPOSED ADAPTABILITY
EXISTING FLEXIBILITY	PROPOSED FLEXIBILITY
EXISTING ROBUSTNESS	PROPOSED ROBUSTNESS
EXISTING RECOVERY	PROPOSED RECOVERY
EXISTING TRANSFORMABILITY	PROPOSED TRANSFORMABILITY
EXISTING ANTICIPATION	PROPOSED ANTICIPATION
EXISTING PREVENTION	PROPOSED PREVENTION
EXISTING PROTECTION	PROPOSED PROTECTION
EXISTING PROMOTION	PROPOSED PROMOTION
EXISTING ENFORCEMENT	PROPOSED ENFORCEMENT
EXISTING MONITORING	PROPOSED MONITORING
EXISTING EVALUATION	PROPOSED EVALUATION
EXISTING IMPROVEMENT	PROPOSED IMPROVEMENT
EXISTING OPTIMIZATION	PROPOSED OPTIMIZATION
EXISTING INNOVATION	PROPOSED INNOVATION
EXISTING SUSTAINABILITY	PROPOSED SUSTAINABILITY
EXISTING RESILIENCE	PROPOSED RESILIENCE
EXISTING ADAPTABILITY	PROPOSED ADAPTABILITY
EXISTING FLEXIBILITY	PROPOSED FLEXIBILITY
EXISTING ROBUSTNESS	PROPOSED ROBUSTNESS
EXISTING RECOVERY	PROPOSED RECOVERY
EXISTING TRANSFORMABILITY	PROPOSED TRANSFORMABILITY
EXISTING ANTICIPATION	PROPOSED ANTICIPATION
EXISTING PREVENTION	PROPOSED PREVENTION
EXISTING PROTECTION	PROPOSED PROTECTION
EXISTING PROMOTION	PROPOSED PROMOTION
EXISTING ENFORCEMENT	PROPOSED ENFORCEMENT
EXISTING MONITORING	PROPOSED MONITORING

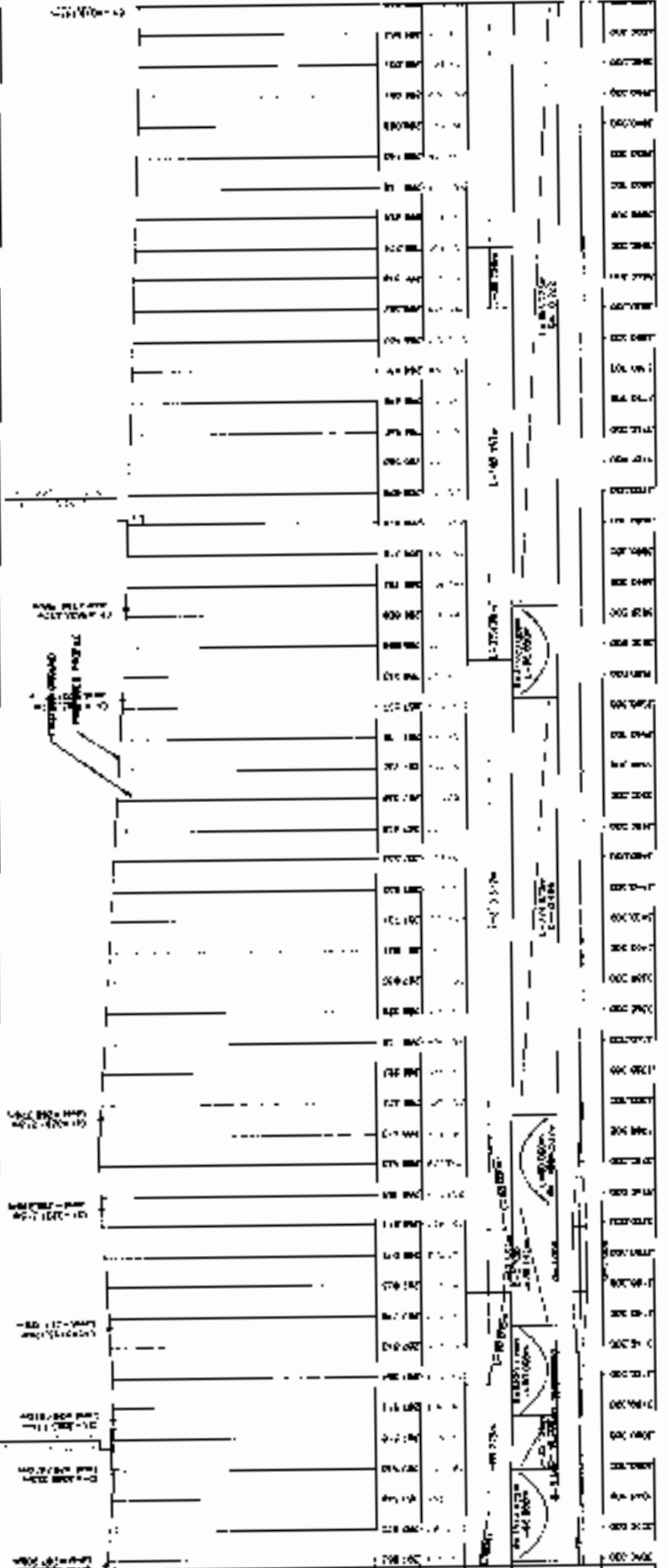
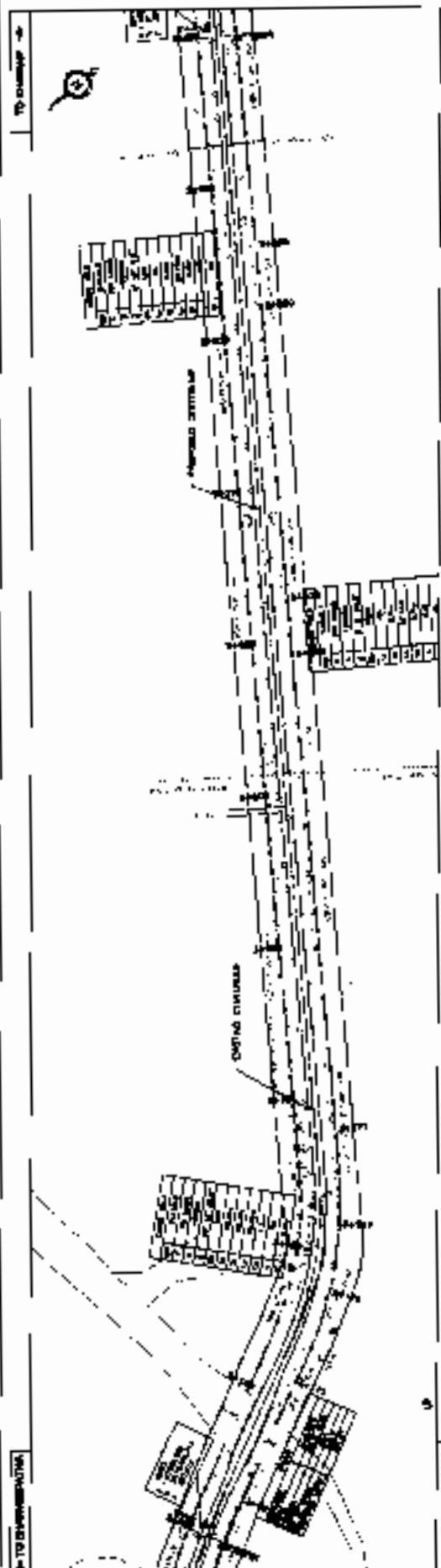
TO BHANGAR →

← TO BHANGARPATNA

Scale: 1:1000

North Arrow





Station	Ground Level (m)	Proposed Road Level (m)	Height (m)
0+00	100.00	100.00	0.00
0+10	100.50	100.50	0.00
0+20	101.00	101.00	0.00
0+30	101.50	101.50	0.00
0+40	102.00	102.00	0.00
0+50	102.50	102.50	0.00
0+60	103.00	103.00	0.00
0+70	103.50	103.50	0.00
0+80	104.00	104.00	0.00
0+90	104.50	104.50	0.00
1+00	105.00	105.00	0.00
1+10	105.50	105.50	0.00
1+20	106.00	106.00	0.00
1+30	106.50	106.50	0.00
1+40	107.00	107.00	0.00
1+50	107.50	107.50	0.00
1+60	108.00	108.00	0.00
1+70	108.50	108.50	0.00
1+80	109.00	109.00	0.00
1+90	109.50	109.50	0.00
2+00	110.00	110.00	0.00
2+10	110.50	110.50	0.00
2+20	111.00	111.00	0.00
2+30	111.50	111.50	0.00
2+40	112.00	112.00	0.00
2+50	112.50	112.50	0.00
2+60	113.00	113.00	0.00
2+70	113.50	113.50	0.00
2+80	114.00	114.00	0.00
2+90	114.50	114.50	0.00
3+00	115.00	115.00	0.00
3+10	115.50	115.50	0.00
3+20	116.00	116.00	0.00
3+30	116.50	116.50	0.00
3+40	117.00	117.00	0.00
3+50	117.50	117.50	0.00
3+60	118.00	118.00	0.00
3+70	118.50	118.50	0.00
3+80	119.00	119.00	0.00
3+90	119.50	119.50	0.00
4+00	120.00	120.00	0.00
4+10	120.50	120.50	0.00
4+20	121.00	121.00	0.00
4+30	121.50	121.50	0.00
4+40	122.00	122.00	0.00
4+50	122.50	122.50	0.00
4+60	123.00	123.00	0.00
4+70	123.50	123.50	0.00
4+80	124.00	124.00	0.00
4+90	124.50	124.50	0.00
5+00	125.00	125.00	0.00
5+10	125.50	125.50	0.00
5+20	126.00	126.00	0.00
5+30	126.50	126.50	0.00
5+40	127.00	127.00	0.00
5+50	127.50	127.50	0.00
5+60	128.00	128.00	0.00
5+70	128.50	128.50	0.00
5+80	129.00	129.00	0.00
5+90	129.50	129.50	0.00
6+00	130.00	130.00	0.00
6+10	130.50	130.50	0.00
6+20	131.00	131.00	0.00
6+30	131.50	131.50	0.00
6+40	132.00	132.00	0.00
6+50	132.50	132.50	0.00
6+60	133.00	133.00	0.00
6+70	133.50	133.50	0.00
6+80	134.00	134.00	0.00
6+90	134.50	134.50	0.00
7+00	135.00	135.00	0.00
7+10	135.50	135.50	0.00
7+20	136.00	136.00	0.00
7+30	136.50	136.50	0.00
7+40	137.00	137.00	0.00
7+50	137.50	137.50	0.00
7+60	138.00	138.00	0.00
7+70	138.50	138.50	0.00
7+80	139.00	139.00	0.00
7+90	139.50	139.50	0.00
8+00	140.00	140.00	0.00
8+10	140.50	140.50	0.00
8+20	141.00	141.00	0.00
8+30	141.50	141.50	0.00
8+40	142.00	142.00	0.00
8+50	142.50	142.50	0.00
8+60	143.00	143.00	0.00
8+70	143.50	143.50	0.00
8+80	144.00	144.00	0.00
8+90	144.50	144.50	0.00
9+00	145.00	145.00	0.00
9+10	145.50	145.50	0.00
9+20	146.00	146.00	0.00
9+30	146.50	146.50	0.00
9+40	147.00	147.00	0.00
9+50	147.50	147.50	0.00
9+60	148.00	148.00	0.00
9+70	148.50	148.50	0.00
9+80	149.00	149.00	0.00
9+90	149.50	149.50	0.00
10+00	150.00	150.00	0.00

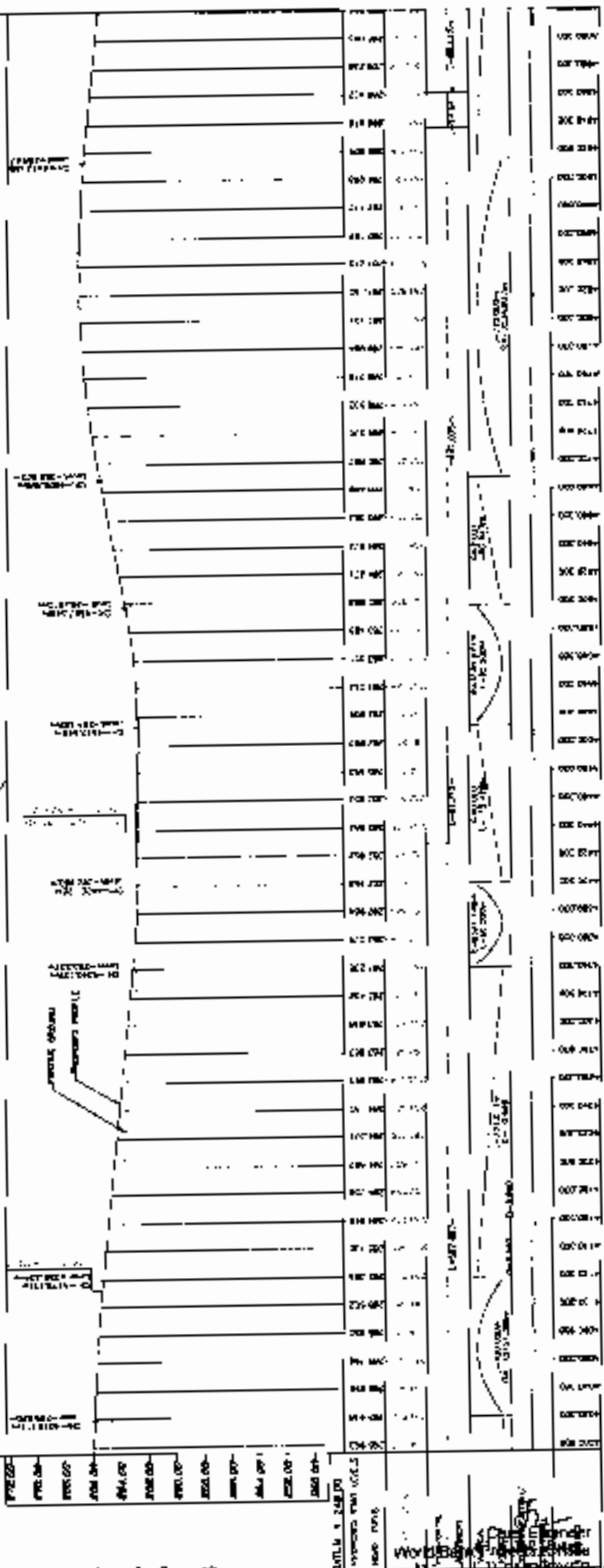
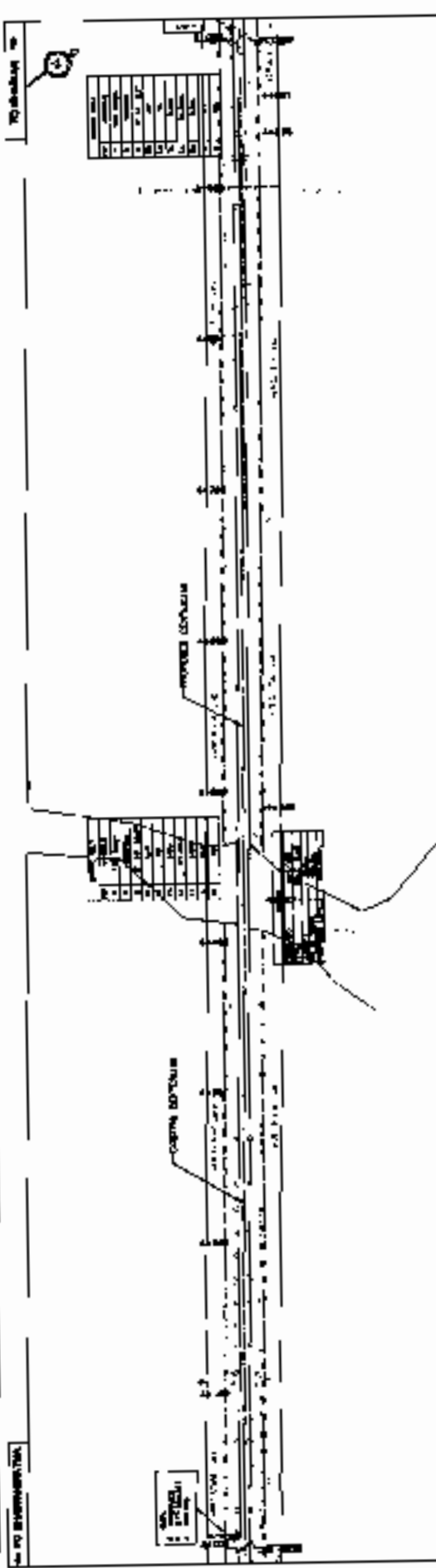
PATEL ARSS JV
   
 CONTRACTOR

Volume IV: Page 12
   
 PROJECT: ROAD AND STRENGTHENING TO TWO LANE
   
 CONSULTING ENGINEERS: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE
   
 PROJECT: ROAD AND STRENGTHENING TO TWO LANE
   
 PLAN AT D - ORIGINIAL SECTION
   
 (50-1-10) KM 3/2000 TO KM 4/2000

LEGEND
   
 1. Existing Road
   
 2. Proposed Road
   
 3. Right of Way
   
 4. Utility Lines
   
 5. Obstructions
   
 6. Survey Points
   
 7. Bench Marks
   
 8. Spot Levels
   
 9. Contour Lines
   
 10. Proposed Road Profile

Prepared by: E. I. C. (Civil) Orissa,
   
 Rhoanagar

As per Specification No. 10



Station	Grade (%)	Curve Length (m)	Vertical Curve Type
0+00	0.00	100.00	Vertical Curve
1+00	0.00	100.00	Vertical Curve
2+00	0.00	100.00	Vertical Curve
3+00	0.00	100.00	Vertical Curve
4+00	0.00	100.00	Vertical Curve
5+00	0.00	100.00	Vertical Curve
6+00	0.00	100.00	Vertical Curve
7+00	0.00	100.00	Vertical Curve
8+00	0.00	100.00	Vertical Curve
9+00	0.00	100.00	Vertical Curve
10+00	0.00	100.00	Vertical Curve



Go to the E.I.C (Civil) Office  
Rajshahi

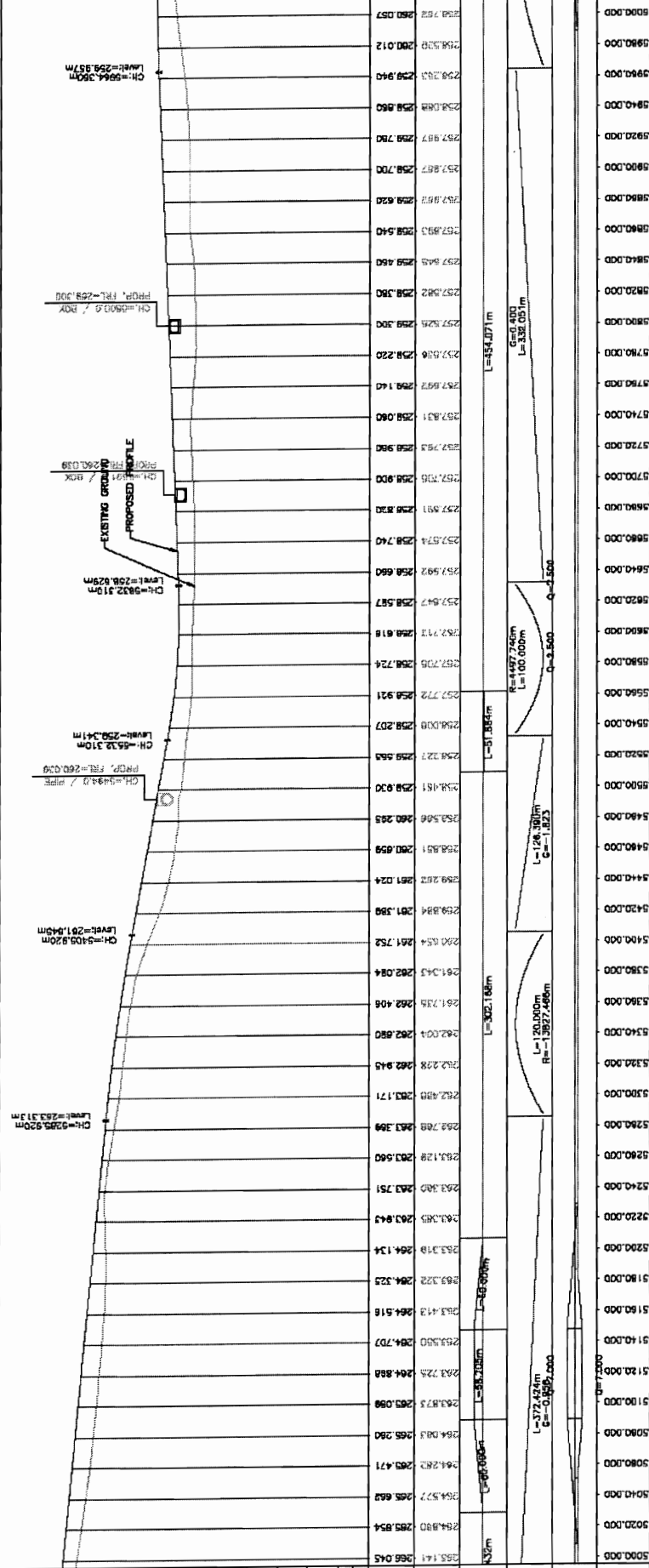
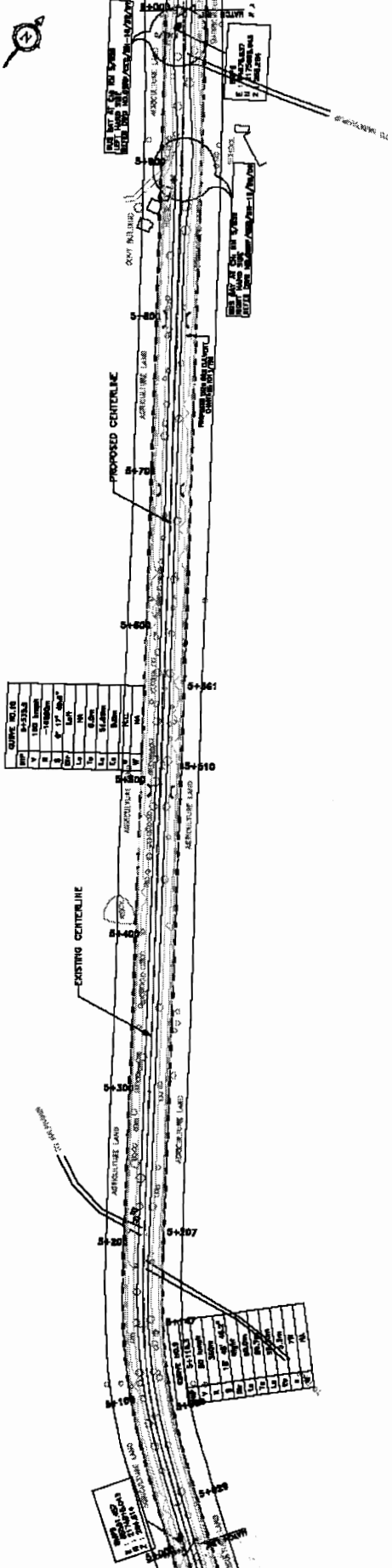
**WASHING AND STRENGTHENING TO TWO LANE**  
**PLAN AND LONGITUDINAL SECTION**  
 (S-16) KM 4/000 TC KM 5/000  
 ROAD NO. 10  
 DIST. RAJSHAHI

**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAIL PROJECT PREPARATION OF PHASE-II ROADWORK FOR BSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**CONSULTING ENGINEERS GROUP LTD.**  
 1/11/11, Charing Avenue, Dhaka-1000  
 TEL: 95414, 95415, 95416, 95417, 95418, 95419, 95420, 95421, 95422, 95423, 95424, 95425, 95426, 95427, 95428, 95429, 95430, 95431, 95432, 95433, 95434, 95435, 95436, 95437, 95438, 95439, 95440, 95441, 95442, 95443, 95444, 95445, 95446, 95447, 95448, 95449, 95450, 95451, 95452, 95453, 95454, 95455, 95456, 95457, 95458, 95459, 95460, 95461, 95462, 95463, 95464, 95465, 95466, 95467, 95468, 95469, 95470, 95471, 95472, 95473, 95474, 95475, 95476, 95477, 95478, 95479, 95480, 95481, 95482, 95483, 95484, 95485, 95486, 95487, 95488, 95489, 95490, 95491, 95492, 95493, 95494, 95495, 95496, 95497, 95498, 95499, 95500

← TO BHANGARPATNA

TO BHANGAR →



**WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 5/000 TO KM 6/000**

DRG. NO.	DATE	CH.	SCALE
SH. NO.	DATE	CH.	SCALE

**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**G E C CONSULTING ENGINEERS GROUP LTD.**  
 E-10/14/3 Col-4th, 4th Floor, Sector 17, Gurgaon, Haryana  
 Tel: 0122-2721344, Fax: 0122-2721344, e-mail: gce@gecgurgaon.com

**LEGEND**

ROADWAY CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE
PROPOSED CENTERLINE	PROPOSED ROAD LEVEL	EXISTING GROUND	PROPOSED PROFILE

**Patel - ARSS JV**  
**CONTRACTOR**

Volume IV: Page 14

World Bank Projects  
 the E I C (Civil) Orissa  
 Rhubaneswar

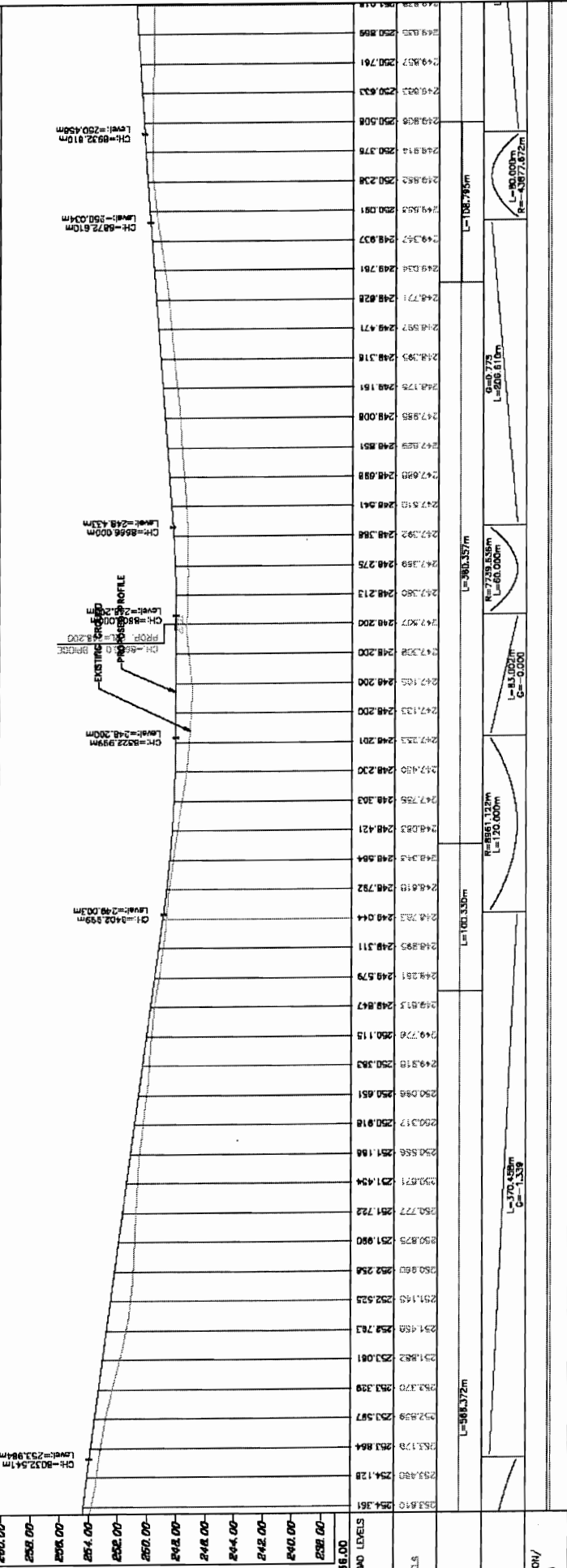
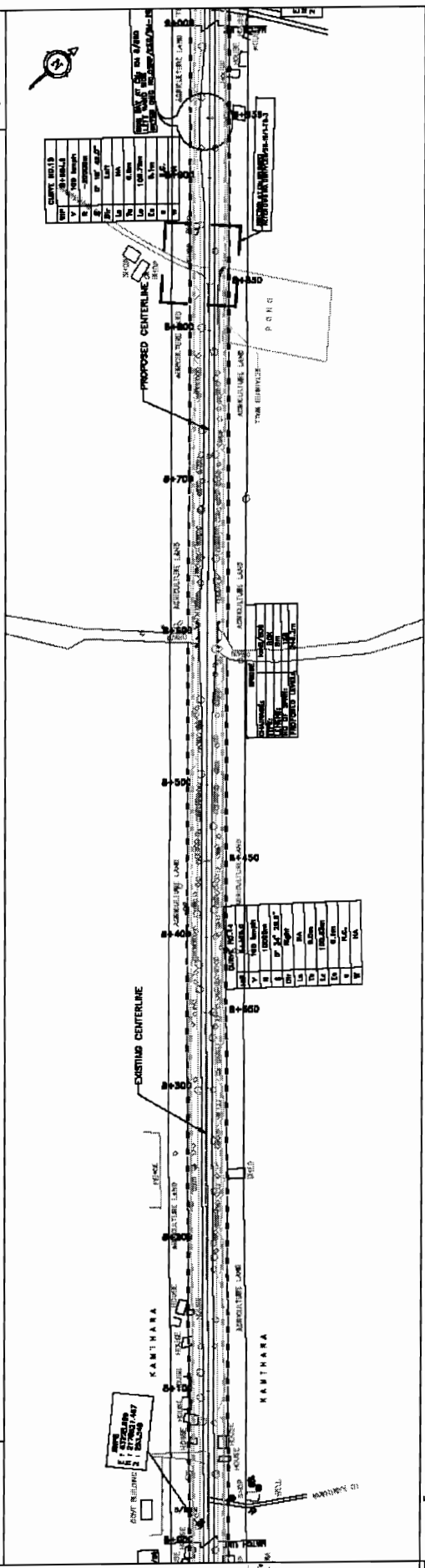






TO BHAWANIPATNA

TO KHARWAR



STATION	PROPOSED ROAD LEVELS	EXISTING ROAD LEVELS
8200.00	254.361	253.854
8210.00	254.128	253.597
8220.00	253.329	253.081
8230.00	251.772	251.454
8240.00	250.556	251.184
8250.00	250.017	250.918
8260.00	250.056	250.851
8270.00	249.318	250.383
8280.00	249.726	250.119
8290.00	249.813	249.847
8300.00	249.379	249.579
8310.00	248.895	249.311
8320.00	248.733	249.044
8330.00	248.018	248.782
8340.00	248.343	248.514
8350.00	248.083	248.421
8360.00	247.785	248.303
8370.00	247.480	248.200
8380.00	247.133	248.200
8390.00	247.103	248.200
8400.00	247.238	248.200
8410.00	247.307	248.200
8420.00	247.360	248.213
8430.00	247.389	248.275
8440.00	247.392	248.384
8450.00	247.313	248.541
8460.00	247.698	248.898
8470.00	247.839	249.251
8480.00	247.953	249.608
8490.00	248.193	249.971
8500.00	248.334	249.781
8510.00	248.347	249.837
8520.00	249.343	250.081
8530.00	249.343	250.238
8540.00	249.343	250.378
8550.00	249.343	250.508
8560.00	249.343	250.633
8570.00	249.343	250.761
8580.00	249.343	250.896

**WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 8/000 TO KM 9/000**

SCALE: HORIZONTAL: 1"=100.00m VERTICAL: 1"=10.00m

DATE: 07/07/2014

DESIGNER: S. K. PATIL

PROJECT NO: ORISSA STATE ROAD PROJECT

**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.**  
 L-12, H-1, Calcutta Market, New Delhi-110002  
 Tel: 491-141-330888, 2521889, 25202556  
 Fax: 2521344, e-mail: ceg@cegindia.com

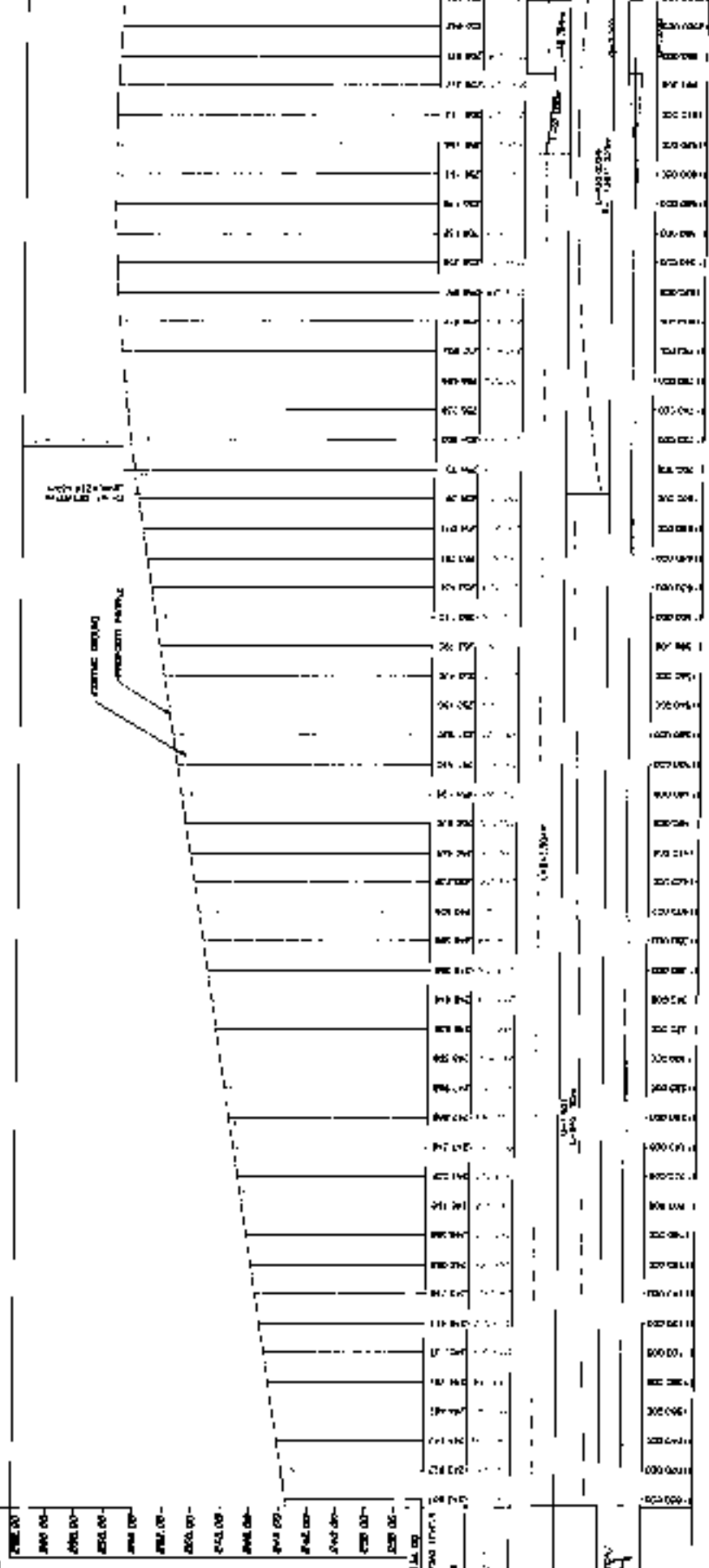
**LEGEND**

PROPOSED CENTERLINE	EXISTING CENTERLINE	RIGHT OF WAY	ADJACENT LANDS
ROAD LEVELS	EXISTING ROAD LEVELS	VERTICAL CURVE	GRADES
VERTICAL CURVE	GRADES	ADJACENT LANDS	ADJACENT LANDS
ADJACENT LANDS	ADJACENT LANDS	ADJACENT LANDS	ADJACENT LANDS

**PATEL - ARSS JV**  
**CONTRACTOR**



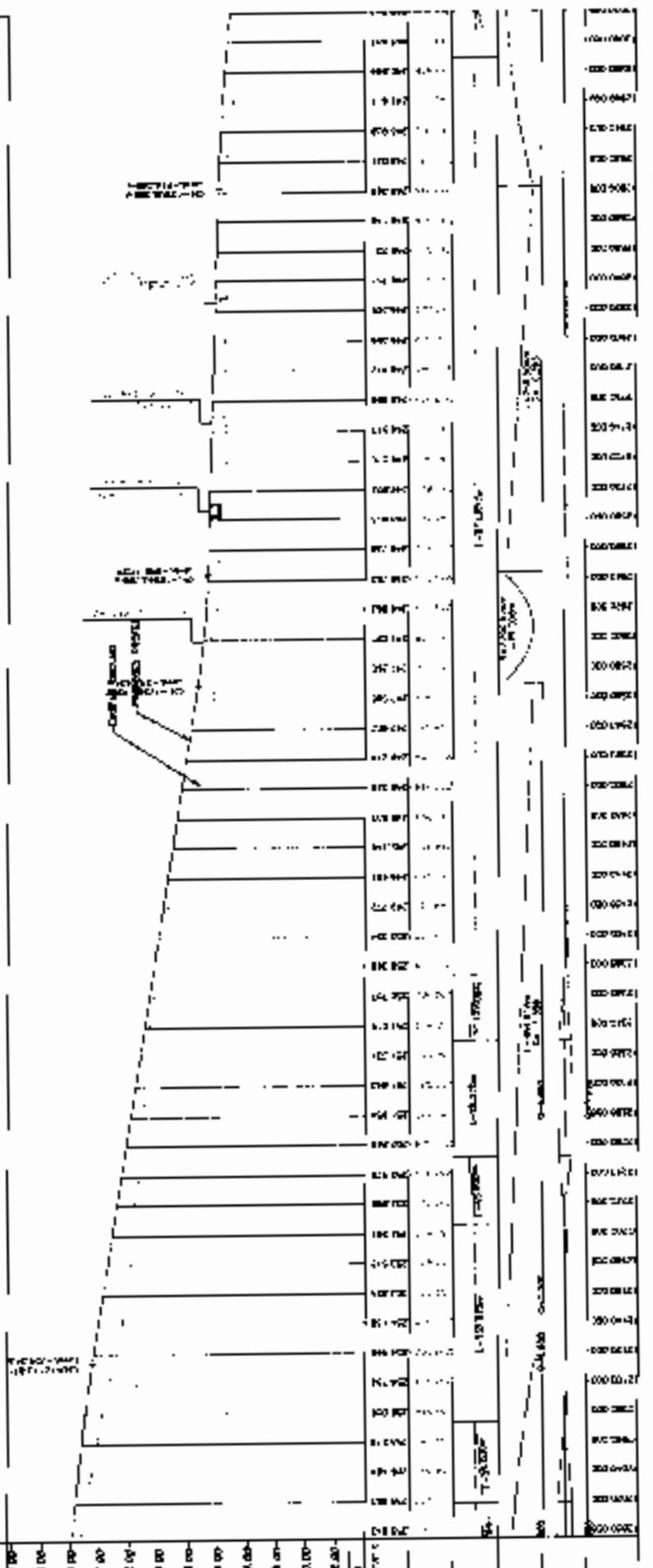
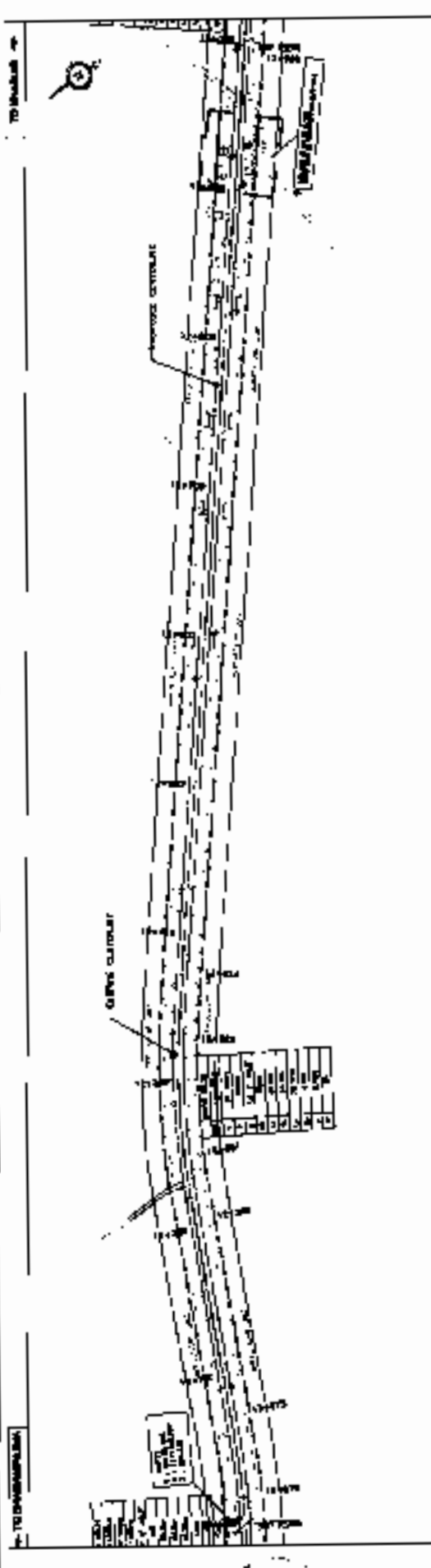




<p><b>LEGEND</b></p> <p>Proposed          Existing          Proposed          Existing          Proposed          Existing          Proposed          Existing          Proposed          Existing</p>	<p><b>PROJECT:</b>          CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>	<p><b>WIDEN AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (5H 1R) KM 11/200 TO KM 12/000</b></p> <p>DATE: 11/2000          DRAWN BY: [Name]          CHECKED BY: [Name]          SCALE: 1:100</p>
--	---	---

**PATEL ARSS JV**  
**CONTRACTOR**

Checked by: [Signature]  
 Date: [Date]



STATION	ELEVATION	REMARKS
0+00	100.00	PROPOSED ROADWAY
0+05	100.00	PROPOSED ROADWAY
0+10	100.00	PROPOSED ROADWAY
0+15	100.00	PROPOSED ROADWAY
0+20	100.00	PROPOSED ROADWAY
0+25	100.00	PROPOSED ROADWAY
0+30	100.00	PROPOSED ROADWAY
0+35	100.00	PROPOSED ROADWAY
0+40	100.00	PROPOSED ROADWAY
0+45	100.00	PROPOSED ROADWAY
0+50	100.00	PROPOSED ROADWAY
0+55	100.00	PROPOSED ROADWAY
0+60	100.00	PROPOSED ROADWAY
0+65	100.00	PROPOSED ROADWAY
0+70	100.00	PROPOSED ROADWAY
0+75	100.00	PROPOSED ROADWAY
0+80	100.00	PROPOSED ROADWAY

TO CHANDERNAGAR  
 TO BHADRAK  
 GIVE'S OUTLINE  
 PROPOSED OUTLINE  
 PROPOSED ROADWAY  
 PROPOSED SIDEWALK  
 PROPOSED SHOULDER  
 PROPOSED DRAINAGE  
 L=100 METER  
 G=0.000  
 DATUM = F.S.L. OF  
 APPROVED ROAD PLAN  
 DATE: 19/10/2010

Volume IV Page 21  
 (C) of the E. I. C. (Civil) Orissa  
 Bhubaneswar

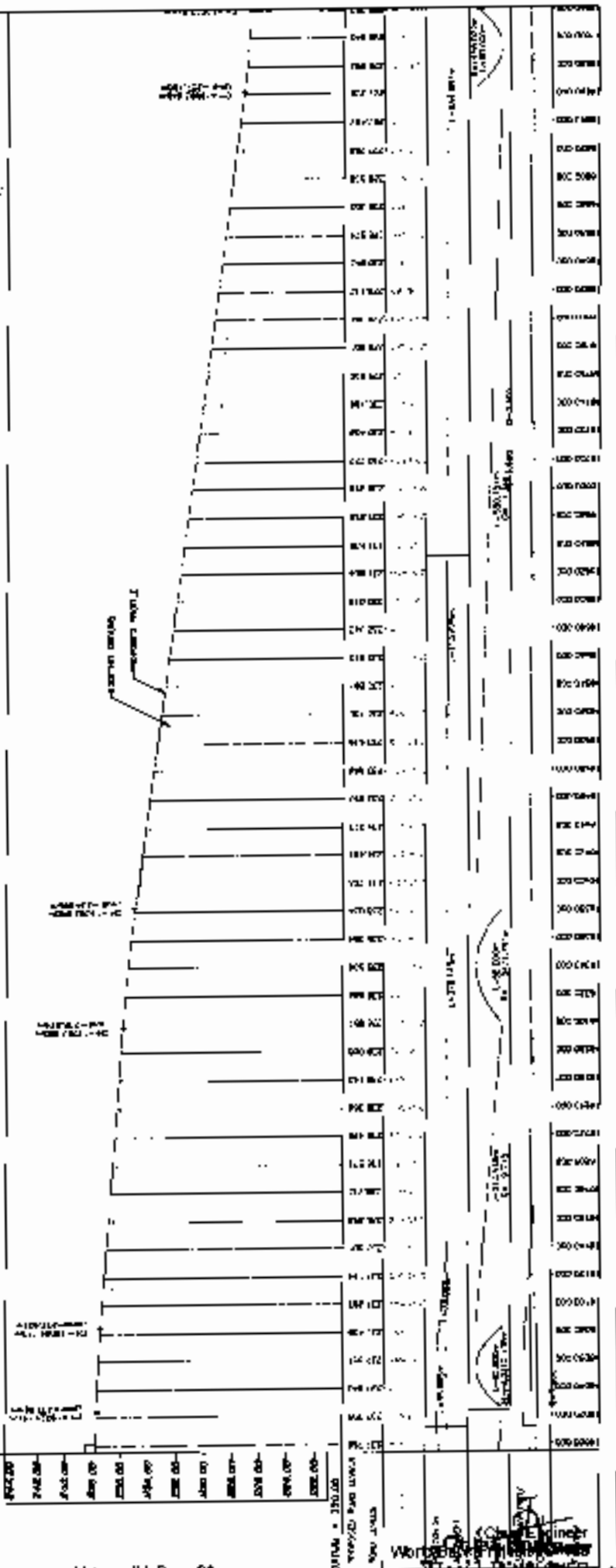
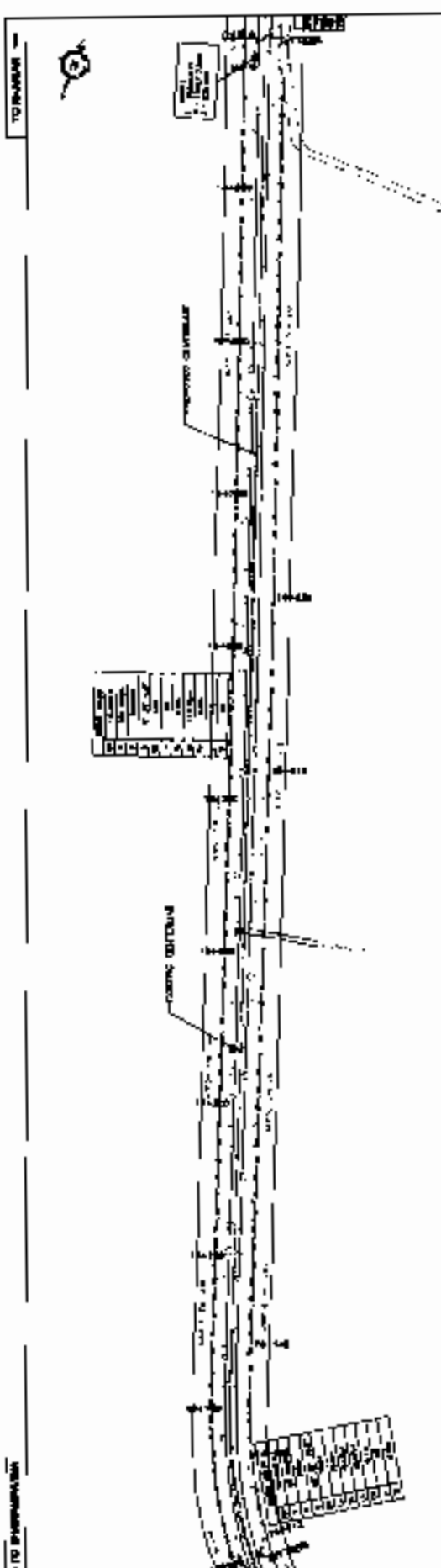
**COMPLETING**  
 ENGINEERS RESPONSIBLE  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE - II REPORT FOR ORISSA STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE  
 PROJECT NO. OR/01/001  
 CONTRACT NO. 100/01/001  
 DRAWING NO. 100/01/001/001  
 DATE: 19/10/2010











**LEGEND**

**CONSTRUCTION PROJECT**

**CONSULTING PROJECT**

**CONSULTING GROUP LTD.**

**CONSULTANCY SERVICES FOR ROAD BILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE II ROAD FOR GEORGIA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**PROJECT NO. 15/000 TO 15/000**

**SECTION 15/000 TO 15/000**

**DATE: 15/000 TO 15/000**

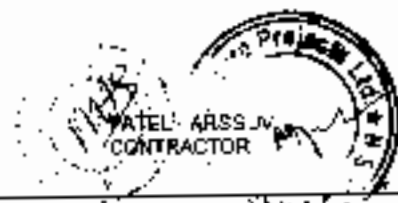
**SCALE: 1" = 100'**

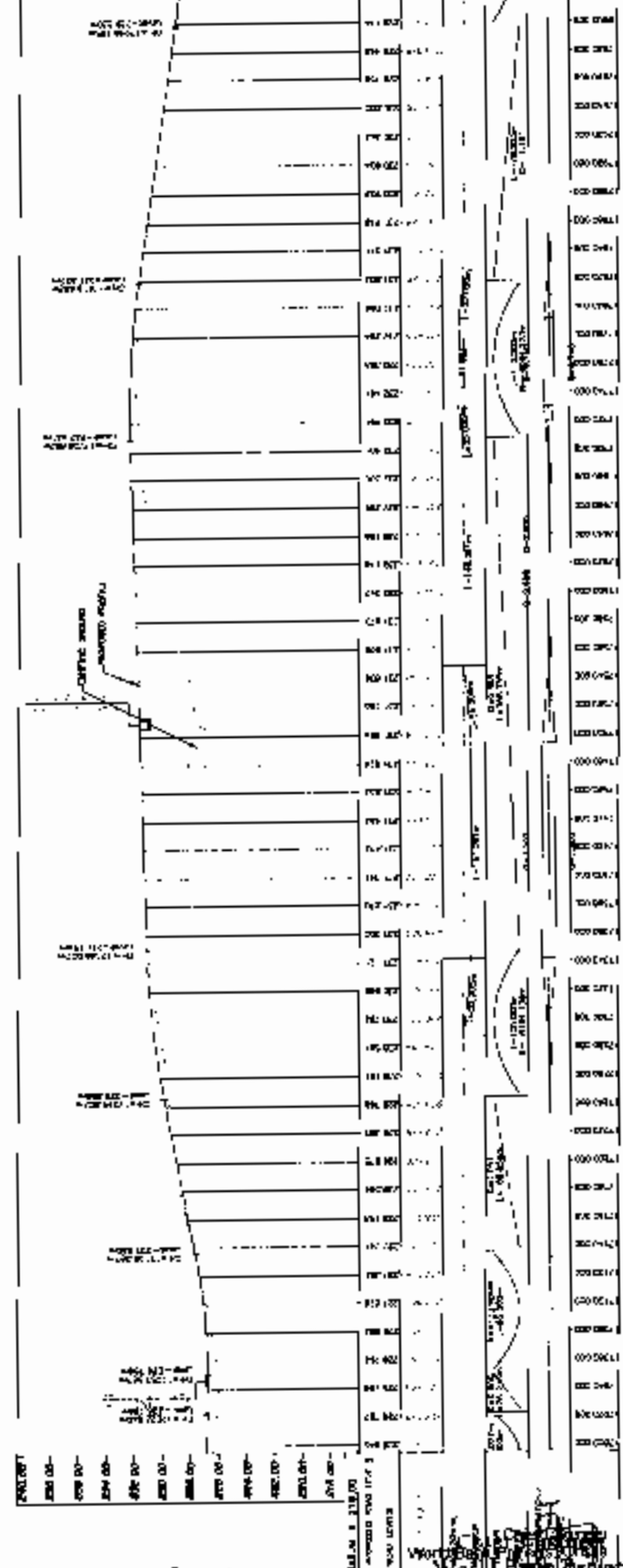
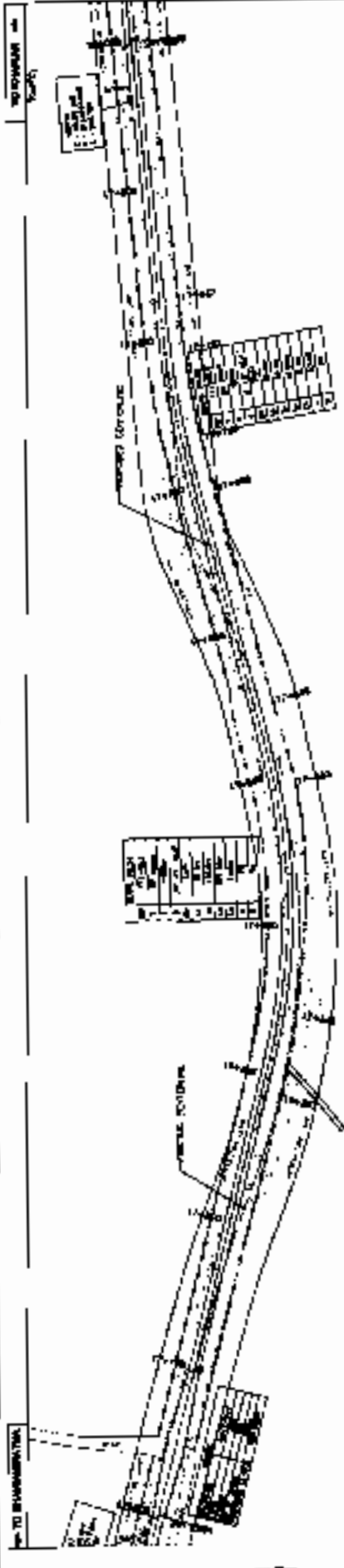
**PROJECT NO. 15/000 TO 15/000**

**SECTION 15/000 TO 15/000**

**DATE: 15/000 TO 15/000**

**SCALE: 1" = 100'**





**PROJECTIONS AND STRIKINGS TO TWO LANE ROAD AND LONGITUDINAL SECTION (5+18) KM 17+000 TO KM 18+000**

DATE	BY	CHKD BY	APPD BY
20/10/2010	...	...	...

**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

**PROJECT:**

PROJECT NO.	...
SCALE	...

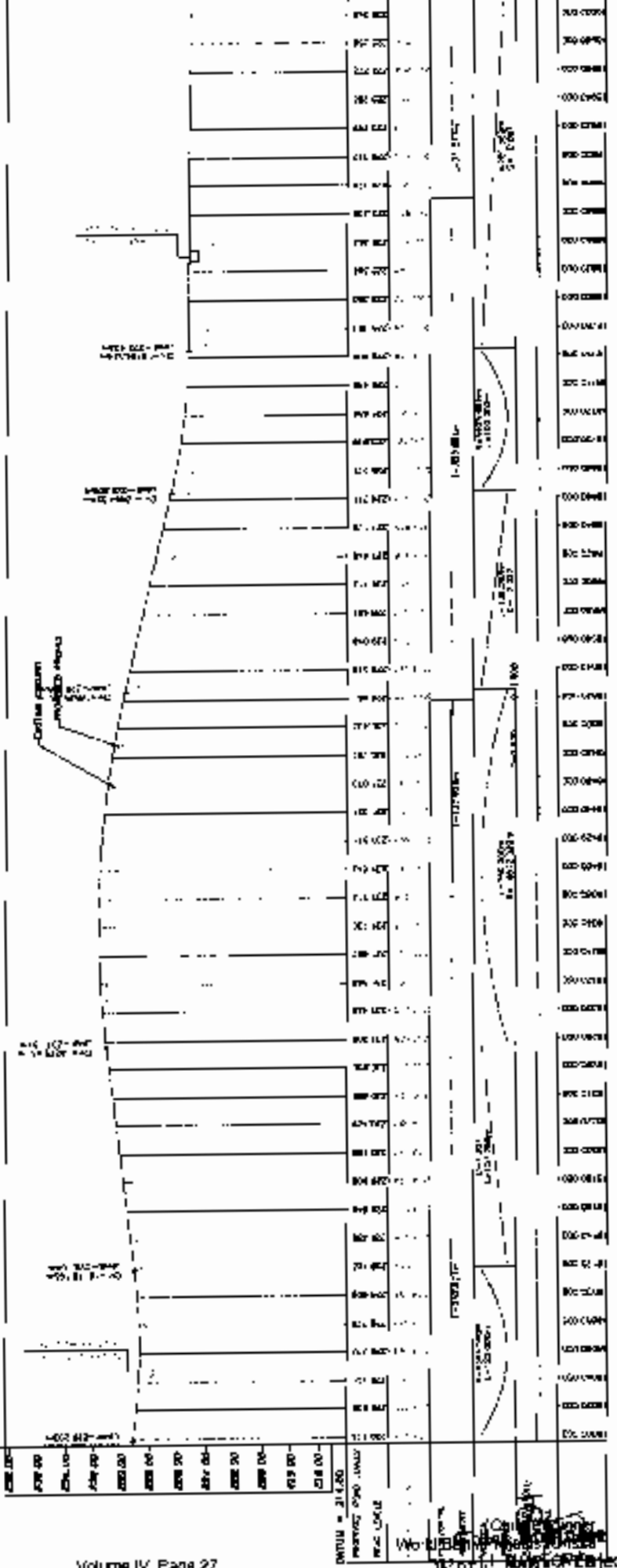
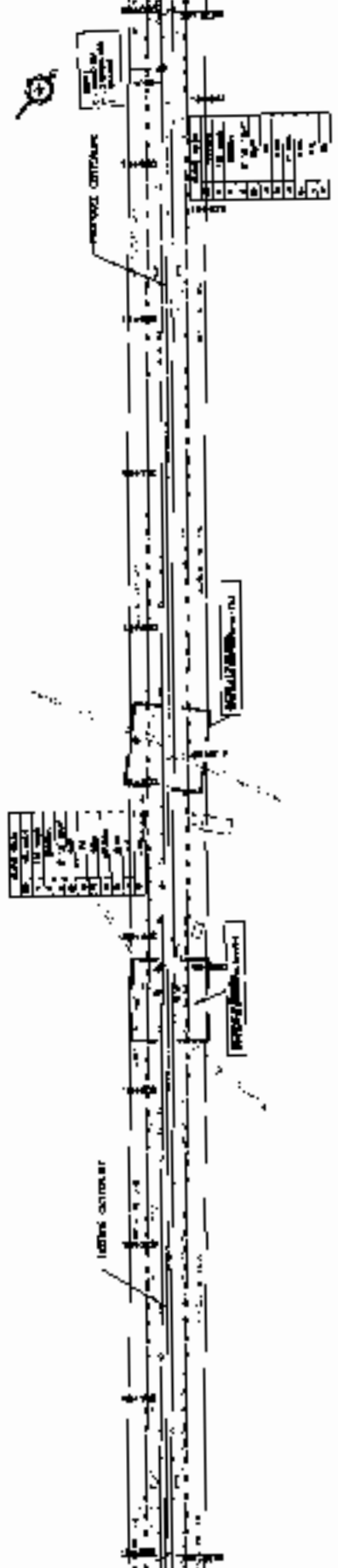
**DESIGNER:**

NAME	...
DESIGN NO.	...
DATE	...



NO DIMENSIONS

NO DIMENSIONS



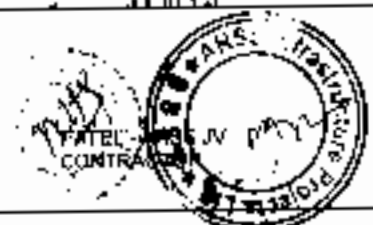
**LEGEND**

**CONSTRUCTION GROUP LTD.**  
 CONSULTING ENGINEERS  
 11111 14th Avenue SW  
 Edmonton, Alberta T6E 0A7  
 Tel: (780) 443-3333 Fax: (780) 443-3334

**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PLANS - (7) ROADS FOR ORWA STATE ROAD PROJECT  
 UNDER FEDERAL BANK ASSISTANCE

**WORKING AND STRENGTHENING TO TWO LANE  
 PLAN AND LONGITUDINAL SECTION**  
 (S1-16) KM 18/2200 TO KM 19/000

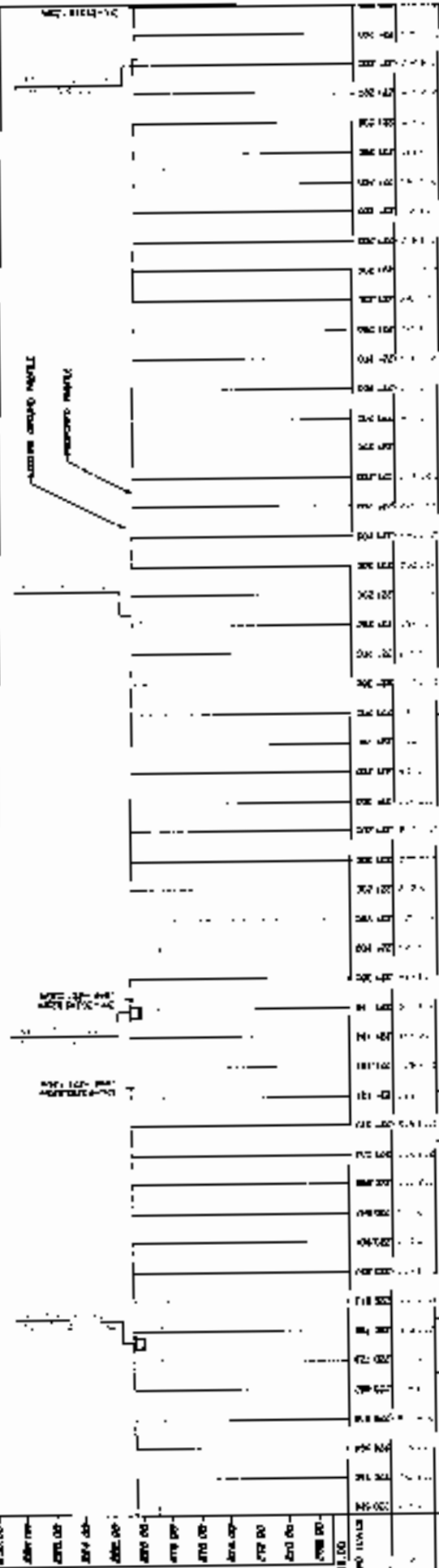
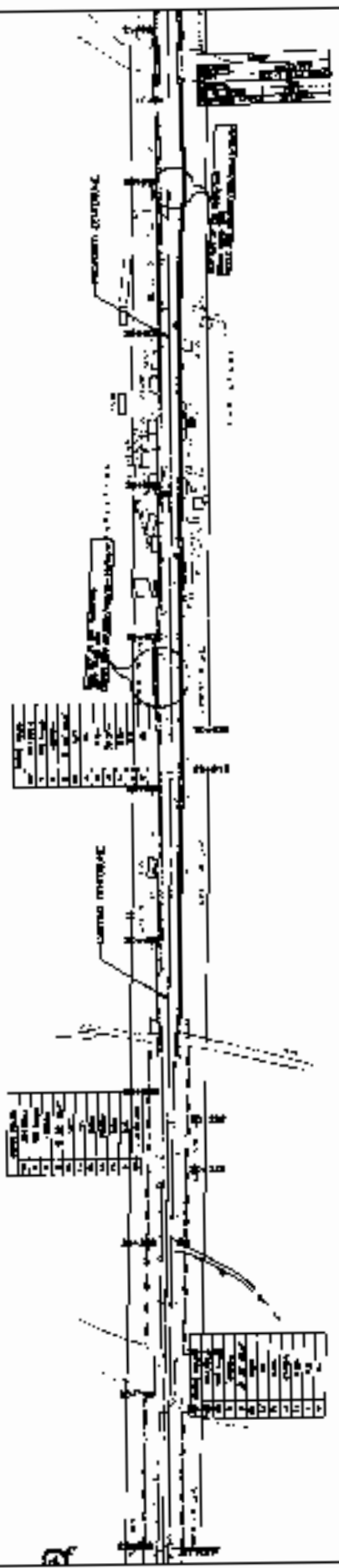
DATE: 18/02/01  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 APPROVED BY: [Signature]





As TO (Specification)

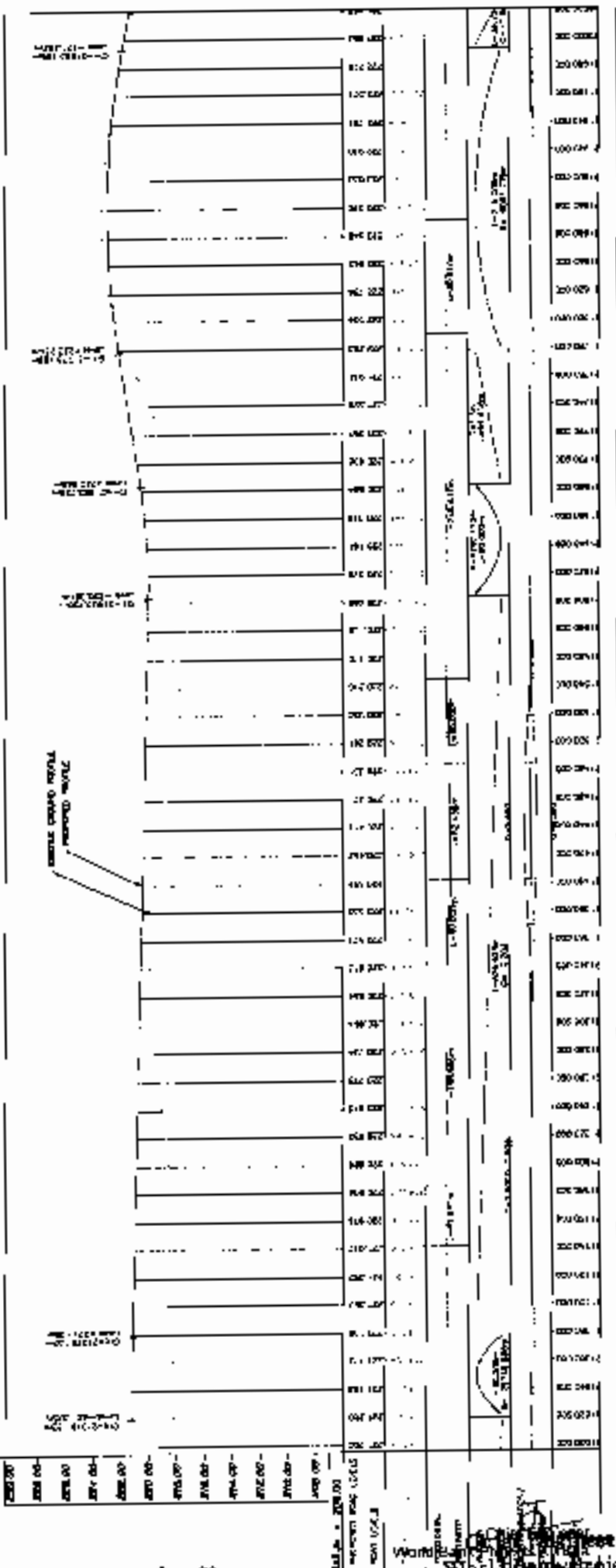
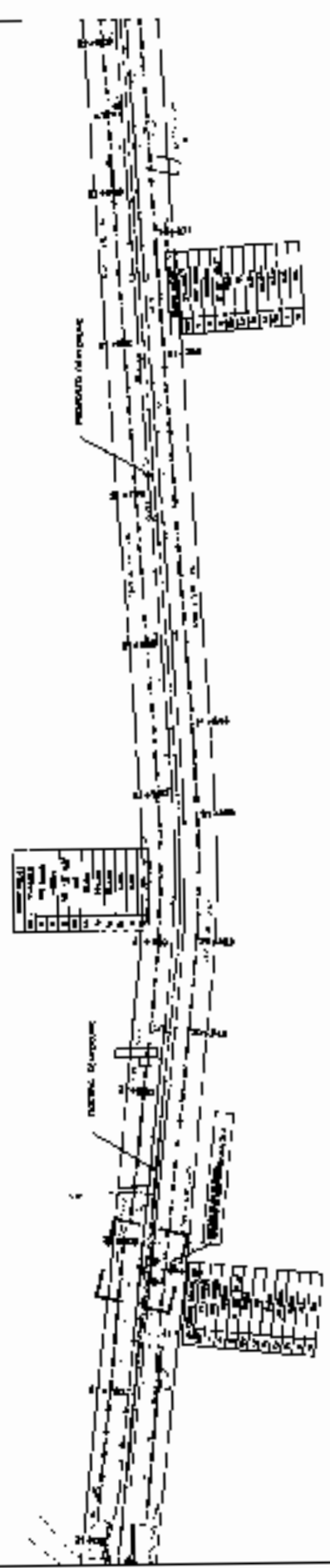
TO DRAWING



<p><b>LEGEND</b></p> <p>1. ...</p> <p>2. ...</p> <p>3. ...</p> <p>4. ...</p> <p>5. ...</p> <p>6. ...</p> <p>7. ...</p> <p>8. ...</p> <p>9. ...</p> <p>10. ...</p>		<p><b>PROJECT:</b></p> <p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE 1 ROAD FOR CR USA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>		<p><b>CONSULTING ENGINEERING GROUP LTD.</b></p> <p>112NAI ...</p> <p>112NAI ...</p> <p>112NAI ...</p>	
<p><b>WORKING AND DIMENSIONING TO TWO LANE</b></p> <p>PLAN AT 1:500 ORIGINAL SECTION</p> <p>DATE: 21/05/2000</p> <p>SCALE: 1:500</p> <p>PROJECT NO: ...</p> <p>DATE: ...</p> <p>SCALE: ...</p>		<p><b>PROJECT NO:</b> ...</p> <p><b>DATE:</b> ...</p> <p><b>SCALE:</b> ...</p>		<p><b>DATE:</b> ...</p> <p><b>SCALE:</b> ...</p>	

TO BANGALORE

TO MUMBAI



**LEGEND**

- 1. Proposed Road
- 2. Proposed Lanes
- 3. Proposed Pavement
- 4. Proposed Drainage
- 5. Proposed Utilities
- 6. Proposed Structures
- 7. Proposed Landmarks
- 8. Proposed Stationing
- 9. Proposed Elevation
- 10. Proposed Cross-section

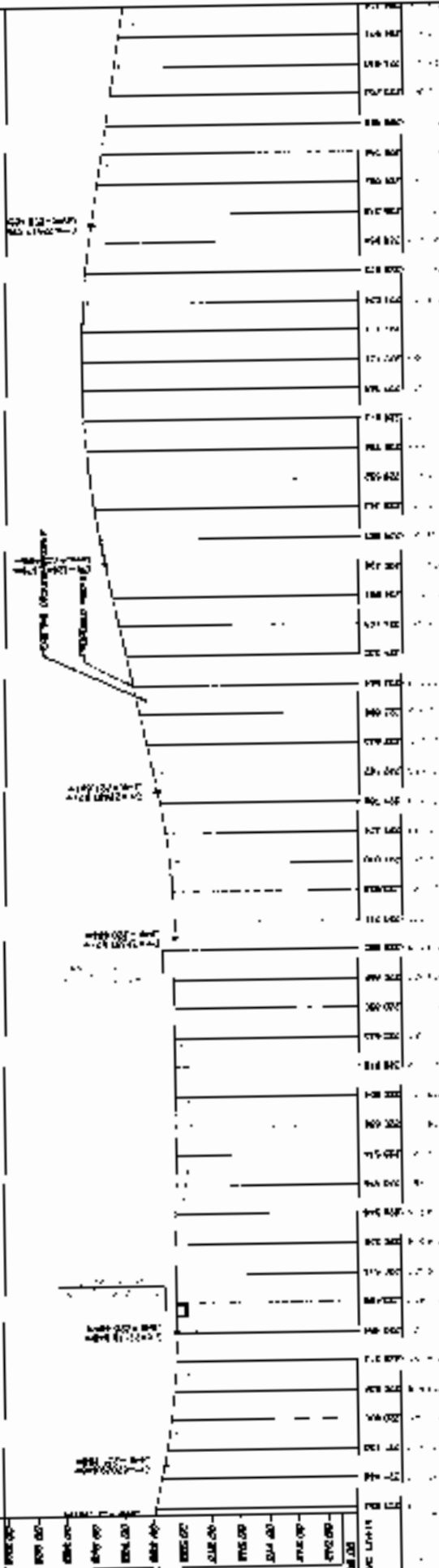
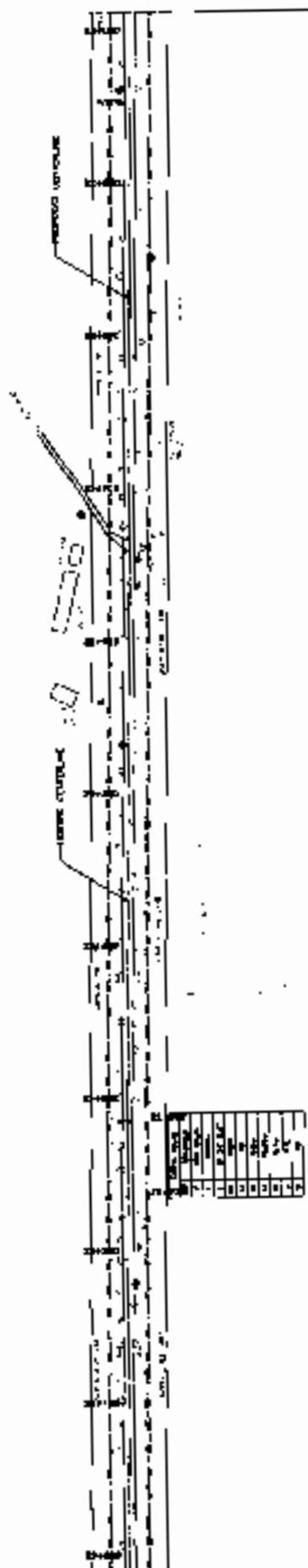
**PROJECT**  
**CONSULTING ENGINEERS GROUP LTD.**  
 11/11, Convent Road, Bangalore  
 Ph: 26111170, 26111171, 26111172, 26111173, 26111174

**PROJECT**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE II) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**PRELIMINARY AND STRONG OPINION NO TO TWO LANE PLAN, AND 1 CONSULTRIA SECTION (SH 'E) KM 21/000 TO KM 27/000**

DATE	NO.	REVISION
21/08/00	1	ISSUED FOR TENDER
21/08/00	2	ISSUED FOR TENDER
21/08/00	3	ISSUED FOR TENDER
21/08/00	4	ISSUED FOR TENDER
21/08/00	5	ISSUED FOR TENDER
21/08/00	6	ISSUED FOR TENDER
21/08/00	7	ISSUED FOR TENDER
21/08/00	8	ISSUED FOR TENDER
21/08/00	9	ISSUED FOR TENDER
21/08/00	10	ISSUED FOR TENDER

**PATEL AND ASS JV**  
**CONTRACTOR**



STATION	PROPOSED GRADE	EXISTING GRADE	FINISH GRADE
0+00	100.00	100.00	100.00
0+10	100.00	100.00	100.00
0+20	100.00	100.00	100.00
0+30	100.00	100.00	100.00
0+40	100.00	100.00	100.00
0+50	100.00	100.00	100.00
0+60	100.00	100.00	100.00
0+70	100.00	100.00	100.00
0+80	100.00	100.00	100.00
0+90	100.00	100.00	100.00
1+00	100.00	100.00	100.00

WORKING AND STRUCTURE TO TWO LANE  
 PLAN AND GEOMETRICAL SECTION  
 (S-15) KM 22/328 TD RN P/3/000

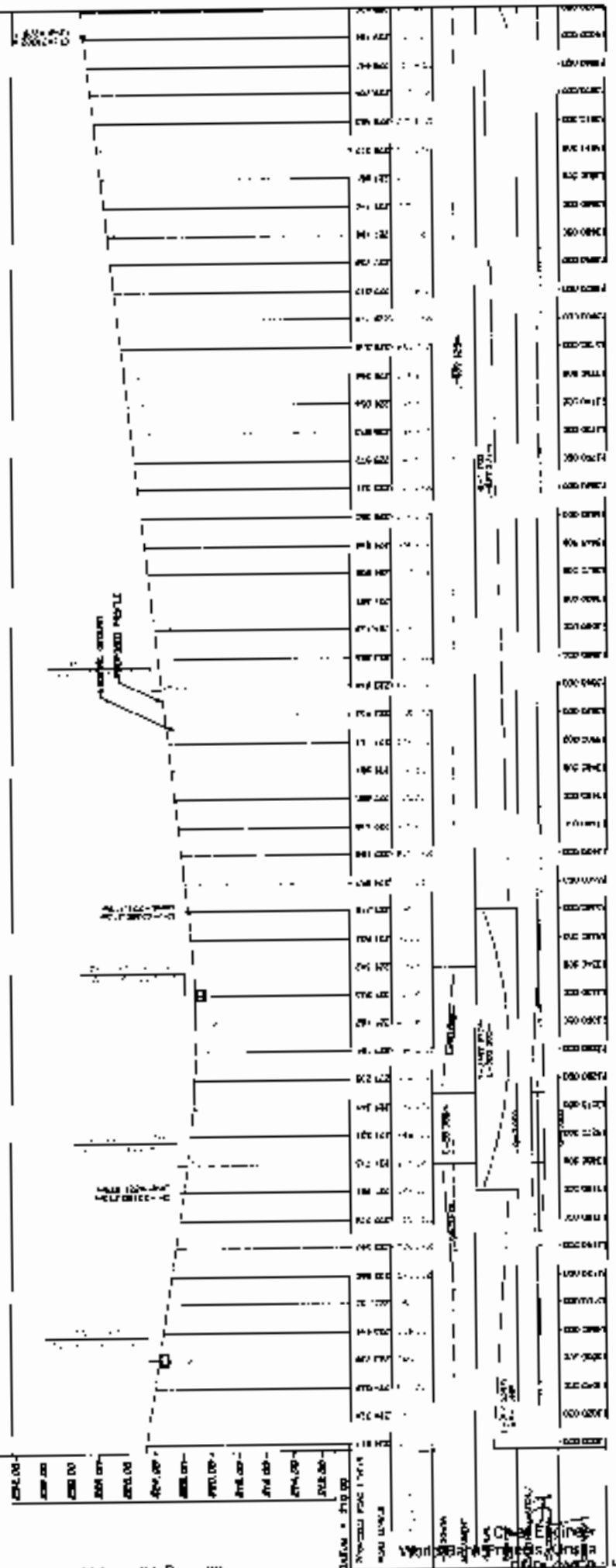
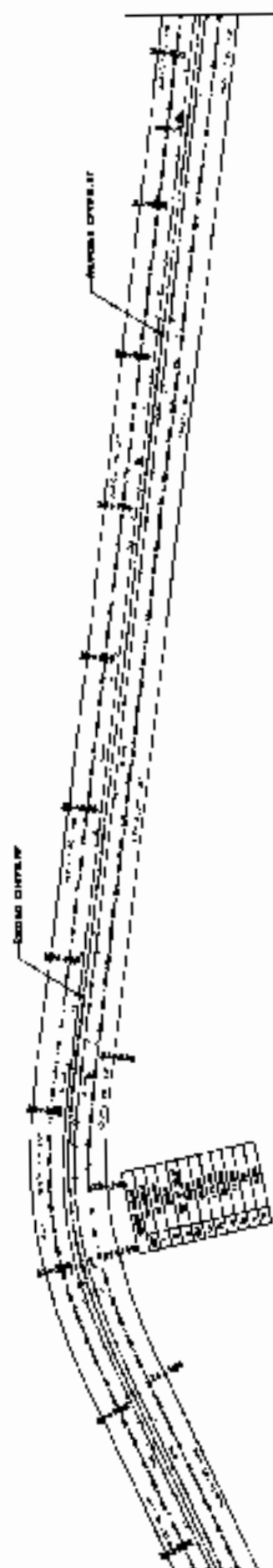
CONSULTING ENGINEERS  
 PATEL ARSS JV CONTRACTOR

PROJECT: ROADWAY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR CROSS STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DATE: 10/10/2010  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]

TO BE MAINTAINED

TO BE MAINTAINED



**CONSULTING ENGINEERS GROUP LTD.**  
 6-11/12, Gopalganj Road, Dhaka-1000  
 Tel: 955344, 955345, 955346

**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II, ROADS FOR DSRBA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**SECTION:**  
 ROAD AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (311-1B) KM 23/000 TO KM 24/000

**DATE:** 10/01/2011  
**SCALE:** 1:1000  
**PROJECT NO.:** 10/01/2011  
**SECTION NO.:** 311-1B





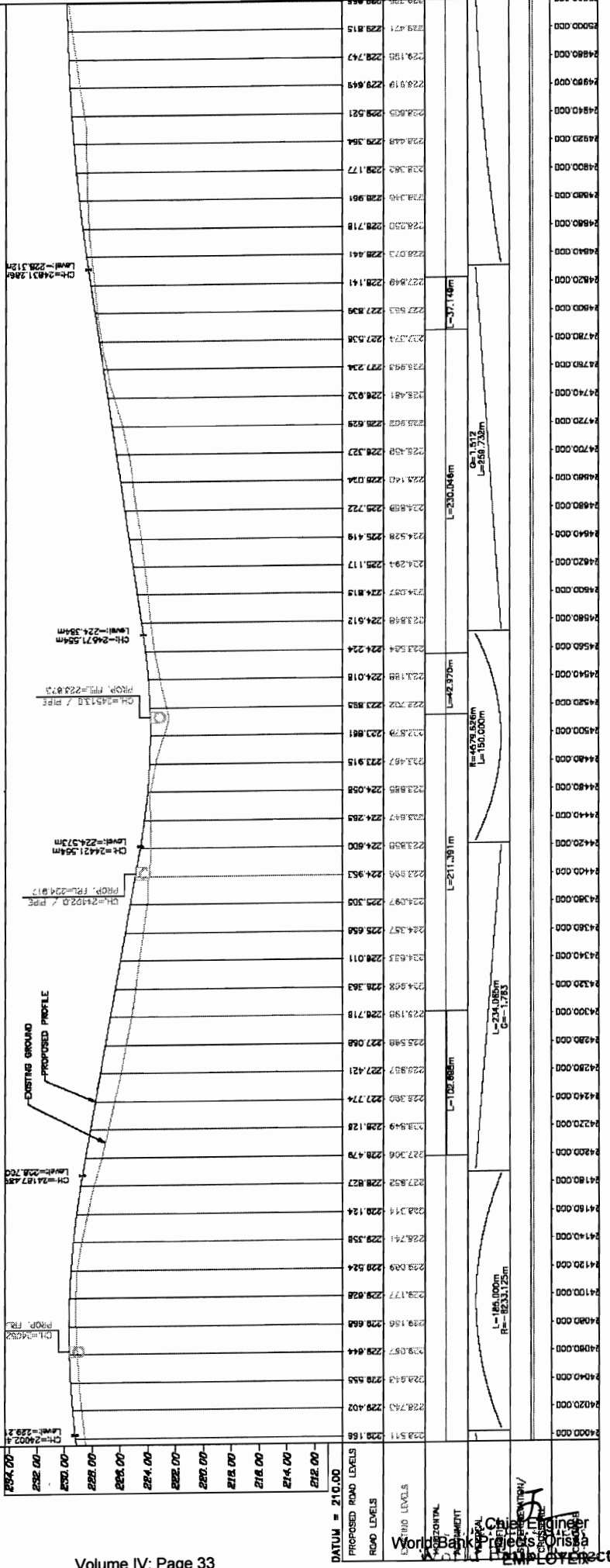
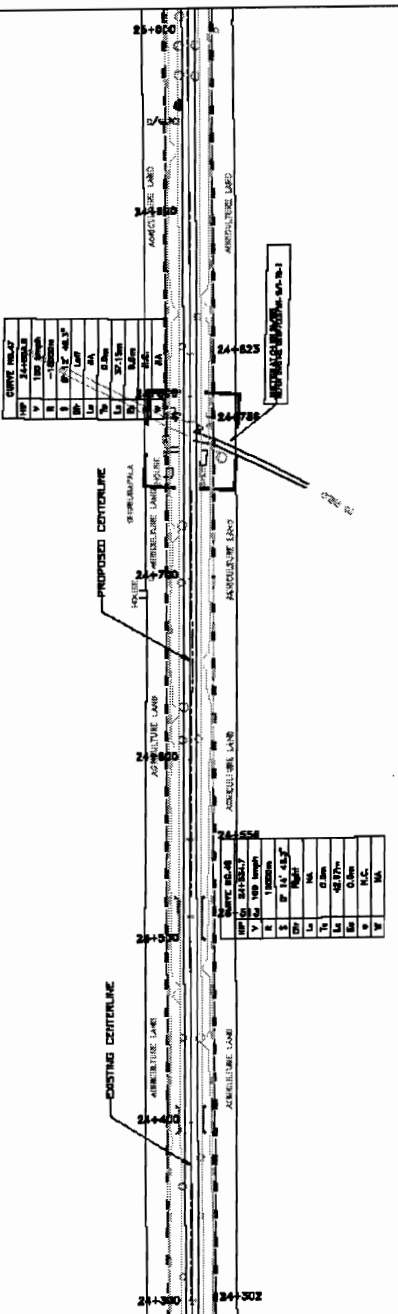
TO BHANSAPATNA

TO BHARUAR

CH	PC	PT	TA	SA	MA
1	2	3	4	5	6

CH	PC	PT	TA	SA	MA
1	2	3	4	5	6

CH	PC	PT	TA	SA	MA
1	2	3	4	5	6



STATION	PROPOSED ROAD LEVEL	EXISTING GROUND
200+00	228.16	228.16
200+10	228.40	228.40
200+20	228.64	228.64
200+30	228.88	228.88
200+40	229.12	229.12
200+50	229.36	229.36
200+60	229.60	229.60
200+70	229.84	229.84
200+80	230.08	230.08
200+90	230.32	230.32
201+00	230.56	230.56
201+10	230.80	230.80
201+20	231.04	231.04
201+30	231.28	231.28
201+40	231.52	231.52
201+50	231.76	231.76
201+60	232.00	232.00
201+70	232.24	232.24
201+80	232.48	232.48
201+90	232.72	232.72
202+00	232.96	232.96
202+10	233.20	233.20
202+20	233.44	233.44
202+30	233.68	233.68
202+40	233.92	233.92
202+50	234.16	234.16
202+60	234.40	234.40
202+70	234.64	234.64
202+80	234.88	234.88
202+90	235.12	235.12
203+00	235.36	235.36
203+10	235.60	235.60
203+20	235.84	235.84
203+30	236.08	236.08
203+40	236.32	236.32
203+50	236.56	236.56
203+60	236.80	236.80
203+70	237.04	237.04
203+80	237.28	237.28
203+90	237.52	237.52
204+00	237.76	237.76
204+10	238.00	238.00
204+20	238.24	238.24
204+30	238.48	238.48
204+40	238.72	238.72
204+50	238.96	238.96
204+60	239.20	239.20
204+70	239.44	239.44
204+80	239.68	239.68
204+90	239.92	239.92
205+00	240.16	240.16
205+10	240.40	240.40
205+20	240.64	240.64
205+30	240.88	240.88
205+40	241.12	241.12
205+50	241.36	241.36
205+60	241.60	241.60
205+70	241.84	241.84
205+80	242.08	242.08
205+90	242.32	242.32
206+00	242.56	242.56
206+10	242.80	242.80
206+20	243.04	243.04
206+30	243.28	243.28
206+40	243.52	243.52
206+50	243.76	243.76
206+60	244.00	244.00
206+70	244.24	244.24
206+80	244.48	244.48
206+90	244.72	244.72
207+00	244.96	244.96
207+10	245.20	245.20
207+20	245.44	245.44
207+30	245.68	245.68
207+40	245.92	245.92
207+50	246.16	246.16
207+60	246.40	246.40
207+70	246.64	246.64
207+80	246.88	246.88
207+90	247.12	247.12
208+00	247.36	247.36
208+10	247.60	247.60
208+20	247.84	247.84
208+30	248.08	248.08
208+40	248.32	248.32
208+50	248.56	248.56
208+60	248.80	248.80
208+70	249.04	249.04
208+80	249.28	249.28
208+90	249.52	249.52
209+00	249.76	249.76
209+10	250.00	250.00

**PROJECT:**  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-19 Jajaj Colony, Madhya Nagar, Jabalpur-47  
 Tel: 417-141, 2530895, 2531869, 2530556  
 Fax: 2521344, e-mail: ceg@cegroupindia.com

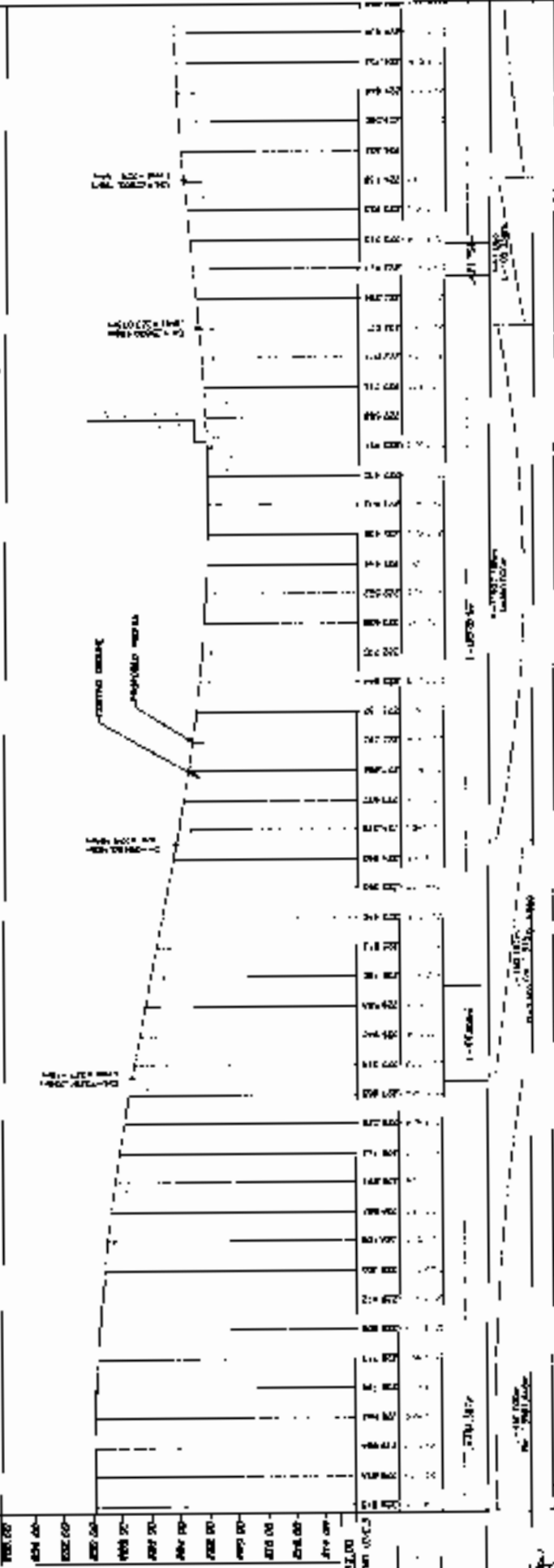
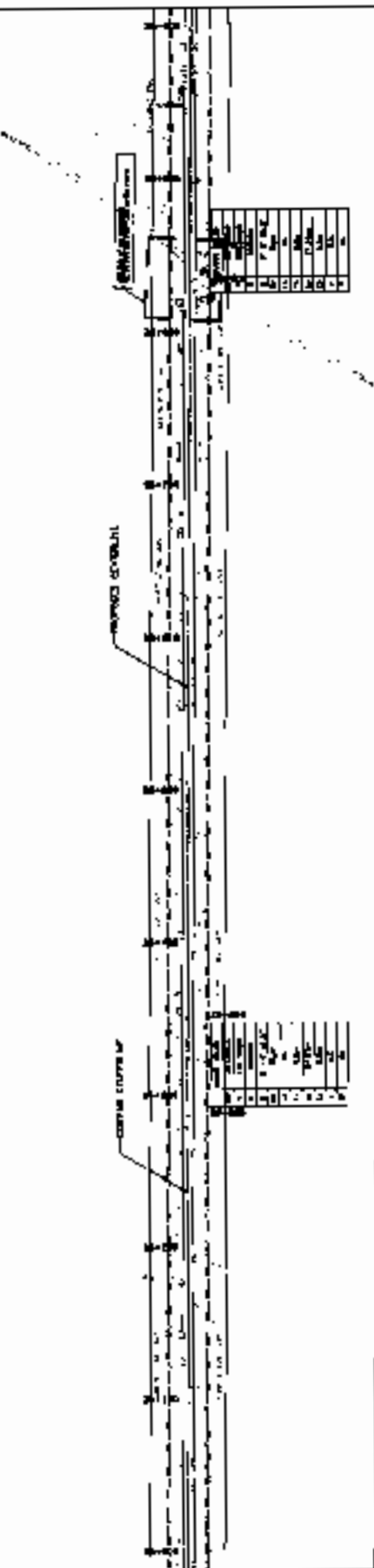
**LEGEND**

**WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 24/000 TO KM 25/000**

**PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

DATE: 23/05/2014  
 SCALE: HORIZONTAL: 1:1000, VERTICAL: 1:100

**ARSS Infrastructure**  
 RATEL ARSS JV  
 CONTRACTOR



STATION	ELEVATION
1+00	100.00
1+10	100.10
1+20	100.20
1+30	100.30
1+40	100.40
1+50	100.50
1+60	100.60
1+70	100.70
1+80	100.80
1+90	100.90
2+00	101.00



**CONSULTING ENGINEERS GROUP LTD.**  
 11100 Lakeshore Blvd. Suite 200  
 Willowood, OH 44094  
 Tel: 440.320.1234 Fax: 440.320.1235

**PROJECT:**  
 COMPLIANCE SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**PLAN AND LONGITUDINAL SECTION (SH 16) KM 25/000 TO 4/ 28/000**

DATE: 10/10/2010  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]

TO REVISION:

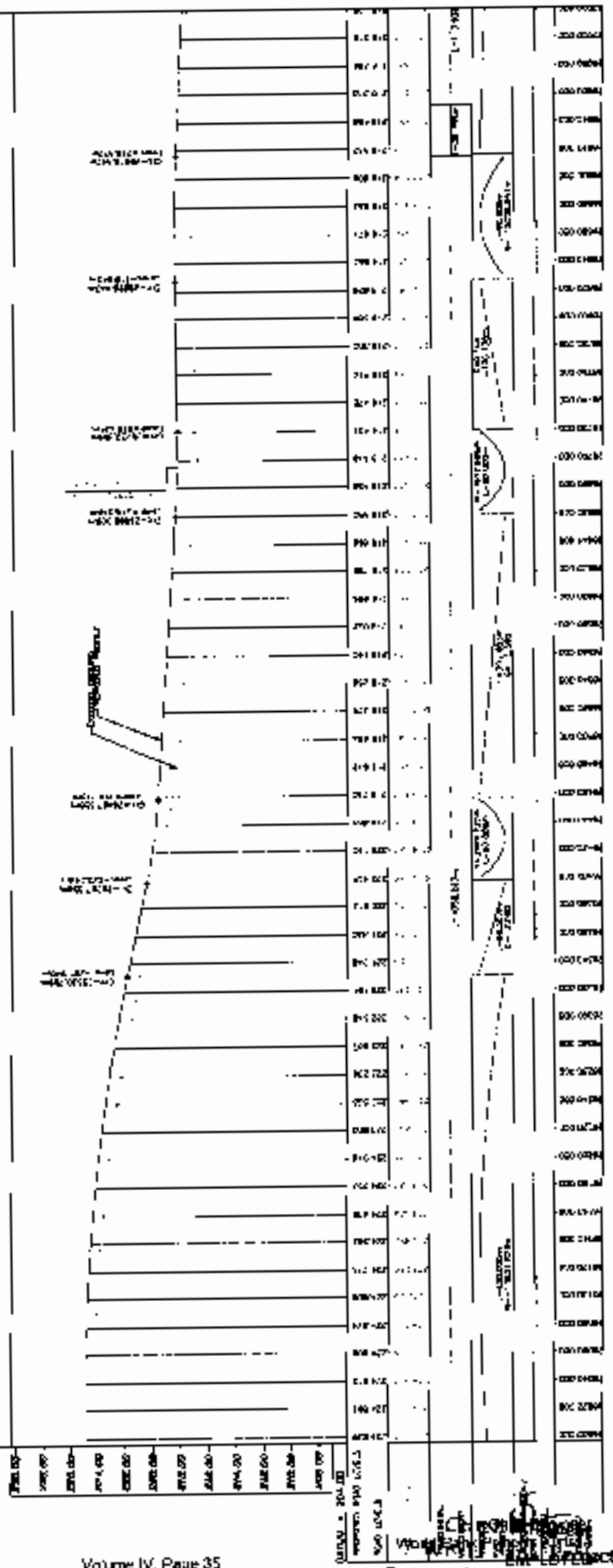
TO REVISION:

NO.	DESCRIPTION	DATE
1	ISSUED FOR PERMITS	10/20/11
2	ISSUED FOR BIDDING	11/15/11
3	ISSUED FOR CONSTRUCTION	12/15/11
4	ISSUED FOR AS-BUILT	01/15/12
5	ISSUED FOR FINAL	02/15/12
6	ISSUED FOR RECORD	03/15/12
7	ISSUED FOR ARCHIVE	04/15/12
8	ISSUED FOR CLOSURE	05/15/12
9	ISSUED FOR DEMOLITION	06/15/12
10	ISSUED FOR RECONSTRUCTION	07/15/12

ALIGNED CENTERLINE

CENTRAL CENTERLINE

PATEL ANS JV  
CONTRACTOR



**PROJECT:**  
 CONSULTANT 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.**  
 7/1, Gopal Chandra Road, Sector 1, Salt Lake, Kolkata - 700 064, India  
 Tel: 91-33-23341111, Fax: 91-33-23341112

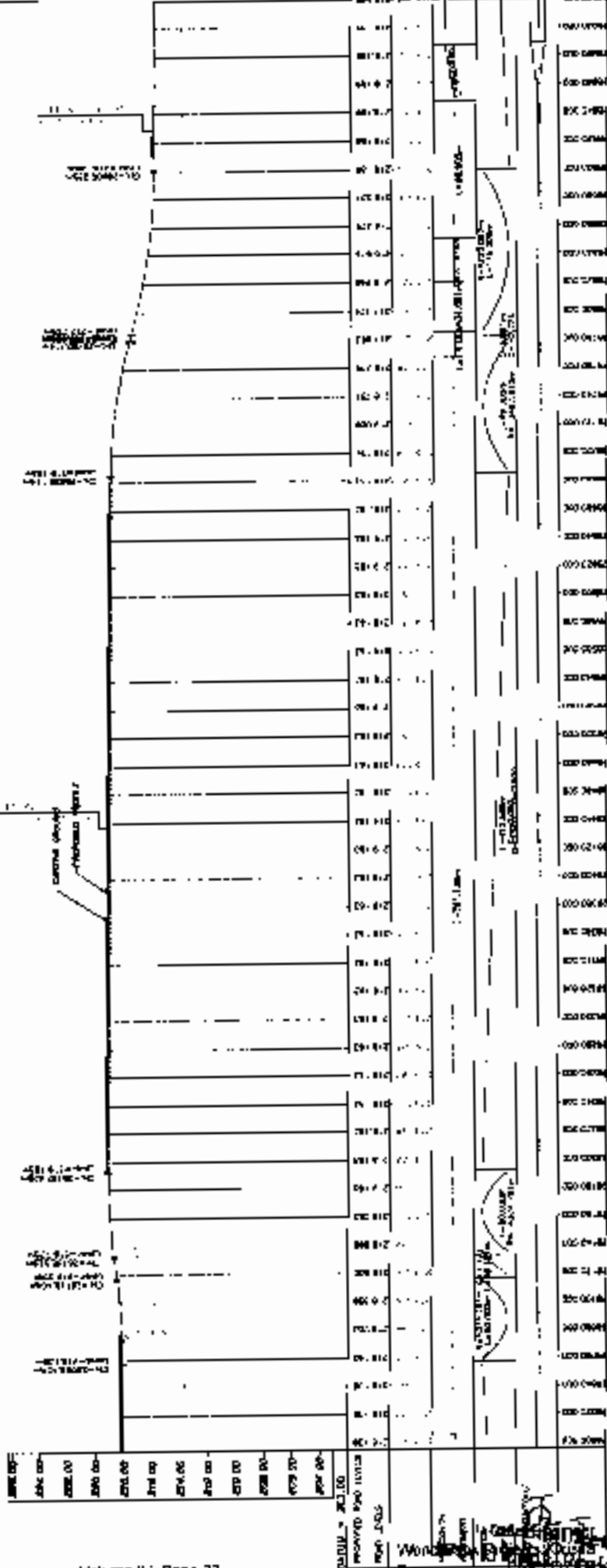
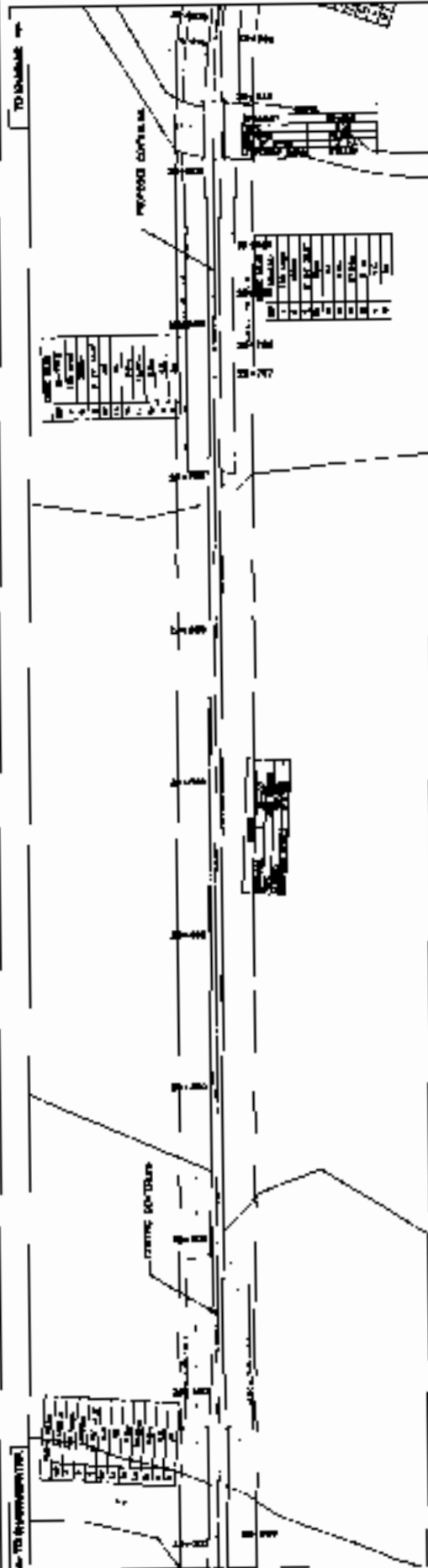
**LEGEND:**

1	Proposed 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
19	Proposed Road
20	Proposed Road
21	Proposed Road
22	Proposed Road
23	Proposed Road
24	Proposed Road
25	Proposed Road
26	Proposed Road
27	Proposed Road

**ROADING AND STRENGTHENING NO. 10 TWO LANE P.I.P.A. AND LONGITUDINAL SECTION (311-0)**  
 KM 28/000 TO KM 27/000

DR. B. C. (Civil) Oriya  
\*DR. B. C. (Civil) Oriya





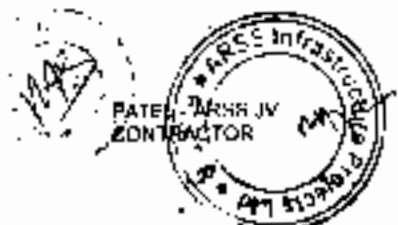
LEGEND

PROJECT: WOODLAND STRENGTHENING TO TRO LAKE  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE 1 ROAD FOR ILLINOIS STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DATE: 2010.08.10

REVISIONS:

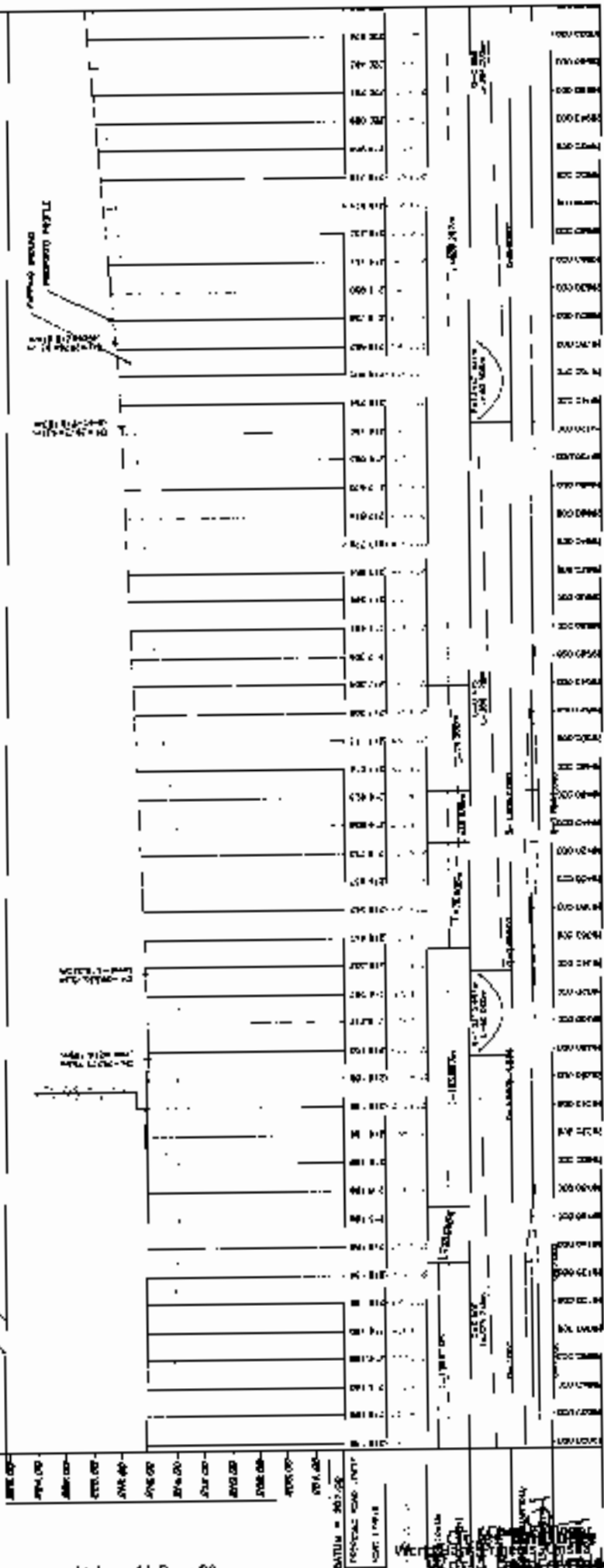
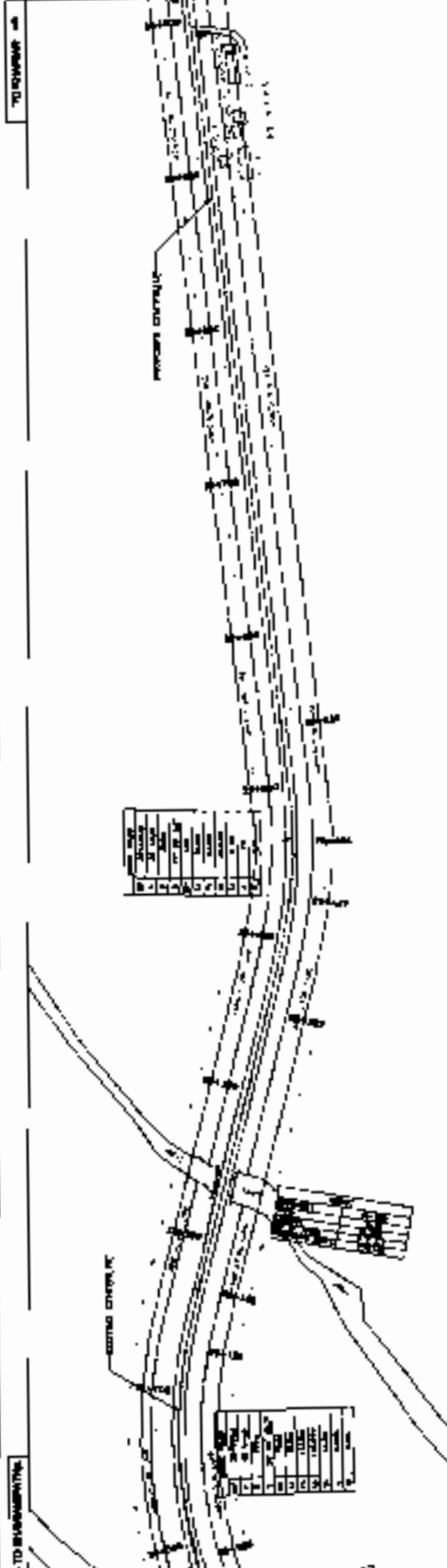
NO.	DATE	DESCRIPTION
1	2010.08.10	ISSUED FOR TENDER
2	2010.08.10	ISSUED FOR TENDER
3	2010.08.10	ISSUED FOR TENDER
4	2010.08.10	ISSUED FOR TENDER
5	2010.08.10	ISSUED FOR TENDER
6	2010.08.10	ISSUED FOR TENDER
7	2010.08.10	ISSUED FOR TENDER
8	2010.08.10	ISSUED FOR TENDER
9	2010.08.10	ISSUED FOR TENDER
10	2010.08.10	ISSUED FOR TENDER
11	2010.08.10	ISSUED FOR TENDER
12	2010.08.10	ISSUED FOR TENDER
13	2010.08.10	ISSUED FOR TENDER
14	2010.08.10	ISSUED FOR TENDER
15	2010.08.10	ISSUED FOR TENDER
16	2010.08.10	ISSUED FOR TENDER
17	2010.08.10	ISSUED FOR TENDER
18	2010.08.10	ISSUED FOR TENDER
19	2010.08.10	ISSUED FOR TENDER
20	2010.08.10	ISSUED FOR TENDER
21	2010.08.10	ISSUED FOR TENDER
22	2010.08.10	ISSUED FOR TENDER
23	2010.08.10	ISSUED FOR TENDER
24	2010.08.10	ISSUED FOR TENDER
25	2010.08.10	ISSUED FOR TENDER
26	2010.08.10	ISSUED FOR TENDER
27	2010.08.10	ISSUED FOR TENDER
28	2010.08.10	ISSUED FOR TENDER
29	2010.08.10	ISSUED FOR TENDER
30	2010.08.10	ISSUED FOR TENDER
31	2010.08.10	ISSUED FOR TENDER
32	2010.08.10	ISSUED FOR TENDER
33	2010.08.10	ISSUED FOR TENDER
34	2010.08.10	ISSUED FOR TENDER
35	2010.08.10	ISSUED FOR TENDER
36	2010.08.10	ISSUED FOR TENDER
37	2010.08.10	ISSUED FOR TENDER
38	2010.08.10	ISSUED FOR TENDER
39	2010.08.10	ISSUED FOR TENDER
40	2010.08.10	ISSUED FOR TENDER
41	2010.08.10	ISSUED FOR TENDER
42	2010.08.10	ISSUED FOR TENDER
43	2010.08.10	ISSUED FOR TENDER
44	2010.08.10	ISSUED FOR TENDER
45	2010.08.10	ISSUED FOR TENDER
46	2010.08.10	ISSUED FOR TENDER
47	2010.08.10	ISSUED FOR TENDER
48	2010.08.10	ISSUED FOR TENDER
49	2010.08.10	ISSUED FOR TENDER
50	2010.08.10	ISSUED FOR TENDER
51	2010.08.10	ISSUED FOR TENDER
52	2010.08.10	ISSUED FOR TENDER
53	2010.08.10	ISSUED FOR TENDER
54	2010.08.10	ISSUED FOR TENDER
55	2010.08.10	ISSUED FOR TENDER
56	2010.08.10	ISSUED FOR TENDER
57	2010.08.10	ISSUED FOR TENDER
58	2010.08.10	ISSUED FOR TENDER
59	2010.08.10	ISSUED FOR TENDER
60	2010.08.10	ISSUED FOR TENDER
61	2010.08.10	ISSUED FOR TENDER
62	2010.08.10	ISSUED FOR TENDER
63	2010.08.10	ISSUED FOR TENDER
64	2010.08.10	ISSUED FOR TENDER
65	2010.08.10	ISSUED FOR TENDER
66	2010.08.10	ISSUED FOR TENDER
67	2010.08.10	ISSUED FOR TENDER
68	2010.08.10	ISSUED FOR TENDER
69	2010.08.10	ISSUED FOR TENDER
70	2010.08.10	ISSUED FOR TENDER
71	2010.08.10	ISSUED FOR TENDER
72	2010.08.10	ISSUED FOR TENDER
73	2010.08.10	ISSUED FOR TENDER
74	2010.08.10	ISSUED FOR TENDER
75	2010.08.10	ISSUED FOR TENDER
76	2010.08.10	ISSUED FOR TENDER
77	2010.08.10	ISSUED FOR TENDER
78	2010.08.10	ISSUED FOR TENDER
79	2010.08.10	ISSUED FOR TENDER
80	2010.08.10	ISSUED FOR TENDER
81	2010.08.10	ISSUED FOR TENDER
82	2010.08.10	ISSUED FOR TENDER
83	2010.08.10	ISSUED FOR TENDER
84	2010.08.10	ISSUED FOR TENDER
85	2010.08.10	ISSUED FOR TENDER
86	2010.08.10	ISSUED FOR TENDER
87	2010.08.10	ISSUED FOR TENDER
88	2010.08.10	ISSUED FOR TENDER
89	2010.08.10	ISSUED FOR TENDER
90	2010.08.10	ISSUED FOR TENDER
91	2010.08.10	ISSUED FOR TENDER
92	2010.08.10	ISSUED FOR TENDER
93	2010.08.10	ISSUED FOR TENDER
94	2010.08.10	ISSUED FOR TENDER
95	2010.08.10	ISSUED FOR TENDER
96	2010.08.10	ISSUED FOR TENDER
97	2010.08.10	ISSUED FOR TENDER
98	2010.08.10	ISSUED FOR TENDER
99	2010.08.10	ISSUED FOR TENDER
100	2010.08.10	ISSUED FOR TENDER



WOODLAND STRENGTHENING TO TRO LAKE  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE 1 ROAD FOR ILLINOIS STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DATE: 2010.08.10

REVISIONS:



STATION	EXISTING GROUND (M)	PROPOSED ROAD (M)	ROAD WIDTH (M)	ROAD CENTERLINE (M)	ROAD EDGE (M)
0+00	115.00	115.00	12.00	0+00	0+00
0+10	115.00	115.00	12.00	0+10	0+10
0+20	115.00	115.00	12.00	0+20	0+20
0+30	115.00	115.00	12.00	0+30	0+30
0+40	115.00	115.00	12.00	0+40	0+40
0+50	115.00	115.00	12.00	0+50	0+50
0+60	115.00	115.00	12.00	0+60	0+60
0+70	115.00	115.00	12.00	0+70	0+70
0+80	115.00	115.00	12.00	0+80	0+80
0+90	115.00	115.00	12.00	0+90	0+90
1+00	115.00	115.00	12.00	1+00	1+00

TO BANGKOK

TO BANGKOK

DATE: 17/11/2010

PROJECT: HOTEL - ARSIS JV CONTRACTOR

Volume IV, Page 38

PROJECT: UPGRADE AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 18/000 TC KM 30/000

CONSULTING ENGINEERS GROUP LTD.

12/11/2010

PROJECT: UPGRADE AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 18/000 TC KM 30/000

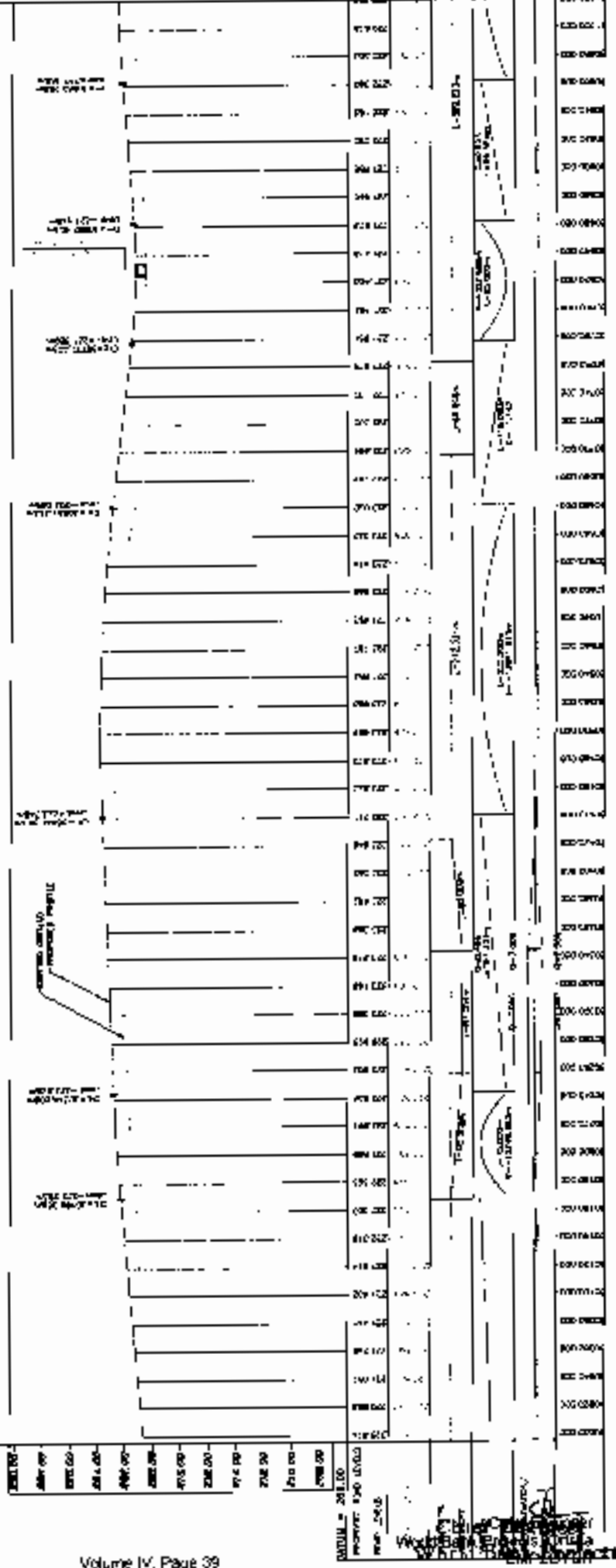
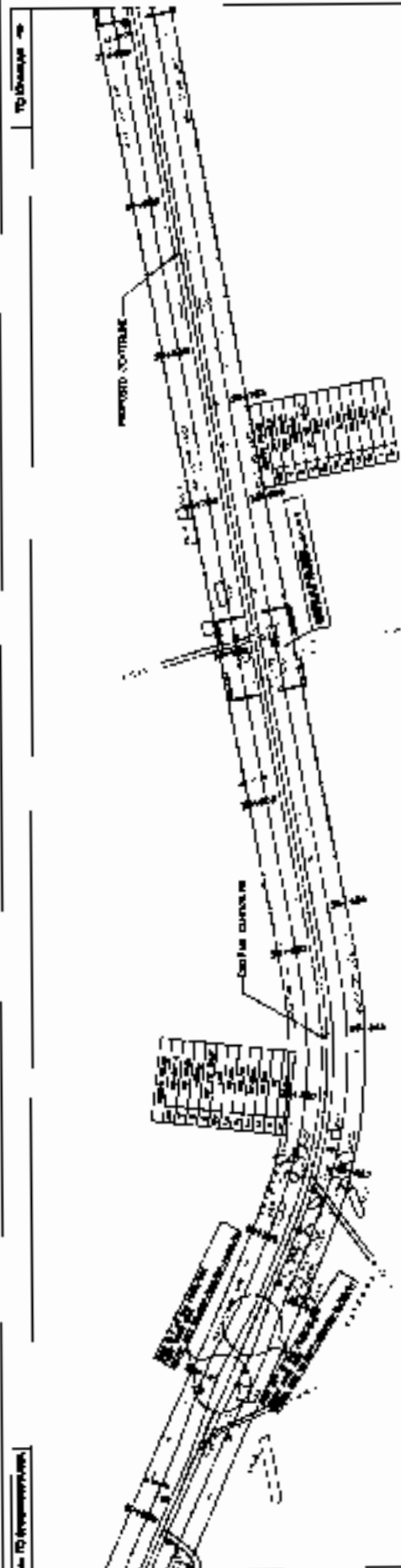
CONSULTING ENGINEERS GROUP LTD.

12/11/2010

PROJECT: UPGRADE AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 18/000 TC KM 30/000

CONSULTING ENGINEERS GROUP LTD.

12/11/2010



**CONSULTING ENGINEERS GROUP LTD.**  
 6-173 and 174, Sector 14, Gurgaon, Haryana  
 Tel: 0129-4252221, 4252222, 4252223  
 Fax: 0129-4252224, 4252225, 4252226

**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR ORISSA STATE ROAD PROJECT UNDER THROLD BANK AND STAGE

**PLAN AND LONGITUDINAL SECTION (311-10) KM 30/000 TO KM 31/000**

**SCALE:**  
 HORIZONTAL: 1:1000  
 VERTICAL: 1:500

**DATE:** 10/01/2010

**BY:** [Signature]

**CHECKED BY:** [Signature]

**APPROVED BY:** [Signature]

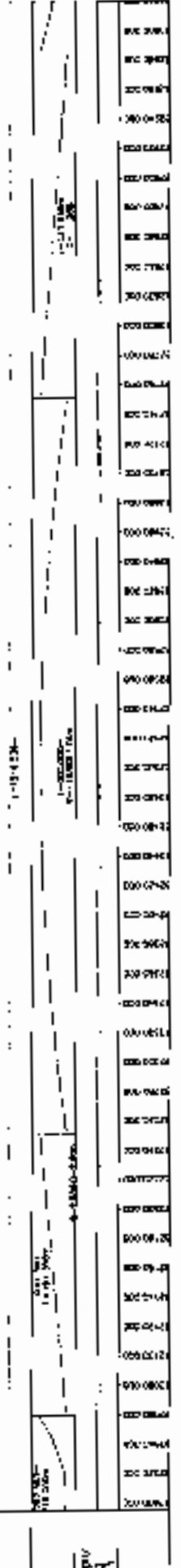
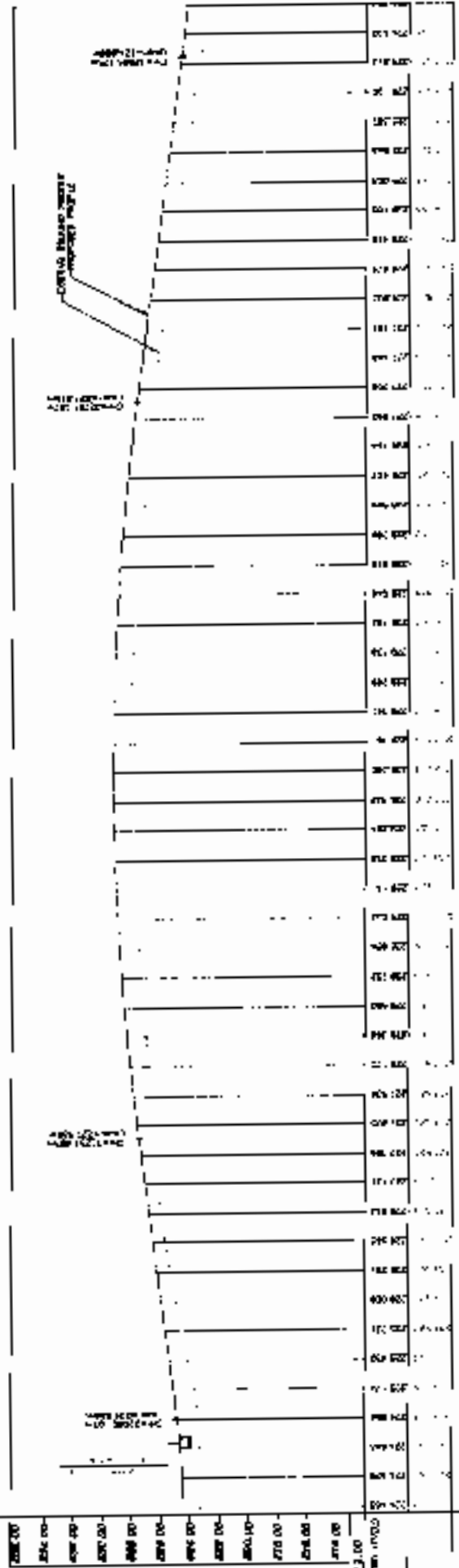
**PATEL - ARBSS JV**  
**CONTRACTOR**





TO BE MAINTAINED

TO BE MAINTAINED



STATION	ELEVATION (FEET)
208+00	212.00
208+20	212.00
208+40	212.00
208+60	212.00
208+80	212.00
209+00	212.00
209+20	212.00
209+40	212.00
209+60	212.00
210+00	212.00
210+20	212.00
210+40	212.00
210+60	212.00
211+00	212.00
211+20	212.00
211+40	212.00
211+60	212.00
212+00	212.00
212+20	212.00
212+40	212.00
212+60	212.00
213+00	212.00
213+20	212.00
213+40	212.00
213+60	212.00
214+00	212.00
214+20	212.00
214+40	212.00
214+60	212.00
215+00	212.00
215+20	212.00
215+40	212.00
215+60	212.00
216+00	212.00
216+20	212.00
216+40	212.00
216+60	212.00
217+00	212.00
217+20	212.00
217+40	212.00
217+60	212.00
218+00	212.00
218+20	212.00
218+40	212.00
218+60	212.00
219+00	212.00
219+20	212.00
219+40	212.00
219+60	212.00
220+00	212.00
220+20	212.00
220+40	212.00
220+60	212.00
221+00	212.00
221+20	212.00
221+40	212.00
221+60	212.00
222+00	212.00
222+20	212.00
222+40	212.00
222+60	212.00
223+00	212.00
223+20	212.00
223+40	212.00
223+60	212.00
224+00	212.00
224+20	212.00
224+40	212.00
224+60	212.00
225+00	212.00
225+20	212.00
225+40	212.00
225+60	212.00
226+00	212.00
226+20	212.00
226+40	212.00
226+60	212.00
227+00	212.00
227+20	212.00
227+40	212.00
227+60	212.00
228+00	212.00
228+20	212.00
228+40	212.00
228+60	212.00
229+00	212.00
229+20	212.00
229+40	212.00
229+60	212.00
230+00	212.00
230+20	212.00
230+40	212.00
230+60	212.00
231+00	212.00
231+20	212.00
231+40	212.00
231+60	212.00
232+00	212.00
232+20	212.00
232+40	212.00
232+60	212.00
233+00	212.00
233+20	212.00
233+40	212.00
233+60	212.00
234+00	212.00
234+20	212.00
234+40	212.00
234+60	212.00
235+00	212.00
235+20	212.00
235+40	212.00
235+60	212.00
236+00	212.00
236+20	212.00
236+40	212.00
236+60	212.00
237+00	212.00
237+20	212.00
237+40	212.00
237+60	212.00
238+00	212.00
238+20	212.00
238+40	212.00
238+60	212.00
239+00	212.00
239+20	212.00
239+40	212.00
239+60	212.00
240+00	212.00
240+20	212.00
240+40	212.00
240+60	212.00
241+00	212.00
241+20	212.00
241+40	212.00
241+60	212.00
242+00	212.00
242+20	212.00
242+40	212.00
242+60	212.00
243+00	212.00
243+20	212.00
243+40	212.00
243+60	212.00
244+00	212.00
244+20	212.00
244+40	212.00
244+60	212.00
245+00	212.00
245+20	212.00
245+40	212.00
245+60	212.00
246+00	212.00
246+20	212.00
246+40	212.00
246+60	212.00
247+00	212.00
247+20	212.00
247+40	212.00
247+60	212.00
248+00	212.00
248+20	212.00
248+40	212.00
248+60	212.00
249+00	212.00
249+20	212.00
249+40	212.00
249+60	212.00
250+00	212.00
250+20	212.00
250+40	212.00
250+60	212.00
251+00	212.00
251+20	212.00
251+40	212.00
251+60	212.00
252+00	212.00
252+20	212.00
252+40	212.00
252+60	212.00
253+00	212.00
253+20	212.00
253+40	212.00
253+60	212.00
254+00	212.00
254+20	212.00
254+40	212.00
254+60	212.00
255+00	212.00
255+20	212.00
255+40	212.00
255+60	212.00
256+00	212.00
256+20	212.00
256+40	212.00
256+60	212.00
257+00	212.00
257+20	212.00
257+40	212.00
257+60	212.00
258+00	212.00
258+20	212.00
258+40	212.00
258+60	212.00
259+00	212.00
259+20	212.00
259+40	212.00
259+60	212.00
260+00	212.00
260+20	212.00
260+40	212.00
260+60	212.00
261+00	212.00
261+20	212.00
261+40	212.00
261+60	212.00
262+00	212.00
262+20	212.00
262+40	212.00
262+60	212.00
263+00	212.00
263+20	212.00
263+40	212.00
263+60	212.00
264+00	212.00
264+20	212.00
264+40	212.00
264+60	212.00
265+00	212.00
265+20	212.00
265+40	212.00
265+60	212.00
266+00	212.00
266+20	212.00
266+40	212.00
266+60	212.00
267+00	212.00
267+20	212.00
267+40	212.00
267+60	212.00
268+00	212.00
268+20	212.00
268+40	212.00
268+60	212.00
269+00	212.00
269+20	212.00
269+40	212.00
269+60	212.00
270+00	212.00
270+20	212.00
270+40	212.00
270+60	212.00
271+00	212.00
271+20	212.00
271+40	212.00
271+60	212.00
272+00	212.00
272+20	212.00
272+40	212.00
272+60	212.00
273+00	212.00
273+20	212.00
273+40	212.00
273+60	212.00
274+00	212.00
274+20	212.00
274+40	212.00
274+60	212.00
275+00	212.00
275+20	212.00
275+40	212.00
275+60	212.00
276+00	212.00
276+20	212.00
276+40	212.00
276+60	212.00
277+00	212.00
277+20	212.00
277+40	212.00
277+60	212.00
278+00	212.00
278+20	212.00
278+40	212.00
278+60	212.00
279+00	212.00
279+20	212.00
279+40	212.00
279+60	212.00
280+00	212.00
280+20	212.00
280+40	212.00
280+60	212.00
281+00	212.00
281+20	212.00
281+40	212.00
281+60	212.00
282+00	212.00
282+20	212.00
282+40	212.00
282+60	212.00
283+00	212.00
283+20	212.00
283+40	212.00
283+60	212.00
284+00	212.00
284+20	212.00
284+40	212.00
284+60	212.00
285+00	212.00
285+20	212.00
285+40	212.00
285+60	212.00
286+00	212.00
286+20	212.00
286+40	212.00
286+60	212.00
287+00	212.00
287+20	212.00
287+40	212.00
287+60	212.00
288+00	212.00
288+20	212.00
288+40	212.00
288+60	212.00
289+00	212.00
289+20	212.00
289+40	212.00
289+60	212.00
290+00	212.00
290+20	212.00
290+40	212.00
290+60	212.00
291+00	212.00
291+20	212.00
291+40	212.00
291+60	212.00
292+00	212.00
292+20	212.00
292+40	212.00
292+60	212.00
293+00	212.00
293+20	212.00
293+40	212.00
293+60	212.00
294+00	212.00
294+20	212.00
294+40	212.00
294+60	212.00
295+00	212.00
295+20	212.00
295+40	212.00
295+60	212.00
296+00	212.00
296+20	212.00
296+40	212.00
296+60	212.00
297+00	212.00
297+20	212.00
297+40	212.00
297+60	212.00
298+00	212.00
298+20	212.00
298+40	212.00
298+60	212.00
299+00	212.00
299+20	212.00
299+40	212.00
299+60	212.00
300+00	212.00



DATE: 2/13/00  
 PROJECT: **WORLD BANK ASSISTANCE UNDER WORLD BANK ASSISTANCE**  
 SHEET NO.: 41  
 TOTAL SHEETS: 41

**CONSULTING ENGINEERS GROUP LTD.**  
 11315 Wilshire Blvd, Suite 1100  
 Los Angeles, CA 90024  
 Tel: 310.201.2200  
 Fax: 310.201.2201

**CEG**

**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR DRAMA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

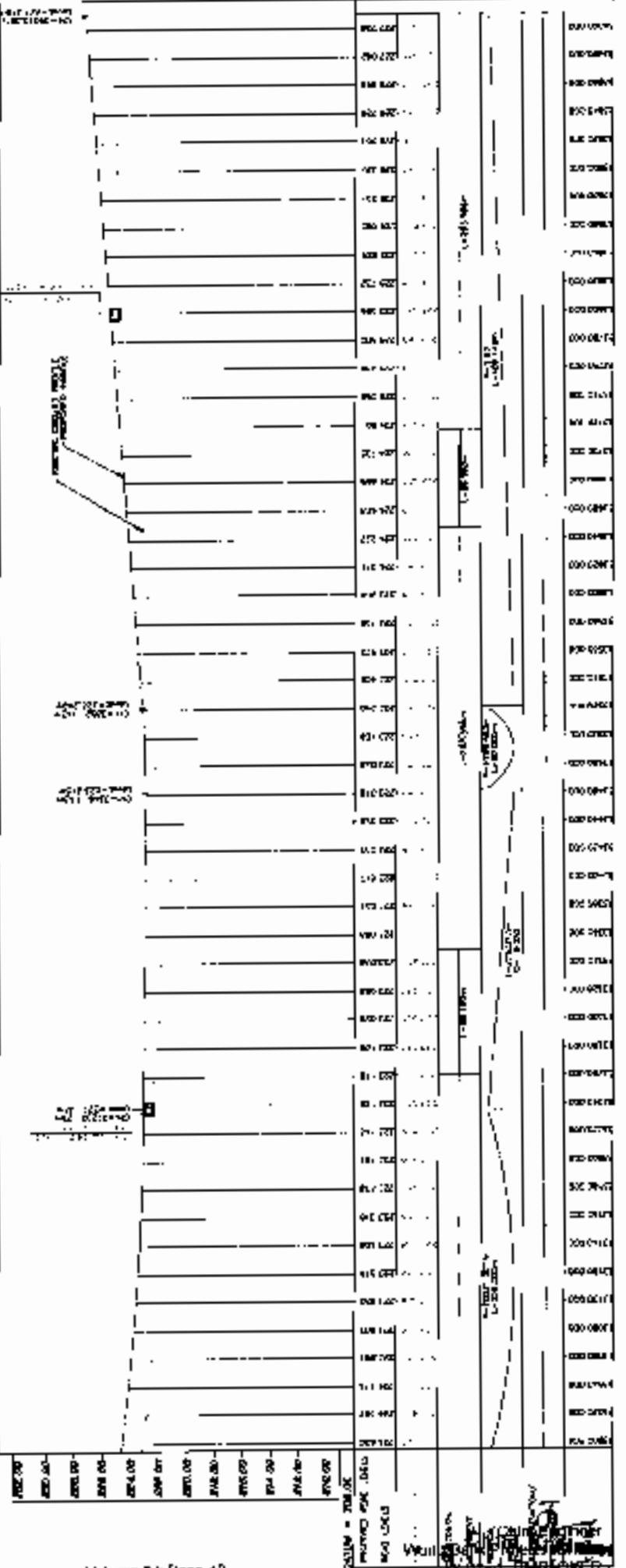
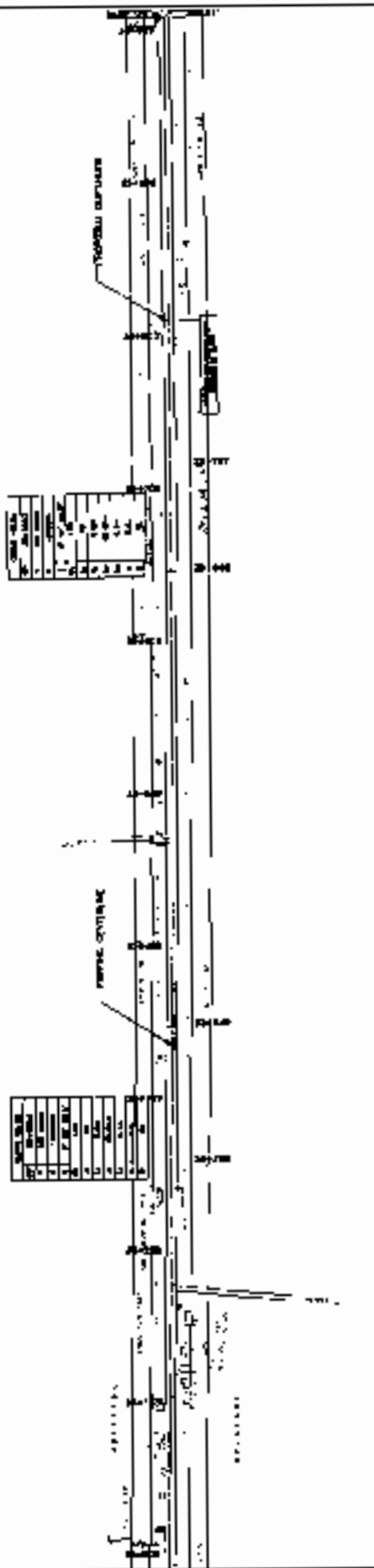
**PLAN AT C - C (CITY) DUAL SECTION (9+15) KM 32.735 TO KM 33.000**

SCALE: 1:1000

OK for Civil Origin

TO BRIDGE

TO BRIDGE



STATION	PROPOSED GRADE (ft)	EXISTING GROUND (ft)	DEPTH (ft)	WIDTH (ft)	AREA (sq ft)	VOLUME (cu yd)
0+00	100.00	100.00	0.00	12.00	0.00	0.00
0+10	100.50	100.50	0.00	12.00	0.00	0.00
0+20	101.00	101.00	0.00	12.00	0.00	0.00
0+30	101.50	101.50	0.00	12.00	0.00	0.00
0+40	102.00	102.00	0.00	12.00	0.00	0.00
0+50	102.50	102.50	0.00	12.00	0.00	0.00
0+60	103.00	103.00	0.00	12.00	0.00	0.00
0+70	103.50	103.50	0.00	12.00	0.00	0.00
0+80	104.00	104.00	0.00	12.00	0.00	0.00
0+90	104.50	104.50	0.00	12.00	0.00	0.00
1+00	105.00	105.00	0.00	12.00	0.00	0.00

**PATEL - ARSS JV**  
**CONTRACTOR**

Office of the E.I.C. (Civil) Office  
 State of Michigan

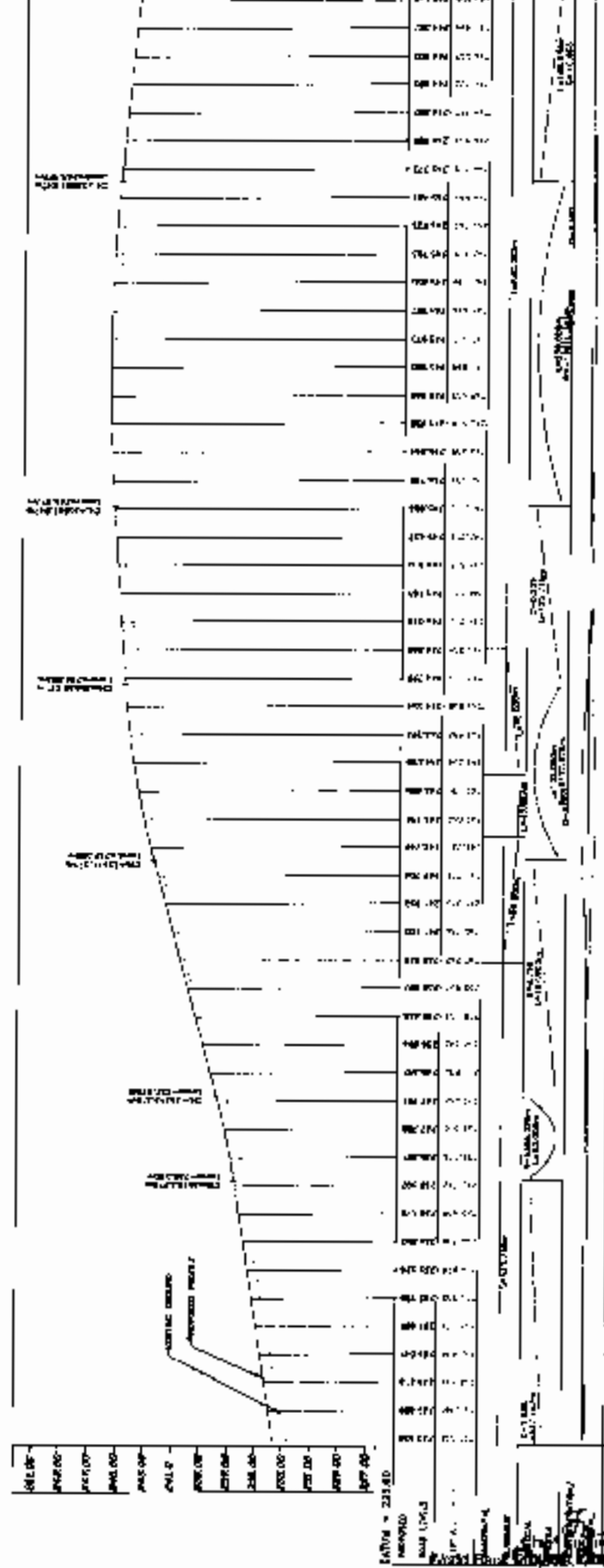
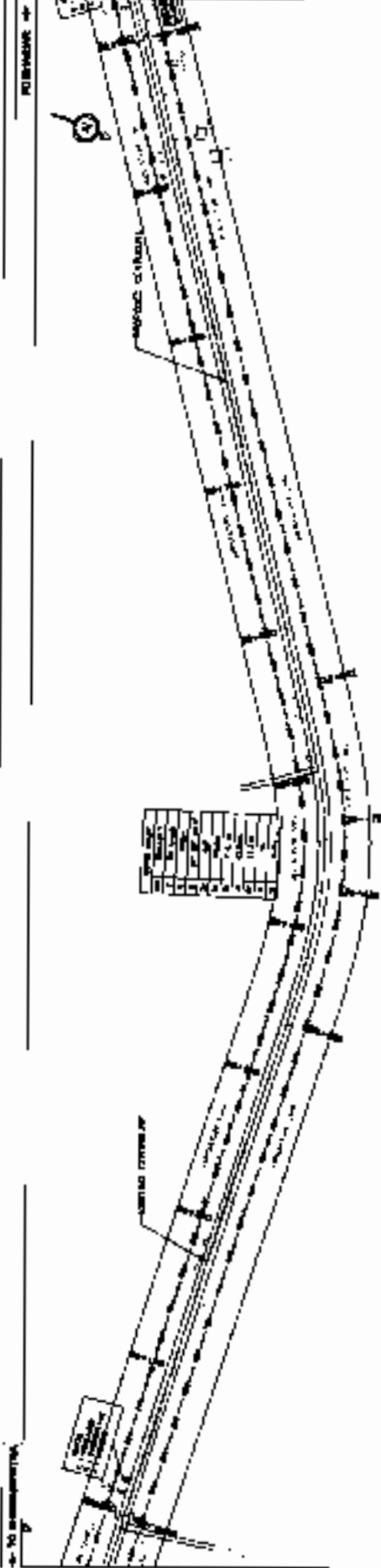
**WORKING AND STRENGTHENING TO TWO LANE  
 PLAY AND LONGTUNING S-C 104  
 (5+16) CM 33/100 TO MN 39/000**

**PROJECT -  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE II ROADWAY FOR CONCRETE STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE**

**COMULTIMO  
 ENGINEERING GROUP LTD.  
 11/11/11, 11/11/11, 11/11/11, 11/11/11  
 11/11/11, 11/11/11, 11/11/11, 11/11/11**

**LEGEND**  
 1. Proposed Roadway Profile  
 2. Existing Ground Profile  
 3. Proposed Grades  
 4. Proposed Roadway Width  
 5. Proposed Roadway Depth





STATION	ELEVATION	DESCRIPTION
0+00	100.00	START OF ROAD
0+10	100.50	ROAD PROFILE
0+20	101.00	ROAD PROFILE
0+30	101.50	ROAD PROFILE
0+40	102.00	ROAD PROFILE
0+50	102.50	ROAD PROFILE
0+60	103.00	ROAD PROFILE
0+70	103.50	ROAD PROFILE
0+80	104.00	ROAD PROFILE
0+90	104.50	ROAD PROFILE
1+00	105.00	ROAD PROFILE
1+10	105.50	ROAD PROFILE
1+20	106.00	ROAD PROFILE
1+30	106.50	ROAD PROFILE
1+40	107.00	ROAD PROFILE
1+50	107.50	ROAD PROFILE
1+60	108.00	ROAD PROFILE
1+70	108.50	ROAD PROFILE
1+80	109.00	ROAD PROFILE
1+90	109.50	ROAD PROFILE
2+00	110.00	ROAD PROFILE
2+10	110.50	ROAD PROFILE
2+20	111.00	ROAD PROFILE
2+30	111.50	ROAD PROFILE
2+40	112.00	ROAD PROFILE
2+50	112.50	ROAD PROFILE
2+60	113.00	ROAD PROFILE
2+70	113.50	ROAD PROFILE
2+80	114.00	ROAD PROFILE
2+90	114.50	ROAD PROFILE
3+00	115.00	ROAD PROFILE
3+10	115.50	ROAD PROFILE
3+20	116.00	ROAD PROFILE
3+30	116.50	ROAD PROFILE
3+40	117.00	ROAD PROFILE
3+50	117.50	ROAD PROFILE
3+60	118.00	ROAD PROFILE
3+70	118.50	ROAD PROFILE
3+80	119.00	ROAD PROFILE
3+90	119.50	ROAD PROFILE
4+00	120.00	ROAD PROFILE
4+10	120.50	ROAD PROFILE
4+20	121.00	ROAD PROFILE
4+30	121.50	ROAD PROFILE
4+40	122.00	ROAD PROFILE
4+50	122.50	ROAD PROFILE
4+60	123.00	ROAD PROFILE
4+70	123.50	ROAD PROFILE
4+80	124.00	ROAD PROFILE
4+90	124.50	ROAD PROFILE
5+00	125.00	ROAD PROFILE
5+10	125.50	ROAD PROFILE
5+20	126.00	ROAD PROFILE
5+30	126.50	ROAD PROFILE
5+40	127.00	ROAD PROFILE
5+50	127.50	ROAD PROFILE
5+60	128.00	ROAD PROFILE
5+70	128.50	ROAD PROFILE
5+80	129.00	ROAD PROFILE
5+90	129.50	ROAD PROFILE
6+00	130.00	ROAD PROFILE
6+10	130.50	ROAD PROFILE
6+20	131.00	ROAD PROFILE
6+30	131.50	ROAD PROFILE
6+40	132.00	ROAD PROFILE
6+50	132.50	ROAD PROFILE
6+60	133.00	ROAD PROFILE
6+70	133.50	ROAD PROFILE
6+80	134.00	ROAD PROFILE
6+90	134.50	ROAD PROFILE
7+00	135.00	ROAD PROFILE
7+10	135.50	ROAD PROFILE
7+20	136.00	ROAD PROFILE
7+30	136.50	ROAD PROFILE
7+40	137.00	ROAD PROFILE
7+50	137.50	ROAD PROFILE
7+60	138.00	ROAD PROFILE
7+70	138.50	ROAD PROFILE
7+80	139.00	ROAD PROFILE
7+90	139.50	ROAD PROFILE
8+00	140.00	ROAD PROFILE
8+10	140.50	ROAD PROFILE
8+20	141.00	ROAD PROFILE
8+30	141.50	ROAD PROFILE
8+40	142.00	ROAD PROFILE
8+50	142.50	ROAD PROFILE
8+60	143.00	ROAD PROFILE
8+70	143.50	ROAD PROFILE
8+80	144.00	ROAD PROFILE
8+90	144.50	ROAD PROFILE
9+00	145.00	ROAD PROFILE
9+10	145.50	ROAD PROFILE
9+20	146.00	ROAD PROFILE
9+30	146.50	ROAD PROFILE
9+40	147.00	ROAD PROFILE
9+50	147.50	ROAD PROFILE
9+60	148.00	ROAD PROFILE
9+70	148.50	ROAD PROFILE
9+80	149.00	ROAD PROFILE
9+90	149.50	ROAD PROFILE
10+00	150.00	ROAD PROFILE
10+10	150.50	ROAD PROFILE
10+20	151.00	ROAD PROFILE
10+30	151.50	ROAD PROFILE
10+40	152.00	ROAD PROFILE
10+50	152.50	ROAD PROFILE
10+60	153.00	ROAD PROFILE
10+70	153.50	ROAD PROFILE
10+80	154.00	ROAD PROFILE
10+90	154.50	ROAD PROFILE
11+00	155.00	ROAD PROFILE
11+10	155.50	ROAD PROFILE
11+20	156.00	ROAD PROFILE
11+30	156.50	ROAD PROFILE
11+40	157.00	ROAD PROFILE
11+50	157.50	ROAD PROFILE
11+60	158.00	ROAD PROFILE
11+70	158.50	ROAD PROFILE
11+80	159.00	ROAD PROFILE
11+90	159.50	ROAD PROFILE
12+00	160.00	ROAD PROFILE
12+10	160.50	ROAD PROFILE
12+20	161.00	ROAD PROFILE
12+30	161.50	ROAD PROFILE
12+40	162.00	ROAD PROFILE
12+50	162.50	ROAD PROFILE
12+60	163.00	ROAD PROFILE
12+70	163.50	ROAD PROFILE
12+80	164.00	ROAD PROFILE
12+90	164.50	ROAD PROFILE
13+00	165.00	ROAD PROFILE
13+10	165.50	ROAD PROFILE
13+20	166.00	ROAD PROFILE
13+30	166.50	ROAD PROFILE
13+40	167.00	ROAD PROFILE
13+50	167.50	ROAD PROFILE
13+60	168.00	ROAD PROFILE
13+70	168.50	ROAD PROFILE
13+80	169.00	ROAD PROFILE
13+90	169.50	ROAD PROFILE
14+00	170.00	ROAD PROFILE
14+10	170.50	ROAD PROFILE
14+20	171.00	ROAD PROFILE
14+30	171.50	ROAD PROFILE
14+40	172.00	ROAD PROFILE
14+50	172.50	ROAD PROFILE
14+60	173.00	ROAD PROFILE
14+70	173.50	ROAD PROFILE
14+80	174.00	ROAD PROFILE
14+90	174.50	ROAD PROFILE
15+00	175.00	ROAD PROFILE
15+10	175.50	ROAD PROFILE
15+20	176.00	ROAD PROFILE
15+30	176.50	ROAD PROFILE
15+40	177.00	ROAD PROFILE
15+50	177.50	ROAD PROFILE
15+60	178.00	ROAD PROFILE
15+70	178.50	ROAD PROFILE
15+80	179.00	ROAD PROFILE
15+90	179.50	ROAD PROFILE
16+00	180.00	ROAD PROFILE
16+10	180.50	ROAD PROFILE
16+20	181.00	ROAD PROFILE
16+30	181.50	ROAD PROFILE
16+40	182.00	ROAD PROFILE
16+50	182.50	ROAD PROFILE
16+60	183.00	ROAD PROFILE
16+70	183.50	ROAD PROFILE
16+80	184.00	ROAD PROFILE
16+90	184.50	ROAD PROFILE
17+00	185.00	ROAD PROFILE
17+10	185.50	ROAD PROFILE
17+20	186.00	ROAD PROFILE
17+30	186.50	ROAD PROFILE
17+40	187.00	ROAD PROFILE
17+50	187.50	ROAD PROFILE
17+60	188.00	ROAD PROFILE
17+70	188.50	ROAD PROFILE
17+80	189.00	ROAD PROFILE
17+90	189.50	ROAD PROFILE
18+00	190.00	ROAD PROFILE
18+10	190.50	ROAD PROFILE
18+20	191.00	ROAD PROFILE
18+30	191.50	ROAD PROFILE
18+40	192.00	ROAD PROFILE
18+50	192.50	ROAD PROFILE
18+60	193.00	ROAD PROFILE
18+70	193.50	ROAD PROFILE
18+80	194.00	ROAD PROFILE
18+90	194.50	ROAD PROFILE
19+00	195.00	ROAD PROFILE
19+10	195.50	ROAD PROFILE
19+20	196.00	ROAD PROFILE
19+30	196.50	ROAD PROFILE
19+40	197.00	ROAD PROFILE
19+50	197.50	ROAD PROFILE
19+60	198.00	ROAD PROFILE
19+70	198.50	ROAD PROFILE
19+80	199.00	ROAD PROFILE
19+90	199.50	ROAD PROFILE
20+00	200.00	ROAD PROFILE
20+10	200.50	ROAD PROFILE
20+20	201.00	ROAD PROFILE
20+30	201.50	ROAD PROFILE
20+40	202.00	ROAD PROFILE
20+50	202.50	ROAD PROFILE
20+60	203.00	ROAD PROFILE
20+70	203.50	ROAD PROFILE
20+80	204.00	ROAD PROFILE
20+90	204.50	ROAD PROFILE
21+00	205.00	ROAD PROFILE
21+10	205.50	ROAD PROFILE
21+20	206.00	ROAD PROFILE
21+30	206.50	ROAD PROFILE
21+40	207.00	ROAD PROFILE
21+50	207.50	ROAD PROFILE
21+60	208.00	ROAD PROFILE
21+70	208.50	ROAD PROFILE
21+80	209.00	ROAD PROFILE
21+90	209.50	ROAD PROFILE
22+00	210.00	ROAD PROFILE
22+10	210.50	ROAD PROFILE
22+20	211.00	ROAD PROFILE
22+30	211.50	ROAD PROFILE
22+40	212.00	ROAD PROFILE
22+50	212.50	ROAD PROFILE
22+60	213.00	ROAD PROFILE
22+70	213.50	ROAD PROFILE
22+80	214.00	ROAD PROFILE
22+90	214.50	ROAD PROFILE
23+00	215.00	ROAD PROFILE
23+10	215.50	ROAD PROFILE
23+20	216.00	ROAD PROFILE
23+30	216.50	ROAD PROFILE
23+40	217.00	ROAD PROFILE
23+50	217.50	ROAD PROFILE
23+60	218.00	ROAD PROFILE
23+70	218.50	ROAD PROFILE
23+80	219.00	ROAD PROFILE
23+90	219.50	ROAD PROFILE
24+00	220.00	ROAD PROFILE
24+10	220.50	ROAD PROFILE
24+20	221.00	ROAD PROFILE
24+30	221.50	ROAD PROFILE
24+40	222.00	ROAD PROFILE
24+50	222.50	ROAD PROFILE
24+60	223.00	ROAD PROFILE
24+70	223.50	ROAD PROFILE
24+80	224.00	ROAD PROFILE
24+90	224.50	ROAD PROFILE
25+00	225.00	ROAD PROFILE
25+10	225.50	ROAD PROFILE
25+20	226.00	ROAD PROFILE
25+30	226.50	ROAD PROFILE
25+40	227.00	ROAD PROFILE
25+50	227.50	ROAD PROFILE
25+60	228.00	ROAD PROFILE
25+70	228.50	ROAD PROFILE
25+80	229.00	ROAD PROFILE
25+90	229.50	ROAD PROFILE
26+00	230.00	ROAD PROFILE
26+10	230.50	ROAD PROFILE
26+20	231.00	ROAD PROFILE
26+30	231.50	ROAD PROFILE
26+40	232.00	ROAD PROFILE
26+50	232.50	ROAD PROFILE
26+60	233.00	ROAD PROFILE
26+70	233.50	ROAD PROFILE
26+80	234.00	ROAD PROFILE
26+90	234.50	ROAD PROFILE
27+00	235.00	ROAD PROFILE
27+10	235.50	ROAD PROFILE
27+20	236.00	ROAD PROFILE
27+30	236.50	ROAD PROFILE
27+40	237.00	ROAD PROFILE
27+50	237.50	ROAD PROFILE
27+60	238.00	ROAD PROFILE
27+70	238.50	ROAD PROFILE
27+80	239.00	ROAD PROFILE
27+90	239.50	ROAD PROFILE
28+00	240.00	ROAD PROFILE
28+10	240.50	ROAD PROFILE
28+20	241.00	ROAD PROFILE
28+30	241.50	ROAD PROFILE
28+40	242.00	ROAD PROFILE
28+50	242.50	ROAD PROFILE
28+60	243.00	ROAD PROFILE
28+70	243.50	ROAD PROFILE
28+80	244.00	ROAD PROFILE
28+90	244.50	ROAD PROFILE
29+00	245.00	ROAD PROFILE
29+10	245.50	ROAD PROFILE
29+20	246.00	ROAD PROFILE
29+30	246.50	ROAD PROFILE
29+40	247.00	ROAD PROFILE
29+50	247.50	ROAD PROFILE
29+60	248.00	ROAD PROFILE
29+70	248.50	ROAD PROFILE
29+80	249.00	ROAD PROFILE
29+90	249.50	ROAD PROFILE
30+00	250.00	ROAD PROFILE

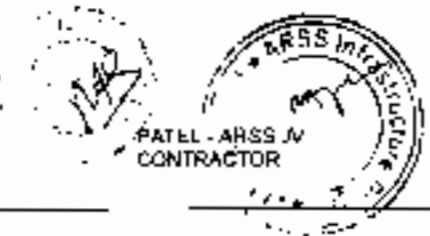
WIDENING AND STRENGTHENING TO TWO LANE  
 FLAY AND LONGITUDINAL SECTION  
 (S-1-18) KM 35/000 TO KM 35/000

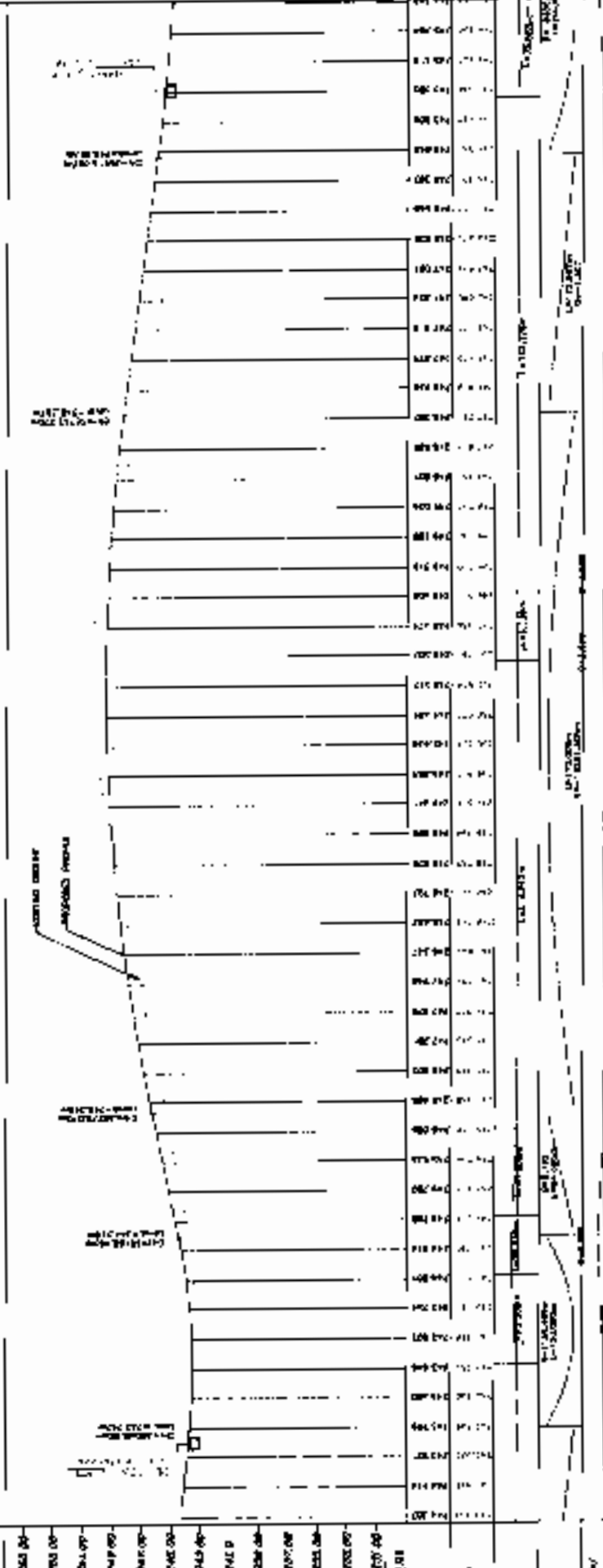
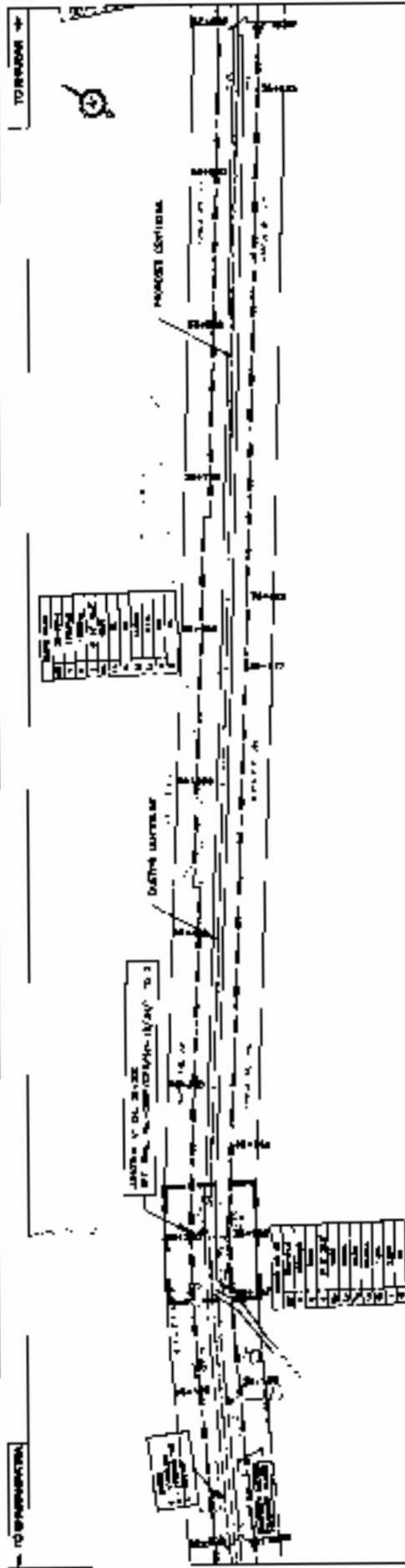
COMPARISON SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE - 01) ROWS FOR ORISSA STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

**CONSULTING ENGINEERING GROUP LTD.**  
 Plot - 48/101, Chhatrapati Shivaji Maharaj  
 Road, Bhubaneswar - 751004, Orissa, India

**LEGEND**

- 1. ROAD PROFILE
- 2. EXISTING PROFILE
- 3. PROPOSED PROFILE
- 4. ROAD WIDTH
- 5. ROAD GRADE
- 6. ROAD CROSS SECTION
- 7. ROAD DRAINAGE
- 8. ROAD UTILITY
- 9. ROAD FENCE
- 10. ROAD SIGN
- 11. ROAD LIGHT
- 12. ROAD BRIDGE
- 13. ROAD TUNNEL
- 14. ROAD CULVERT
- 15. ROAD GULLY
- 16. ROAD DRAIN
- 17. ROAD CANAL
- 18. ROAD RIVER
- 19. ROAD LAKE
- 20. ROAD POND
- 21. ROAD DAM
- 22. ROAD WEIR
- 23. ROAD LOCK
- 24. ROAD TOWER
- 25. ROAD MAST
- 26. ROAD Pylon
- 27. ROAD Pole
- 28. ROAD Post
- 29. ROAD Stake
- 30. ROAD Nail
- 31. ROAD Pin
- 32. ROAD Screw
- 33. ROAD Bolt
- 34. ROAD Nut
- 35. ROAD Washer
- 36. ROAD Cotter
- 37. ROAD Pin
- 38. ROAD Nail
- 39. ROAD Stake
- 40. ROAD Nail





STATION	PROPOSED ROAD LEVEL	EXISTING ROAD LEVEL
100+00	100.00	100.00
105+00	105.00	105.00
110+00	110.00	110.00
115+00	115.00	115.00
120+00	120.00	120.00
125+00	125.00	125.00
130+00	130.00	130.00
135+00	135.00	135.00
140+00	140.00	140.00
145+00	145.00	145.00
150+00	150.00	150.00
155+00	155.00	155.00
160+00	160.00	160.00
165+00	165.00	165.00
170+00	170.00	170.00
175+00	175.00	175.00
180+00	180.00	180.00
185+00	185.00	185.00
190+00	190.00	190.00
195+00	195.00	195.00
200+00	200.00	200.00

PATEL - ARSS JV  
CONTRACTOR

VERTICAL AND STRENGTHENING TO TWO LANE  
PLAN AND LONGITUDINAL SECTION  
(5H-15) KM 30/2000 TC KM 37/2000

COMBINATION OF PHASE - (1) ROAD FOR GREEN STATE ROAD PROJECT  
UNDER WORLD BANK ASSISTANCE

CONSULTING  
SARMA ENGINEERING LTD.  
11, Road No. 1, East of Central Station,  
PO BOX 11, K. M. 30/2000

LEGEND

PROPOSED ROAD LEVEL

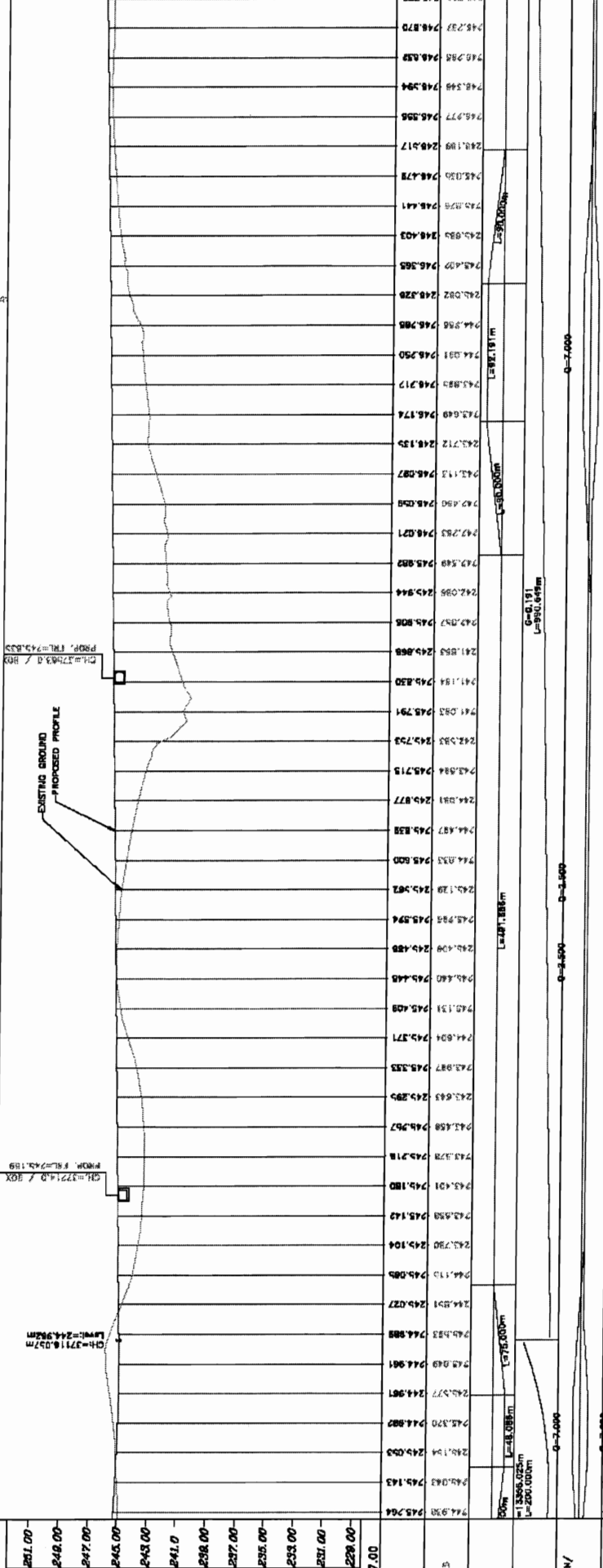
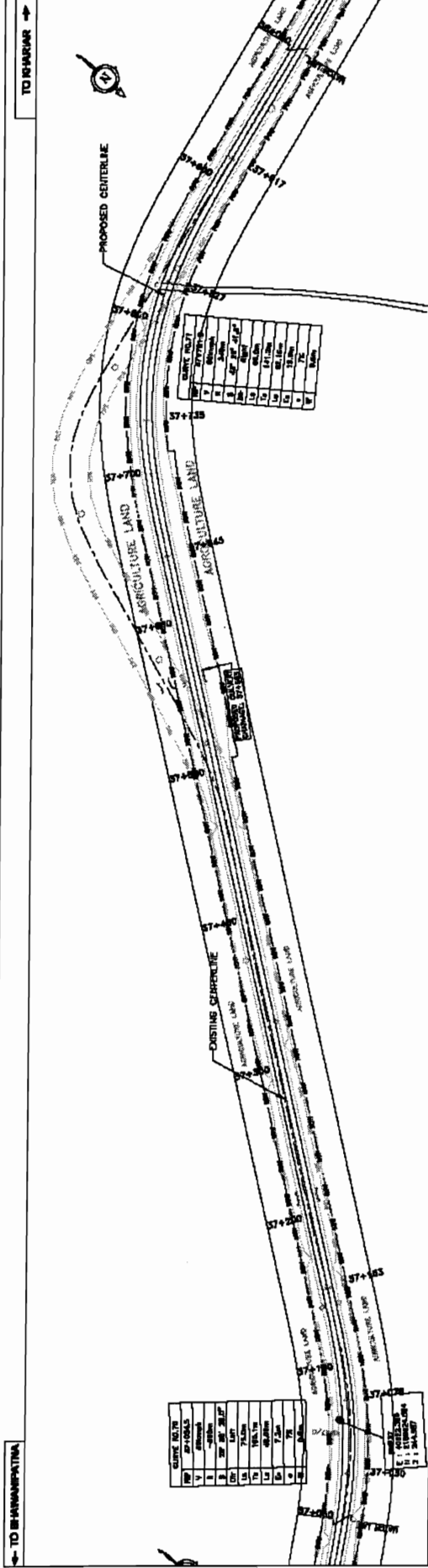
EXISTING ROAD LEVEL

VERTICAL CURVE

GRADE

GRADE

GRADE



STATION	PROPOSED ROAD LEVELS	EXISTING LEVELS
2+72.00	245.26	245.26
2+73.00	245.26	245.26
2+74.00	245.26	245.26
2+75.00	245.26	245.26
2+76.00	245.26	245.26
2+77.00	245.26	245.26
2+78.00	245.26	245.26
2+79.00	245.26	245.26
2+80.00	245.26	245.26
2+81.00	245.26	245.26
2+82.00	245.26	245.26
2+83.00	245.26	245.26
2+84.00	245.26	245.26
2+85.00	245.26	245.26
2+86.00	245.26	245.26
2+87.00	245.26	245.26
2+88.00	245.26	245.26
2+89.00	245.26	245.26
2+90.00	245.26	245.26
2+91.00	245.26	245.26
2+92.00	245.26	245.26
2+93.00	245.26	245.26
2+94.00	245.26	245.26
2+95.00	245.26	245.26
2+96.00	245.26	245.26
2+97.00	245.26	245.26
2+98.00	245.26	245.26

**PROJECT:-**  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12 Mid Colony Market, Hyderabad-500027  
 Tel: +91-44-2520899-93080 2520850  
 Fax: 2521348, e-mail: ceg@cegroup.com

**LEGEND**

PROPOSED CENTERLINE  
 EXISTING CENTERLINE  
 PROPOSED ROAD LEVELS  
 EXISTING LEVELS  
 PROPOSED ROAD WIDTH  
 EXISTING ROAD WIDTH  
 PROPOSED ROAD GRADE  
 EXISTING ROAD GRADE  
 PROPOSED ROAD CROSS SECTION  
 EXISTING ROAD CROSS SECTION

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12 Mid Colony Market, Hyderabad-500027  
 Tel: +91-44-2520899-93080 2520850  
 Fax: 2521348, e-mail: ceg@cegroup.com

**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**SECTION NO. SH-16**  
**KM 37/000 TO KM 38/000**

**DATE** \_\_\_\_\_ **REV** \_\_\_\_\_

**SCALE** \_\_\_\_\_

**VERTICAL** \_\_\_\_\_

**PROPOSED CENTERLINE**  
**EXISTING CENTERLINE**  
**PROPOSED ROAD LEVELS**  
**EXISTING LEVELS**  
**PROPOSED ROAD WIDTH**  
**EXISTING ROAD WIDTH**  
**PROPOSED ROAD GRADE**  
**EXISTING ROAD GRADE**  
**PROPOSED ROAD CROSS SECTION**  
**EXISTING ROAD CROSS SECTION**

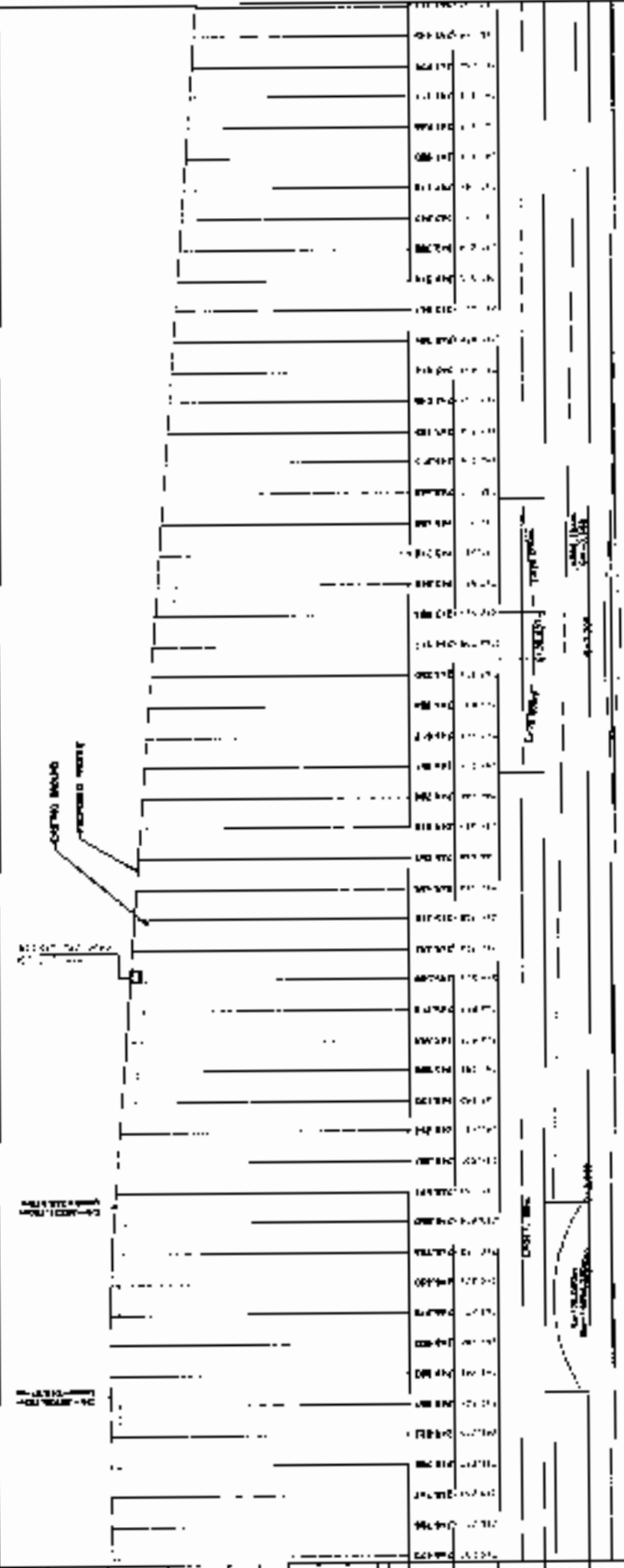
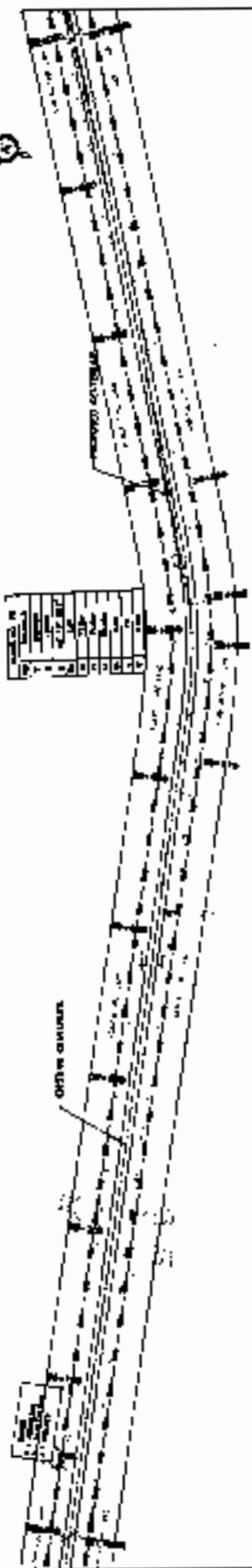
**PATEL - ARSS JV**  
**CONTRACTOR**

**ARSS Infrastructure Projects Ltd.**

TO BANGALORE

TO BANGALORE

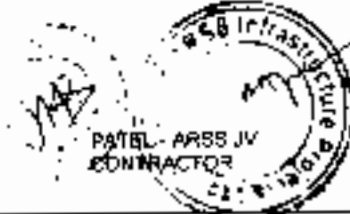
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----



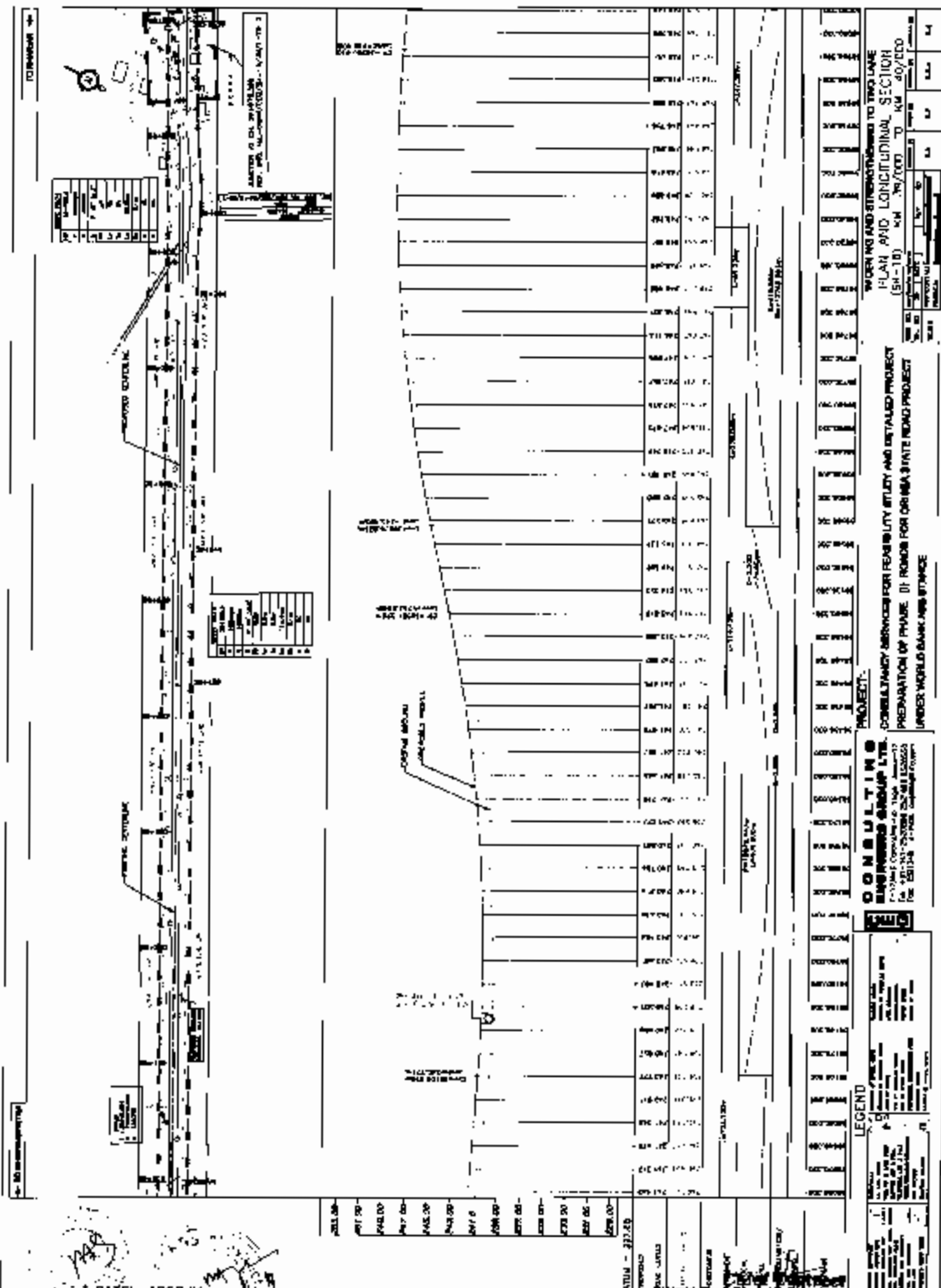
203.00	204.00	205.00	206.00	207.00	208.00	209.00	210.00	211.00	212.00	213.00	214.00	215.00	216.00	217.00	218.00	219.00	220.00	221.00	222.00	223.00	224.00	225.00	226.00	227.00	228.00	229.00	230.00	231.00	232.00	233.00	234.00	235.00	236.00	237.00	238.00	239.00	240.00	241.00	242.00	243.00	244.00	245.00	246.00	247.00	248.00	249.00	250.00	251.00	252.00	253.00	254.00	255.00	256.00	257.00	258.00	259.00	260.00	261.00	262.00	263.00	264.00	265.00	266.00	267.00	268.00	269.00	270.00	271.00	272.00	273.00	274.00	275.00	276.00	277.00	278.00	279.00	280.00	281.00	282.00	283.00	284.00	285.00	286.00	287.00	288.00	289.00	290.00	291.00	292.00	293.00	294.00	295.00	296.00	297.00	298.00	299.00	300.00
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

203.00	204.00	205.00	206.00	207.00	208.00	209.00	210.00	211.00	212.00	213.00	214.00	215.00	216.00	217.00	218.00	219.00	220.00	221.00	222.00	223.00	224.00	225.00	226.00	227.00	228.00	229.00	230.00	231.00	232.00	233.00	234.00	235.00	236.00	237.00	238.00	239.00	240.00	241.00	242.00	243.00	244.00	245.00	246.00	247.00	248.00	249.00	250.00	251.00	252.00	253.00	254.00	255.00	256.00	257.00	258.00	259.00	260.00	261.00	262.00	263.00	264.00	265.00	266.00	267.00	268.00	269.00	270.00	271.00	272.00	273.00	274.00	275.00	276.00	277.00	278.00	279.00	280.00	281.00	282.00	283.00	284.00	285.00	286.00	287.00	288.00	289.00	290.00	291.00	292.00	293.00	294.00	295.00	296.00	297.00	298.00	299.00	300.00
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

301.00	302.00	303.00	304.00	305.00	306.00	307.00	308.00	309.00	310.00	311.00	312.00	313.00	314.00	315.00	316.00	317.00	318.00	319.00	320.00	321.00	322.00	323.00	324.00	325.00	326.00	327.00	328.00	329.00	330.00	331.00	332.00	333.00	334.00	335.00	336.00	337.00	338.00	339.00	340.00	341.00	342.00	343.00	344.00	345.00	346.00	347.00	348.00	349.00	350.00	351.00	352.00	353.00	354.00	355.00	356.00	357.00	358.00	359.00	360.00	361.00	362.00	363.00	364.00	365.00	366.00	367.00	368.00	369.00	370.00	371.00	372.00	373.00	374.00	375.00	376.00	377.00	378.00	379.00	380.00	381.00	382.00	383.00	384.00	385.00	386.00	387.00	388.00	389.00	390.00	391.00	392.00	393.00	394.00	395.00	396.00	397.00	398.00	399.00	400.00
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------



PANEL - ARSS JV  
CONTRACTOR

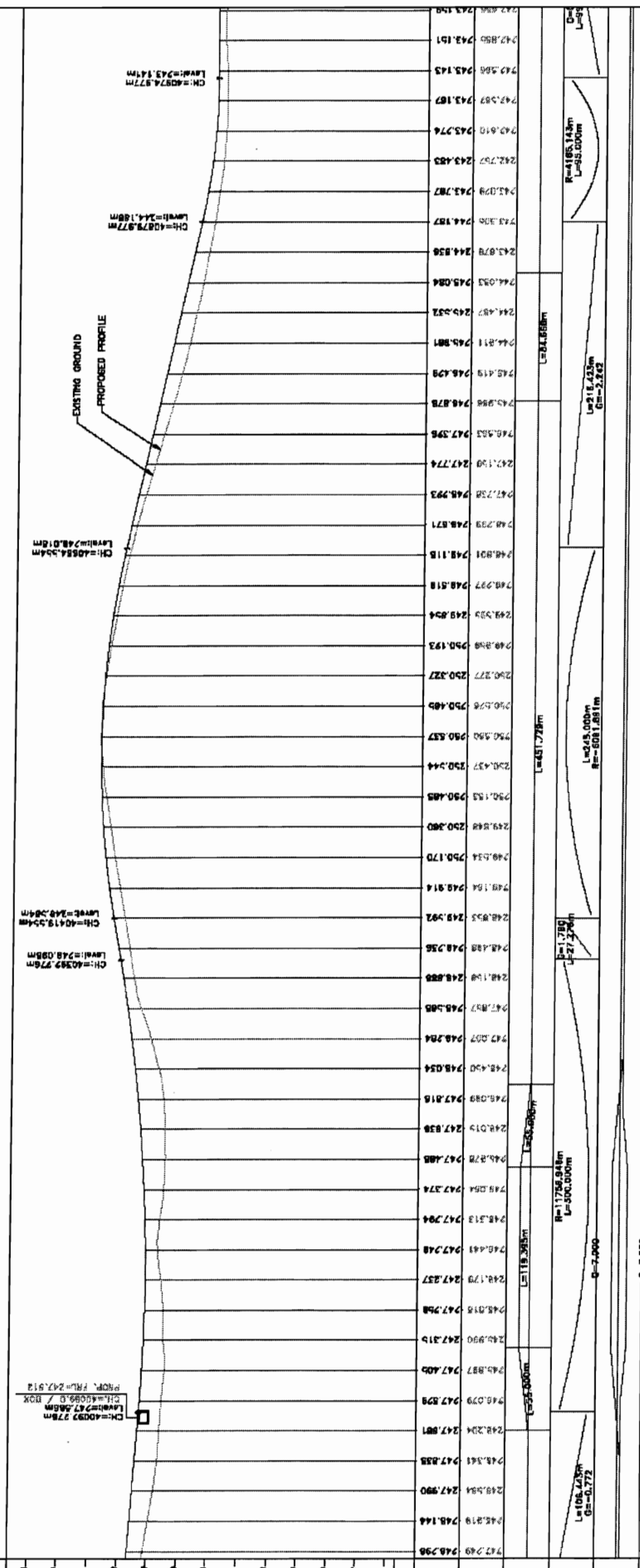
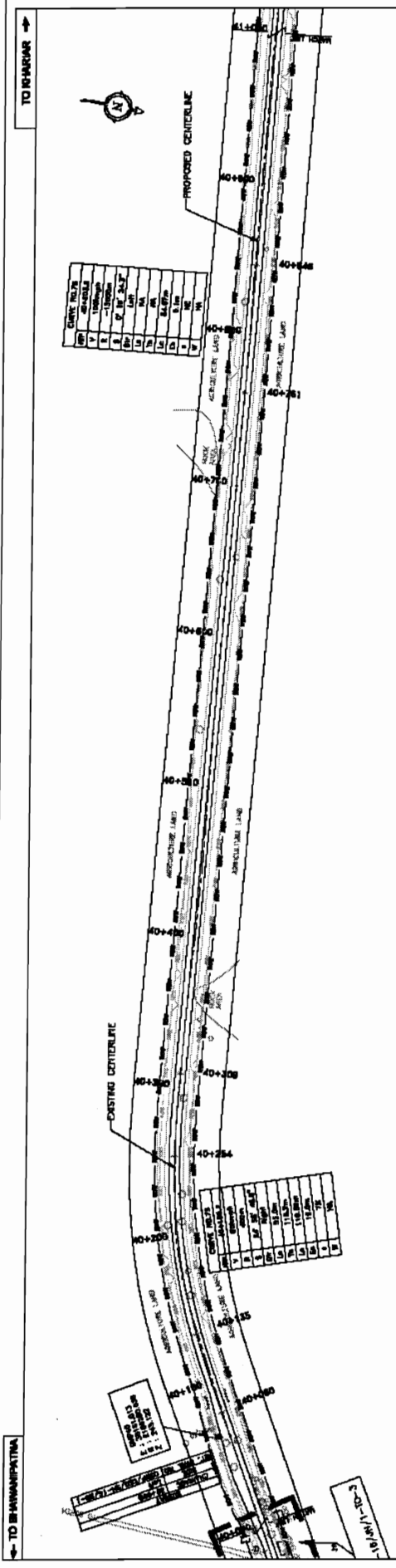


**CONSULTING ENGINEERS GROUP LTD.**  
10000 170th Street, Surrey, BC V3W 2G1  
Tel: (604) 273-2222 Fax: (604) 273-2222

**LEGEND**  
 1. Existing Roadway  
 2. Proposed Roadway  
 3. Proposed Roadway - 10m  
 4. Proposed Roadway - 15m  
 5. Proposed Roadway - 20m  
 6. Proposed Roadway - 25m  
 7. Proposed Roadway - 30m  
 8. Proposed Roadway - 35m  
 9. Proposed Roadway - 40m  
 10. Proposed Roadway - 45m  
 11. Proposed Roadway - 50m  
 12. Proposed Roadway - 55m  
 13. Proposed Roadway - 60m  
 14. Proposed Roadway - 65m  
 15. Proposed Roadway - 70m  
 16. Proposed Roadway - 75m  
 17. Proposed Roadway - 80m  
 18. Proposed Roadway - 85m  
 19. Proposed Roadway - 90m  
 20. Proposed Roadway - 95m  
 21. Proposed Roadway - 100m  
 22. Proposed Roadway - 105m  
 23. Proposed Roadway - 110m  
 24. Proposed Roadway - 115m  
 25. Proposed Roadway - 120m  
 26. Proposed Roadway - 125m  
 27. Proposed Roadway - 130m  
 28. Proposed Roadway - 135m  
 29. Proposed Roadway - 140m  
 30. Proposed Roadway - 145m  
 31. Proposed Roadway - 150m  
 32. Proposed Roadway - 155m  
 33. Proposed Roadway - 160m  
 34. Proposed Roadway - 165m  
 35. Proposed Roadway - 170m  
 36. Proposed Roadway - 175m  
 37. Proposed Roadway - 180m  
 38. Proposed Roadway - 185m  
 39. Proposed Roadway - 190m  
 40. Proposed Roadway - 195m  
 41. Proposed Roadway - 200m  
 42. Proposed Roadway - 205m  
 43. Proposed Roadway - 210m  
 44. Proposed Roadway - 215m  
 45. Proposed Roadway - 220m  
 46. Proposed Roadway - 225m  
 47. Proposed Roadway - 230m  
 48. Proposed Roadway - 235m  
 49. Proposed Roadway - 240m  
 50. Proposed Roadway - 245m  
 51. Proposed Roadway - 250m  
 52. Proposed Roadway - 255m  
 53. Proposed Roadway - 260m  
 54. Proposed Roadway - 265m  
 55. Proposed Roadway - 270m  
 56. Proposed Roadway - 275m  
 57. Proposed Roadway - 280m  
 58. Proposed Roadway - 285m  
 59. Proposed Roadway - 290m  
 60. Proposed Roadway - 295m  
 61. Proposed Roadway - 300m  
 62. Proposed Roadway - 305m  
 63. Proposed Roadway - 310m  
 64. Proposed Roadway - 315m  
 65. Proposed Roadway - 320m  
 66. Proposed Roadway - 325m  
 67. Proposed Roadway - 330m  
 68. Proposed Roadway - 335m  
 69. Proposed Roadway - 340m  
 70. Proposed Roadway - 345m  
 71. Proposed Roadway - 350m  
 72. Proposed Roadway - 355m  
 73. Proposed Roadway - 360m  
 74. Proposed Roadway - 365m  
 75. Proposed Roadway - 370m  
 76. Proposed Roadway - 375m  
 77. Proposed Roadway - 380m  
 78. Proposed Roadway - 385m  
 79. Proposed Roadway - 390m  
 80. Proposed Roadway - 395m  
 81. Proposed Roadway - 400m  
 82. Proposed Roadway - 405m  
 83. Proposed Roadway - 410m  
 84. Proposed Roadway - 415m  
 85. Proposed Roadway - 420m  
 86. Proposed Roadway - 425m  
 87. Proposed Roadway - 430m  
 88. Proposed Roadway - 435m  
 89. Proposed Roadway - 440m  
 90. Proposed Roadway - 445m  
 91. Proposed Roadway - 450m  
 92. Proposed Roadway - 455m  
 93. Proposed Roadway - 460m  
 94. Proposed Roadway - 465m  
 95. Proposed Roadway - 470m  
 96. Proposed Roadway - 475m  
 97. Proposed Roadway - 480m  
 98. Proposed Roadway - 485m  
 99. Proposed Roadway - 490m  
 100. Proposed Roadway - 495m  
 101. Proposed Roadway - 500m  
 102. Proposed Roadway - 505m  
 103. Proposed Roadway - 510m  
 104. Proposed Roadway - 515m  
 105. Proposed Roadway - 520m  
 106. Proposed Roadway - 525m  
 107. Proposed Roadway - 530m  
 108. Proposed Roadway - 535m  
 109. Proposed Roadway - 540m  
 110. Proposed Roadway - 545m  
 111. Proposed Roadway - 550m  
 112. Proposed Roadway - 555m  
 113. Proposed Roadway - 560m  
 114. Proposed Roadway - 565m  
 115. Proposed Roadway - 570m  
 116. Proposed Roadway - 575m  
 117. Proposed Roadway - 580m  
 118. Proposed Roadway - 585m  
 119. Proposed Roadway - 590m  
 120. Proposed Roadway - 595m  
 121. Proposed Roadway - 600m  
 122. Proposed Roadway - 605m  
 123. Proposed Roadway - 610m  
 124. Proposed Roadway - 615m  
 125. Proposed Roadway - 620m  
 126. Proposed Roadway - 625m  
 127. Proposed Roadway - 630m  
 128. Proposed Roadway - 635m  
 129. Proposed Roadway - 640m  
 130. Proposed Roadway - 645m  
 131. Proposed Roadway - 650m  
 132. Proposed Roadway - 655m  
 133. Proposed Roadway - 660m  
 134. Proposed Roadway - 665m  
 135. Proposed Roadway - 670m  
 136. Proposed Roadway - 675m  
 137. Proposed Roadway - 680m  
 138. Proposed Roadway - 685m  
 139. Proposed Roadway - 690m  
 140. Proposed Roadway - 695m  
 141. Proposed Roadway - 700m  
 142. Proposed Roadway - 705m  
 143. Proposed Roadway - 710m  
 144. Proposed Roadway - 715m  
 145. Proposed Roadway - 720m  
 146. Proposed Roadway - 725m  
 147. Proposed Roadway - 730m  
 148. Proposed Roadway - 735m  
 149. Proposed Roadway - 740m  
 150. Proposed Roadway - 745m  
 151. Proposed Roadway - 750m

World Bank Project  
 (Official) Credit  
 Under World Bank AID





Station	Existing Ground (m)	Proposed Profile (m)	Vertical Curve Data
0+00	747.249	747.249	
0+10	748.144	748.144	
0+20	748.199	748.199	
0+30	747.958	747.958	
0+40	747.837	747.837	
0+50	747.837	747.837	
0+60	747.837	747.837	
0+70	747.837	747.837	
0+80	747.837	747.837	
0+90	747.837	747.837	
1+00	747.837	747.837	

**WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 40/000 TO KM 41/000**

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, Colaba Market, Mumbai - 400 006  
 Tel: +91-22-2350888, 2520 688, 2520 6554  
 Fax: 2521 343, e-mail: ceg@cegroup.com

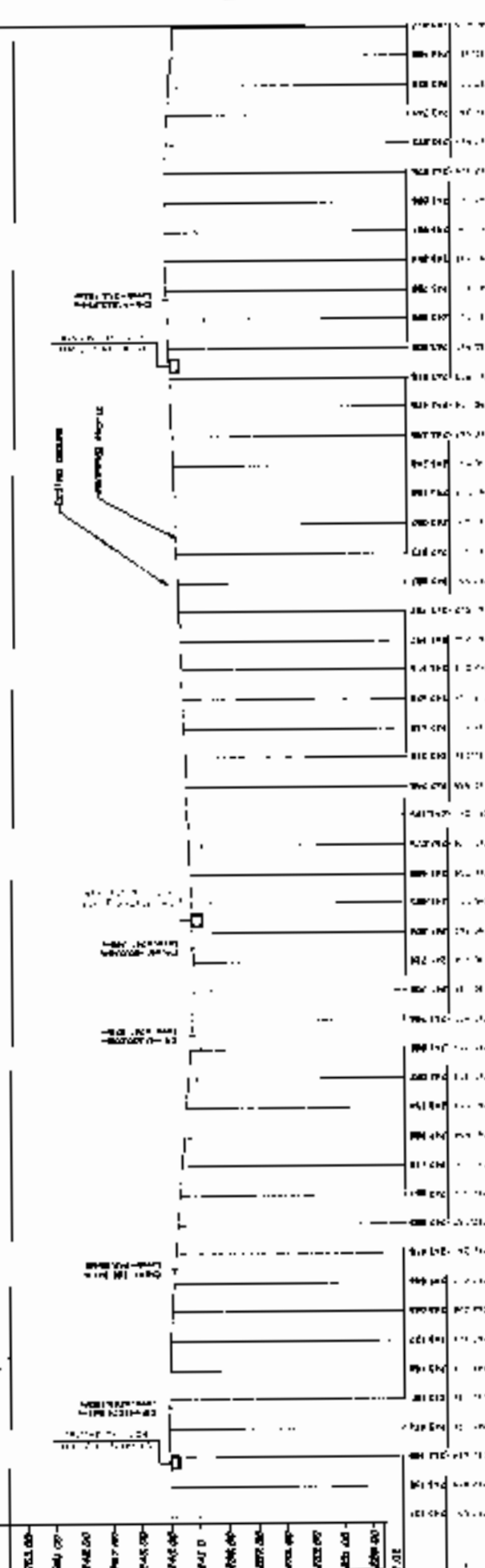
**LEGEND**

- PROPOSED CENTERLINE
- EXISTING CENTERLINE
- EXISTING ROAD
- PROPOSED ROAD
- EXISTING GRADE
- PROPOSED GRADE
- EXISTING BANK
- PROPOSED BANK
- EXISTING DRAINAGE
- PROPOSED DRAINAGE
- EXISTING UTILITIES
- PROPOSED UTILITIES
- EXISTING LAND USE
- PROPOSED LAND USE

**DATE** = 22.08.2010  
**SCALE** = 1:1000  
**PROJECT NO.** = SH-16/000  
**SECTION NO.** = 01

**PATEL - ARSS JV**  
**CONTRACTOR**

Work done by **EMPOK Projects** for **E.I.C (Civil) Orissa**, Bhubaneswar.



Stationing	Elevation (m)	Notes
227+00	10.00	
227+05	10.05	
227+10	10.10	
227+15	10.15	
227+20	10.20	
227+25	10.25	
227+30	10.30	
227+35	10.35	
227+40	10.40	
227+45	10.45	
227+50	10.50	
227+55	10.55	
227+60	10.60	
227+65	10.65	
227+70	10.70	
227+75	10.75	
227+80	10.80	
227+85	10.85	
227+90	10.90	
227+95	10.95	
228+00	11.00	

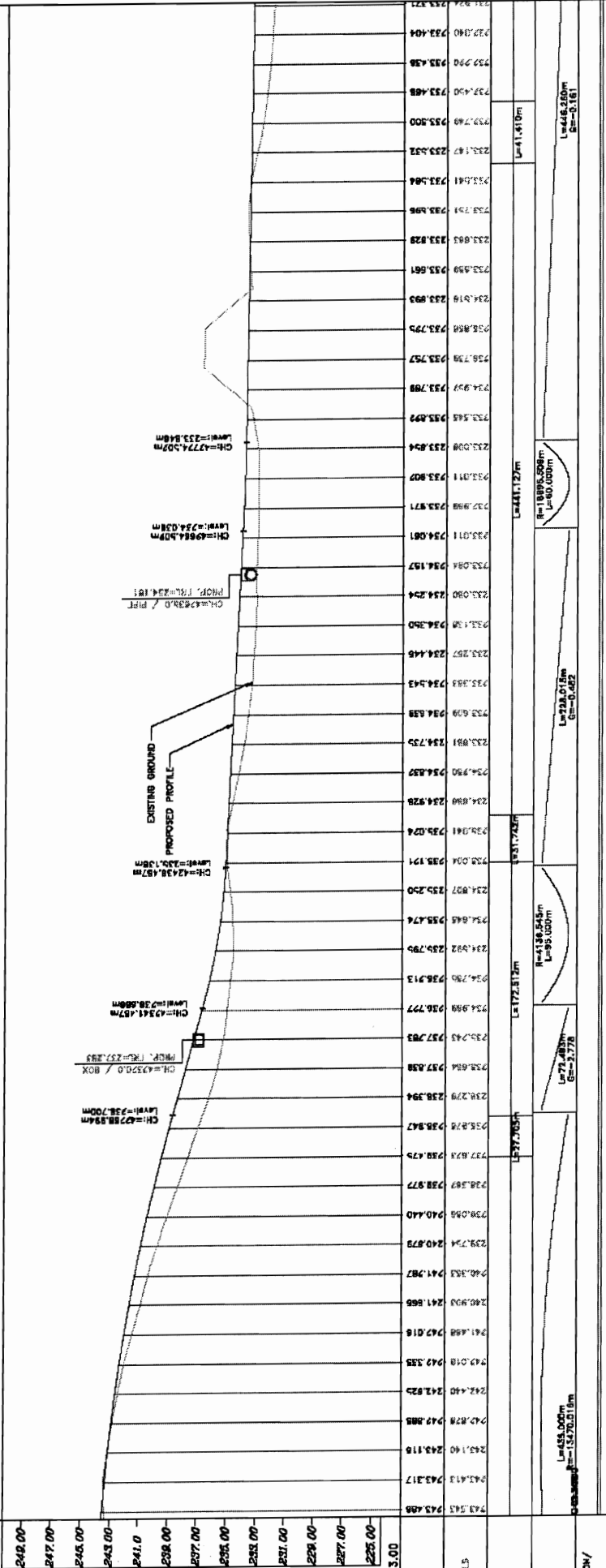
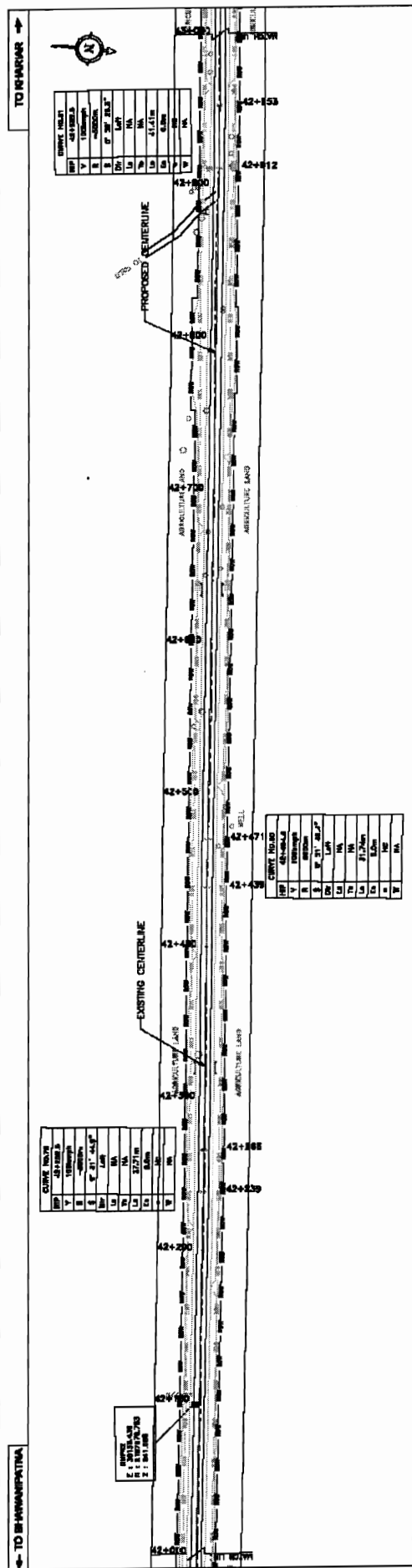
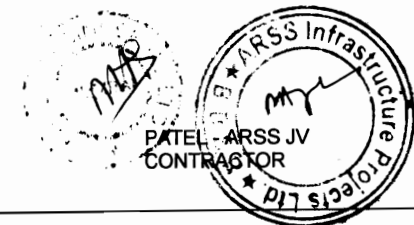


**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR DROGA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**GO MULTIMEDIA ENGINEERS GROUP LTD.**  
 11/13, New Market, Bhubaneswar, Odisha - 751 013, India  
 Tel: 91 674 252 2323 Fax: 91 674 252 2324

**LEGEND**  
 1. Proposed Road  
 2. Existing Road  
 3. Right of Way  
 4. Boundary  
 5. Water Body  
 6. Power Line  
 7. Telephone Line  
 8. Drainage  
 9. Survey Line  
 10. Spot Level

Stationing	Elevation (m)	Notes
227+00	10.00	
227+05	10.05	
227+10	10.10	
227+15	10.15	
227+20	10.20	
227+25	10.25	
227+30	10.30	
227+35	10.35	
227+40	10.40	
227+45	10.45	
227+50	10.50	
227+55	10.55	
227+60	10.60	
227+65	10.65	
227+70	10.70	
227+75	10.75	
227+80	10.80	
227+85	10.85	
227+90	10.90	
227+95	10.95	
228+00	11.00	



Stationing	Elevation (m)
243+00	243.00
243+10	243.10
243+20	243.20
243+30	243.30
243+40	243.40
243+50	243.50
243+60	243.60
243+70	243.70
243+80	243.80
243+90	243.90
244+00	244.00
244+10	244.10
244+20	244.20
244+30	244.30
244+40	244.40
244+50	244.50
244+60	244.60
244+70	244.70
244+80	244.80
244+90	244.90
245+00	245.00
245+10	245.10
245+20	245.20
245+30	245.30
245+40	245.40
245+50	245.50
245+60	245.60
245+70	245.70
245+80	245.80
245+90	245.90
246+00	246.00
246+10	246.10
246+20	246.20
246+30	246.30
246+40	246.40
246+50	246.50
246+60	246.60
246+70	246.70
246+80	246.80
246+90	246.90
247+00	247.00
247+10	247.10
247+20	247.20
247+30	247.30
247+40	247.40
247+50	247.50
247+60	247.60
247+70	247.70
247+80	247.80
247+90	247.90
248+00	248.00
248+10	248.10
248+20	248.20
248+30	248.30
248+40	248.40
248+50	248.50
248+60	248.60
248+70	248.70
248+80	248.80
248+90	248.90
249+00	249.00

Scale	Horizontal	Vertical
1:1000	1:100	1:100

**PROJECT:**  
 WIDENING AND STRENGTHENING TO TWO LANE  
 PLAN AND LONGITUDINAL SECTION  
 (SH-16) KM 42/000 TO KM 43/000  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

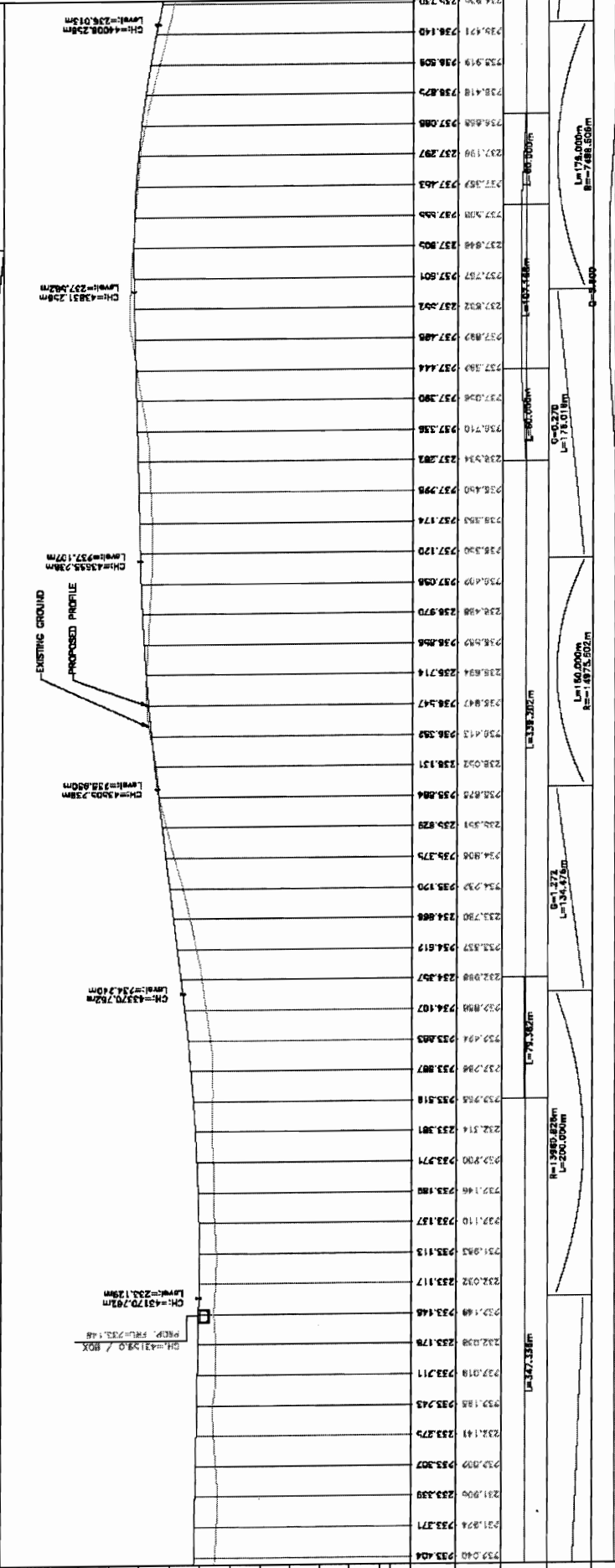
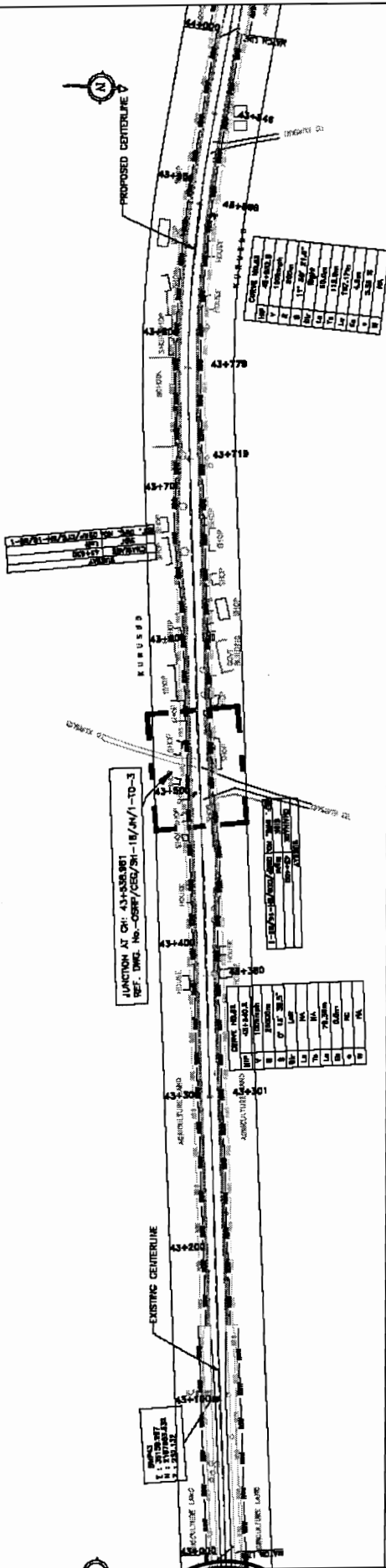
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, 6th Floor, Colony, Bhubaneswar, Odisha - 751017  
 Tel: +91-674-2520889, 2521488, 2520554  
 Fax: 2521348, e-mail: ce@cegroupindia.com

**LEGEND**

Symbol	Description
(Symbol)	Proposed Road
(Symbol)	Existing Road
(Symbol)	Proposed Centreline
(Symbol)	Existing Centreline
(Symbol)	Right of Way
(Symbol)	Water
(Symbol)	Drainage
(Symbol)	Structure
(Symbol)	Well
(Symbol)	Tree
(Symbol)	Boundary
(Symbol)	Survey Station
(Symbol)	Reference Point

TO BHAWANIPATNA

TO KHARWAR



CH	EL	PROF	GR
43+70	237.444	237.444	237.444
43+72	237.488	237.488	237.488
43+74	237.532	237.532	237.532
43+76	237.576	237.576	237.576
43+78	237.620	237.620	237.620
43+80	237.664	237.664	237.664
43+82	237.708	237.708	237.708
43+84	237.752	237.752	237.752
43+86	237.796	237.796	237.796
43+88	237.840	237.840	237.840
43+90	237.884	237.884	237.884
43+92	237.928	237.928	237.928
43+94	237.972	237.972	237.972
43+96	238.016	238.016	238.016
43+98	238.060	238.060	238.060

**PROJECT:-**  
**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

**LEGEND**

**ROAD LEVELS**

**EXISTING LEVELS**

**DATUM = 219.00**

**PROPOSED ROAD LEVELS**

**EXISTING LEVELS**

**DATUM = 219.00**

**WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 43/000 TO KM 44/000**

DWG NO. 16-1/2018-01  
 SHEET NO. 43  
 DATE: 15/11/2018  
 SCALE: HORIZONTAL: 1:1000, VERTICAL: 1:200

**LEGEND**

**ROAD LEVELS**

**EXISTING LEVELS**

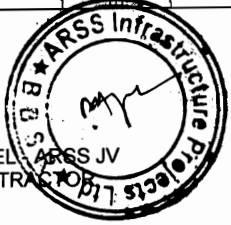
**DATUM = 219.00**

**LEGEND**

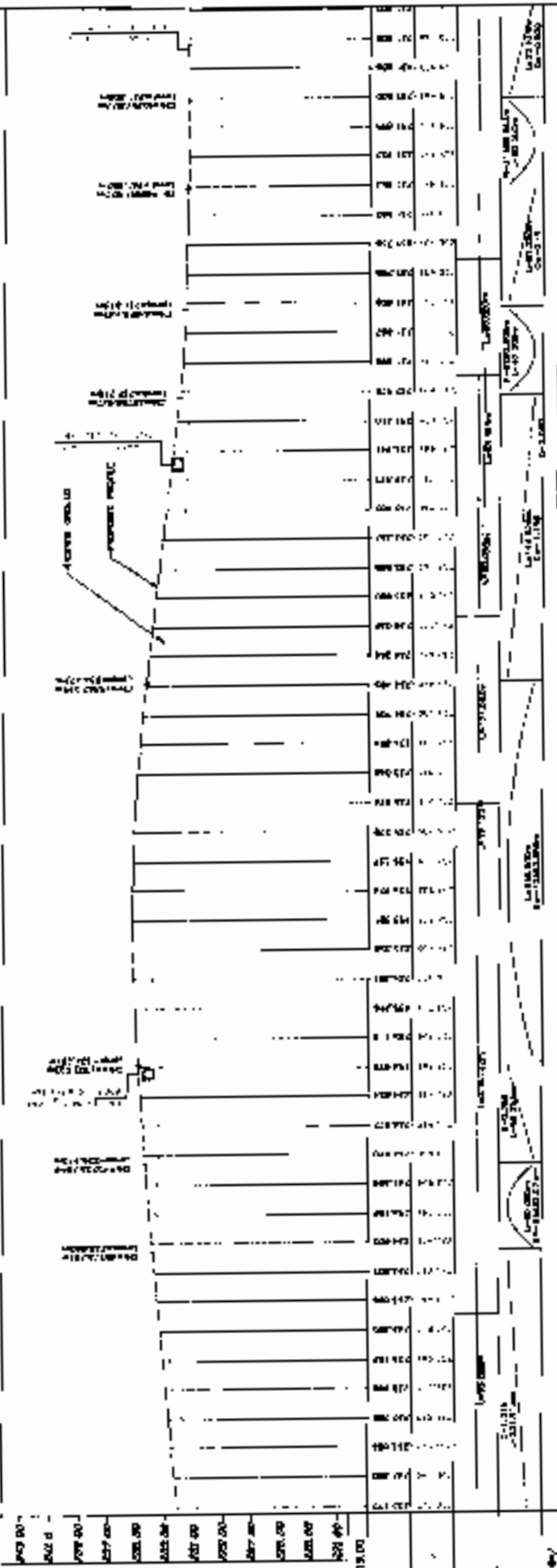
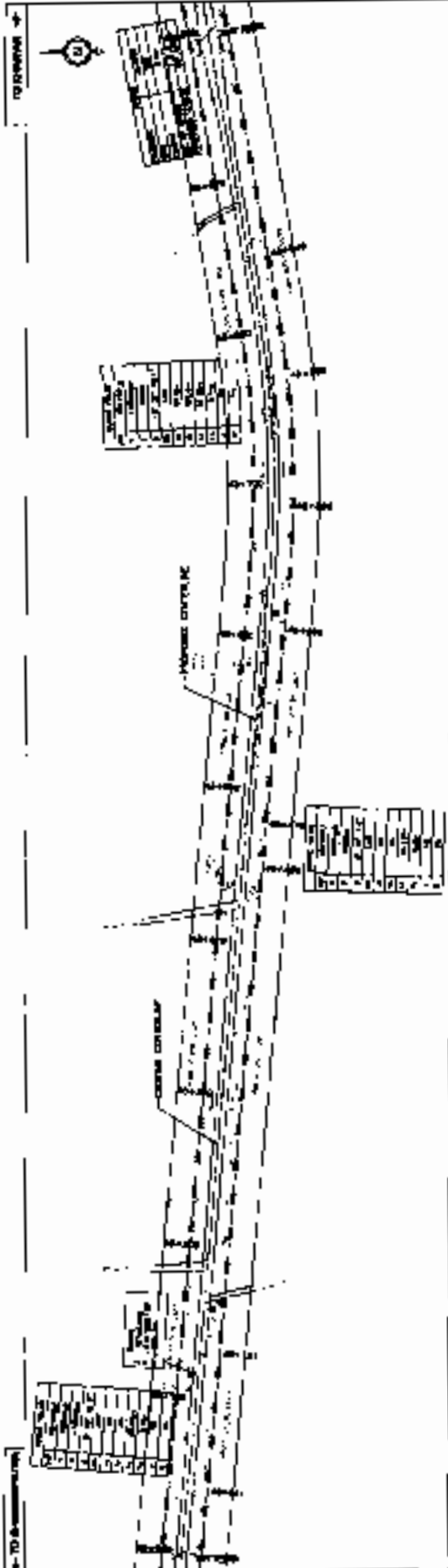
**ROAD LEVELS**

**EXISTING LEVELS**

**DATUM = 219.00**







Station	Elevation (m)	Elevation (ft)	Grade (%)	Vertical Curve Data
0+00	100.00	328.10	1.5%	
0+25	99.88	327.62	1.5%	
0+50	99.75	327.15	1.5%	
0+75	99.63	326.67	1.5%	
1+00	99.50	326.20	1.5%	
1+25	99.38	325.72	1.5%	
1+50	99.25	325.25	1.5%	
1+75	99.13	324.77	1.5%	
2+00	99.00	324.30	1.5%	
2+25	98.88	323.82	1.5%	
2+50	98.75	323.35	1.5%	
2+75	98.63	322.87	1.5%	
3+00	98.50	322.40	1.5%	
3+25	98.38	321.92	1.5%	
3+50	98.25	321.45	1.5%	
3+75	98.13	320.97	1.5%	
4+00	98.00	320.50	1.5%	
4+25	97.88	320.02	1.5%	
4+50	97.75	319.55	1.5%	
4+75	97.63	319.07	1.5%	
5+00	97.50	318.60	1.5%	
5+25	97.38	318.12	1.5%	
5+50	97.25	317.65	1.5%	
5+75	97.13	317.17	1.5%	
6+00	97.00	316.70	1.5%	
6+25	96.88	316.22	1.5%	
6+50	96.75	315.75	1.5%	
6+75	96.63	315.27	1.5%	
7+00	96.50	314.80	1.5%	
7+25	96.38	314.32	1.5%	
7+50	96.25	313.85	1.5%	
7+75	96.13	313.37	1.5%	
8+00	96.00	312.90	1.5%	
8+25	95.88	312.42	1.5%	
8+50	95.75	311.95	1.5%	
8+75	95.63	311.47	1.5%	
9+00	95.50	311.00	1.5%	
9+25	95.38	310.52	1.5%	
9+50	95.25	310.05	1.5%	
9+75	95.13	309.57	1.5%	
10+00	95.00	309.10	1.5%	

ARSS Infrastructure
   
 RATEL - ARSS JV
   
 CONTRACTOR

LEGEND  
 DATE: 21/11/2010  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]

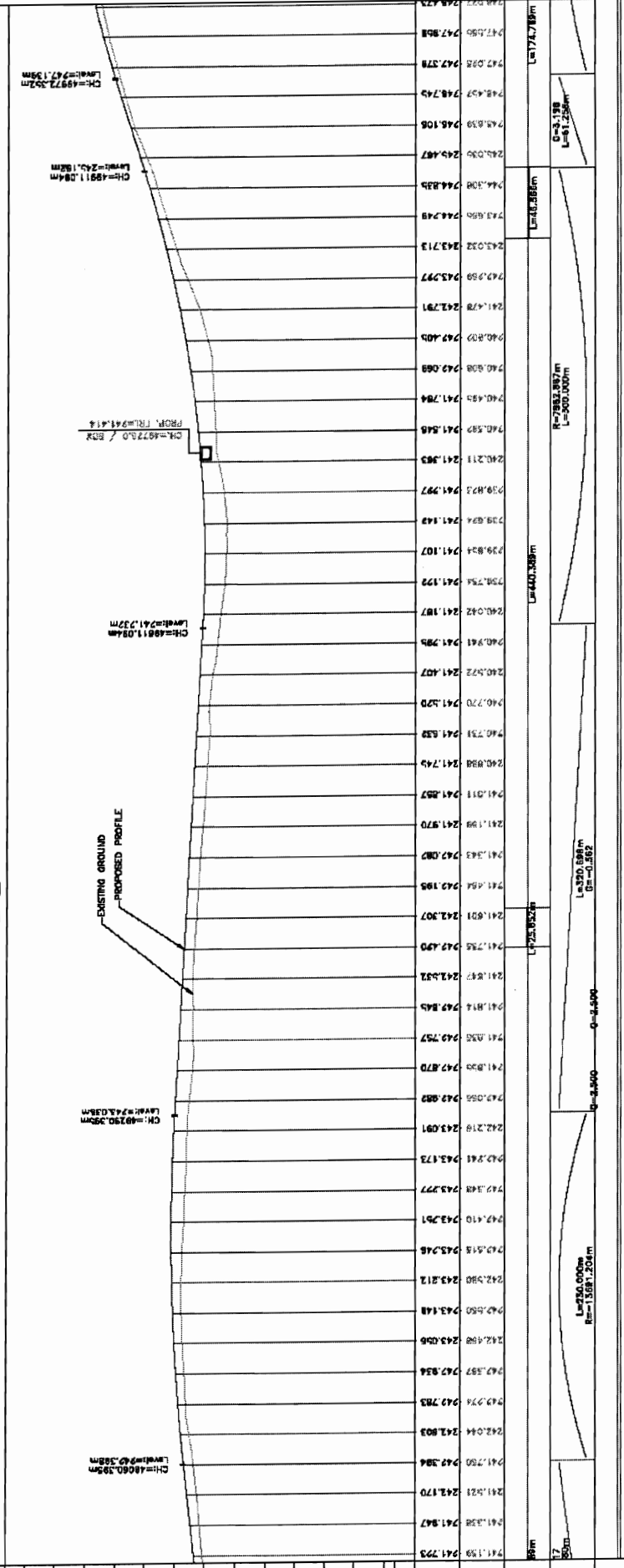
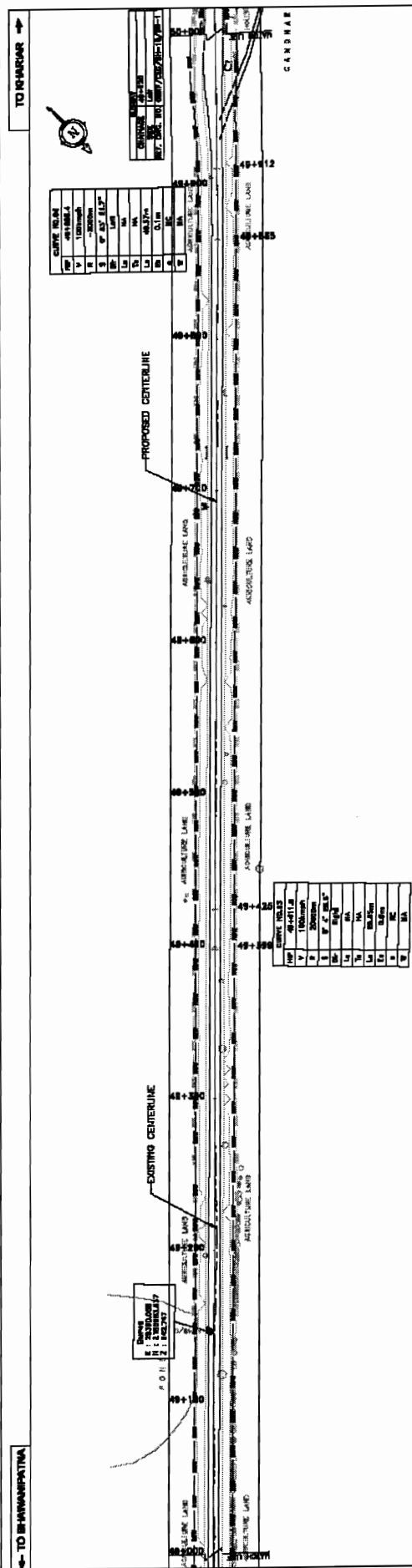
**CONSULTING ENGINEERS GROUP LTD**  
 CONSULTING ENGINEERS  
 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581, 1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607, 1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633, 1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659, 1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685, 1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711, 1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737, 1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763, 1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789, 1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815, 1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841, 1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867, 1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893, 1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919, 1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945, 1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971, 1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023, 2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049, 2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075, 2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101, 2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127, 2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153, 2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179, 2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205, 2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231, 2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257, 2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283, 2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309, 2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335, 2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361, 2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387, 2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413, 2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439, 2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465, 2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491, 2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517, 2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543, 2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569, 2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595, 2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621, 2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647, 2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673, 2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699, 2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725, 2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751, 2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777, 2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803, 2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829, 2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855, 2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881, 2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907, 2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933, 2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959, 2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985, 2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011, 3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037, 3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063, 3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089, 3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115, 3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141, 3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167, 3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193, 3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219, 3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245, 3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271, 3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297, 3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323, 3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349, 3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375, 3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401, 3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427, 3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453, 3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479, 3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 3505, 3507, 3509, 3511, 3513, 3515, 3517, 3519, 3521, 3523, 3525, 3527, 3529, 3531, 3533, 3535, 3537, 3539, 3541, 3543, 3545, 3547, 3549, 3551, 3553, 3555, 3557, 3559, 3561, 3563, 3565, 3567, 3569, 3571, 3573, 3575, 3577, 3579, 3581, 3583, 3585, 3587, 3589, 3591, 3593, 3595, 3597, 3599, 3601, 3603, 3605, 3607, 3609, 3611, 3613, 3615, 3617, 3619, 3621, 3623, 3625, 3627, 3629, 3631, 3633, 3635, 3637, 3639, 3641, 3643, 3645, 3647, 3649, 3651, 3653, 3655, 3657, 3659, 3661, 3663, 3665, 3667, 3669, 3671, 3673, 3675, 3677, 3679, 3681, 3683, 3685, 3687, 3689











STATION	PROPOSED ROAD LEVEL	EXISTING GROUND LEVEL
229.00		
230.00		
231.00		
232.00		
233.00		
234.00		
235.00		
236.00		
237.00		
238.00		
239.00		
240.00		
241.00		
242.00		
243.00		
244.00		
245.00		
246.00		
247.00		
248.00		
249.00		
250.00		
251.00		
252.00		
253.00		
254.00		
255.00		
256.00		
257.00		
258.00		
259.00		
260.00		
261.00		
262.00		
263.00		
264.00		
265.00		
266.00		
267.00		
268.00		
269.00		
270.00		
271.00		
272.00		
273.00		
274.00		
275.00		
276.00		
277.00		
278.00		
279.00		
280.00		
281.00		
282.00		
283.00		
284.00		
285.00		
286.00		
287.00		
288.00		
289.00		
290.00		
291.00		
292.00		
293.00		
294.00		
295.00		
296.00		
297.00		
298.00		
299.00		
300.00		

NO.	DATE	BY	CHKD.	SCALE

**PROJECT:-**  
**WIDENING AND STRENGTHENING TO TWO LANE**  
**PLAN AND LONGITUDINAL SECTION**  
**(SH-16) KM 49/000 TO KM 50/000**

**CONSULTING ENGINEERS GROUP LTD.**  
 E-13/1st Cross Malviya Nagar, Sector-17  
 Gurgaon, Haryana-122002  
 Tel: +91-11-441-252088, 2521818, 2520558  
 Fax: 2521348, e-mail: ceg@cegltd.com

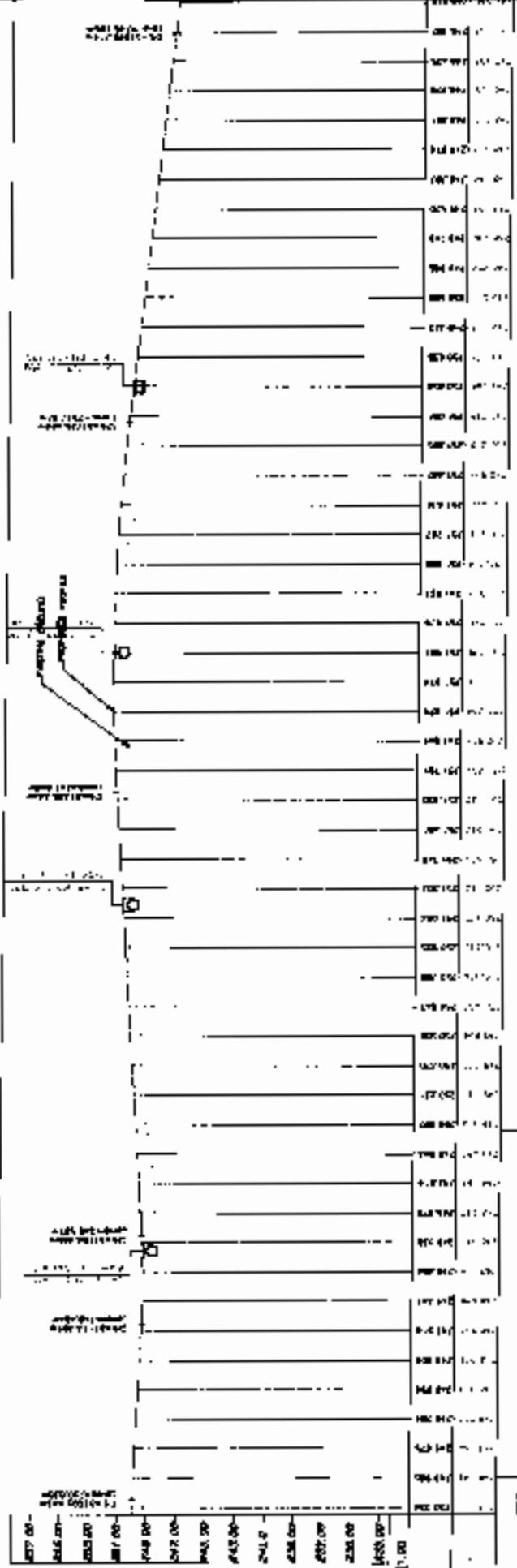
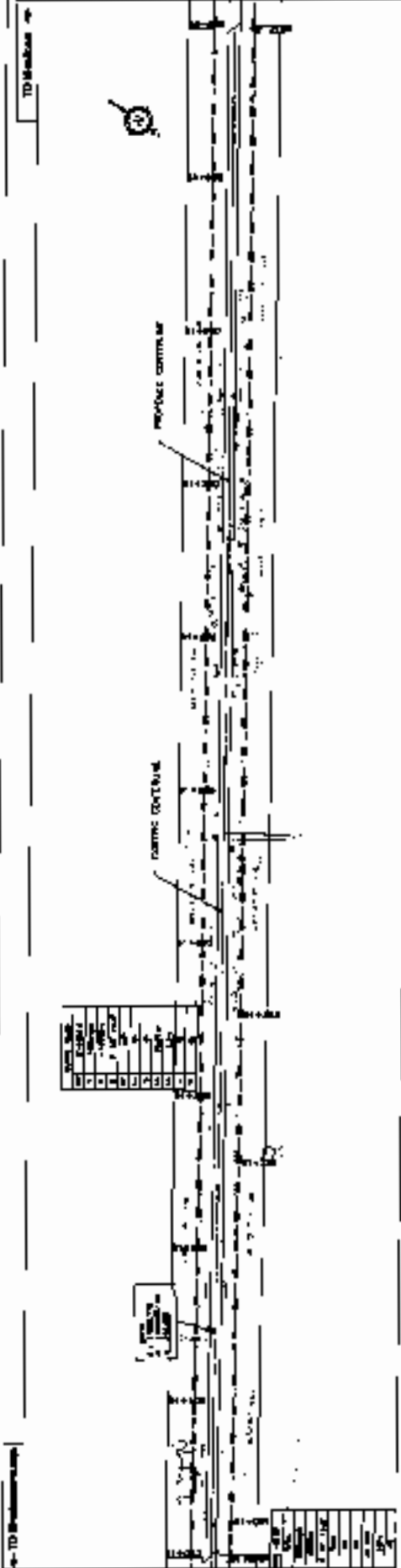
NO.	DESCRIPTION	DATE

**TO BHANUPATNA**

**APATEL & SONS JV**  
**CONTRACTOR**

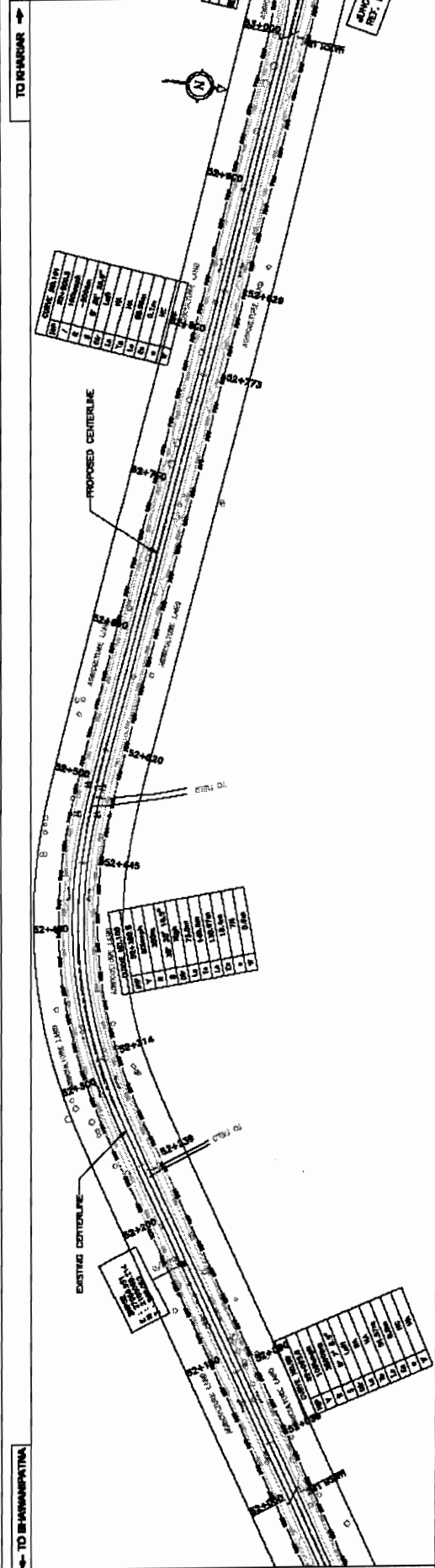
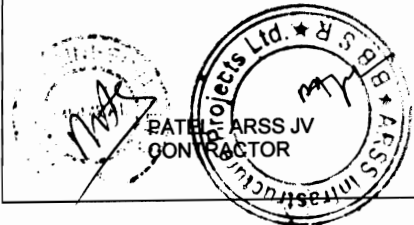
World Bank Project  
 Ok... Projects





Station	Height	Grade	Notes
0+00	10.00	1:10	
0+10	10.00	1:10	
0+20	10.00	1:10	
0+30	10.00	1:10	
0+40	10.00	1:10	
0+50	10.00	1:10	
0+60	10.00	1:10	
0+70	10.00	1:10	
0+80	10.00	1:10	
0+90	10.00	1:10	
1+00	10.00	1:10	
1+10	10.00	1:10	
1+20	10.00	1:10	
1+30	10.00	1:10	
1+40	10.00	1:10	
1+50	10.00	1:10	
1+60	10.00	1:10	
1+70	10.00	1:10	
1+80	10.00	1:10	
1+90	10.00	1:10	
2+00	10.00	1:10	
2+10	10.00	1:10	
2+20	10.00	1:10	
2+30	10.00	1:10	
2+40	10.00	1:10	
2+50	10.00	1:10	
2+60	10.00	1:10	
2+70	10.00	1:10	
2+80	10.00	1:10	
2+90	10.00	1:10	
3+00	10.00	1:10	
3+10	10.00	1:10	
3+20	10.00	1:10	
3+30	10.00	1:10	
3+40	10.00	1:10	
3+50	10.00	1:10	
3+60	10.00	1:10	
3+70	10.00	1:10	
3+80	10.00	1:10	
3+90	10.00	1:10	
4+00	10.00	1:10	
4+10	10.00	1:10	
4+20	10.00	1:10	
4+30	10.00	1:10	
4+40	10.00	1:10	
4+50	10.00	1:10	
4+60	10.00	1:10	
4+70	10.00	1:10	
4+80	10.00	1:10	
4+90	10.00	1:10	
5+00	10.00	1:10	
5+10	10.00	1:10	
5+20	10.00	1:10	
5+30	10.00	1:10	
5+40	10.00	1:10	
5+50	10.00	1:10	
5+60	10.00	1:10	
5+70	10.00	1:10	
5+80	10.00	1:10	
5+90	10.00	1:10	
6+00	10.00	1:10	
6+10	10.00	1:10	
6+20	10.00	1:10	
6+30	10.00	1:10	
6+40	10.00	1:10	
6+50	10.00	1:10	
6+60	10.00	1:10	
6+70	10.00	1:10	
6+80	10.00	1:10	
6+90	10.00	1:10	
7+00	10.00	1:10	
7+10	10.00	1:10	
7+20	10.00	1:10	
7+30	10.00	1:10	
7+40	10.00	1:10	
7+50	10.00	1:10	
7+60	10.00	1:10	
7+70	10.00	1:10	
7+80	10.00	1:10	
7+90	10.00	1:10	
8+00	10.00	1:10	
8+10	10.00	1:10	
8+20	10.00	1:10	
8+30	10.00	1:10	
8+40	10.00	1:10	
8+50	10.00	1:10	
8+60	10.00	1:10	
8+70	10.00	1:10	
8+80	10.00	1:10	
8+90	10.00	1:10	
9+00	10.00	1:10	
9+10	10.00	1:10	
9+20	10.00	1:10	
9+30	10.00	1:10	
9+40	10.00	1:10	
9+50	10.00	1:10	
9+60	10.00	1:10	
9+70	10.00	1:10	
9+80	10.00	1:10	
9+90	10.00	1:10	
10+00	10.00	1:10	





STATION	PROPOSED LEVEL	EXISTING LEVEL	DEPTH OF CUT	DEPTH OF FILL	CH	LWB	LWB	CH	LWB	CH	LWB	CH	LWB	CH	LWB
287+00	231.00	248.19	17.19		248.19	248.19									
287+25	232.00	248.19	16.19		248.19	248.19									
287+50	233.00	248.19	15.19		248.19	248.19									
288+00	234.00	248.19	14.19		248.19	248.19									
288+25	235.00	248.19	13.19		248.19	248.19									
288+50	236.00	248.19	12.19		248.19	248.19									
289+00	237.00	248.19	11.19		248.19	248.19									
289+25	238.00	248.19	10.19		248.19	248.19									
289+50	239.00	248.19	9.19		248.19	248.19									
290+00	240.00	248.19	8.19		248.19	248.19									
290+25	241.00	248.19	7.19		248.19	248.19									
290+50	242.00	248.19	6.19		248.19	248.19									
291+00	243.00	248.19	5.19		248.19	248.19									
291+25	244.00	248.19	4.19		248.19	248.19									
291+50	245.00	248.19	3.19		248.19	248.19									
292+00	246.00	248.19	2.19		248.19	248.19									
292+25	247.00	248.19	1.19		248.19	248.19									
292+50	248.00	248.19	0.19		248.19	248.19									
293+00	249.00	248.19	-0.19	0.19	248.19	248.19									
293+25	250.00	248.19	-1.19	1.19	248.19	248.19									
293+50	251.00	248.19	-2.19	2.19	248.19	248.19									
294+00	252.00	248.19	-3.19	3.19	248.19	248.19									
294+25	253.00	248.19	-4.19	4.19	248.19	248.19									
294+50	254.00	248.19	-5.19	5.19	248.19	248.19									
295+00	255.00	248.19	-6.19	6.19	248.19	248.19									
295+25	256.00	248.19	-7.19	7.19	248.19	248.19									
295+50	257.00	248.19	-8.19	8.19	248.19	248.19									
296+00	258.00	248.19	-9.19	9.19	248.19	248.19									
296+25	259.00	248.19	-10.19	10.19	248.19	248.19									
296+50	260.00	248.19	-11.19	11.19	248.19	248.19									
297+00	261.00	248.19	-12.19	12.19	248.19	248.19									
297+25	262.00	248.19	-13.19	13.19	248.19	248.19									
297+50	263.00	248.19	-14.19	14.19	248.19	248.19									
298+00	264.00	248.19	-15.19	15.19	248.19	248.19									
298+25	265.00	248.19	-16.19	16.19	248.19	248.19									
298+50	266.00	248.19	-17.19	17.19	248.19	248.19									
299+00	267.00	248.19	-18.19	18.19	248.19	248.19									
299+25	268.00	248.19	-19.19	19.19	248.19	248.19									
299+50	269.00	248.19	-20.19	20.19	248.19	248.19									
300+00	270.00	248.19	-21.19	21.19	248.19	248.19									

WIDENING AND STRENGTHENING TO TWO LANE  
PLAN AND LONGITUDINAL SECTION  
(SH-16) KM 52/000 TO KM 53/000

PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT  
UNDER WORLD BANK ASSISTANCE

SCALE: HORIZONTAL 1:5000, VERTICAL 1:500

DATE: / /

BY: / /

REVISIONS:

NO.	DESCRIPTION	DATE

**CONSULTING ENGINEERS GROUP LTD.**  
E-12/1st Colony, Muliyige Nagar, Jaipur-17  
PH: 0141-2520089, 2521641, 2520358  
FAX: 2521346, E-Mail: ceg@cegroupindia.com

**CEG**

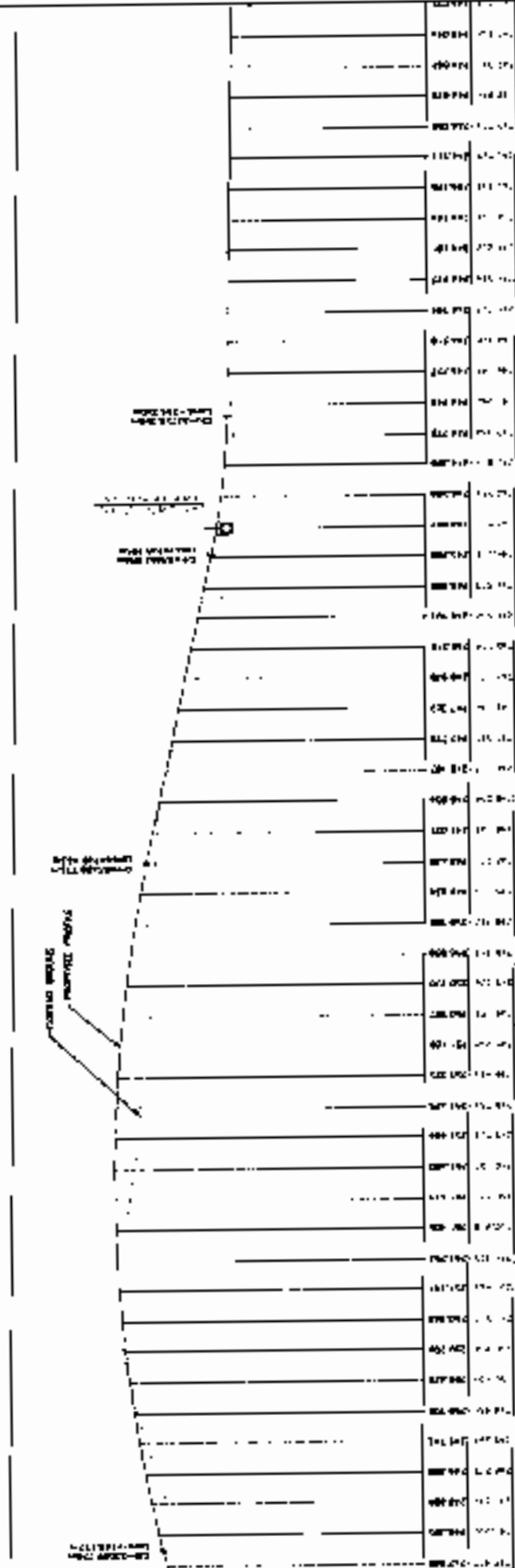
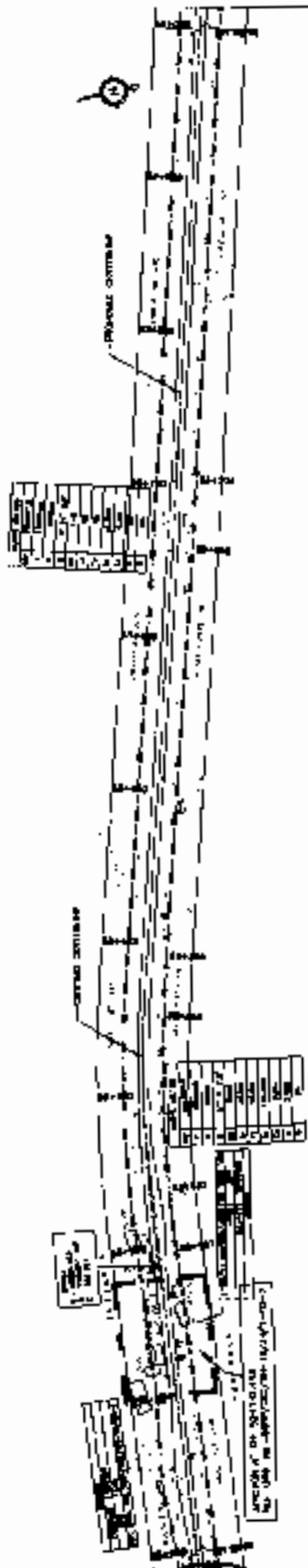
PROJECT: WIDENING AND STRENGTHENING TO TWO LANE (SH-16) KM 52/000 TO KM 53/000

LEGEND:

- PROPOSED CENTERLINE
- EXISTING CENTERLINE
- EXISTING GROUND
- PROPOSED PROFILE
- EXISTING ROAD
- PROPOSED ROAD
- PROPOSED SIDEWALK
- PROPOSED DRAINAGE
- PROPOSED LIGHTING
- PROPOSED SIGNAGE
- PROPOSED FENCE
- PROPOSED UTILITIES
- PROPOSED LANDSCAPING
- PROPOSED VEGETATION
- PROPOSED WATER SUPPLY
- PROPOSED SANITATION
- PROPOSED TELECOMMUNICATIONS
- PROPOSED POWER SUPPLY
- PROPOSED GAS SUPPLY
- PROPOSED OIL SUPPLY
- PROPOSED FUEL SUPPLY
- PROPOSED WATER TOWER
- PROPOSED WATER PUMP
- PROPOSED WATER TREATMENT PLANT
- PROPOSED WASTE TREATMENT PLANT
- PROPOSED WASTE DISPOSAL
- PROPOSED WASTE STORAGE
- PROPOSED WASTE COLLECTION
- PROPOSED WASTE TRANSPORT
- PROPOSED WASTE INCINERATION
- PROPOSED WASTE LANDFILL
- PROPOSED WASTE RECYCLING
- PROPOSED WASTE REUSE
- PROPOSED WASTE ENERGY RECOVERY
- PROPOSED WASTE WATER REUSE
- PROPOSED WASTE WATER TREATMENT
- PROPOSED WASTE WATER COLLECTION
- PROPOSED WASTE WATER TRANSPORT
- PROPOSED WASTE WATER INCINERATION
- PROPOSED WASTE WATER LANDFILL
- PROPOSED WASTE WATER RECYCLING
- PROPOSED WASTE WATER REUSE
- PROPOSED WASTE WATER ENERGY RECOVERY

TO: SUPERINTENDENT

TO: ENGINEER



Stationing	Profile	Notes
0+00	10.00	
0+10	10.50	
0+20	11.00	
0+30	11.50	
0+40	12.00	
0+50	12.50	
0+60	13.00	
0+70	13.50	
0+80	14.00	
0+90	14.50	
1+00	15.00	
1+10	15.50	
1+20	16.00	
1+30	16.50	
1+40	17.00	
1+50	17.50	
1+60	18.00	
1+70	18.50	
1+80	19.00	
1+90	19.50	
2+00	20.00	
2+10	20.50	
2+20	21.00	
2+30	21.50	
2+40	22.00	
2+50	22.50	
2+60	23.00	
2+70	23.50	
2+80	24.00	
2+90	24.50	
3+00	25.00	
3+10	25.50	
3+20	26.00	
3+30	26.50	
3+40	27.00	
3+50	27.50	
3+60	28.00	
3+70	28.50	
3+80	29.00	
3+90	29.50	
4+00	30.00	
4+10	30.50	
4+20	31.00	
4+30	31.50	
4+40	32.00	
4+50	32.50	
4+60	33.00	
4+70	33.50	
4+80	34.00	
4+90	34.50	
5+00	35.00	
5+10	35.50	
5+20	36.00	
5+30	36.50	
5+40	37.00	
5+50	37.50	
5+60	38.00	
5+70	38.50	
5+80	39.00	
5+90	39.50	
6+00	40.00	
6+10	40.50	
6+20	41.00	
6+30	41.50	
6+40	42.00	
6+50	42.50	
6+60	43.00	
6+70	43.50	
6+80	44.00	
6+90	44.50	
7+00	45.00	
7+10	45.50	
7+20	46.00	
7+30	46.50	
7+40	47.00	
7+50	47.50	
7+60	48.00	
7+70	48.50	
7+80	49.00	
7+90	49.50	
8+00	50.00	
8+10	50.50	
8+20	51.00	
8+30	51.50	
8+40	52.00	
8+50	52.50	
8+60	53.00	
8+70	53.50	
8+80	54.00	
8+90	54.50	
9+00	55.00	
9+10	55.50	
9+20	56.00	
9+30	56.50	
9+40	57.00	
9+50	57.50	
9+60	58.00	
9+70	58.50	
9+80	59.00	
9+90	59.50	
10+00	60.00	

Stationing	Profile	Notes
0+00	10.00	
0+10	10.50	
0+20	11.00	
0+30	11.50	
0+40	12.00	
0+50	12.50	
0+60	13.00	
0+70	13.50	
0+80	14.00	
0+90	14.50	
1+00	15.00	
1+10	15.50	
1+20	16.00	
1+30	16.50	
1+40	17.00	
1+50	17.50	
1+60	18.00	
1+70	18.50	
1+80	19.00	
1+90	19.50	
2+00	20.00	
2+10	20.50	
2+20	21.00	
2+30	21.50	
2+40	22.00	
2+50	22.50	
2+60	23.00	
2+70	23.50	
2+80	24.00	
2+90	24.50	
3+00	25.00	
3+10	25.50	
3+20	26.00	
3+30	26.50	
3+40	27.00	
3+50	27.50	
3+60	28.00	
3+70	28.50	
3+80	29.00	
3+90	29.50	
4+00	30.00	
4+10	30.50	
4+20	31.00	
4+30	31.50	
4+40	32.00	
4+50	32.50	
4+60	33.00	
4+70	33.50	
4+80	34.00	
4+90	34.50	
5+00	35.00	
5+10	35.50	
5+20	36.00	
5+30	36.50	
5+40	37.00	
5+50	37.50	
5+60	38.00	
5+70	38.50	
5+80	39.00	
5+90	39.50	
6+00	40.00	
6+10	40.50	
6+20	41.00	
6+30	41.50	
6+40	42.00	
6+50	42.50	
6+60	43.00	
6+70	43.50	
6+80	44.00	
6+90	44.50	
7+00	45.00	
7+10	45.50	
7+20	46.00	
7+30	46.50	
7+40	47.00	
7+50	47.50	
7+60	48.00	
7+70	48.50	
7+80	49.00	
7+90	49.50	
8+00	50.00	
8+10	50.50	
8+20	51.00	
8+30	51.50	
8+40	52.00	
8+50	52.50	
8+60	53.00	
8+70	53.50	
8+80	54.00	
8+90	54.50	
9+00	55.00	
9+10	55.50	
9+20	56.00	
9+30	56.50	
9+40	57.00	
9+50	57.50	
9+60	58.00	
9+70	58.50	
9+80	59.00	
9+90	59.50	
10+00	60.00	

**WIDENING AND STRENGTHENING TO TWO LANES**  
 PLAN A-10 ORIGINAL SECTION  
 (SH-10) KM 33/300 TO KM 34/000

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR GR 68A STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**CONSULTING ENGINEERS GROUP LTD.**  
 C-13/63 Darya Ganga Road, New Delhi  
 Tel: 261 25004, 2244444, 2244444  
 Fax: 261 25111, 2244444

**LEGEND**

1.	Proposed Road
2.	Proposed Pavement
3.	Proposed Subgrade
4.	Proposed Drainage
5.	Proposed Utility Lines
6.	Proposed Bridge
7.	Proposed Culvert
8.	Proposed Retaining Wall
9.	Proposed Earth Retention
10.	Proposed Embankment
11.	Proposed Cutting
12.	Proposed Road Shoulder
13.	Proposed Road Edge
14.	Proposed Road Centerline
15.	Proposed Road Right-of-Way
16.	Proposed Road Left-of-Way
17.	Proposed Road Right-of-Way
18.	Proposed Road Left-of-Way
19.	Proposed Road Right-of-Way
20.	Proposed Road Left-of-Way

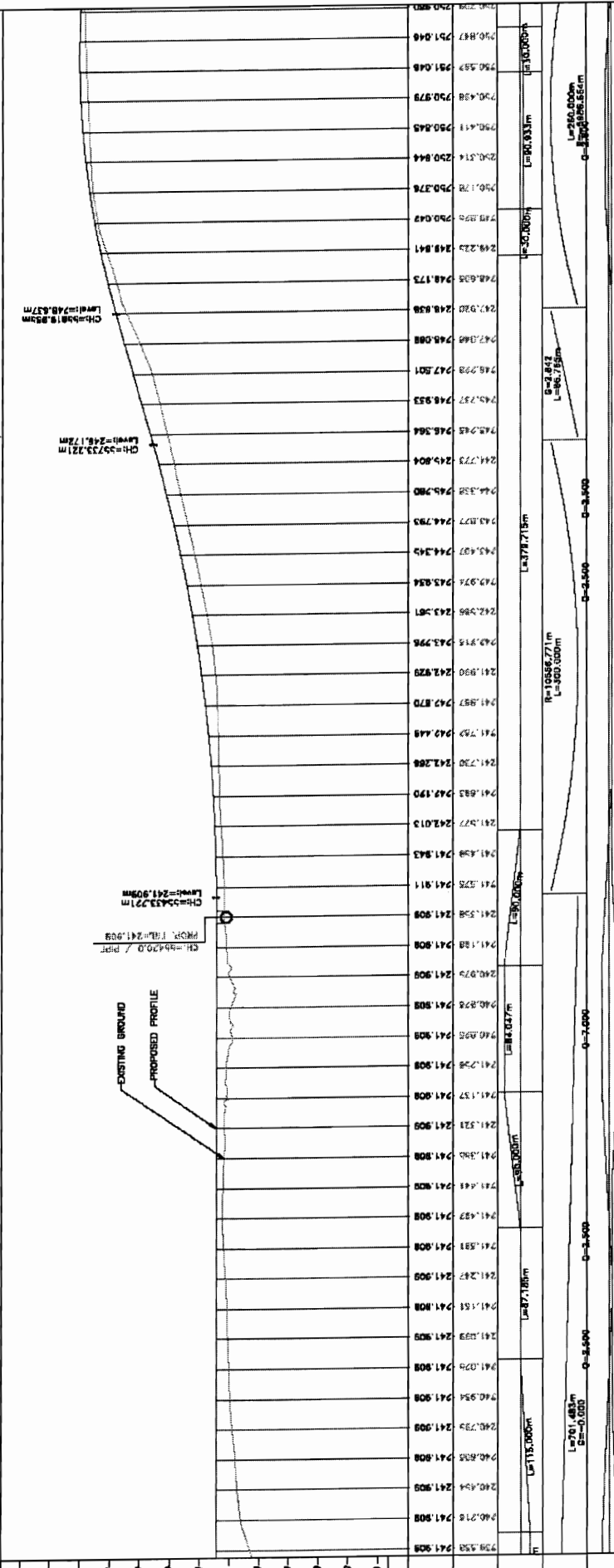
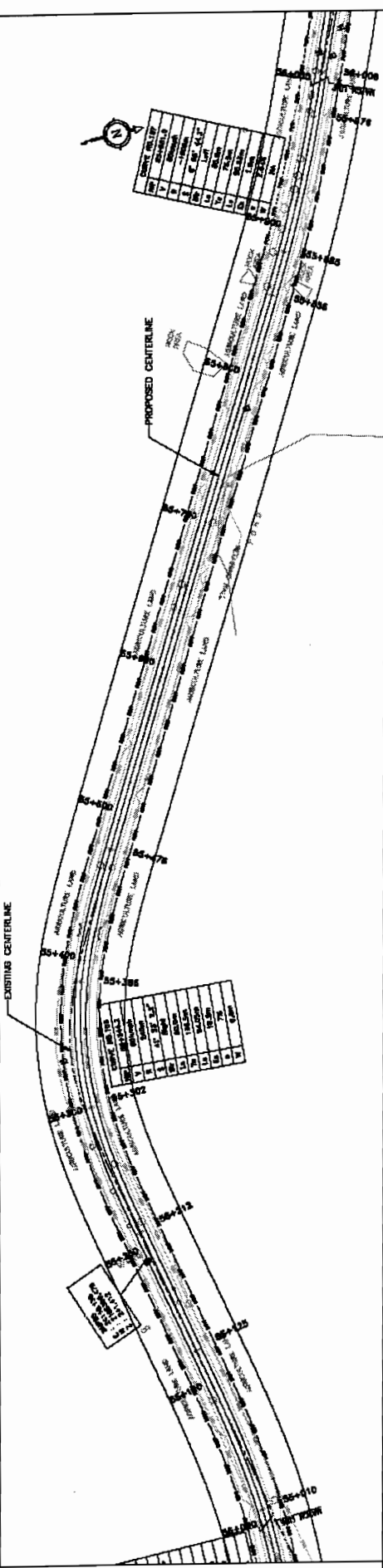


PATEL PROJECTS LTD.  
 CONTRACT



TO BE REPAIR/

TO REPAIR



Stationing	Proposed Elevation	Existing Ground Elevation	Vertical Curve Data
5500.000	241.908	241.908	
5520.000	241.908	241.908	
5540.000	241.908	241.908	
5560.000	241.908	241.908	
5580.000	241.908	241.908	
5600.000	241.908	241.908	
5620.000	241.908	241.908	
5640.000	241.908	241.908	
5660.000	241.908	241.908	
5680.000	241.908	241.908	
5700.000	241.908	241.908	
5720.000	241.908	241.908	
5740.000	241.908	241.908	
5760.000	241.908	241.908	
5780.000	241.908	241.908	
5800.000	241.908	241.908	
5820.000	241.908	241.908	
5840.000	241.908	241.908	
5860.000	241.908	241.908	
5880.000	241.908	241.908	
5900.000	241.908	241.908	
5920.000	241.908	241.908	
5940.000	241.908	241.908	
5960.000	241.908	241.908	
5980.000	241.908	241.908	
6000.000	241.908	241.908	

PATEL - ARS JV  
CONTRACTOR

**WIDENING AND STRENGTHENING TO TWO LANE  
PLAN AND LONGITUDINAL SECTION  
(SH-16) KM 55/000 TO KM 56/000**

**PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT  
UNDER WORLD BANK ASSISTANCE**

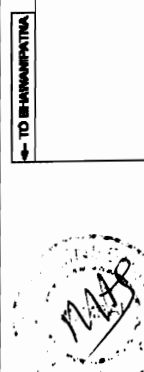
**CONSULTING  
ENGINEERS GROUP LTD.**  
E-17, 1st Floor, Gokulnagar, Ring Road, Cuttack-751 005  
Ph: 2521141, 2521142, 2521143, 2521144, 2521145  
Fax: 2521146, 2521147, 2521148, 2521149, 2521150  
E-mail: ceg@cegroupindia.com

**LEGEND**

	PROPOSED CENTERLINE
	EXISTING CENTERLINE
	ROAD EDGE
	RIGHT OF WAY BOUNDARY
	SURVEY STATION
	LEVEL SPOT
	PROPOSED PROFILE
	EXISTING GROUND PROFILE
	ROAD ALIGNMENT
	ROAD WIDTH
	ROAD SHOULDER
	ROAD BED
	ROAD SUBGRADE
	ROAD PAVEMENT
	ROAD DRAINAGE
	ROAD BRIDGE
	ROAD TUNNEL
	ROAD CULVERT
	ROAD UNDERPASS
	ROAD OVERPASS
	ROAD RETENTION WALL
	ROAD EMBANKMENT
	ROAD CUTTING
	ROAD BRIDGE PIER
	ROAD BRIDGE ABUTMENT
	ROAD BRIDGE DECK
	ROAD BRIDGE APPROACH
	ROAD BRIDGE PIER CAP
	ROAD BRIDGE ABUTMENT CAP
	ROAD BRIDGE DECK SLAB
	ROAD BRIDGE PIER SPIGOT
	ROAD BRIDGE ABUTMENT SPIGOT
	ROAD BRIDGE DECK JOINT
	ROAD BRIDGE PIER JOINT
	ROAD BRIDGE ABUTMENT JOINT
	ROAD BRIDGE DECK EXPANSION JOINT
	ROAD BRIDGE PIER EXPANSION JOINT
	ROAD BRIDGE ABUTMENT EXPANSION JOINT
	ROAD BRIDGE DECK CONSTRUCTION JOINT
	ROAD BRIDGE PIER CONSTRUCTION JOINT
	ROAD BRIDGE ABUTMENT CONSTRUCTION JOINT







PATEL JV  
CONTRACTOR

World Bank Project  
EMPLOYER  
O/o the E.L.C. (Civil) Orissa,  
Bhubaneswar.

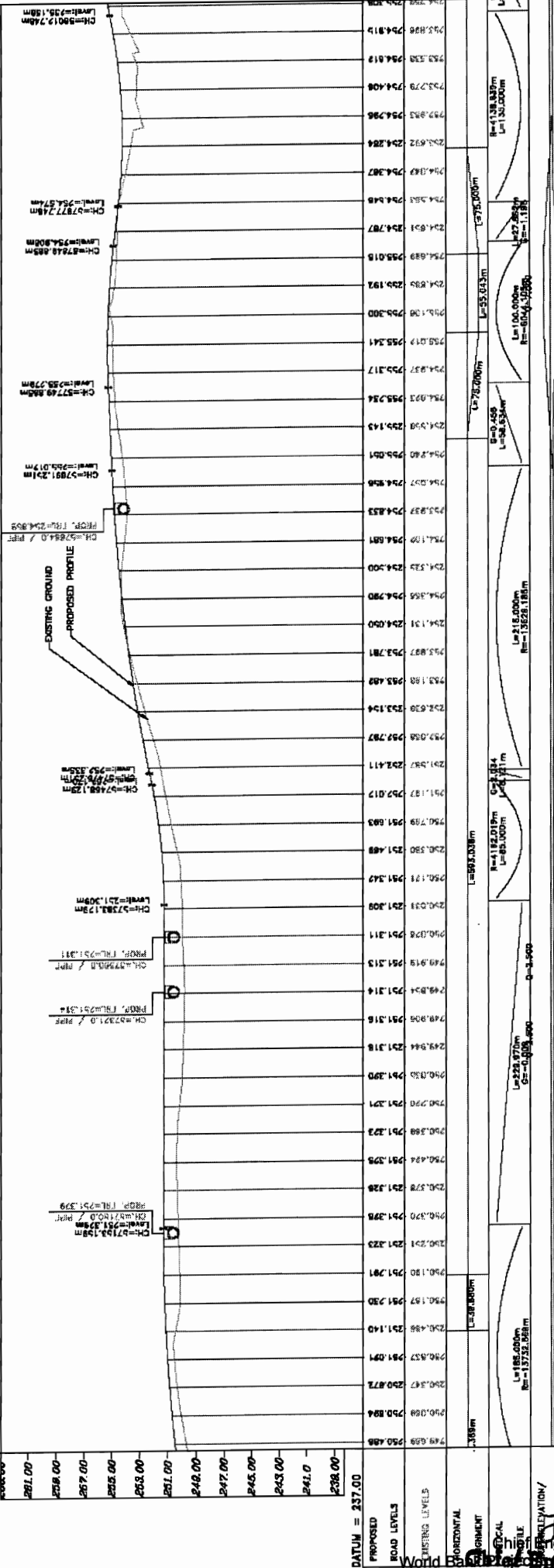
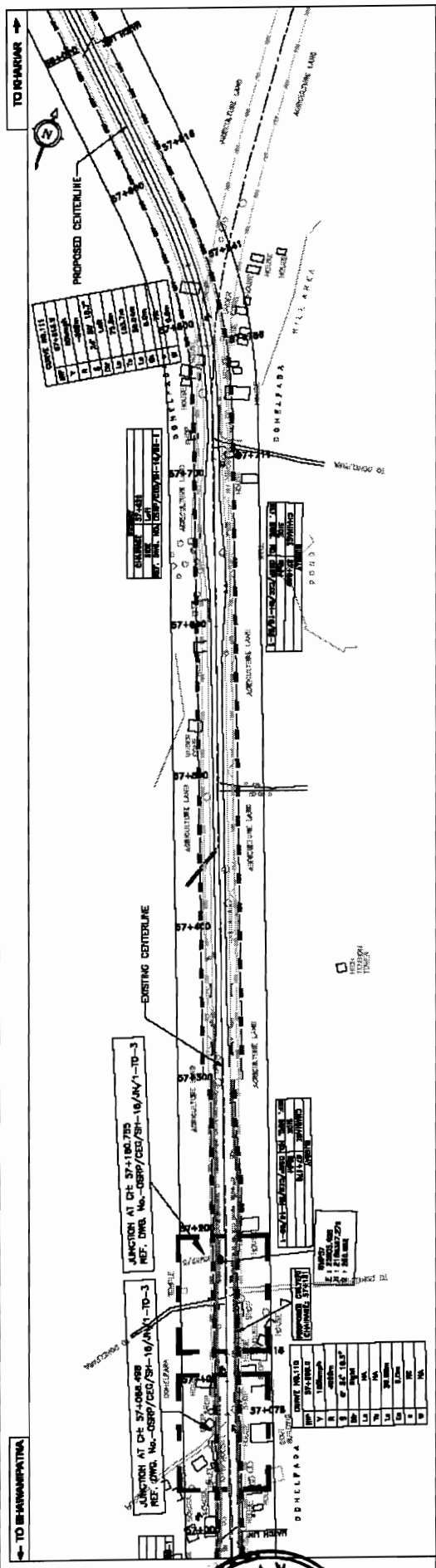
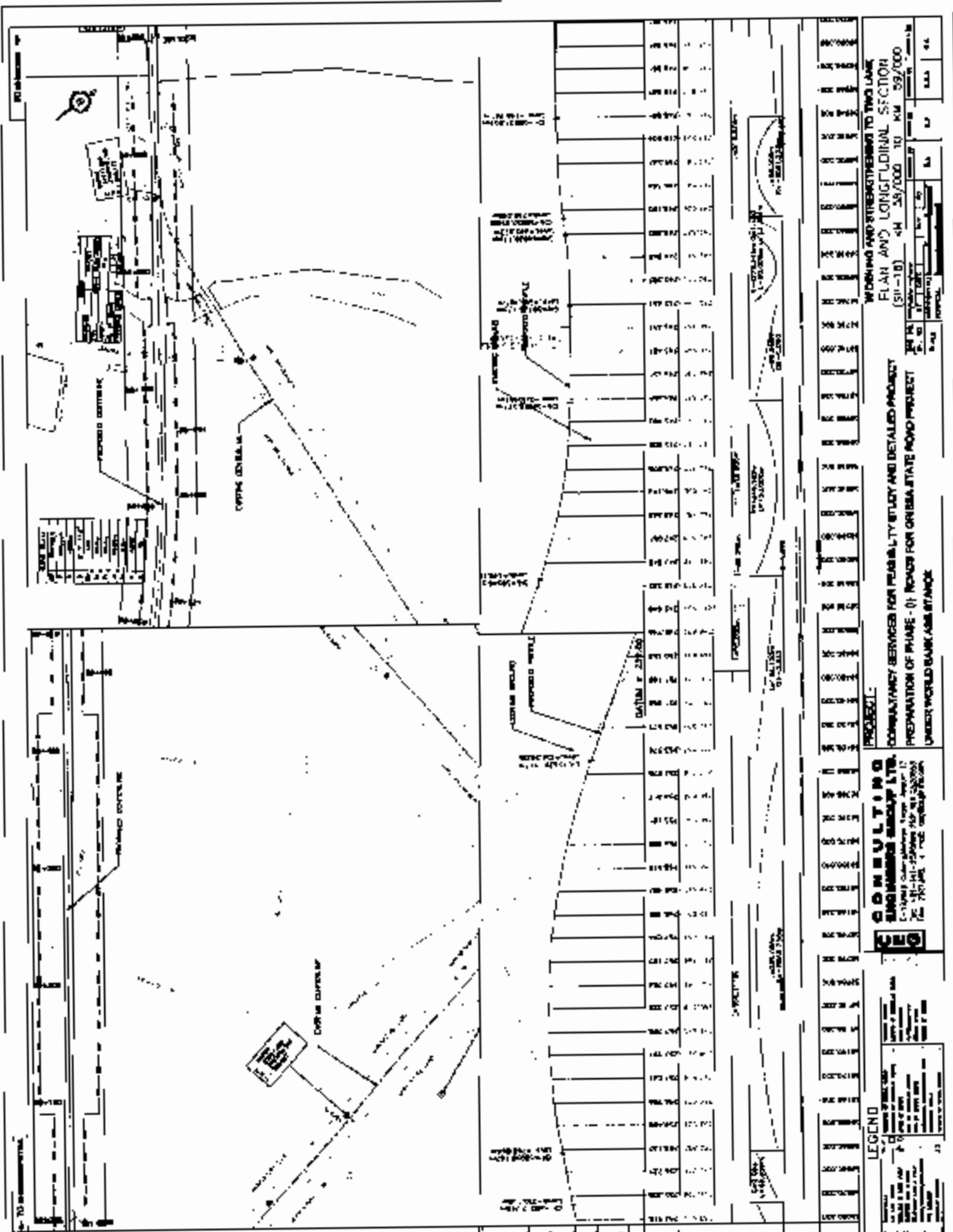


Table with columns for stationing (e.g., 57500.000 to 58000.000) and corresponding elevations for existing ground and proposed road levels.

PROJECT: WIDENING AND STRENGTHENING TO TWO LANE (SH-16) KM 57/000 TO KM 58/000  
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  
LEGEND: Symbols for various road features like centerline, agricultural lands, etc.



WORKING AND STRENGTHENED TO TWO LANE  
 PLAN AND LONGITUDINAL SECTION  
 (SI - 18) 4H 25/000 TO KM 59/000

COMPANANY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE - 0) ROAD FOR ORISSA STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

**CONSULTING ENGINEERS**  
 SANGHVI ENGINEERING & ARCHITECTURE  
 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

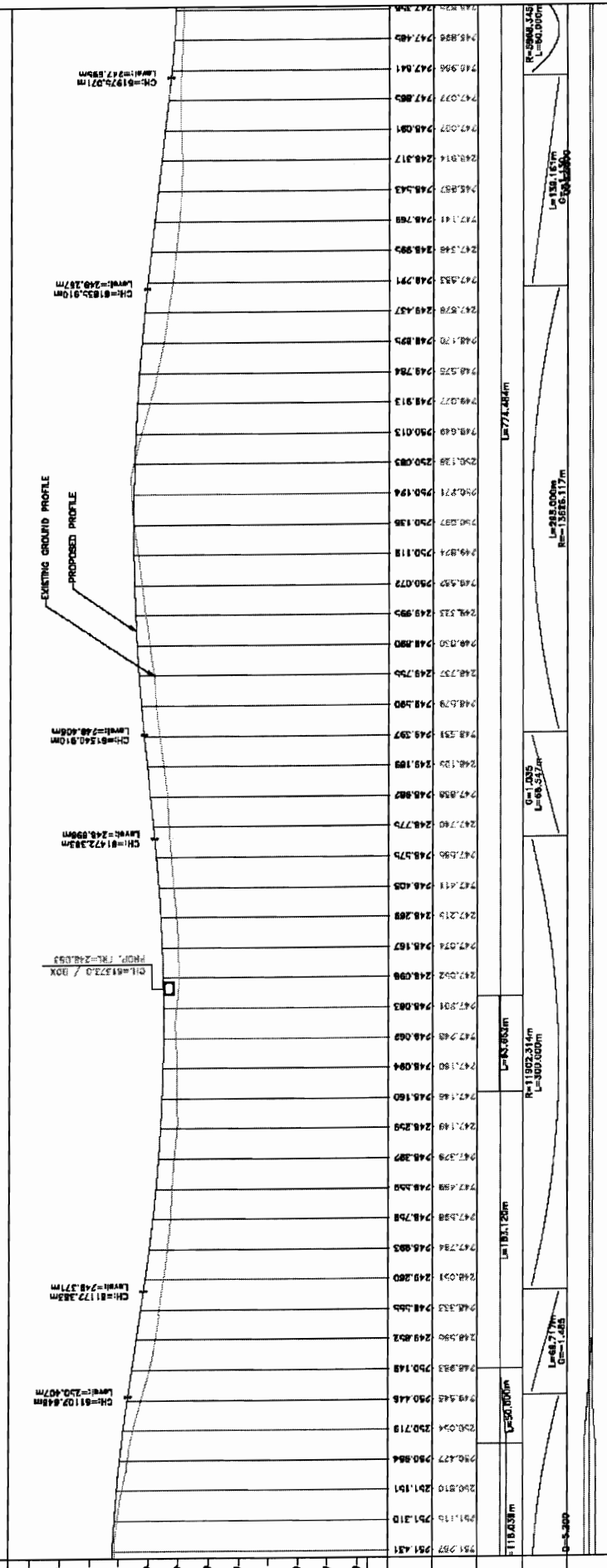
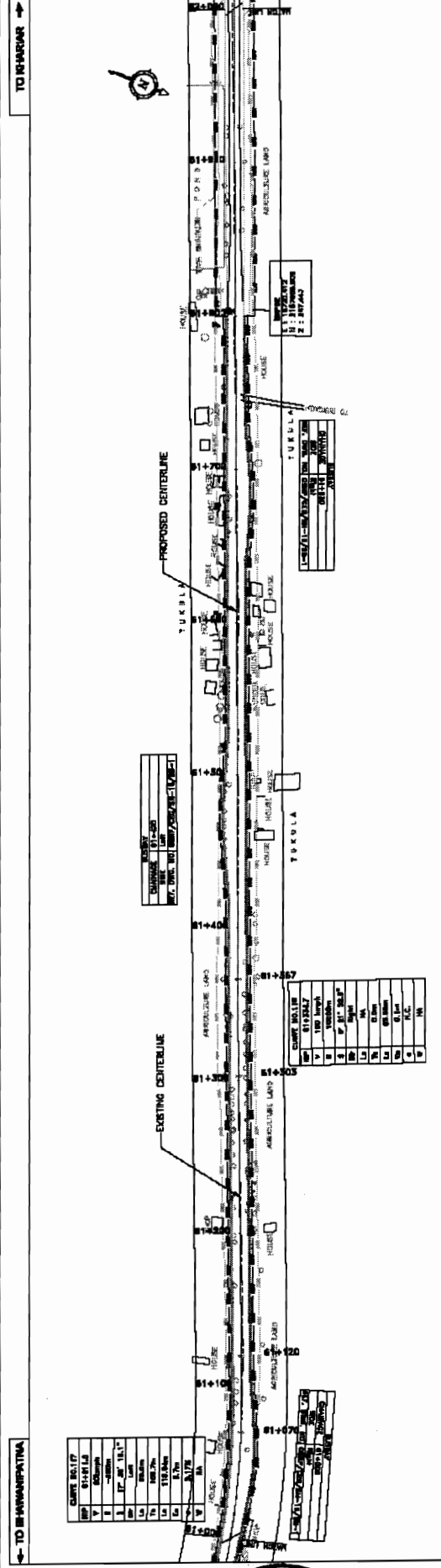
**LEGEND**  
 PROPOSED ROAD  
 EXISTING ROAD  
 PROPOSED DRAINAGE  
 EXISTING DRAINAGE



World Bank Project  
 (to the E.L.C. (Civil) Office)  
 Hubballiwar:





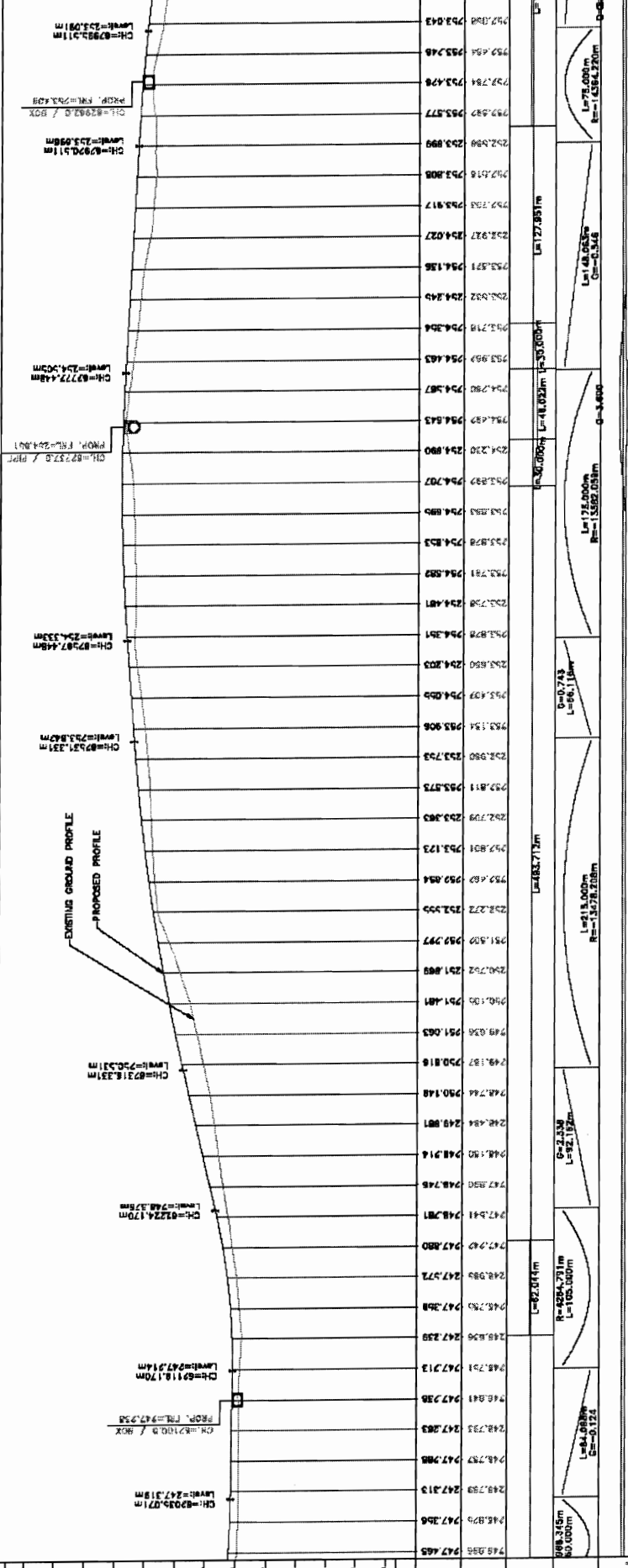
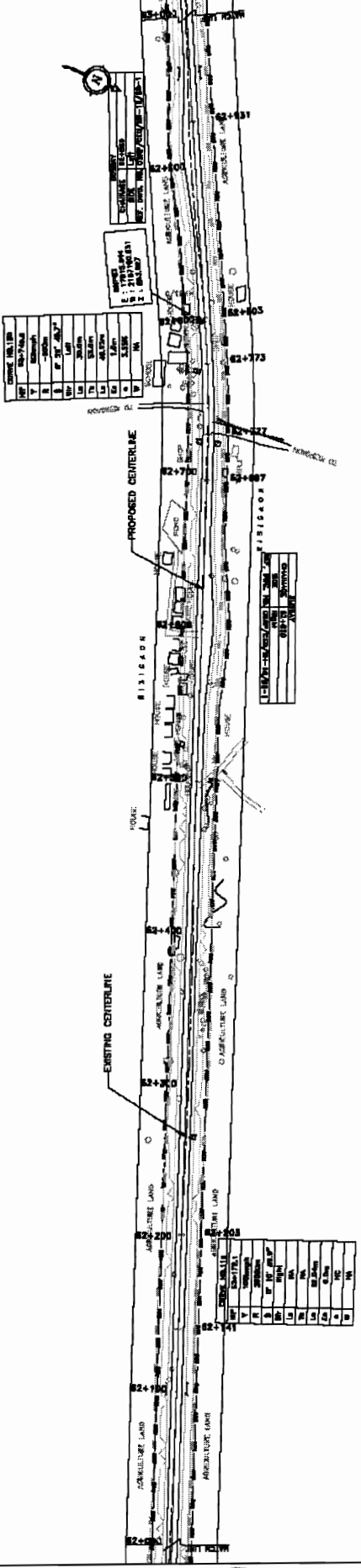


DATUM = 233.00

PROPOSED ROAD LEVELS	EXISTING LEVELS	HORIZONTAL ALIGNMENT	VERTICAL CURVE DATA
235.00	231.810	L=118.63m	G=5.300
237.00	241.151	L=50.00m	G=1.265
239.00	250.427	L=181.125m	R=11902.214m
241.0	260.719	L=62.832m	L=400.000m
243.00	270.910	G=1.035	L=68.517m
245.00	281.151	L=71.844m	R=130.161m
247.00	291.446		G=3.860
249.00	301.741		R=130.161m
251.00	312.036		G=3.860
253.00	322.331		R=130.161m
255.00	332.626		G=3.860
257.00	342.921		R=130.161m
259.00	353.216		G=3.860
261.0	363.511		R=130.161m
263.00	373.806		G=3.860
265.00	384.101		R=130.161m
267.00	394.396		G=3.860
269.00	404.691		R=130.161m
271.00	414.986		G=3.860
273.00	425.281		R=130.161m
275.00	435.576		G=3.860
277.00	445.871		R=130.161m
279.00	456.166		G=3.860
281.00	466.461		R=130.161m
283.00	476.756		G=3.860
285.00	487.051		R=130.161m
287.00	497.346		G=3.860
289.00	507.641		R=130.161m
291.00	517.936		G=3.860
293.00	528.231		R=130.161m
295.00	538.526		G=3.860
297.00	548.821		R=130.161m
299.00	559.116		G=3.860
301.00	569.411		R=130.161m
303.00	579.706		G=3.860
305.00	590.001		R=130.161m
307.00	600.296		G=3.860
309.00	610.591		R=130.161m
311.00	620.886		G=3.860
313.00	631.181		R=130.161m
315.00	641.476		G=3.860
317.00	651.771		R=130.161m
319.00	662.066		G=3.860
321.00	672.361		R=130.161m
323.00	682.656		G=3.860
325.00	692.951		R=130.161m
327.00	703.246		G=3.860
329.00	713.541		R=130.161m
331.00	723.836		G=3.860
333.00	734.131		R=130.161m
335.00	744.426		G=3.860
337.00	754.721		R=130.161m
339.00	765.016		G=3.860
341.00	775.311		R=130.161m
343.00	785.606		G=3.860
345.00	795.901		R=130.161m
347.00	806.196		G=3.860
349.00	816.491		R=130.161m
351.00	826.786		G=3.860
353.00	837.081		R=130.161m
355.00	847.376		G=3.860
357.00	857.671		R=130.161m
359.00	867.966		G=3.860
361.00	878.261		R=130.161m
363.00	888.556		G=3.860
365.00	898.851		R=130.161m
367.00	909.146		G=3.860
369.00	919.441		R=130.161m
371.00	929.736		G=3.860
373.00	940.031		R=130.161m
375.00	950.326		G=3.860
377.00	960.621		R=130.161m
379.00	970.916		G=3.860
381.00	981.211		R=130.161m
383.00	991.506		G=3.860
385.00	1001.801		R=130.161m
387.00	1012.096		G=3.860
389.00	1022.391		R=130.161m
391.00	1032.686		G=3.860
393.00	1042.981		R=130.161m
395.00	1053.276		G=3.860
397.00	1063.571		R=130.161m
399.00	1073.866		G=3.860
401.00	1084.161		R=130.161m
403.00	1094.456		G=3.860
405.00	1104.751		R=130.161m
407.00	1115.046		G=3.860
409.00	1125.341		R=130.161m
411.00	1135.636		G=3.860
413.00	1145.931		R=130.161m
415.00	1156.226		G=3.860
417.00	1166.521		R=130.161m
419.00	1176.816		G=3.860
421.00	1187.111		R=130.161m
423.00	1197.406		G=3.860
425.00	1207.701		R=130.161m
427.00	1217.996		G=3.860
429.00	1228.291		R=130.161m
431.00	1238.586		G=3.860
433.00	1248.881		R=130.161m
435.00	1259.176		G=3.860
437.00	1269.471		R=130.161m
439.00	1279.766		G=3.860
441.00	1290.061		R=130.161m
443.00	1300.356		G=3.860
445.00	1310.651		R=130.161m
447.00	1320.946		G=3.860
449.00	1331.241		R=130.161m
451.00	1341.536		G=3.860
453.00	1351.831		R=130.161m
455.00	1362.126		G=3.860
457.00	1372.421		R=130.161m
459.00	1382.716		G=3.860
461.00	1393.011		R=130.161m
463.00	1403.306		G=3.860
465.00	1413.601		R=130.161m
467.00	1423.896		G=3.860
469.00	1434.191		R=130.161m
471.00	1444.486		G=3.860
473.00	1454.781		R=130.161m
475.00	1465.076		G=3.860
477.00	1475.371		R=130.161m
479.00	1485.666		G=3.860
481.00	1495.961		R=130.161m
483.00	1506.256		G=3.860
485.00	1516.551		R=130.161m
487.00	1526.846		G=3.860
489.00	1537.141		R=130.161m
491.00	1547.436		G=3.860
493.00	1557.731		R=130.161m
495.00	1568.026		G=3.860
497.00	1578.321		R=130.161m
499.00	1588.616		G=3.860
501.00	1598.911		R=130.161m
503.00	1609.206		G=3.860
505.00	1619.501		R=130.161m
507.00	1629.796		G=3.860
509.00	1640.091		R=130.161m
511.00	1650.386		G=3.860
513.00	1660.681		R=130.161m
515.00	1670.976		G=3.860
517.00	1681.271		R=130.161m
519.00	1691.566		G=3.860
521.00	1701.861		R=130.161m
523.00	1712.156		G=3.860
525.00	1722.451		R=130.161m
527.00	1732.746		G=3.860
529.00	1743.041		R=130.161m
531.00	1753.336		G=3.860
533.00	1763.631		R=130.161m
535.00	1773.926		G=3.860
537.00	1784.221		R=130.161m
539.00	1794.516		G=3.860
541.00	1804.811		R=130.161m
543.00	1815.106		G=3.860
545.00	1825.401		R=130.161m
547.00	1835.696		G=3.860
549.00	1845.991		R=130.161m
551.00	1856.286		G=3.860
553.00	1866.581		R=130.161m
555.00	1876.876		G=3.860
557.00	1887.171		R=130.161m
559.00	1897.466		G=3.860
561.00	1907.761		R=130.161m
563.00	1918.056		G=3.860
565.00	1928.351		R=130.161m
567.00	1938.646		G=3.860
569.00	1948.941		R=130.161m
571.00	1959.236		G=3.860
573.00	1969.531		R=130.161m
575.00	1979.826		G=3.860
577.00	1990.121		R=130.161m
579.00	2000.416		G=3.860
581.00	2010.711		R=130.161m
583.00	2021.006		G=3.860
585.00	2031.301		R=130.161m
587.00	2041.596		G=3.860
589.00	2051.891		R=130.161m
591.00	2062.186		G=3.860
593.00	2072.481		R=130.161m
595.00	2082.776		G=3.860
597.00	2093.071		R=130.161m
599.00	2103.366		G=3.860
601.00	2113.661		R=130.161m
603.00	2123.956		G=3.860
605.00	2134.251		R=130.161m
607.00	2144.546		G=3.860
609.00	2154.841		R=130.161m
611.00	2165.136		G=3.860
613.00	2175.431		R=130.161m
615.00	2185.726		G=3.860
617.00	2196.021		R=130.161m
619.00	2206.316		G=3.860
621.00	2216.611		R=130.161m
623.00	2226.906		G=3.860
625.00	2237.201		R=130.161m
627.00	2247.496		G=3.860
629.00	2257.791		R=130.161m
631.00	2268.086		G=3.860
633.00	2278.381		R=130.161m
635.00	2288.676		G=3.860
637.00	2298.971		R=130.161m
639.00	2309.266		G=3.860
641.00	2319.561		R=130.161m
643.00	2329.856		G=3.860
645.00	2340.151		R=130.161m
647.00	2350.446		G=3.860
649.00	2360.741		R=130.161m
651.00	2371.036		G=3.860
653.00	2381.331		R=130.161m
655.00	2391.626		G=3.860
657.00	2401.921		R=130.161m
659.00	2412.216		G=3.860
661.00	2422.511		R=130.161m
663.00	2432.806		G=3.860
665.00	2443.101		R=130.161m
667.00	2453.396		G=3.860
669.00	2463.691		R=130.161m
671.00	2473.986		G=3.860
673.00	2484.281		R=130.161m
675.00	2494.576		G=3.860
677.00	2504.871		R=130.161m
679.00	2515.166		G=3.860
681.00	2525.461		R=130.161m
683.00	2535.756		G=3.860
685.00	2546.051		R=130.161m
687.00	2556.346		G=3.860
689.00	2566.641		R=130.161m
691.00	2576.936		G=3.860
693.00	2587.231		R=130.161m
695.00	2597.526		G=3.860
697.00	2607.821		R=130.161m
699.00	2618.116		G=3.860
701.00	2628.411		R=130.161m
703.00	26		

← TO BHAWANIPATNA

TO BHARWAR →



Station	Proposed Road Level	Existing Ground Level
0+00	247.465	247.465
0+10	247.366	247.366
0+20	247.213	247.213
0+30	247.238	247.238
0+40	247.385	247.385
0+50	247.373	247.373
0+60	247.398	247.398
0+70	247.398	247.398
0+80	247.398	247.398
0+90	247.398	247.398
1+00	247.398	247.398
1+10	247.398	247.398
1+20	247.398	247.398
1+30	247.398	247.398
1+40	247.398	247.398
1+50	247.398	247.398
1+60	247.398	247.398
1+70	247.398	247.398
1+80	247.398	247.398
1+90	247.398	247.398
2+00	247.398	247.398
2+10	247.398	247.398
2+20	247.398	247.398
2+30	247.398	247.398
2+40	247.398	247.398
2+50	247.398	247.398
2+60	247.398	247.398
2+70	247.398	247.398
2+80	247.398	247.398
2+90	247.398	247.398
3+00	247.398	247.398
3+10	247.398	247.398
3+20	247.398	247.398
3+30	247.398	247.398
3+40	247.398	247.398
3+50	247.398	247.398
3+60	247.398	247.398
3+70	247.398	247.398
3+80	247.398	247.398
3+90	247.398	247.398
4+00	247.398	247.398
4+10	247.398	247.398
4+20	247.398	247.398
4+30	247.398	247.398
4+40	247.398	247.398
4+50	247.398	247.398
4+60	247.398	247.398
4+70	247.398	247.398
4+80	247.398	247.398
4+90	247.398	247.398
5+00	247.398	247.398
5+10	247.398	247.398
5+20	247.398	247.398
5+30	247.398	247.398
5+40	247.398	247.398
5+50	247.398	247.398
5+60	247.398	247.398
5+70	247.398	247.398
5+80	247.398	247.398
5+90	247.398	247.398
6+00	247.398	247.398
6+10	247.398	247.398
6+20	247.398	247.398
6+30	247.398	247.398
6+40	247.398	247.398
6+50	247.398	247.398
6+60	247.398	247.398
6+70	247.398	247.398
6+80	247.398	247.398
6+90	247.398	247.398
7+00	247.398	247.398
7+10	247.398	247.398
7+20	247.398	247.398
7+30	247.398	247.398
7+40	247.398	247.398
7+50	247.398	247.398
7+60	247.398	247.398
7+70	247.398	247.398
7+80	247.398	247.398
7+90	247.398	247.398
8+00	247.398	247.398
8+10	247.398	247.398
8+20	247.398	247.398
8+30	247.398	247.398
8+40	247.398	247.398
8+50	247.398	247.398
8+60	247.398	247.398
8+70	247.398	247.398
8+80	247.398	247.398
8+90	247.398	247.398
9+00	247.398	247.398
9+10	247.398	247.398
9+20	247.398	247.398
9+30	247.398	247.398
9+40	247.398	247.398
9+50	247.398	247.398
9+60	247.398	247.398
9+70	247.398	247.398
9+80	247.398	247.398
9+90	247.398	247.398
10+00	247.398	247.398

**PROJECT:**  
**WIDENING AND STRENGTHENING TO TWO LANE**  
**PLAN AND LONGITUDINAL SECTION**  
**(SH-16) KM 62/000 TO KM 63/000**

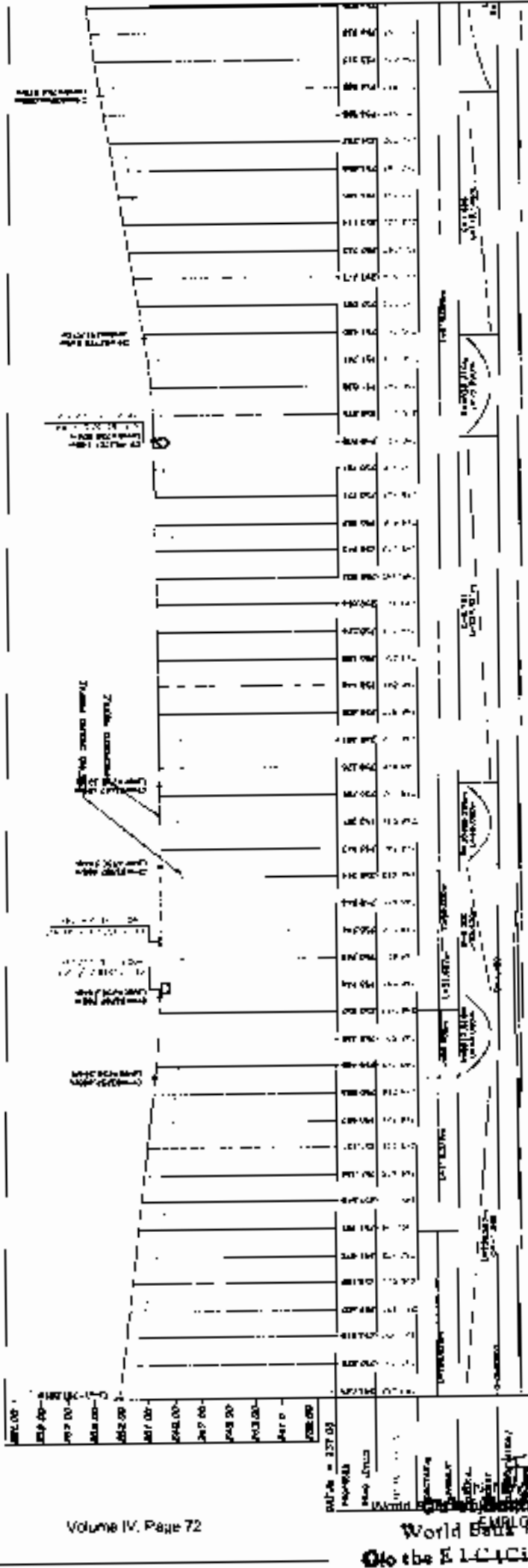
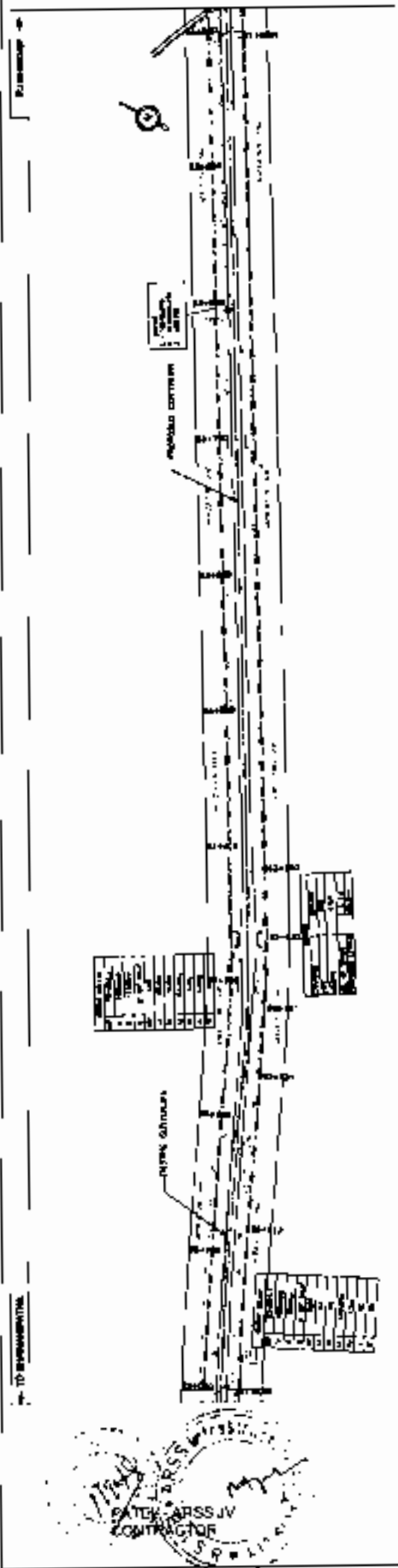
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, 1st Floor, Chhatrapati Shivaji Maharaj Road, Lucknow-226002  
 Tel: +91-522-260888, 2621088, 2620558  
 Fax: +91-522-2621348, e-mail: cog@cegroup.co.uk

**LEGEND**

PROPOSED ROAD	EXISTING ROAD
PROPOSED CENTERLINE	EXISTING CENTERLINE
PROPOSED RIGHT OF WAY	EXISTING RIGHT OF WAY
PROPOSED GRADE	EXISTING GRADE
PROPOSED ELEVATION	EXISTING ELEVATION
PROPOSED ROAD WIDTH	EXISTING ROAD WIDTH
PROPOSED ROAD SURFACE	EXISTING ROAD SURFACE
PROPOSED ROAD DRAINAGE	EXISTING ROAD DRAINAGE
PROPOSED ROAD STRUCTURE	EXISTING ROAD STRUCTURE
PROPOSED ROAD MATERIAL	EXISTING ROAD MATERIAL
PROPOSED ROAD TYPE	EXISTING ROAD TYPE
PROPOSED ROAD CLASSIFICATION	EXISTING ROAD CLASSIFICATION
PROPOSED ROAD DESIGN	EXISTING ROAD DESIGN
PROPOSED ROAD CONSTRUCTION	EXISTING ROAD CONSTRUCTION
PROPOSED ROAD MAINTENANCE	EXISTING ROAD MAINTENANCE
PROPOSED ROAD OPERATIONAL	EXISTING ROAD OPERATIONAL
PROPOSED ROAD ECONOMIC	EXISTING ROAD ECONOMIC
PROPOSED ROAD SOCIAL	EXISTING ROAD SOCIAL
PROPOSED ROAD ENVIRONMENTAL	EXISTING ROAD ENVIRONMENTAL
PROPOSED ROAD CULTURAL	EXISTING ROAD CULTURAL
PROPOSED ROAD HISTORICAL	EXISTING ROAD HISTORICAL
PROPOSED ROAD LEGAL	EXISTING ROAD LEGAL
PROPOSED ROAD POLITICAL	EXISTING ROAD POLITICAL
PROPOSED ROAD RELIGIOUS	EXISTING ROAD RELIGIOUS
PROPOSED ROAD ETHNIC	EXISTING ROAD ETHNIC
PROPOSED ROAD LINGUISTIC	EXISTING ROAD LINGUISTIC
PROPOSED ROAD RACIAL	EXISTING ROAD RACIAL
PROPOSED ROAD SEXUAL	EXISTING ROAD SEXUAL
PROPOSED ROAD AGE	EXISTING ROAD AGE
PROPOSED ROAD DISABILITY	EXISTING ROAD DISABILITY
PROPOSED ROAD OTHER	EXISTING ROAD OTHER

**ARSS Infrastructure Projects**  
 Patel - 1866 JV  
 CONTRACTOR



STATION	ELEVATION	REMARKS
0+00	100.00	ROAD PROFILE
0+10	100.50	
0+20	101.00	
0+30	101.50	
0+40	102.00	
0+50	102.50	
0+60	103.00	
0+70	103.50	
0+80	104.00	
0+90	104.50	
1+00	105.00	
1+10	105.50	
1+20	106.00	
1+30	106.50	
1+40	107.00	
1+50	107.50	
1+60	108.00	
1+70	108.50	
1+80	109.00	
1+90	109.50	
2+00	110.00	
2+10	110.50	
2+20	111.00	
2+30	111.50	
2+40	112.00	
2+50	112.50	
2+60	113.00	
2+70	113.50	
2+80	114.00	
2+90	114.50	
3+00	115.00	
3+10	115.50	
3+20	116.00	
3+30	116.50	
3+40	117.00	
3+50	117.50	
3+60	118.00	
3+70	118.50	
3+80	119.00	
3+90	119.50	
4+00	120.00	
4+10	120.50	
4+20	121.00	
4+30	121.50	
4+40	122.00	
4+50	122.50	
4+60	123.00	
4+70	123.50	
4+80	124.00	
4+90	124.50	
5+00	125.00	
5+10	125.50	
5+20	126.00	
5+30	126.50	
5+40	127.00	
5+50	127.50	
5+60	128.00	
5+70	128.50	
5+80	129.00	
5+90	129.50	
6+00	130.00	
6+10	130.50	
6+20	131.00	
6+30	131.50	
6+40	132.00	
6+50	132.50	
6+60	133.00	
6+70	133.50	
6+80	134.00	
6+90	134.50	
7+00	135.00	
7+10	135.50	
7+20	136.00	
7+30	136.50	
7+40	137.00	
7+50	137.50	
7+60	138.00	
7+70	138.50	
7+80	139.00	
7+90	139.50	
8+00	140.00	
8+10	140.50	
8+20	141.00	
8+30	141.50	
8+40	142.00	
8+50	142.50	
8+60	143.00	
8+70	143.50	
8+80	144.00	
8+90	144.50	
9+00	145.00	
9+10	145.50	
9+20	146.00	
9+30	146.50	
9+40	147.00	
9+50	147.50	
9+60	148.00	
9+70	148.50	
9+80	149.00	
9+90	149.50	
10+00	150.00	

DATE: 12/15/05  
 BY: [Signature]  
 CHECKED: [Signature]  
 APPROVED: [Signature]

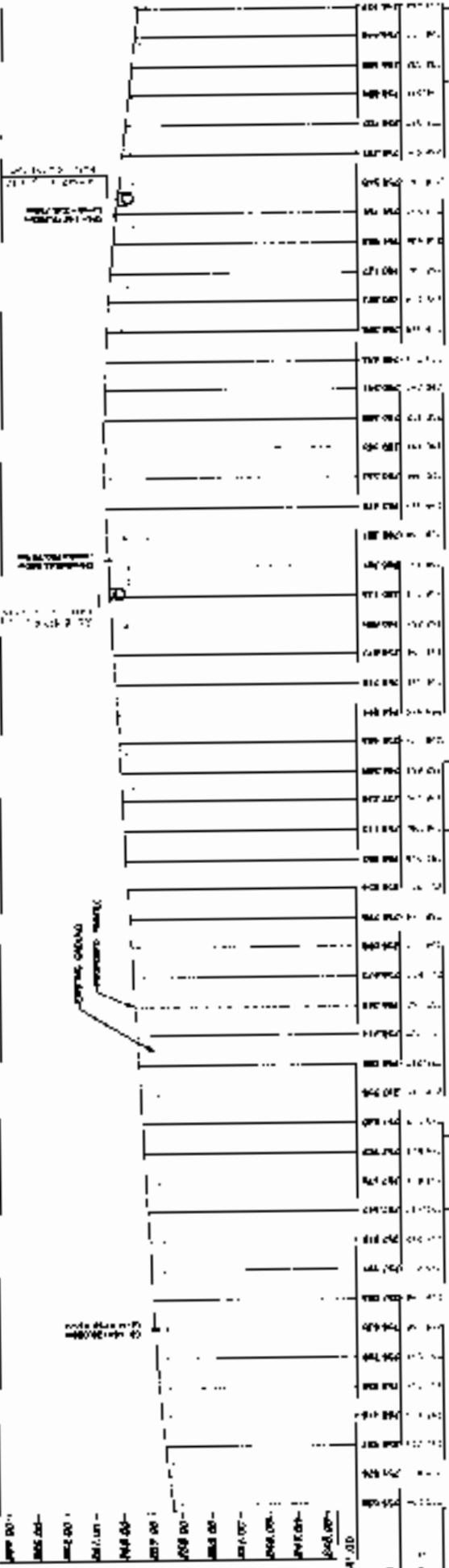
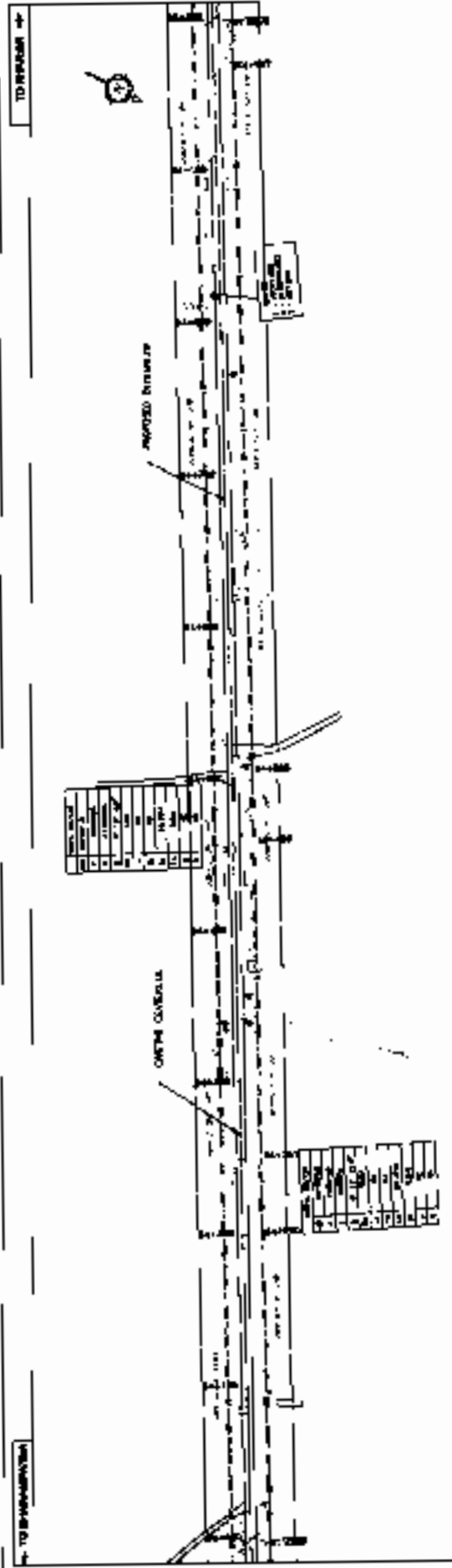
**LEGEND**  
 [Symbol] Right of Way  
 [Symbol] Road Profile  
 [Symbol] Proposed Road Profile  
 [Symbol] Existing Road Profile  
 [Symbol] Centerline  
 [Symbol] Edge of Pavement  
 [Symbol] Edge of Shoulder  
 [Symbol] Edge of Right of Way  
 [Symbol] Utility Line  
 [Symbol] Spot Elevation  
 [Symbol] Proposed Spot Elevation  
 [Symbol] Existing Spot Elevation

**CONSULTING ENGINEERS GROUP LTD.**  
 1-101 West Caldwell Avenue, Suite 100  
 Caldwell, New Jersey 07006  
 Tel: 908-761-1234 Fax: 908-761-1235  
 www.cengroup.com

**PROJECT:**  
 CORRELATION STUDY FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE II BIDS FOR ORISSA STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

**WIDENING AND STRENGTHENING TO TWO LANE  
 PLAY AND LONG TJODINA SECTION  
 N-1-10) KM 63/000 TO KM 65/000**





Station	Width (ft)	Width (m)
1+00.00	12.00	3.66
1+05.00	12.00	3.66
1+10.00	12.00	3.66
1+15.00	12.00	3.66
1+20.00	12.00	3.66
1+25.00	12.00	3.66
1+30.00	12.00	3.66
1+35.00	12.00	3.66
1+40.00	12.00	3.66
1+45.00	12.00	3.66
1+50.00	12.00	3.66
1+55.00	12.00	3.66
1+60.00	12.00	3.66
1+65.00	12.00	3.66
1+70.00	12.00	3.66
1+75.00	12.00	3.66
1+80.00	12.00	3.66
1+85.00	12.00	3.66
1+90.00	12.00	3.66
1+95.00	12.00	3.66
2+00.00	12.00	3.66
2+05.00	12.00	3.66
2+10.00	12.00	3.66
2+15.00	12.00	3.66
2+20.00	12.00	3.66
2+25.00	12.00	3.66
2+30.00	12.00	3.66
2+35.00	12.00	3.66
2+40.00	12.00	3.66
2+45.00	12.00	3.66
2+50.00	12.00	3.66
2+55.00	12.00	3.66
2+60.00	12.00	3.66
2+65.00	12.00	3.66
2+70.00	12.00	3.66
2+75.00	12.00	3.66
2+80.00	12.00	3.66
2+85.00	12.00	3.66
2+90.00	12.00	3.66
2+95.00	12.00	3.66
3+00.00	12.00	3.66
3+05.00	12.00	3.66
3+10.00	12.00	3.66
3+15.00	12.00	3.66
3+20.00	12.00	3.66
3+25.00	12.00	3.66
3+30.00	12.00	3.66
3+35.00	12.00	3.66
3+40.00	12.00	3.66
3+45.00	12.00	3.66
3+50.00	12.00	3.66
3+55.00	12.00	3.66
3+60.00	12.00	3.66
3+65.00	12.00	3.66
3+70.00	12.00	3.66
3+75.00	12.00	3.66
3+80.00	12.00	3.66
3+85.00	12.00	3.66
3+90.00	12.00	3.66
3+95.00	12.00	3.66
4+00.00	12.00	3.66

TO BE MAINTAINED  
 TO BE MAINTAINED  
 PATEL ARSS JV  
 CONTRACTOR

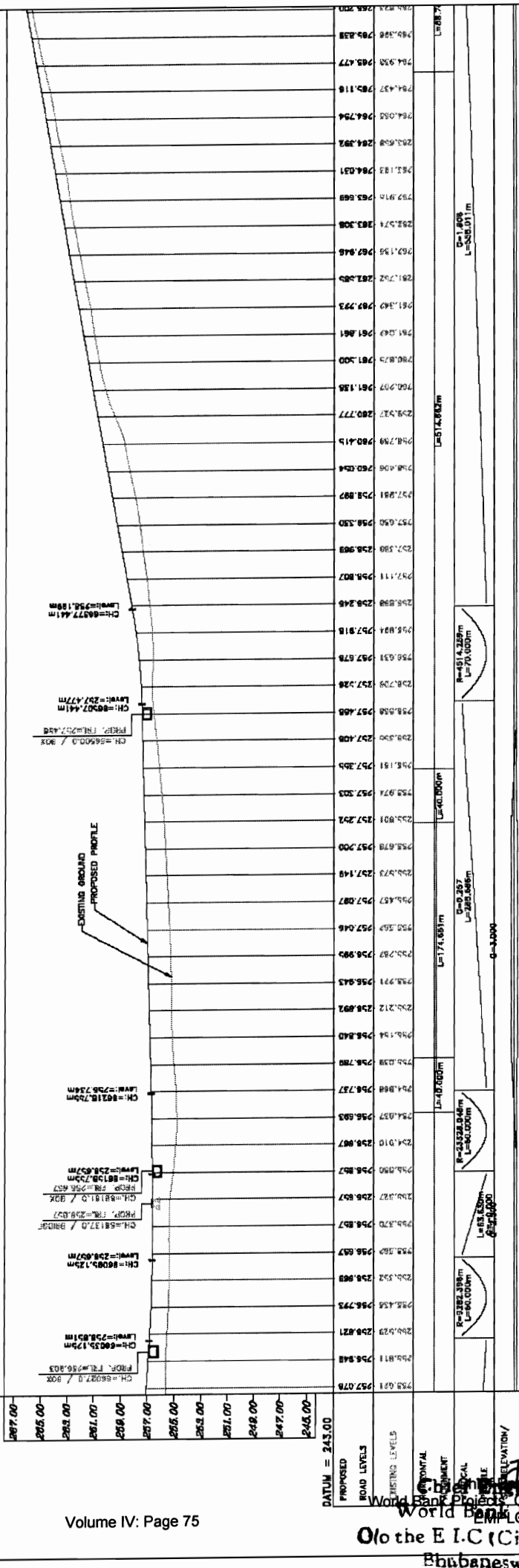
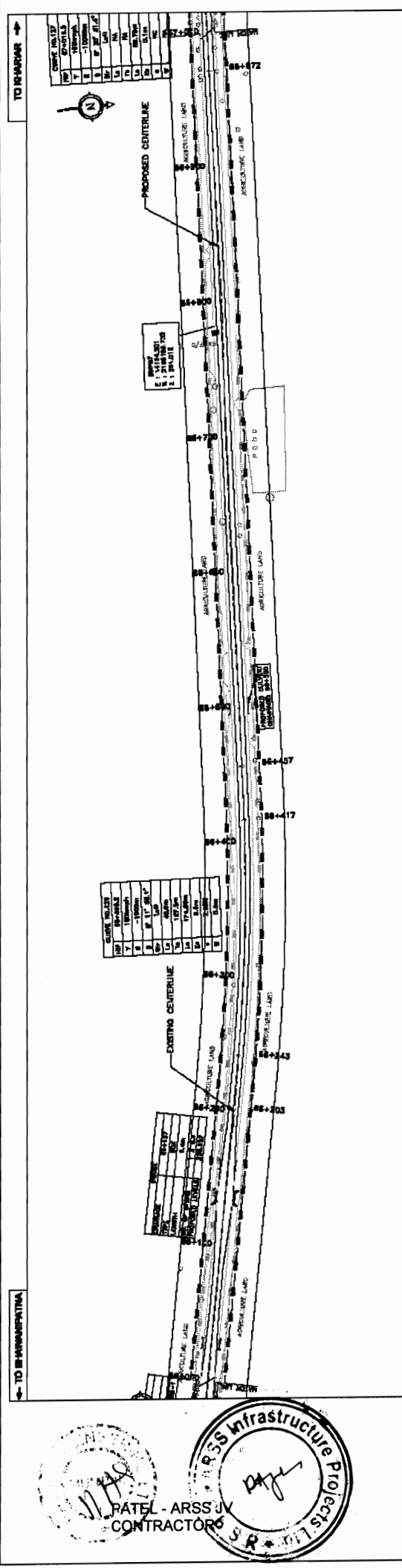
DATE: 24/10/20  
 RECEIVED: 24/10/20  
 WORK: ROAD WORK  
 PROJECT: ROAD WORK  
 EMPLOYER: PROJECTS  
 OF THE E.T.C.(CIVIL) OFFICE,  
 PROBHASARWAR.

**CONSULTING ENGINEERS GROUP LTD.**  
 Civil Engineering  
 10, 11 & 12, Ground Floor,  
 The Arcade, 11, The Arcade,  
 Bangalore - 560 002

**PROJECT:**  
 COMPANY'S SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

**WORKING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION**  
 (31-16) KM RA/2000: EG KM 05/000





STATION	ELEVATION	REMARKS
97+00	247.00	
97+10	247.50	
97+20	248.00	
97+30	248.50	
97+40	249.00	
97+50	249.50	
97+60	250.00	
97+70	250.50	
97+80	251.00	
97+90	251.50	
98+00	252.00	
98+10	252.50	
98+20	253.00	
98+30	253.50	
98+40	254.00	
98+50	254.50	
98+60	255.00	
98+70	255.50	
98+80	256.00	
98+90	256.50	
99+00	257.00	
99+10	257.50	
99+20	258.00	
99+30	258.50	
99+40	259.00	
99+50	259.50	
99+60	260.00	
99+70	260.50	
99+80	261.00	
99+90	261.50	
100+00	262.00	
100+10	262.50	
100+20	263.00	
100+30	263.50	
100+40	264.00	
100+50	264.50	
100+60	265.00	
100+70	265.50	
100+80	266.00	
100+90	266.50	
101+00	267.00	
101+10	267.50	
101+20	268.00	
101+30	268.50	
101+40	269.00	
101+50	269.50	
101+60	270.00	
101+70	270.50	
101+80	271.00	
101+90	271.50	
102+00	272.00	
102+10	272.50	
102+20	273.00	
102+30	273.50	
102+40	274.00	
102+50	274.50	
102+60	275.00	
102+70	275.50	
102+80	276.00	
102+90	276.50	
103+00	277.00	
103+10	277.50	
103+20	278.00	
103+30	278.50	
103+40	279.00	
103+50	279.50	
103+60	280.00	
103+70	280.50	
103+80	281.00	
103+90	281.50	
104+00	282.00	
104+10	282.50	
104+20	283.00	
104+30	283.50	
104+40	284.00	
104+50	284.50	
104+60	285.00	
104+70	285.50	
104+80	286.00	
104+90	286.50	
105+00	287.00	
105+10	287.50	
105+20	288.00	
105+30	288.50	
105+40	289.00	
105+50	289.50	
105+60	290.00	
105+70	290.50	
105+80	291.00	
105+90	291.50	
106+00	292.00	
106+10	292.50	
106+20	293.00	
106+30	293.50	
106+40	294.00	
106+50	294.50	
106+60	295.00	
106+70	295.50	
106+80	296.00	
106+90	296.50	
107+00	297.00	
107+10	297.50	
107+20	298.00	
107+30	298.50	
107+40	299.00	
107+50	299.50	
107+60	300.00	
107+70	300.50	
107+80	301.00	
107+90	301.50	
108+00	302.00	
108+10	302.50	
108+20	303.00	
108+30	303.50	
108+40	304.00	
108+50	304.50	
108+60	305.00	
108+70	305.50	
108+80	306.00	
108+90	306.50	
109+00	307.00	
109+10	307.50	
109+20	308.00	
109+30	308.50	
109+40	309.00	
109+50	309.50	
109+60	310.00	
109+70	310.50	
109+80	311.00	
109+90	311.50	
110+00	312.00	
110+10	312.50	
110+20	313.00	
110+30	313.50	
110+40	314.00	
110+50	314.50	
110+60	315.00	
110+70	315.50	
110+80	316.00	
110+90	316.50	
111+00	317.00	
111+10	317.50	
111+20	318.00	
111+30	318.50	
111+40	319.00	
111+50	319.50	
111+60	320.00	
111+70	320.50	
111+80	321.00	
111+90	321.50	
112+00	322.00	
112+10	322.50	
112+20	323.00	
112+30	323.50	
112+40	324.00	
112+50	324.50	
112+60	325.00	
112+70	325.50	
112+80	326.00	
112+90	326.50	
113+00	327.00	
113+10	327.50	
113+20	328.00	
113+30	328.50	
113+40	329.00	
113+50	329.50	
113+60	330.00	
113+70	330.50	
113+80	331.00	
113+90	331.50	
114+00	332.00	
114+10	332.50	
114+20	333.00	
114+30	333.50	
114+40	334.00	
114+50	334.50	
114+60	335.00	
114+70	335.50	
114+80	336.00	
114+90	336.50	
115+00	337.00	
115+10	337.50	
115+20	338.00	
115+30	338.50	
115+40	339.00	
115+50	339.50	
115+60	340.00	
115+70	340.50	
115+80	341.00	
115+90	341.50	
116+00	342.00	
116+10	342.50	
116+20	343.00	
116+30	343.50	
116+40	344.00	
116+50	344.50	
116+60	345.00	
116+70	345.50	
116+80	346.00	
116+90	346.50	
117+00	347.00	
117+10	347.50	
117+20	348.00	
117+30	348.50	
117+40	349.00	
117+50	349.50	
117+60	350.00	
117+70	350.50	
117+80	351.00	
117+90	351.50	
118+00	352.00	
118+10	352.50	
118+20	353.00	
118+30	353.50	
118+40	354.00	
118+50	354.50	
118+60	355.00	
118+70	355.50	
118+80	356.00	
118+90	356.50	
119+00	357.00	
119+10	357.50	
119+20	358.00	
119+30	358.50	
119+40	359.00	
119+50	359.50	
119+60	360.00	
119+70	360.50	
119+80	361.00	
119+90	361.50	
120+00	362.00	

**PATEL - ARSS JV**  
CONTRACTORS

RS Infrastructure Projects

Volume IV: Page 75

World Bank Project, Orissa

World Bank Project

to the E.I.C (Civil) Orissa.

Bhubaneswar:

**WIDENING AND STRENGTHENING TO TWO LANE PLAN AND LONGITUDINAL SECTION (SH-16) KM 66/000 TO KM 67/000**

PROJECT:

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE- (I) ROADS FOR ORISSA STATE ROAD UNDER WORLD BANK ASSISTANCE

CONTRACT NO. SH-16/000/001/001

DATE: 20/11/2010

SCALE: HORIZONTAL: 1:5000 VERTICAL: 1:1000

**CONSULTING ENGINEERS GROUP LTD.**

E-72, 2nd Floor, Conchamalaya Nagar, Bhubaneswar - 751017

Ph: 2521343, 2521344, E-mail: cegbest@rediffmail.com

**LEGEND**

1. PROPOSED CENTERLINE 2. EXISTING CENTERLINE

3. PROPOSED ROAD WIDTH 4. EXISTING ROAD WIDTH

5. PROPOSED ROAD GRADE 6. EXISTING ROAD GRADE

7. PROPOSED ROAD SURFACE 8. EXISTING ROAD SURFACE

9. PROPOSED ROAD PAVEMENT 10. EXISTING ROAD PAVEMENT

11. PROPOSED ROAD DRAINAGE 12. EXISTING ROAD DRAINAGE

13. PROPOSED ROAD BRIDGE 14. EXISTING ROAD BRIDGE

15. PROPOSED ROAD TUNNEL 16. EXISTING ROAD TUNNEL

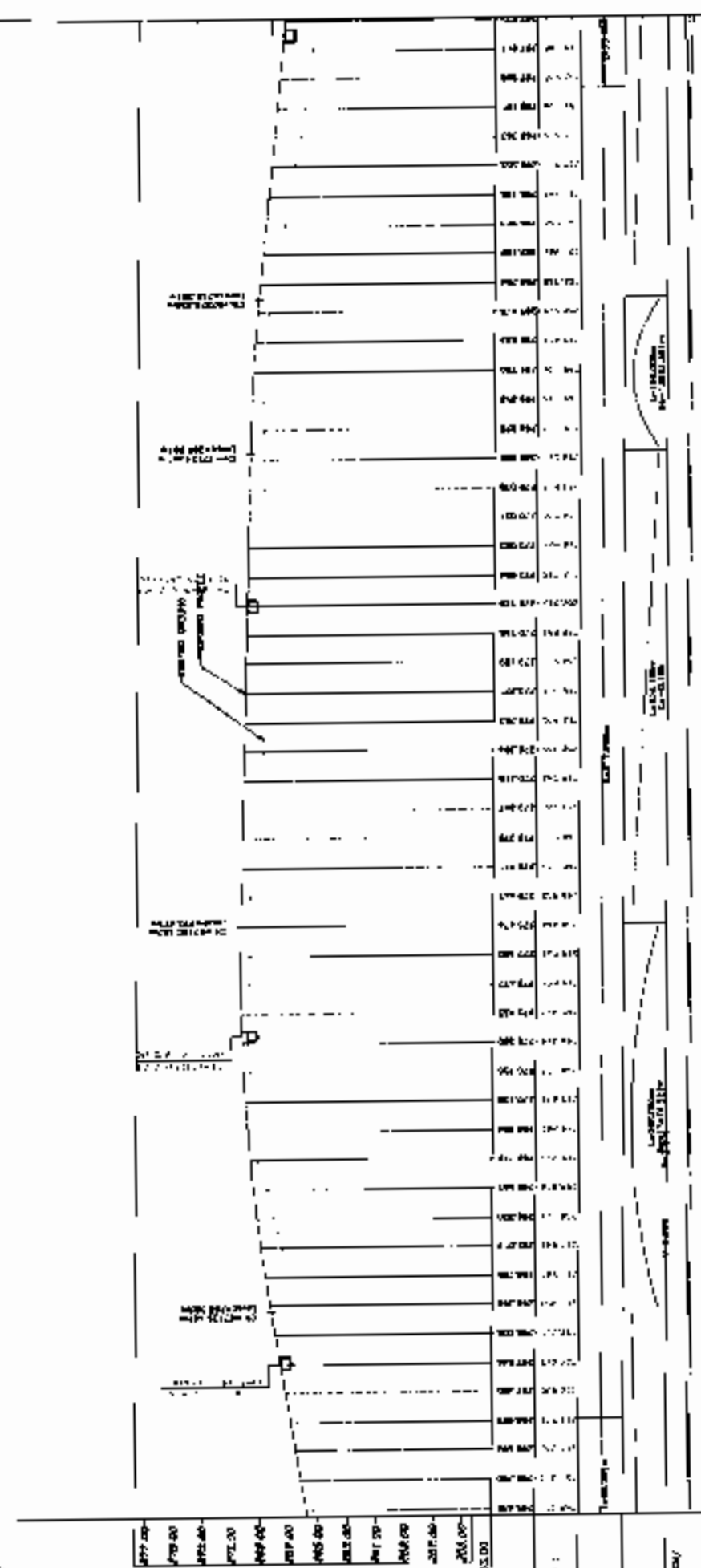
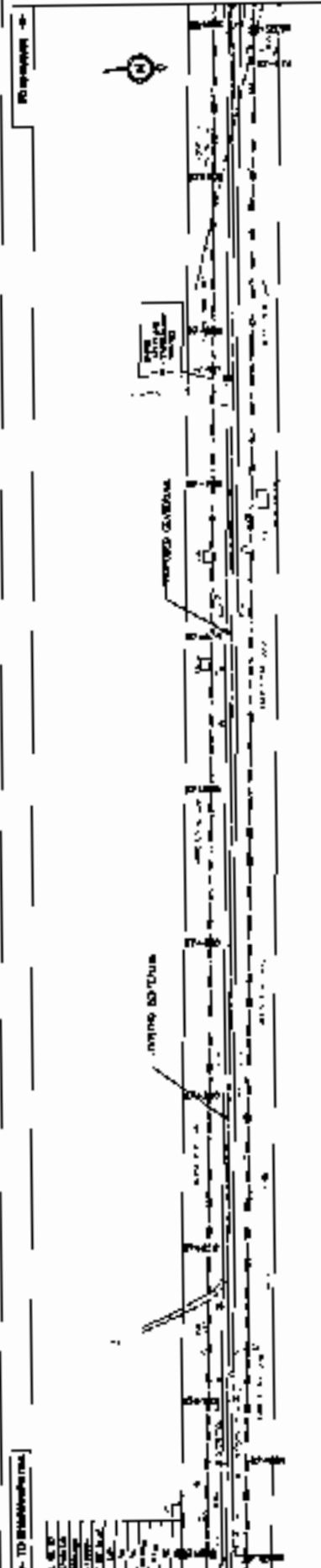
17. PROPOSED ROAD CUTTING 18. EXISTING ROAD CUTTING

19. PROPOSED ROAD EMBANKMENT 20. EXISTING ROAD EMBANKMENT

21. PROPOSED ROAD CUTTING AND EMBANKMENT 22. EXISTING ROAD CUTTING AND EMBANKMENT

23. PROPOSED ROAD CUTTING AND EMBANKMENT WITH DRAINAGE 24. EXISTING ROAD CUTTING AND EMBANKMENT WITH DRAINAGE

25. PROPOSED ROAD CUTTING AND EMBANKMENT WITH DRAINAGE AND BRIDGE 26. EXISTING ROAD CUTTING AND EMBANKMENT WITH DRAINAGE AND BRIDGE

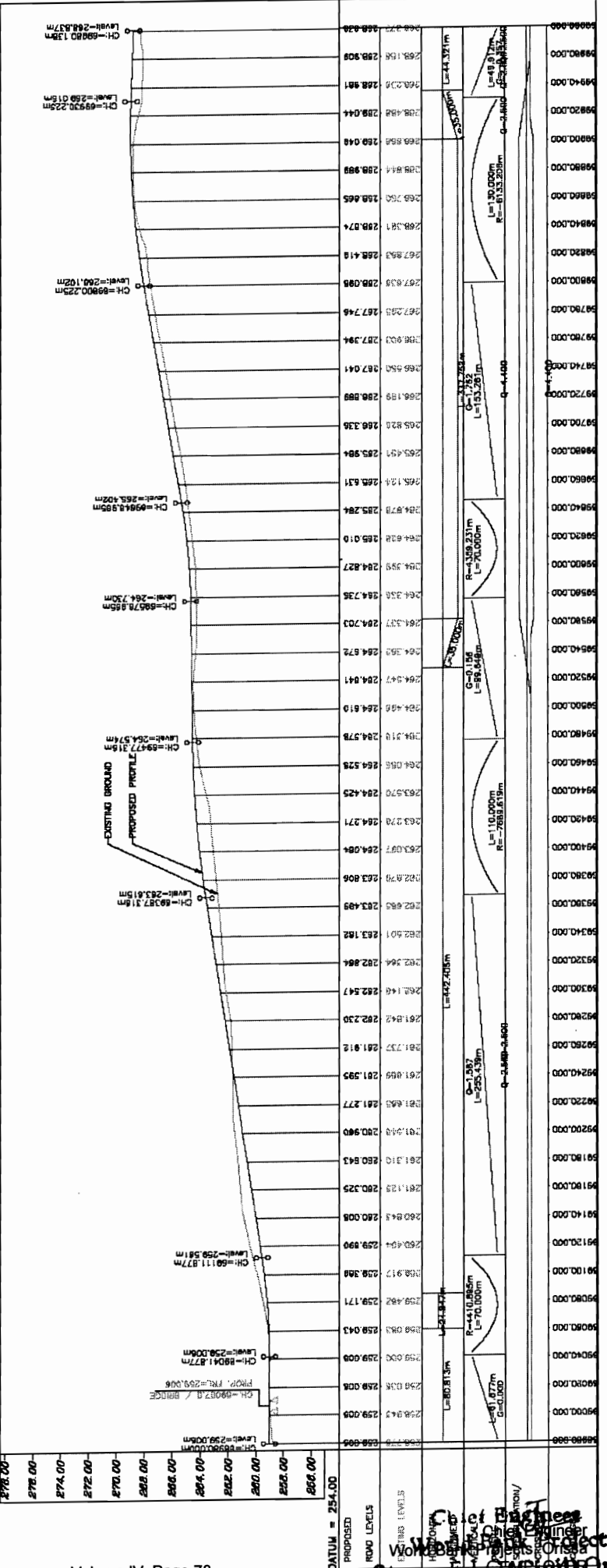
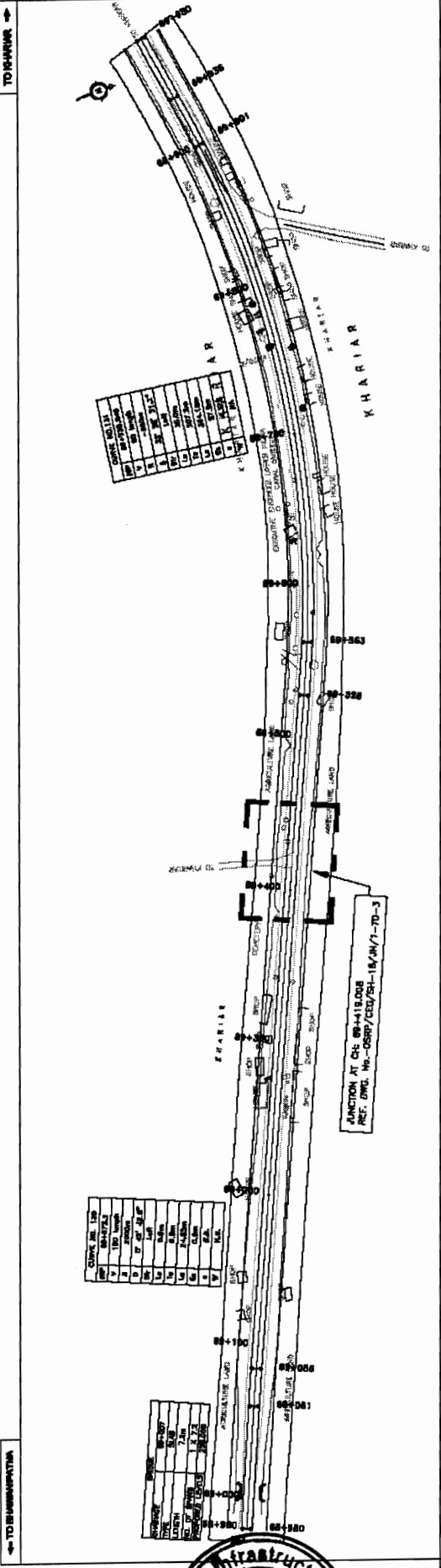


Station	Existing Elevation (ft)	Proposed Elevation (ft)	Grade (%)
200+00	100.00	100.00	0.00
200+10	100.00	100.00	0.00
200+20	100.00	100.00	0.00
200+30	100.00	100.00	0.00
200+40	100.00	100.00	0.00
200+50	100.00	100.00	0.00
200+60	100.00	100.00	0.00
200+70	100.00	100.00	0.00
200+80	100.00	100.00	0.00
200+90	100.00	100.00	0.00
201+00	100.00	100.00	0.00
201+10	100.00	100.00	0.00
201+20	100.00	100.00	0.00
201+30	100.00	100.00	0.00
201+40	100.00	100.00	0.00
201+50	100.00	100.00	0.00
201+60	100.00	100.00	0.00
201+70	100.00	100.00	0.00
201+80	100.00	100.00	0.00
201+90	100.00	100.00	0.00
202+00	100.00	100.00	0.00
202+10	100.00	100.00	0.00
202+20	100.00	100.00	0.00
202+30	100.00	100.00	0.00
202+40	100.00	100.00	0.00
202+50	100.00	100.00	0.00
202+60	100.00	100.00	0.00
202+70	100.00	100.00	0.00
202+80	100.00	100.00	0.00
202+90	100.00	100.00	0.00
203+00	100.00	100.00	0.00
203+10	100.00	100.00	0.00
203+20	100.00	100.00	0.00
203+30	100.00	100.00	0.00
203+40	100.00	100.00	0.00
203+50	100.00	100.00	0.00
203+60	100.00	100.00	0.00
203+70	100.00	100.00	0.00
203+80	100.00	100.00	0.00
203+90	100.00	100.00	0.00
204+00	100.00	100.00	0.00
204+10	100.00	100.00	0.00
204+20	100.00	100.00	0.00
204+30	100.00	100.00	0.00
204+40	100.00	100.00	0.00
204+50	100.00	100.00	0.00
204+60	100.00	100.00	0.00
204+70	100.00	100.00	0.00
204+80	100.00	100.00	0.00
204+90	100.00	100.00	0.00
205+00	100.00	100.00	0.00

TO BE MAINTAINED  
 CONTRACTOR  
 HATEL WASS JV  
 CONTRACTOR

PROJECT: WIDEN AND STRENGTHENING TO TWO LANE  
 PLAN AND LONGITUDINAL SECTION  
 (S&P) KM 87.7006 TO KM 88.0000  
 PROJECT: COMPLETANCY SERVICES FOR FINAL BILTY STUDY AND DETAILED PROJECT  
 PREPARATION OF PH-04 - (1) FORMER FOR CROSS STATE ROAD PROJECT  
 JACKSON PEOPLE BANK ASSISTANCE  
 CONSULTING: BANG HONG GROUP LTD.  
 4-11-10/11, 12/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000







SCHEDULE OF SIGN POSTS

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	SCHEDULE OF SIGN POSTS LOCATION				CHANGING	REMARKS
		LL	RL	CR(L)	CR(R)		
SP-1001	LEFT HAND CURVE	3020.000	✓				
SP-1002	LEFT HAND CURVE	3020.000	✓				
SP-1003	LEFT HAND CURVE	11623.000	✓				
SP-1004	LEFT HAND CURVE	17187.000	✓				
SP-1005	LEFT HAND CURVE	19058.000	✓				
SP-1006	LEFT HAND CURVE	27314.000	✓				
SP-1007	LEFT HAND CURVE	27711.000	✓				
SP-1008	LEFT HAND CURVE	29863.000	✓				
SP-1009	LEFT HAND CURVE	30077.000	✓				
SP-1010	LEFT HAND CURVE	32048.000	✓				
SP-1011	LEFT HAND CURVE	38895.000	✓				
SP-1012	LEFT HAND CURVE	38470.000	✓				
SP-1013	LEFT HAND CURVE	44518.000	✓				
SP-1014	LEFT HAND CURVE	46215.000	✓				
SP-1015	LEFT HAND CURVE	57871.000	✓				
SP-1016	LEFT HAND CURVE	59408.000	✓				
SP-1017	LEFT HAND CURVE	59630.000	✓				
SP-1018	LEFT HAND CURVE	68812.000	✓				
SP-1019	LEFT HAND CURVE	70251.000	✓				
SP-1020	LEFT HAND CURVE	73971.000	✓				
SP-1021	LEFT HAND CURVE	82633.000	✓				
SP-1022	LEFT HAND CURVE	12163.000	✓				
SP-1023	LEFT HAND CURVE	17828.000	✓				
SP-1024	LEFT HAND CURVE	19000.000	✓				
SP-1025	LEFT HAND CURVE	27768.000	✓				
SP-1026	LEFT HAND CURVE	28328.000	✓				
SP-1027	LEFT HAND CURVE	29629.000	✓				
SP-1028	LEFT HAND CURVE	30019.000	✓				
SP-1029	LEFT HAND CURVE	36862.000	✓				
SP-1030	LEFT HAND CURVE	37943.000	✓				
SP-1031	LEFT HAND CURVE	38795.000	✓				
SP-1032	LEFT HAND CURVE	45639.000	✓				
SP-1033	LEFT HAND CURVE	48070.000	✓				
SP-1034	LEFT HAND CURVE	55015.000	✓				
SP-1035	LEFT HAND CURVE	58000.000	✓				

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 20M FROM THE EDGE OF CHANGING WAY
6. FOR DETAILS OF ROAD SIGNS REFER DRAWING FROM OMRP/ESH/SH-16/RS/01 TO 03

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	SCHEDULE OF SIGN POSTS LOCATION				CHANGING	REMARKS
		LL	RL	CR(L)	CR(R)		
SP-12	FEEDBACK CHANGING	6500	✓				
SP-13	FEEDBACK CHANGING	9420	✓				
SP-14	FEEDBACK CHANGING	7190	✓				
SP-15	FEEDBACK CHANGING	7805	✓				
SP-16	FEEDBACK CHANGING	8070	✓				
SP-17	FEEDBACK CHANGING	8000	✓				
SP-18	FEEDBACK CHANGING	70500	✓				
SP-19	FEEDBACK CHANGING	80000	✓				
SP-20	FEEDBACK CHANGING	30000	✓				
SP-21	FEEDBACK CHANGING	38010	✓				
SP-22	FEEDBACK CHANGING	38885	✓				
SP-23	FEEDBACK CHANGING	43410	✓				
SP-24	FEEDBACK CHANGING	43815	✓				
SP-25	FEEDBACK CHANGING	46815	✓				
SP-26	FEEDBACK CHANGING	50200	✓				
SP-27	FEEDBACK CHANGING	50585	✓				
SP-28	FEEDBACK CHANGING	50700	✓				
SP-29	FEEDBACK CHANGING	50995	✓				
SP-30	FEEDBACK CHANGING	57100	✓				
SP-31	FEEDBACK CHANGING	57915	✓				
SP-32	FEEDBACK CHANGING	60300	✓				
SP-33	FEEDBACK CHANGING	67010	✓				
SP-34	FEEDBACK CHANGING	67415	✓				
SP-35	FEEDBACK CHANGING	67840	✓				
SP-36	FEEDBACK CHANGING	62240	✓				
SP-37	FEEDBACK CHANGING	62665	✓				
SP-38	FEEDBACK CHANGING	62665	✓				
SP-39	FEEDBACK CHANGING	64015	✓				
SP-40	FEEDBACK CHANGING	64885	✓				
SP-41	FEEDBACK CHANGING	6920	✓				
SP-42	FEEDBACK CHANGING	7290	✓				
SP-43	FEEDBACK CHANGING	7885	✓				
SP-44	FEEDBACK CHANGING	8070	✓				
SP-45	FEEDBACK CHANGING	8160	✓				
SP-46	FEEDBACK CHANGING	20000	✓				
SP-47	FEEDBACK CHANGING	20960	✓				
SP-48	FEEDBACK CHANGING	30100	✓				
SP-49	FEEDBACK CHANGING	30810	✓				
SP-50	FEEDBACK CHANGING	40000	✓				
SP-51	FEEDBACK CHANGING	43310	✓				
SP-52	FEEDBACK CHANGING	43715	✓				
SP-53	FEEDBACK CHANGING	50015	✓				
SP-54	FEEDBACK CHANGING	50300	✓				
SP-55	FEEDBACK CHANGING	50885	✓				
SP-56	FEEDBACK CHANGING	50900	✓				

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	SCHEDULE OF SIGN POSTS LOCATION				CHANGING	REMARKS
		LL	RL	CR(L)	CR(R)		
SP-100	RIGHT HAND CURVE	56304.000	✓				
SP-101	RIGHT HAND CURVE	59355.000	✓				
SP-102	RIGHT HAND CURVE	61700.000	✓				
SP-103	RIGHT HAND CURVE	56304.000	✓				
SP-104	RIGHT HAND CURVE	56304.000	✓				
SP-105	RIGHT HAND CURVE	56304.000	✓				
SP-106	RIGHT HAND CURVE	56304.000	✓				
SP-107	RIGHT HAND CURVE	2727.000	✓				
SP-108	RIGHT HAND CURVE	4638.000	✓				
SP-109	RIGHT HAND CURVE	12116.000	✓				
SP-110	RIGHT HAND CURVE	15817.000	✓				
SP-111	RIGHT HAND CURVE	17065.000	✓				
SP-112	RIGHT HAND CURVE	20719.000	✓				
SP-113	RIGHT HAND CURVE	26893.000	✓				
SP-114	RIGHT HAND CURVE	37255.000	✓				
SP-115	RIGHT HAND CURVE	39880.000	✓				
SP-116	RIGHT HAND CURVE	52148.000	✓				
SP-117	RIGHT HAND CURVE	53122.000	✓				
SP-118	RIGHT HAND CURVE	56847.000	✓				
SP-119	RIGHT HAND CURVE	57100.000	✓				
SP-120	RIGHT HAND CURVE	5871.000	✓				
SP-121	RIGHT HAND CURVE	12194.000	✓				
SP-122	RIGHT HAND CURVE	18233.000	✓				
SP-123	RIGHT HAND CURVE	17917.000	✓				
SP-124	RIGHT HAND CURVE	24128.000	✓				
SP-125	RIGHT HAND CURVE	29258.000	✓				
SP-126	RIGHT HAND CURVE	35007.000	✓				
SP-127	RIGHT HAND CURVE	40386.000	✓				
SP-128	RIGHT HAND CURVE	5870.000	✓				
SP-129	RIGHT HAND CURVE	5098.000	✓				
SP-130	RIGHT HAND CURVE	5705.000	✓				
SP-131	RIGHT HAND CURVE	4841.93	✓				
SP-132	RIGHT HAND CURVE	2864.774	✓				
SP-133	RIGHT HAND CURVE	2867.777	✓				
SP-134	RIGHT HAND CURVE	2970.981	✓				
SP-135	RIGHT HAND CURVE	2714.729	✓				
SP-136	RIGHT HAND CURVE	2881.841	✓				
SP-137	RIGHT HAND CURVE	8505.754	✓				
SP-138	RIGHT HAND CURVE	2727.047	✓				
SP-139	RIGHT HAND CURVE	6294.781	✓				
SP-140	RIGHT HAND CURVE	3364.800	✓				
SP-141	RIGHT HAND CURVE	6372.225	✓				

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE-(1) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE.

**CEG CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Meji Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520898, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@cegroupindia.com

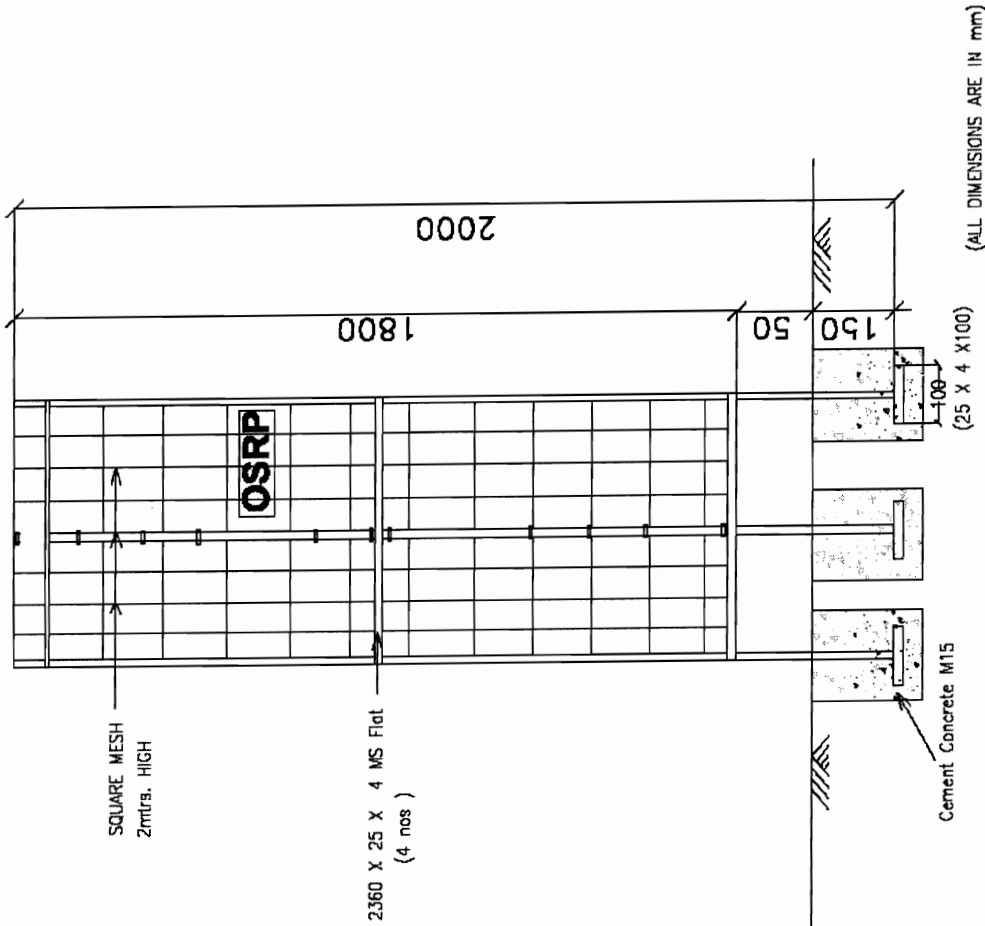
Chief Engineer  
 World Bank Project  
 EMPLOYER  
 O/c the E.I.C (Civil) Orissa,  
 Bhubaneswar

SCHEDULE OF SIGN POSTS		B.M.		R.J.		R.R.D.K		S.G	
BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)		DESIGNED (A)		DRAWN (B)		CHECKED (C)		APPROVED (D)	
DRG NO.	DATE	70	DATE	REV	RD				

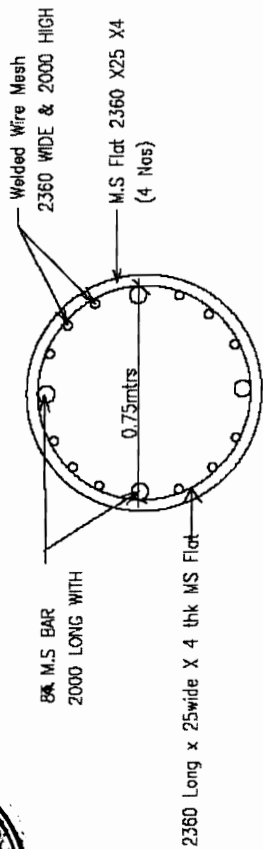
Stamp: PATEL ARSS JV CONTRACTOR  
 Stamp: E.I.C (Civil) Orissa, Bhubaneswar



# TREE GUARD



# ELEVATION



# PLAN

CONCEPTUAL DESIGN FOR TYPICAL TREE GUARD WITH M.S BARS.

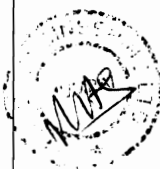
PROJECT:-  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Malviya Colony, Malviya Nagar Jaipur - 17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521346, e-mail: ceg@cegindia.com

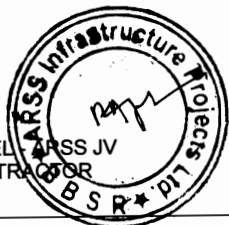
DRG. NO.	OSRP/CEG/SH/ENV/08	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	72	DATE	REV	RO	
SCALE	NTS		M	JYOTI	G.P.M.
					S.G



Chief Engineer  
 World Bank Projects, District  
 World Bank EMPLOYEES  
 Office of the F.I.C. (Civil) Officer  
 Phubaneswar



PATEL  
CONTRACTOR



Chief Engineer  
World Bank Projects, Orissa  
World Bank Project  
to the E.I.C. (Civil) Orissa  
Rhubaneswar

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	CHARGE	LOCATION					REMARKS
			LL	RL	CR(L)	CR(R)	MEDIAN	
SP-12	PEDESTRIAN CROSSING	53095	✓	✓				
		53290	✓	✓				
		57260	✓	✓				
		57715	✓	✓				
		81704	✓	✓				
		81515	✓	✓				
		81740	✓	✓				
		82680	✓	✓				
		82755	✓	✓				
		85998	✓	✓				
		88115	✓	✓				

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	CHARGE	LOCATION					REMARKS
			LL	RL	CR(L)	CR(R)	MEDIAN	
SP-14(B)	Y-INTERSECTION	8000	✓					
		7308	✓					
		8240	✓					
		7548	✓					
SP-14(C)		8217	✓					
		94956	✓					
		56948	✓					
		8837	✓					
		41096	✓					
		50230	✓					
		57188	✓					

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	CHARGE	LOCATION					REMARKS
			LL	RL	CR(L)	CR(R)	MEDIAN	
SP-17	STATE ROUTE MARKER	2100						
SP-19	REASSURANCE SIGN	70000	✓					
		12000	✓					
		54000	✓					
		13000	✓					
		48000	✓					
SP-23	HOSPITAL	7210	✓					
		7420	✓					
		28800	✓					
		7210	✓					
		7820	✓					
		26720	✓					

SIGN POST ID	DESCRIPTION OF THE SIGN BOARD	CHARGE	LOCATION					REMARKS
			LL	RL	CR(L)	CR(R)	MEDIAN	
SP-16(C)	ROAD HUMP	5750	✓					SCHOOL/HOSPITAL ZONE
		7210	✓					
		7420	✓					
		20650	✓					
		25880	✓					
		26820	✓					
		32880	✓					
		33000	✓					
		5850	✓					
		7310	✓					
		7820	✓					
		20720	✓					
		26880	✓					
		28720	✓					
		32980	✓					
		33100	✓					
		8120	✓					MIRROR ROAD INTERSECTION
		7428	✓					
		7874	✓					
		8837	✓					
		12858	✓					
		18353	✓					
		18523	✓					
		21194	✓					
		24785	✓					
		25835	✓					
		26275	✓					
		27138	✓					
		30800	✓					
		31000	✓					
		38200	✓					
		38878	✓					
		43538	✓					
		48854	✓					
		47282	✓					
		50110	✓					
		53142	✓					
		58217	✓					
		57868	✓					
		57181	✓					
		60018	✓					
		69419	✓					

1. LL = LEFT LAKE
2. RL = RIGHT LAKE
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 DRAWINGS FROM CSPP/DEE/SH-16/RS/01 TO 03

**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, Majil Colony, Malviya Nagar, Jaipur-17  
Tel: +91-141-2520898, 2521898, 2520556  
Fax: 2521348, e-mail: ceg@egindia.com

**SCHEDULE OF SIGN POSTS**  
BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)

DRG. NO. CSPP/DEE/SH-16/SCH 01  
SH. NO. 71 DATE: / / REV: / NO: /

B.M. R.J. R.R.D.K. S.G.

SCALE: NTS

**SCHEDULE OF BUS BAYS**

LEFT			RIGHT		
START	END	TYPE	START	END	TYPE
3950	6030	1	5850	5955	1
7150	7255	1	7180	7285	1
7850	7955	1	7875	7980	1
8880	8985	1	9050	9155	1
20525	20630	1	20850	20955	1
30950	30155	1	30070	30175	1
43820	40095	1	39800	39905	1
49920	43725	1	43400	43505	1
50800	50025	1	50250	50355	1
53000	50705	1	50770	50875	1
5600	53105	1	53170	53275	1
57820	5600	1	57170	57275	1
60810	57725	1	57580	57685	1
61420	60715	1	61000	61105	1
62860	61525	1	61630	61735	1
65900	62965	1	62550	62655	1
	66005	1	66005	66110	1

**SCHEDULE OF BUS BAYS**

LEFT			RIGHT		
START	END	TYPE	START	END	TYPE
3950	6030	1	5850	5955	1
7150	7255	1	7180	7285	1
7850	7955	1	7875	7980	1
8880	8985	1	9050	9155	1
20525	20630	1	20850	20955	1
30950	30155	1	30070	30175	1
43820	40095	1	39800	39905	1
49920	43725	1	43400	43505	1
50800	50025	1	50250	50355	1
53000	50705	1	50770	50875	1
5600	53105	1	53170	53275	1
57820	5600	1	57170	57275	1
60810	57725	1	57580	57685	1
61420	60715	1	61000	61105	1
62860	61525	1	61630	61735	1
65900	62965	1	62550	62655	1
	66005	1	66005	66110	1

**SCHEDULE OF EXTRA-WIDENING**

LEFT C/W			RIGHT C/W		
START	END	ADDL.WIDTH	START	END	ADDL.WIDTH
2877.047	2969.454	0.300	2877.047	2969.454	0.300
3174.729	3216.88	0.300	3174.729	3216.88	0.300
6090.465	6127.587	0.300	6090.465	6127.587	0.300
16011.851	16067.516	0.300	16011.851	16067.516	0.300
23199.185	23249.474	0.300	23199.185	23249.474	0.300
27483.946	27527.924	0.300	27483.946	27527.924	0.300
28988.846	29128.760	0.300	28988.846	29128.760	0.300
29427.647	29484.186	0.300	29427.647	29484.186	0.300
30257.667	30344.527	0.300	30257.667	30344.527	0.300
35427.667	35471.564	0.300	35427.667	35471.564	0.300
37030.378	37078.465	0.300	37030.378	37078.465	0.300
37735.151	37827.342	0.300	37735.151	37827.342	0.300
38589.540	38620.177	0.300	38589.540	38620.177	0.300
48379.881	48505.389	0.300	48379.881	48505.389	0.300
52314.253	52445.226	0.300	52314.253	52445.226	0.300
55301.717	55385.784	0.300	55301.717	55385.784	0.300
58727.186	58824.844	0.300	58727.186	58824.844	0.300
57785.929	57840.971	0.300	57785.929	57840.971	0.300
59709.991	59755.081	0.300	59709.991	59755.081	0.300

**NOTE:**

- FOR DETAILS OF BUS BAYS REFER DWG NO. OSRP/CEG/BB/01 AND 02
- LOCATIONS OF THE BUS BAYS MAY BE CHANGED AT SITE AS PER THE REQUIREMENTS AND CONDITIONS DURING THE CONSTRUCTION
- LOWER BUS BAY STANDARDS SHALL BE ADOPTED AS PER THE REQUIREMENTS
- STANDARDS SHALL BE ADOPTED UNLESS OTHERWISE SPECIFIED
- STANDARDS ARE NOT FEASIBLE FROM ECONOMIC POINT OF VIEW

**NOTE:**

- EXTRA WIDENING HAS BEEN DONE AS PER THE GUIDELINES 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 TH WIDENING SECTIONS

**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, M.J. Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520888, 2521888, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

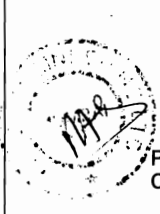
**SCHEDULE OF BUS BAYS & EXTRA WIDENING BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)**

DWG NO.	DATE	REV	RD	SCALE	BY	CHECKED	APPROVED
OSRP/CEG/BB/SH-16/SHI 04	72				B.M.	R.J.	S.G

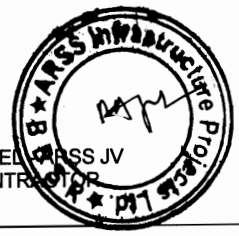


PATEL - ARORA JV  
 CONTRACTOR

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



PATEL ASS JV  
CONTRACTOR



SCHEDULE OF ROAD HUMPS

SL NO	CHAINAGE	REMARKS
1	5800	SCHOOL ZONE
2	7260	SCHOOL ZONE & HOSPITAL ZONE
3	7470	HOSPITAL ZONE
4	20700	SCHOOL ZONE
5	26030	SCHOOL ZONE
6	26670	HOSPITAL ZONE
7	32940	SCHOOL ZONE
8	33050	SCHOOL ZONE

SCHEDULE OF LINED DRAIN AND FOOTPATH BARRIERS CHAINAGE

FROM	TO	LENGTH	LHS/RHS
14800	15200	300	BOTH
20350	21010	660	BOTH
27050	27200	150	BOTH
43150	44000	850	BOTH
44800	44900	300	BOTH
50000	50300	300	BOTH
56900	57300	400	BOTH
60700	61800	1100	BOTH
65650	66000	350	BOTH

- 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 ALONG THE LINED DRAIN SECTIONS
  4. FOR BARRICADES OPENING SHALL BE PROVIDED WHEREVER CROSS ROAD/ GATES

SCHEDULE OF ROAD HUMPS

SL NO	CHAINAGE	TYPE OF JUNCTION	LHS/RHS
1	6120	T-JUNCTION	RHS
2	7428	Y-JUNCTION	RHS
3	7574	T-JUNCTION	LHS
4	8637	Y-JUNCTION	LHS
5	12958	X-JUNCTION	LHS/RHS
6	18353	X-JUNCTION	LHS/RHS
7	18523	X-JUNCTION	LHS/RHS
8	21194	T-JUNCTION	RHS
9	24785	X-JUNCTION	LHS/RHS
10	25835	X-JUNCTION	LHS/RHS
11	26275	T-JUNCTION	LHS
12	27139	T-JUNCTION	RHS
13	30600	X-JUNCTION	LHS/RHS
14	31050	X-JUNCTION	LHS/RHS
15	36200	X-JUNCTION	LHS/RHS
16	39876	Y-JUNCTION	LHS
17	43539	X-JUNCTION	LHS/RHS
18	46854	T-JUNCTION	RHS
19	47252	X-JUNCTION	LHS/RHS
20	50110	Y-JUNCTION	LHS
21	53142	T-JUNCTION	RHS
22	56217	T-JUNCTION	LHS
23	57068	Y-JUNCTION	LHS
24	57161	X-JUNCTION	LHS/RHS
25	60918	X-JUNCTION	LHS/RHS
26	69419	T-JUNCTION	LHS

SCHEDULE OF PEDESTRIAN CROSSING

SCHOOL ZONE	HOSPITAL ZONE	CHAINAGE	BUS BAYS
5800	7260	5970	5910
20700	7470	7195	7240
26030	26670	7895	7935
32940	-	8925	9110
33050	-	20570	20910
-	-	30095	30130
-	-	40035	39860
-	-	43665	43460
-	-	49965	50310
-	-	50645	50830
-	-	53045	53230
-	-	5645	57230
-	-	57665	57840
-	-	60655	61060
-	-	61465	61690
-	-	62905	62610
-	-	65945	66065

- NOTE:-
1. FOR DETAILS OF PEDESTRIAN CROSSING REFER ROAD MARKINGS
  2. FOR DETAILS OF RPMs AT PEDESTRIAN CROSSING REFER STANDARD DRAWINGS

**PROJECT:-**

SCHEDULE OF LINED DRAIN, ROAD HUMPS AND PEDESTRIAN CROSSING BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)

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, M.J. Colony, Malviya Nagar, Jaipur-17  
Tel: +91-141-2520898, 2521898, 2520556  
Fax: 2521348, e-mail: ceg@cegroupindia.com

Chief Engineer  
World Bank Project Director  
EMPLOYER  
To the E.P.C. (Civil)

DRG NO.	DATE	REV	NO	B.M.	R.J.	R.R.D.K	S.G
SH. NO. 73	73						

SCHEDULE OF MINOR JUNCTIONS TO BE IMPROVED

SL NO	CHANGAGE	TYPE OF JUNCTION	LHS/RHS	NAME OF THE VILLAGE	REF. DRAWING
1	6120	T-JUNCTION	RHS	TO NARAYANPUR	ORSP/CEG/JN/03
2	7428	Y-JUNCTION	RHS	TO KAMTHANA	ORSP/CEG/JN/03
3	7574	T-JUNCTION	LHS	TO KATMITHANA	ORSP/CEG/JN/02
4	8837	Y-JUNCTION	LHS	TO SANKHANIMAL	ORSP/CEG/JN/03
5	12958	X-JUNCTION	LHS/RHS	TO KUMUDI	ORSP/CEG/JN/01
6	18353	X-JUNCTION	LHS/RHS	TO TENDULPADA/TO BASTUDI	ORSP/CEG/JN/01
7	18523	X-JUNCTION	LHS/RHS	TO TENDULPADA/TO KUNGUPYA	ORSP/CEG/JN/01
8	21194	T-JUNCTION	RHS	TO KALPADA	ORSP/CEG/JN/02
9	24795	X-JUNCTION	LHS/RHS	TO CHAGAN/TO FIELD	ORSP/CEG/JN/01
10	25835	X-JUNCTION	LHS/RHS	TO GHANTABAJI/TO BURAPADA	ORSP/CEG/JN/01
11	26275	T-JUNCTION	LHS	TO BONTHPADA	ORSP/CEG/JN/02
12	27139	T-JUNCTION	RHS	TO TURKEL	ORSP/CEG/JN/02
13	30600	X-JUNCTION	LHS/RHS	TO SAPSILE/TO MATIA	ORSP/CEG/JN/01
14	31050	X-JUNCTION	LHS/RHS	TO SAPSILE/TO KARASUDA	ORSP/CEG/JN/01
15	36200	X-JUNCTION	LHS/RHS	TO BANGAKON	ORSP/CEG/JN/01
16	39976	Y-JUNCTION	LHS	TO BORDA	ORSP/CEG/JN/03
17	43539	X-JUNCTION	LHS/RHS	TO KURSUD/TO KURSUD	ORSP/CEG/JN/01
18	46854	T-JUNCTION	RHS	TO KOTHMORA	ORSP/CEG/JN/02
19	47252	X-JUNCTION	LHS/RHS	BOTH TO KOTHMORA	ORSP/CEG/JN/01
20	50110	Y-JUNCTION	LHS	TO GANDEHARLA	ORSP/CEG/JN/03
21	53142	T-JUNCTION	RHS	TO TUREKALA	ORSP/CEG/JN/02
22	56217	T-JUNCTION	LHS	TO RAMAJINDA	ORSP/CEG/JN/02
23	57068	Y-JUNCTION	LHS	TO BANPUR	ORSP/CEG/JN/03
24	57161	X-JUNCTION	LHS/RHS	BOTH TO DHELPARA	ORSP/CEG/JN/01
25	60918	X-JUNCTION	LHS/RHS	BOTH TO DHUKULA	ORSP/CEG/JN/01
26	69419	T-JUNCTION	LHS	TO KHARIYAR	ORSP/CEG/JN/02

NOTE:

1. JUNCTION SHALL BE IMPROVED AS PER THE DRAWING NO ORSP/CEG/JN/01 TO 03
2. ALL OTHER JUNCTIONS WITH NEW 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:-

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  
 Tel: +91-141-2520898, 2521898, 2520556  
 Fax: 2521348, e-mail: ceg@egindia.com



SCHEDULE OF JUNCTIONS

BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)

DRG. NO.	ORSP/CEG/SH-16/RSCH 06	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	74	DATE	REV	RD	
SCALE	NTS				
		B.M.	R.J.	R.R.D.K	S.G

PATEL  
CONTRACTOR



Chief Engineer  
 World Bank Projects, Orissa Project  
 World Bank Project  
 Of the E.I.C.(Civil) Dept.

SCHEDULE OF LOCATIONS FOR GUARD POSTS

START	END	LENGTH
3011	3091	80
3088	3138	50
4366	4506	140
4600	4630	30
4670	4770	100
6460	6570	80
6600	6600	200
6820	7080	260
9430	9530	100
10400	10460	60
10470	10520	50
10541	10680	139
15700	15850	150
17300	17500	200
18770	18970	200
20060	20360	300
20830	21230	400
21400	21600	200
22200	22300	100
24300	24300	80
27200	28165	965
28765	29550	785
30600	30760	160
31180	31200	20
37180	37270	90
37600	37710	110
40080	40120	40
41880	41880	200
42250	42360	110
43100	43130	30
44740	44870	130
44960	45040	80
45300	45330	30
45670	46150	480
49720	49780	60
50220	50240	20
51130	51180	50
51736	51770	34
93340	93360	20
94410	94850	440
54760	54840	80
58140	58240	100
59030	59090	60
59456	59500	44
63200	63240	40
64020	64050	30
66200	66250	50
67870	68000	130
68953	69080	127

SCHEDULE OF ROAD DELINEATORS AT CURVES UPTO 1000m

START	END	RADIUS	ARC LENGTH	SPACING	TOTAL
2877.047	2968.454	200	92.407	20	13
3174.729	3216.08	200	42.151	20	9
5089.156	5147.361	360	58.205	25	9
6090.485	6127.587	300	37.122	25	8
7195.232	7287.931	1000	91.699	50	9
11988.31	12018.09	400	48.784	30	8
12250.77	12329.04	500	78.27	35	9
15283.71	15374.72	1000	91.009	50	9
16011.85	16067.52	300	55.665	25	9
17342.22	17493.31	400	151.087	30	14
17729.88	17781.86	600	61.965	38	8
19267.64	19337.78	600	70.148	38	9
21402.57	21485.01	800	82.437	45	9
23199.17	23249.47	250	50.309	20	10
27493.95	27527.92	240	33.978	20	9
27856.35	27896.71	400	30.367	30	8
28988.85	29128.76	300	139.914	25	14
29427.65	29464.19	300	36.539	25	8
30257.47	30344.53	280	87.053	20	13
35427.67	35471.56	240	43.897	20	9
38181.63	38201.57	800	39.945	45	7
37030.38	37078.47	300	48.087	25	9
37735.15	37827.34	240	92.191	20	13
38589.54	38620.18	300	30.637	25	8
40135.09	40254.48	400	119.394	30	12
43779.11	43886.27	800	107.167	45	10
45685.75	45769.34	600	83.58	38	9
48379.88	48505.37	300	125.486	25	14
50121.41	50307.57	900	186.151	48	12
52314.25	52445.23	300	130.973	25	14
53235.92	53352.4	800	115.48	45	10
54955.9	55009.53	400	53.629	30	9
55301.72	55385.76	240	84.047	20	12
55885.48	55976.41	1000	90.933	50	9
58727.19	58824.64	240	97.458	20	13
57785.93	57840.97	300	55.042	25	9
58521.18	58609.44	900	88.256	48	9
59213.11	59268.87	600	55.758	38	8
59709.99	59755.08	240	45.09	20	9
60951.76	61069.8	550	118.039	35	11
62726.81	62772.83	800	46.021	45	8
63280.53	63332.23	1000	51.697	50	8
65017.39	65425.42	620	408.035	38	22
68043.81	68231.12	700	187.308	42	13

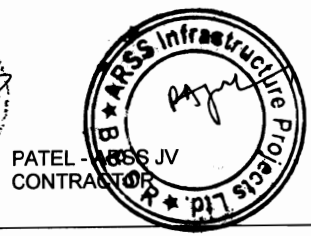
NOTE:  
 1. ROAD DELINEATORS SHALL BE PROVIDED AS PER THE GUIDELINES IN IRC:78-1981  
 2. FOR THE DETAILS OF ROAD DELINEATORS REFER DWG NO OSRP/CEG/RD

NOTE:  
 1. GUARD POSTS SHALL BE PROVIDED AS PER THE DRAWING NO OSRP/CEG/CB  
 2. GUARD POSTS SHALL BE PROVIDED AT ALL THE SECTIONS WITH HT OF EMBANKMENT MORE THAN 3m  
 AND BRIDGE LOCATIONS AS PER DRAWING NO OSRP/CEG/TR

**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 GUARD POSTS & ROAD DELINEATOR**  
**BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)**

DRG NO. OSRP/CEG/SH-16/RS/07	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 75	DATE	REV	RD	
SCALE	NTS		B.M.	R.J.
			R.R.D.K	S.C



PATEL - JVS JV  
 CONTRACTOR

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

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, M.J. Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520898, 2521898, 2520556  
 Fax: 2521348, e-mail: ceg@cegroupindia.com

**SCHEDULE FOR PAVEMENT COMPOSITION AND TYPE OF CONSTRUCTION FOR BHAWANIPATNA - KHARIAR (SH-16)**

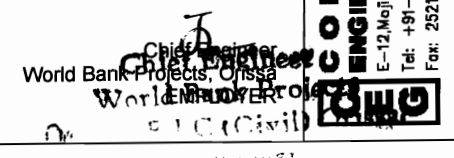
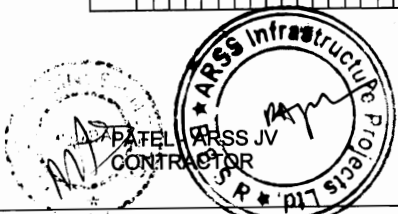
Sl. No.	Propy. charge/Length in Met	Length in Met	Thickness Design (IRC-87)										Thickness Design (IRC-87)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
			Sub Base					Base					Sub Base					Base																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			W80	W100	W120	W150	W180	W80	W100	W120	W150	W180	W80	W100	W120	W150	W180	W80	W100	W120	W150	W180																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
1	2,000	2,000	0.00	0.00	0.00	40	70	100	150	110	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760	780	800	820	840	860	880	900	920	940	960	980	1000	1020	1040	1060	1080	1100	1120	1140	1160	1180	1200	1220	1240	1260	1280	1300	1320	1340	1360	1380	1400	1420	1440	1460	1480	1500	1520	1540	1560	1580	1600	1620	1640	1660	1680	1700	1720	1740	1760	1780	1800	1820	1840	1860	1880	1900	1920	1940	1960	1980	2000	2020	2040	2060	2080	2100	2120	2140	2160	2180	2200	2220	2240	2260	2280	2300	2320	2340	2360	2380	2400	2420	2440	2460	2480	2500	2520	2540	2560	2580	2600	2620	2640	2660	2680	2700	2720	2740	2760	2780	2800	2820	2840	2860	2880	2900	2920	2940	2960	2980	3000	3020	3040	3060	3080	3100	3120	3140	3160	3180	3200	3220	3240	3260	3280	3300	3320	3340	3360	3380	3400	3420	3440	3460	3480	3500	3520	3540	3560	3580	3600	3620	3640	3660	3680	3700	3720	3740	3760	3780	3800	3820	3840	3860	3880	3900	3920	3940	3960	3980	4000	4020	4040	4060	4080	4100	4120	4140	4160	4180	4200	4220	4240	4260	4280	4300	4320	4340	4360	4380	4400	4420	4440	4460	4480	4500	4520	4540	4560	4580	4600	4620	4640	4660	4680	4700	4720	4740	4760	4780	4800	4820	4840	4860	4880	4900	4920	4940	4960	4980	5000	5020	5040	5060	5080	5100	5120	5140	5160	5180	5200	5220	5240	5260	5280	5300	5320	5340	5360	5380	5400	5420	5440	5460	5480	5500	5520	5540	5560	5580	5600	5620	5640	5660	5680	5700	5720	5740	5760	5780	5800	5820	5840	5860	5880	5900	5920	5940	5960	5980	6000	6020	6040	6060	6080	6100	6120	6140	6160	6180	6200	6220	6240	6260	6280	6300	6320	6340	6360	6380	6400	6420	6440	6460	6480	6500	6520	6540	6560	6580	6600	6620	6640	6660	6680	6700	6720	6740	6760	6780	6800	6820	6840	6860	6880	6900	6920	6940	6960	6980	7000	7020	7040	7060	7080	7100	7120	7140	7160	7180	7200	7220	7240	7260	7280	7300	7320	7340	7360	7380	7400	7420	7440	7460	7480	7500	7520	7540	7560	7580	7600	7620	7640	7660	7680	7700	7720	7740	7760	7780	7800	7820	7840	7860	7880	7900	7920	7940	7960	7980	8000	8020	8040	8060	8080	8100	8120	8140	8160	8180	8200	8220	8240	8260	8280	8300	8320	8340	8360	8380	8400	8420	8440	8460	8480	8500	8520	8540	8560	8580	8600	8620	8640	8660	8680	8700	8720	8740	8760	8780	8800	8820	8840	8860	8880	8900	8920	8940	8960	8980	9000	9020	9040	9060	9080	9100	9120	9140	9160	9180	9200	9220	9240	9260	9280	9300	9320	9340	9360	9380	9400	9420	9440	9460	9480	9500	9520	9540	9560	9580	9600	9620	9640	9660	9680	9700	9720	9740	9760	9780	9800	9820	9840	9860	9880	9900	9920	9940	9960	9980	10000

- Note:
- The pavement design has been based on IRC : 37- 2001 & IRC:81 - 1997
  - The Borrowed CBR (not less than 6) shall be used for new construction Section
  - The Typical Cross Sections applicable for different sections are given in STANDARD DRAWINGS SET
  - Lined Drain with 10 m (7m Carriageway + 1.5m Paved Shoulder) shall be Provided
- Refer Dwg 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.

**C CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Mejl Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520898, 2521898, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

SCHEDULE OF PAVEMENT COMPOSITION		BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)	
DRG NO. (SPP/332/SH-16/SC/08)	DATE	REV	RD
SH. NO. 76	DATE	REV	RD
SCALE	NTS	B.M.	R.J.
		B.M.	R.R.D.K
			S.G



# DETAILED PAVEMENT SCHEDULE

Sl.No.	Prop chainage		Length in KM	Total Thickness	Type of Construction	Type of Area	TCS
	From	To					
31	43.600	44.000	0.400	1100	Reconstruction	BUILT	TCS - 05
32	44.000	44.100	0.100	1100	Reconstruction	OPEN	TCS - 02
33	44.100	44.300	0.200	1100	New Construction	OPEN	TCS - 03
34	44.300	44.800	0.500	1100	New Construction	OPEN	TCS - 02
35	44.800	44.900	0.100	1100	New Construction	BUILT	TCS - 06
36	44.900	46.830	1.730	1100	New Construction	OPEN	TCS - 03
37	46.830	47.060	0.230	1100	Reconstruction	OPEN	TCS - 02
38	47.060	48.760	1.700	1100	New Construction	OPEN	TCS - 03
39	48.760	49.200	0.440	1100	Reconstruction	OPEN	TCS - 02
40	49.2	50	0.800	1100	New Construction	OPEN	TCS - 03
41	50.000	50.300	0.300	1100	New Construction	BUILT	TCS - 05
42	50.300	50.700	0.400	1100	Reconstruction	OPEN	TCS - 02
43	50.700	51.100	0.400	1100	New Construction	OPEN	TCS - 03
44	51.100	52.120	1.020	1100	New Construction	OPEN	TCS - 02
45	52.120	53.160	1.040	1100	Reconstruction	OPEN	TCS - 03
46	53.160	56.040	2.880	1100	New Construction	OPEN	TCS - 05
47	56.040	56.100	0.060	1100	Reconstruction	OPEN	TCS - 02
48	56.100	58.900	0.800	1100	New Construction	OPEN	TCS - 03
49	58.900	57.300	0.400	1100	New Construction	BUILT	TCS - 06
50	57.300	58.260	0.960	1100	New Construction	OPEN	TCS - 03
51	58.260	59.430	1.170	1100	Reconstruction	OPEN	TCS - 02
52	59.430	60.700	1.270	1100	New Construction	OPEN	TCS - 03
53	60.700	60.900	0.200	1100	Reconstruction	BUILT	TCS - 05
54	60.900	61.800	0.900	1100	New Construction	BUILT	TCS - 06
55	61.800	64.770	2.970	1100	New Construction	OPEN	TCS - 03
56	64.770	65.270	0.500	1100	Reconstruction	OPEN	TCS - 02
57	65.270	65.860	0.590	1100	New Construction	OPEN	TCS - 03
58	65.860	68.000	0.360	1100	New Construction	BUILT	TCS - 06
59	68.000	67.030	0.970	1100	New Construction	OPEN	TCS - 03
60	67.030	67.230	0.200	1100	Reconstruction	OPEN	TCS - 02
61	67.230	69.760	2.530	1100	New Construction	OPEN	TCS - 03

Sl.No.	Prop chainage		Length in KM	Total Thickness	Type of Construction	Type of Area	TCS
	From	To					
31	43.600	44.000	0.400	1100	Reconstruction	BUILT	TCS - 05
32	44.000	44.100	0.100	1100	Reconstruction	OPEN	TCS - 02
33	44.100	44.300	0.200	1100	New Construction	OPEN	TCS - 03
34	44.300	44.800	0.500	1100	New Construction	OPEN	TCS - 02
35	44.800	44.900	0.100	1100	New Construction	BUILT	TCS - 06
36	44.900	46.830	1.730	1100	New Construction	OPEN	TCS - 03
37	46.830	47.060	0.230	1100	Reconstruction	OPEN	TCS - 02
38	47.060	48.760	1.700	1100	New Construction	OPEN	TCS - 03
39	48.760	49.200	0.440	1100	Reconstruction	OPEN	TCS - 02
40	49.2	50	0.800	1100	New Construction	OPEN	TCS - 03
41	50.000	50.300	0.300	1100	New Construction	BUILT	TCS - 05
42	50.300	50.700	0.400	1100	Reconstruction	OPEN	TCS - 02
43	50.700	51.100	0.400	1100	New Construction	OPEN	TCS - 03
44	51.100	52.120	1.020	1100	New Construction	OPEN	TCS - 02
45	52.120	53.160	1.040	1100	Reconstruction	OPEN	TCS - 03
46	53.160	56.040	2.880	1100	New Construction	OPEN	TCS - 05
47	56.040	56.100	0.060	1100	Reconstruction	OPEN	TCS - 02
48	56.100	58.900	0.800	1100	New Construction	OPEN	TCS - 03
49	58.900	57.300	0.400	1100	New Construction	BUILT	TCS - 06
50	57.300	58.260	0.960	1100	New Construction	OPEN	TCS - 03
51	58.260	59.430	1.170	1100	Reconstruction	OPEN	TCS - 02
52	59.430	60.700	1.270	1100	New Construction	OPEN	TCS - 03
53	60.700	60.900	0.200	1100	Reconstruction	BUILT	TCS - 05
54	60.900	61.800	0.900	1100	New Construction	BUILT	TCS - 06
55	61.800	64.770	2.970	1100	New Construction	OPEN	TCS - 03
56	64.770	65.270	0.500	1100	Reconstruction	OPEN	TCS - 02
57	65.270	65.860	0.590	1100	New Construction	OPEN	TCS - 03
58	65.860	68.000	0.360	1100	New Construction	BUILT	TCS - 06
59	68.000	67.030	0.970	1100	New Construction	OPEN	TCS - 03
60	67.030	67.230	0.200	1100	Reconstruction	OPEN	TCS - 02
61	67.230	69.760	2.530	1100	New Construction	OPEN	TCS - 03

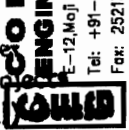
**PROJECT:-**

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**

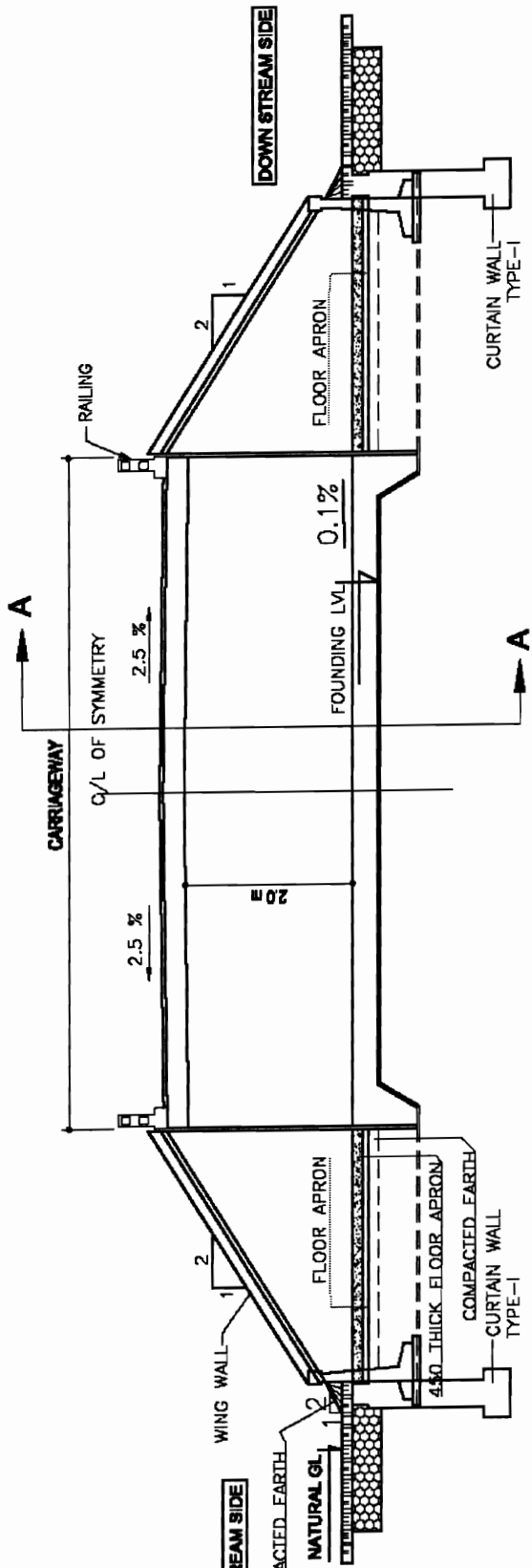
BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)

DRG. NO. 088P/523/SH-16/SCH. 06	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 77	DATE	REV	RD	
SCALE	NTS		R.J.	R.R.D.K
			B.M.	S.C

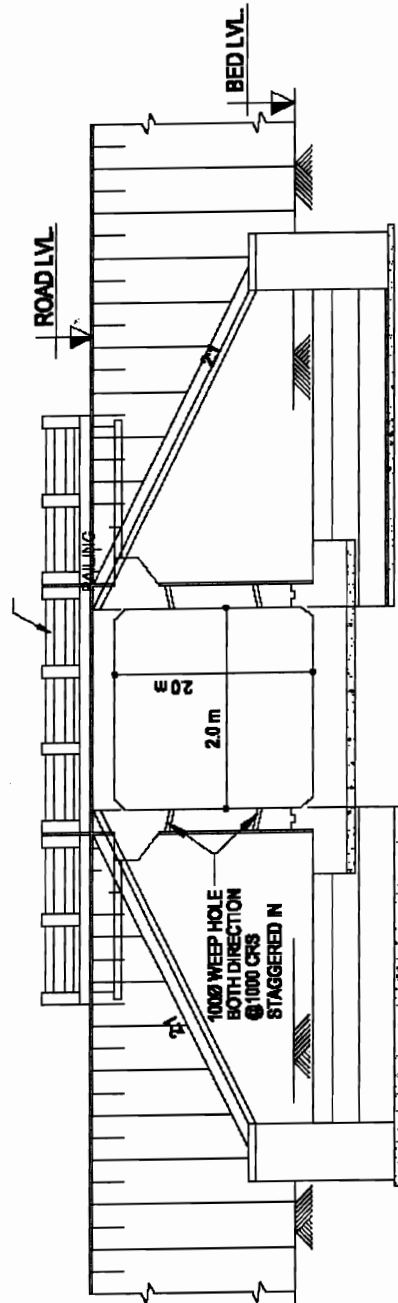

  
**ENGINEERS GROUP LTD.**  
 E-12, Maji Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520898, 2521898, 2520556  
 Fax: 2521348, e-mail: ceg@egindia.com  
 Chief Engineer  
 World Bank Projects, Orissa Project  
 EMPLOYER  
 O/o the E.I.C (Civil)  
 Bhubaneswar

PATEL ARSS JV  
CONTRACTOR

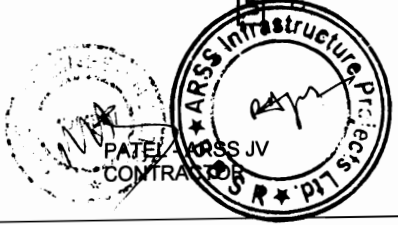




**LONGITUDINAL SECTION**



**SECTION A-A**



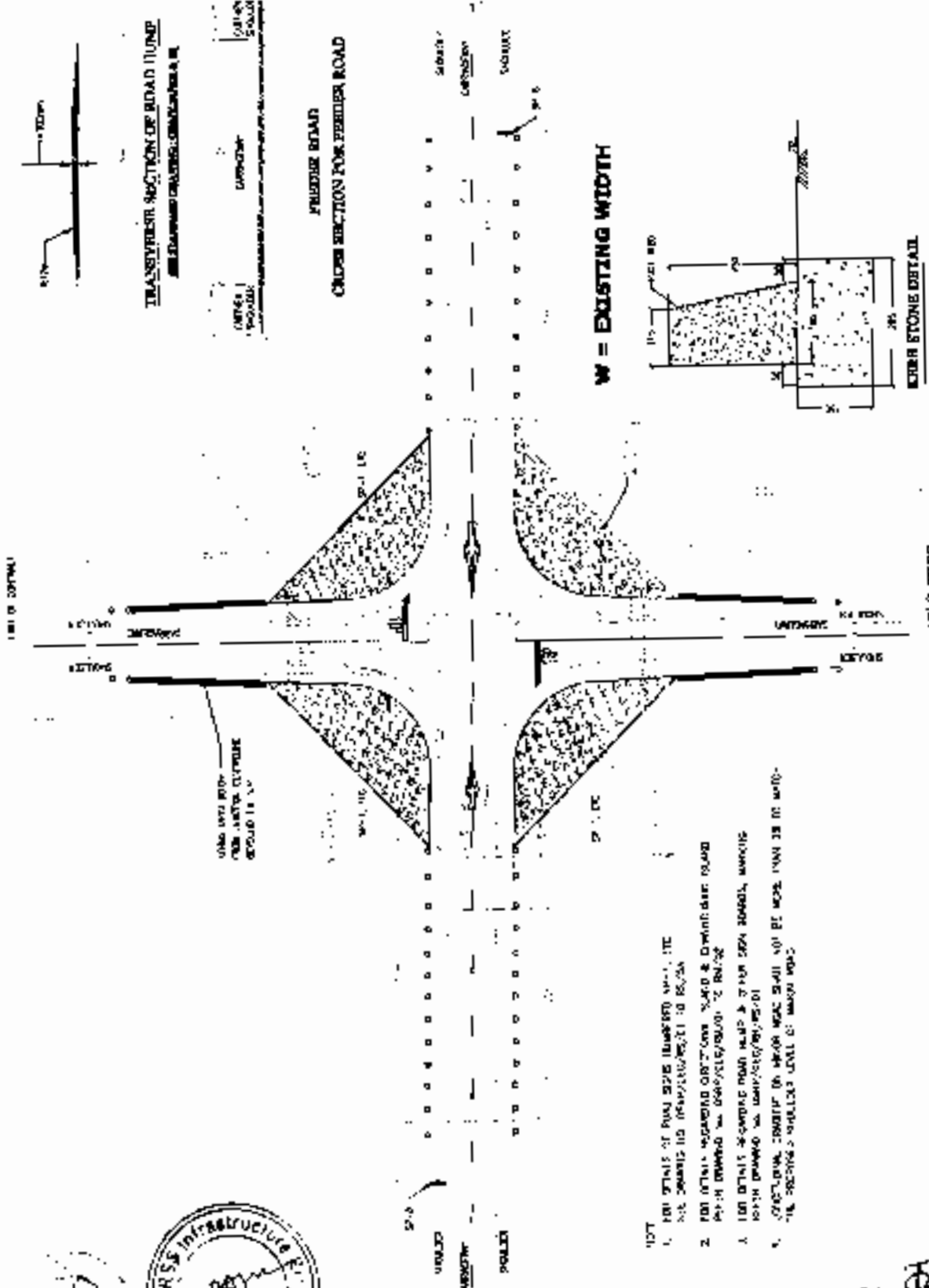
Chief Engineer  
 World Bank Projects  
 To the E.I.C. Civil  
 Phubaneswar

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

TYPICAL ANIMAL PASS - BOX CULVERT (WITH OUT CUSHION) BHAWANIPATNA TO KHARIAR (SH-16, KM 2 TO 70)

DRG. NO.	REV.	DATE	BY	CHKD.	APPD.
SH. NO. 78	RD				
SCALE	NTS		B.M.	R.J.	R.R.D.K
					S.C



CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.

**PROJECT:**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

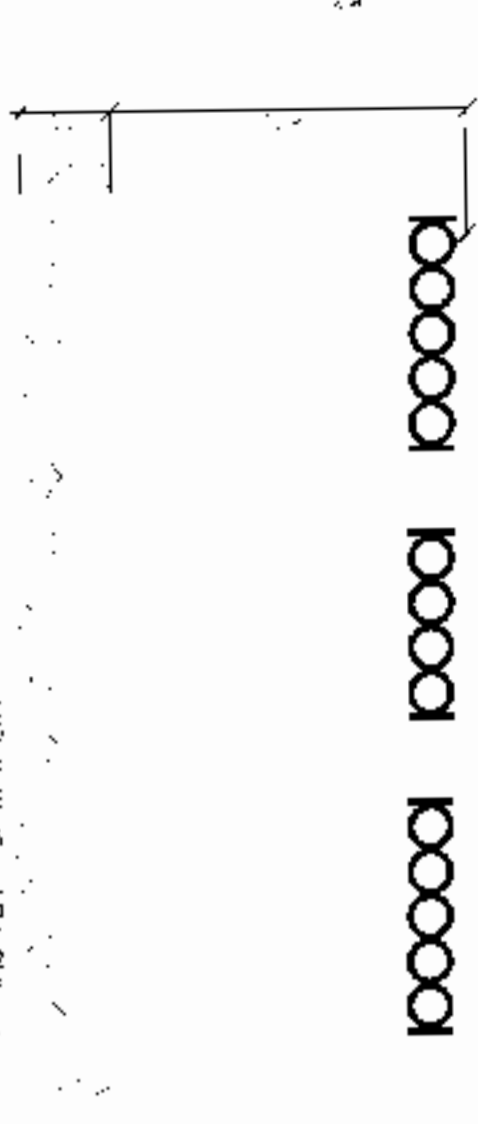
**CONSULTING ENGINEERS GROUP LTD.**  
 F-12, 1st Floor, Cyber Park, Sector-17, Gurgaon, Haryana  
 Tel: +91-11-2610899, 2610999, 2610998  
 Fax: 2610960, e-mail: ce@cegroup.com

SCALE	NTS	DATE	REV	NO	BY	CHKD	APPD



World Bank Project... EMPLOYER... Olo the E.T.C. (City)...

M.S. FLAT 10mm x 2mm

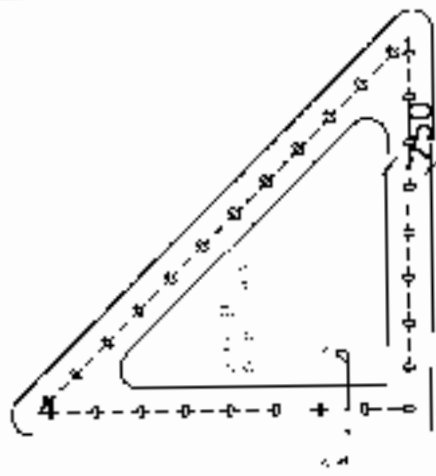


FRONT ELEVATION  
M.S. GRILL FOR JUNCTION

(ALL DIMENSIONS ARE IN mm)



SECTION A-A



PLAN OF M.S. GRILL AT JUNCTION

CORNERS AS SITE ENHANCEMENT AND PREVENTION OF ENCRCHED COMMERCIAL ACTIVITY AND KOBKS 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 DRISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

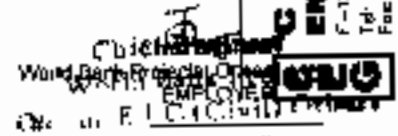
**CONSULTING ENGINEERS GROUP LTD.**  
F-12, Model Colony, Haryana Nagar, Jaipur-17  
Tel: +91-141-2570699, 2521898, 2520156  
Fax: 2521348 e-mail: eng@enginfo.com

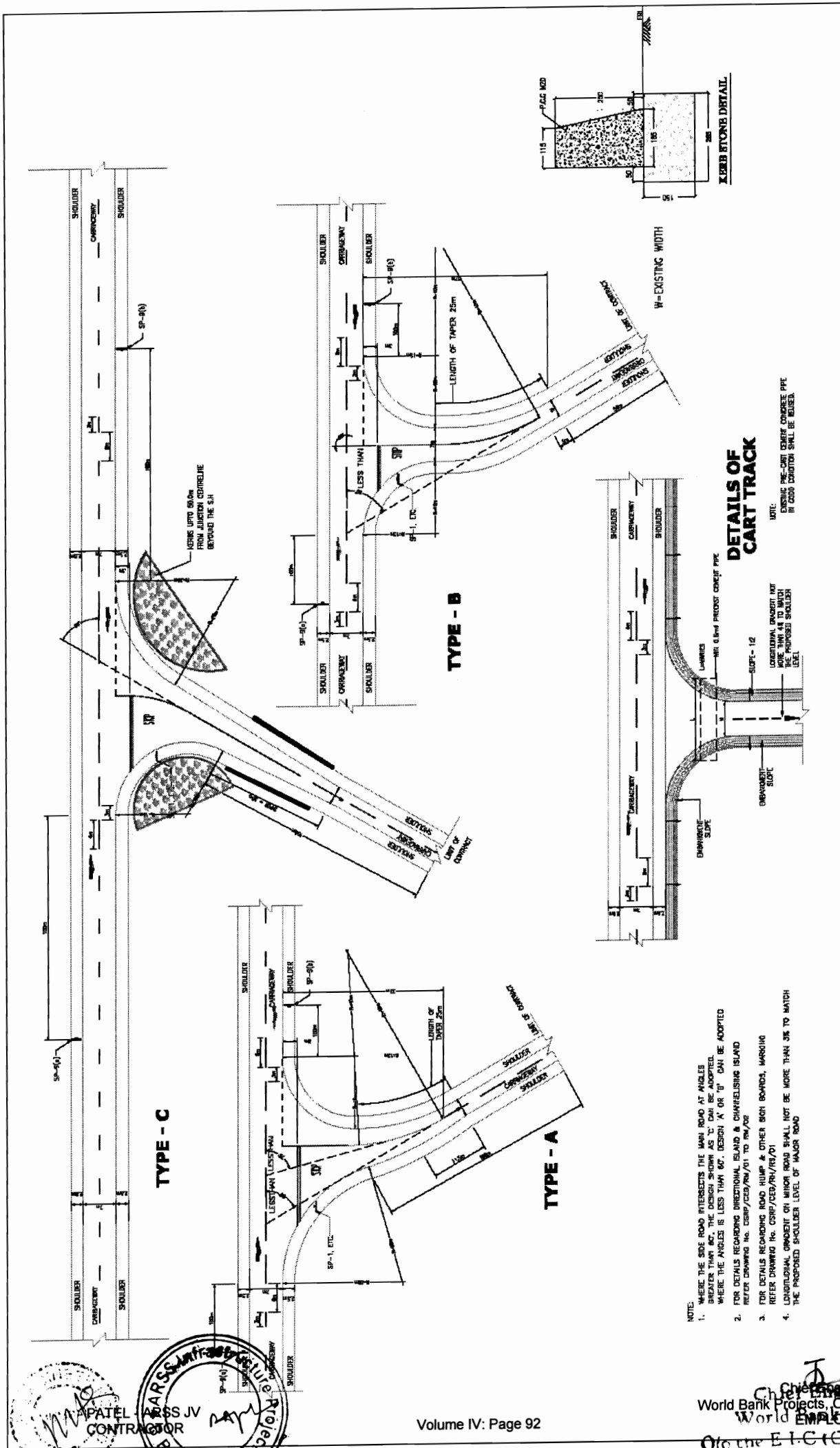
TYPICAL DESIGN OF  
M.S. GRILL FOR JUNCTION

DRG. NO.	DATE	BY	CHKD.	DATE	REV.	NO.
SH. NO.	07					
SCALE						
				4	JYD-1	C.P.M
						S.G



GET : 10/10/2018 11:18:18 AM





**PROJECT:-**  
**CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.**

**CON S U L T I N G ENGINEERS GROUP LTD.**  
 E-12, Moji Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

**CONCEPTUAL SITE ENHANCEMENT DESIGNS FOR ROAD JUNCTIONS AS ENVIRONMENTAL IMPACT MITIGATION.**

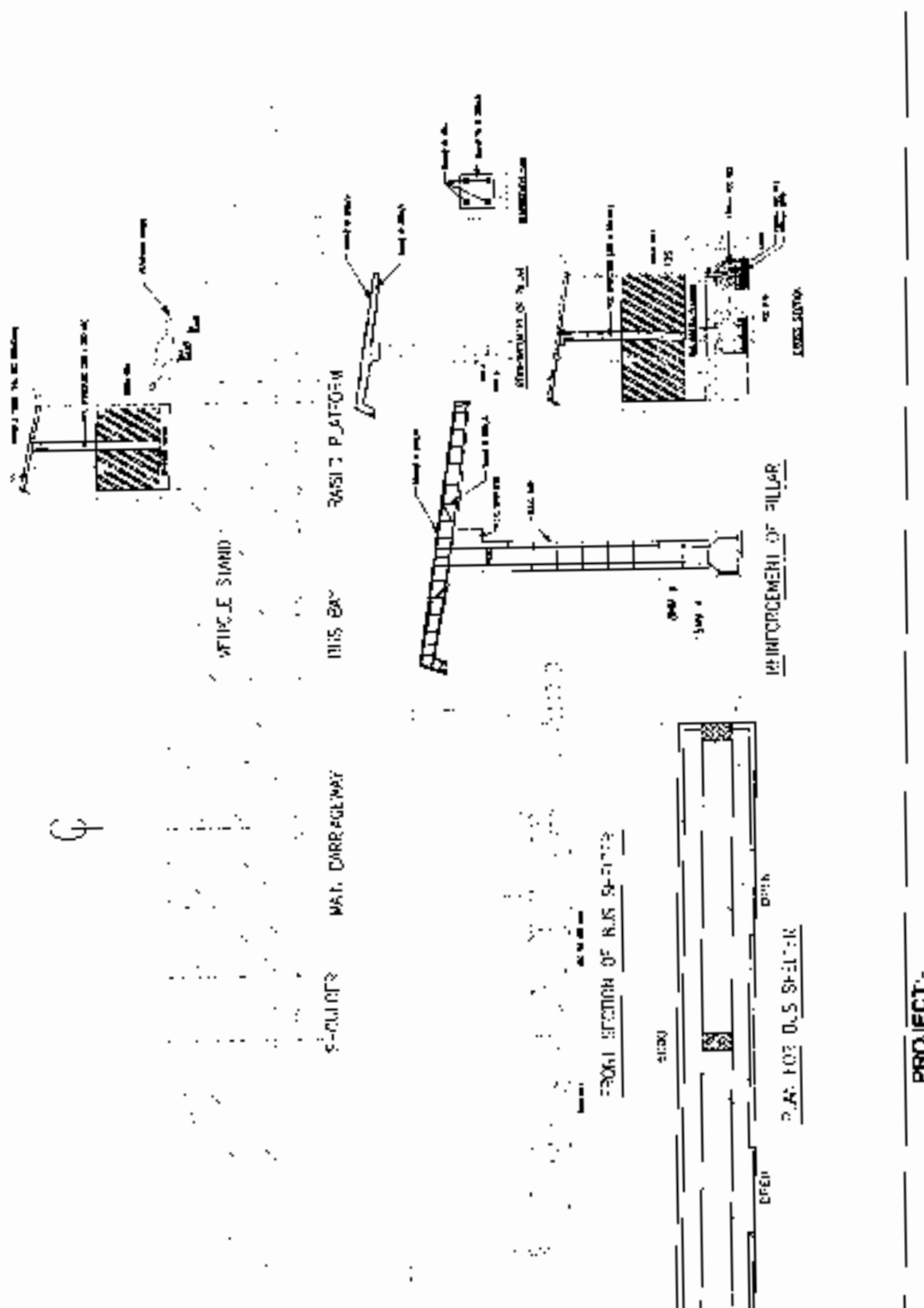
DRG NO. CSR/CEG/SH/ENV/01-C  
 SH. NO. 63  
 DATE  
 DESIGNED (A)  
 DRAWN (B)  
 CHECKED (C) APPROVED (D)

SCALE: NTS  
 REV. NO. RO  
 M  
 JYOTI G.P.M S.G

- NOTE:**
- WHERE THE SIDE ROAD INTERSECTS THE MAIN ROAD AT ANGLE GREATER THAN 60°, THE DESIGN SHOWN AS 'C' CAN BE ADOPTED. WHERE THE ANGLE IS LESS THAN 60°, DESIGN 'A' OR 'B' CAN BE ADOPTED.
  - FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHAFFELSHIRE ISLAND REFER DRAWING NO. CSR/CEG/SH/01 TO SH/02.
  - FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING NO. CSR/CEG/SH/RS/01.
  - LONGITUDINAL GRADIENT ON MAIN ROAD SHALL NOT BE MORE THAN 0.8% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAIN ROAD.

**M. PATIL - B.S.R. - P.M. SPECIALIST**  
**CONTRACTOR**

**CEG**  
 Chief Engineer  
 World Bank Projects, Orissa  
 World Employer  
 Of the E.I.C. (Civil) Office  
 Bhubaneswar



**DESIGN OF PASSENGER SHED AT BUS BAY & BUS STOP**

Scale: 1/4" = 1'-0"

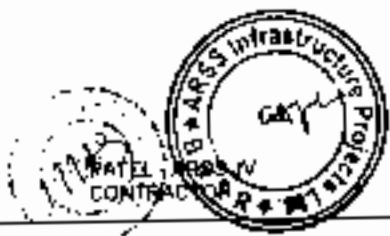
DATE: 15/07/2011

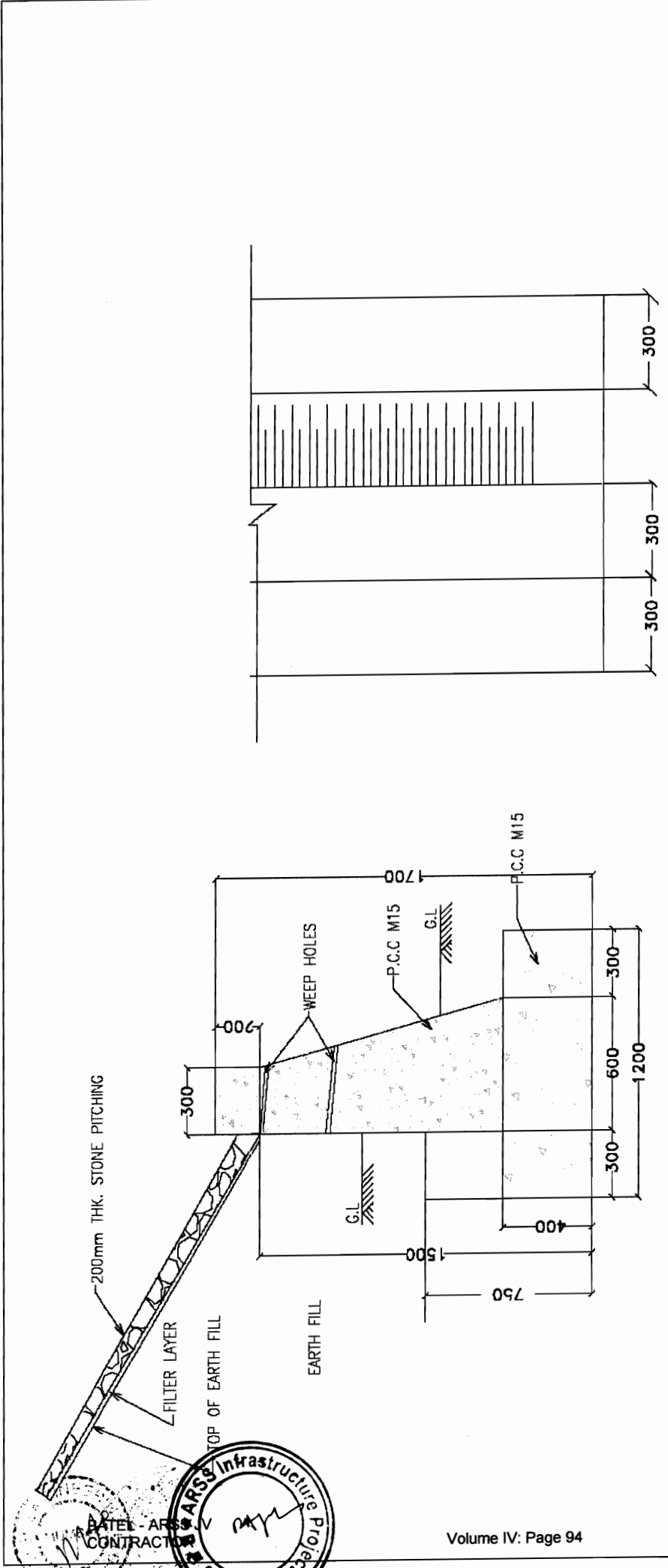
REV: 01

SCALE: S.C

**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.**  
 2nd Floor, 1st Floor, 2nd Floor, 2nd Floor, 2nd Floor  
 Tel: +91-11-2610889, 252 899, 2520065  
 Fax: 261315, e-mail: ceeg@ceegindia.com





TOE WALL FOR POND  
( CROSS SECTION )

PLAN OF TOE WALL FOR WATER BODY

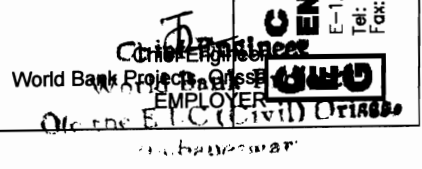
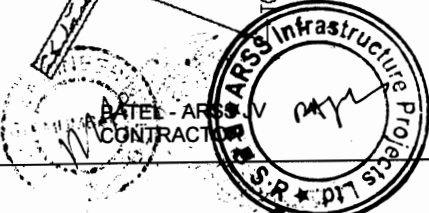
**TO MINIMISE IMPACT ON STORAGE CAPACITY & WATER SPREAD OF PONDS, WATER BODY, NALA BED RETAINING WALLS TO BE ERRECTED SUCH THAT IT PREVENTS ACCIDENTAL FALL INTO THE DEPRESSION AND WASHING OF VEHICLES/BATHING/ WASHING GHAT ON THE ROAD SIDE**

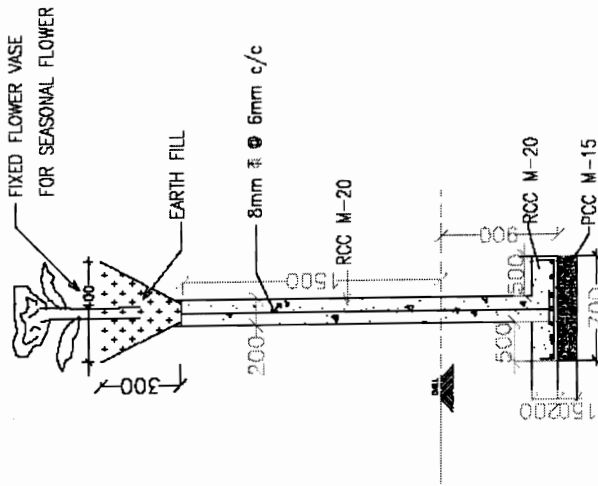
**PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE**

**CONSULTING  
ENGINEERS GROUP LTD.**  
E-12, Moji Colony, Malviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@cegindia.com

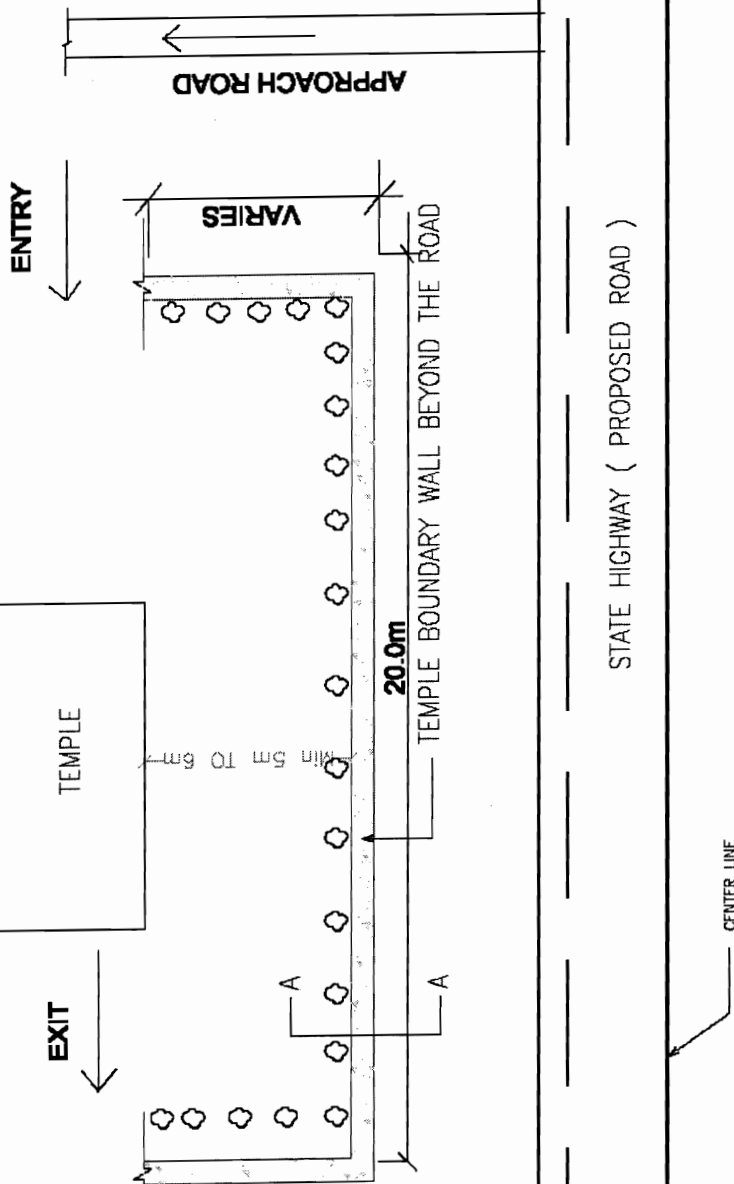
TYPICAL PCC TOE WALL FOR  
WATER BODIES AS ENVIRONMENTAL MITIGATION.

DRG NO. OSRP/CEG/SH/ENV/03	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 65	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G





RCC RETAINING WALL FOR TEMPLE  
( CROSS SECTION A-A )



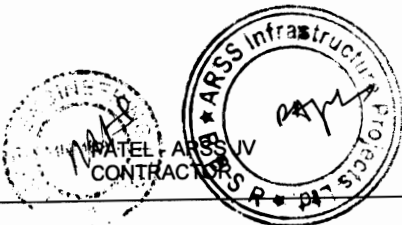
- ALL RELOCATED TEMPLES TO HAVE ENTRY AND EXIT AWAY FROM ROAD AND ROW
- EVERGREEN SHRUBS & MEDIUM TREES LIKE TAGAR, TARAT, MANDAR, PLUMERIA NICTANTHES, MALLIKA, JASHMINE, KUNDA, KANCHAN, KARABIRA, TULSI, BELA, SHAMI, ASHOK (saraca asoka), KAMINI, NAGESWAR AND CHAMPA (PLANT TO PLANT SPACE 1.5m TO 2.0m DEPENDING ON THE SPECIES)
- FIXED FLOWER VASE ON THE BOUNDARY WALL FOR SEASONAL FLOWER & TULSI.

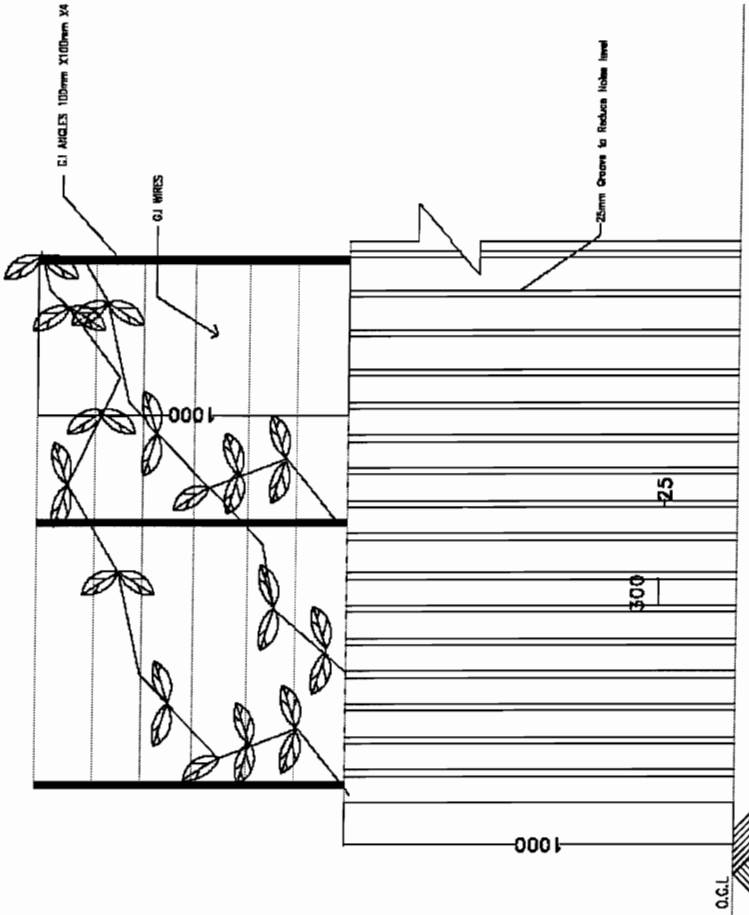
CONCEPTUAL RCC BOUNDARY WALL OF TEMPLES, STATUES  
RELIGIOUS TREES AS SITE ENHANCEMENT UNDER  
ENVIRONMENT MITIGATION PLAN.

PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

**CONSULTING  
ENGINEERS GROUP LTD.**  
E-12, Moji Colony, Malviya Nagar, Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@ceginfinia.com

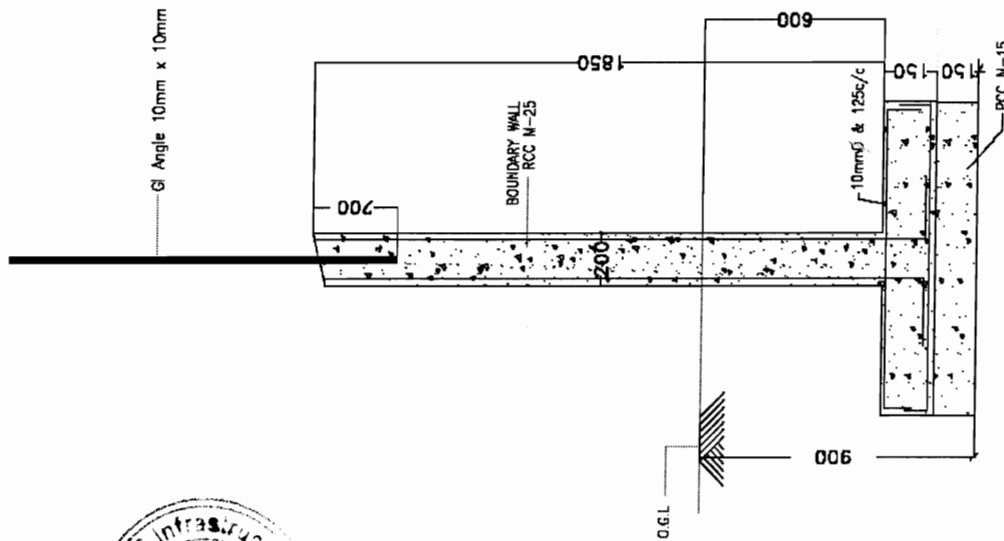
DRG NO. OSRP/CEG/SH/ENV/04-A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 66	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G





FRONT ELEVATION

RCC BOUNDARY WALL FOR SENSITIVE RECEPTORS WITH NOISE & DUST REDUCTION ARRANGEMENT



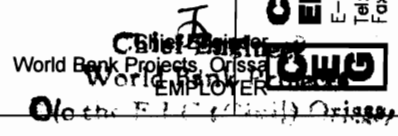
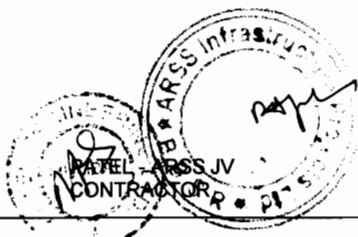
RCC BOUNDARY WALL FOR SCHOOL (CROSS SECTION)

**TYPICAL NOISES & DUST BARRIER FOR ENVIRONMENTAL MITIGATION.**

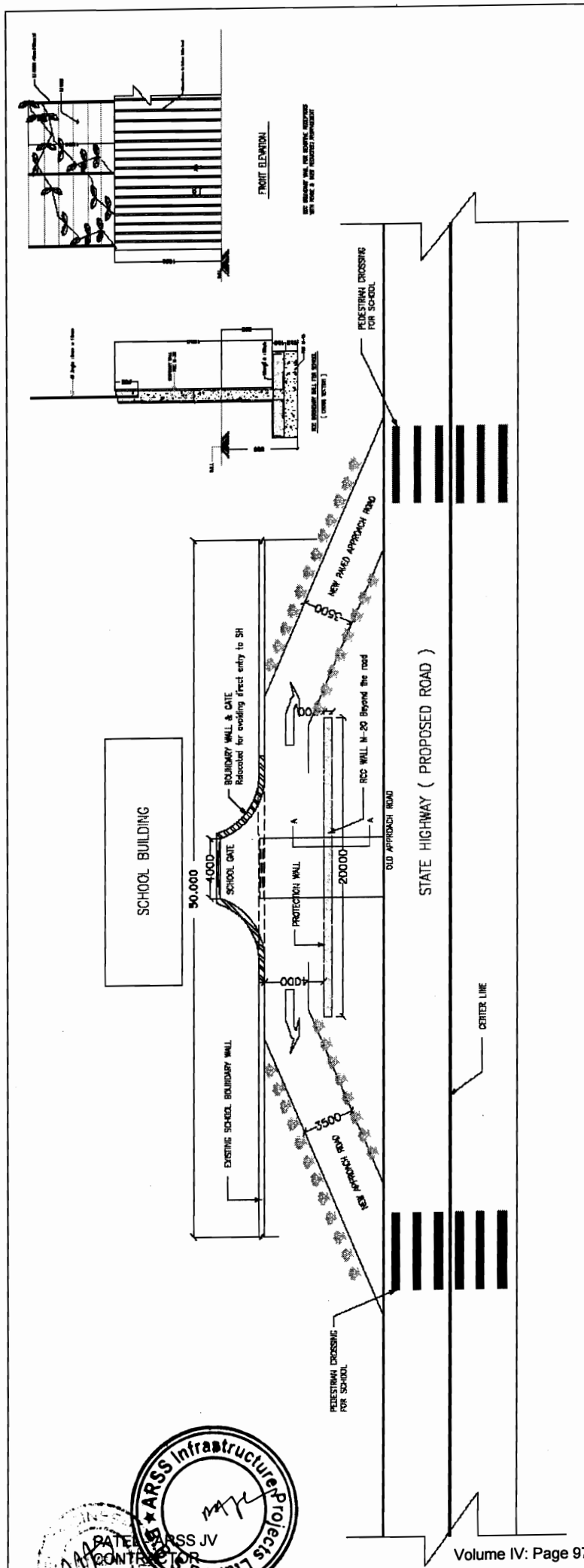
**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moji Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520889, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@cegroupindia.com

DIRG NO. OSRP/CEG/SH/EIV/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







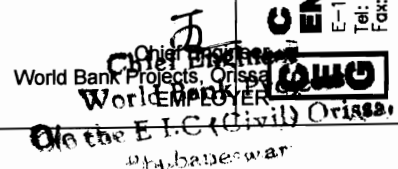
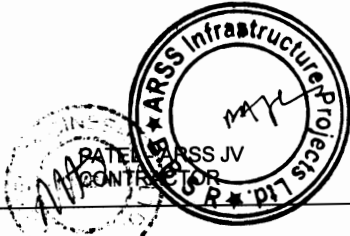
- THERE SHALL BE RUMBLER STRIPS & SPEED BREAKERS 150m & 10m AWAY FROM PEDESTRIAN CROSSINGS NEAR SCHOOLS, COLLEGES, HOSTELS, TEMPLES, HOSPITALS, DISPENSARIES AND OLD AGE HOMES, WEEKLY MARKET AREA, G.P MARKET COMPLEX ADJACENT TO THE ROAD WITHIN 25m TO 50m DISTANCE FROM CENTRE LINE. THE BOUNDARY WALL SHOULD 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

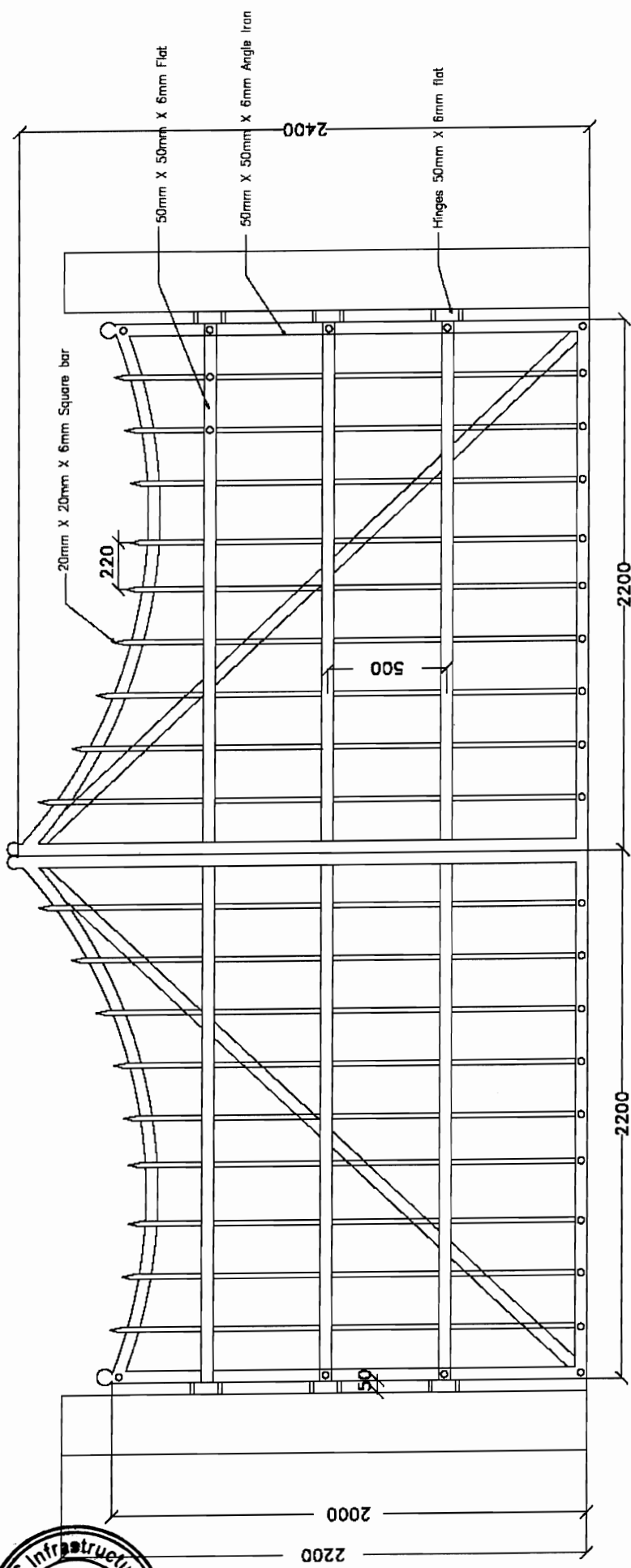
**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moji Colony, Malviya Nagar, Jaipur-17  
 Tel: +91 -141-2520899, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@ceginia.com

**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.	88	DATE	REV.	RO	
SCALE			NTS		
				JYOTI	G.P.M
				M	S.G





ORNAMENTAL GATE

ORNAMENTAL GATE DESIGN FOR EDUCATIONAL AND MEDICAL INSTITUTIONAL APPROACHES AS ENVIRONMENTAL MITIGATION PLAN.

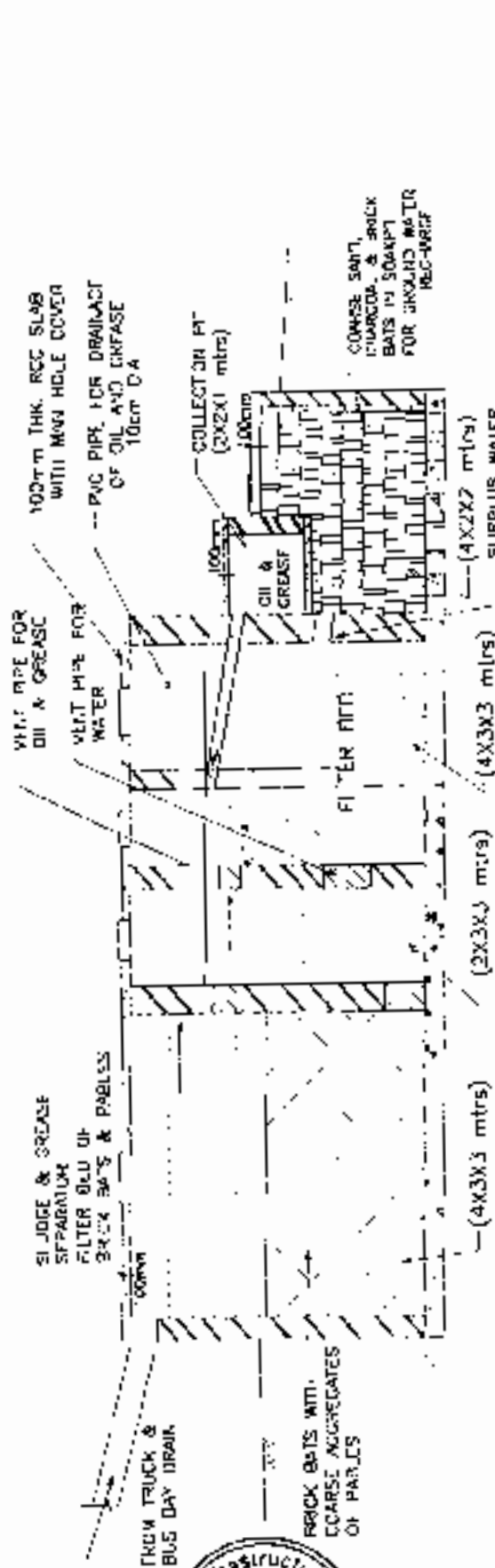
DRG NO. OSRP/CEG/SH/ENV/05 A	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 69	DATE	REV	RO	
SCALE	NTS		M	JYOTI
			G.P.M	S.G

**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND**  
**DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS**  
**FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK**  
**ASSISTANCE**

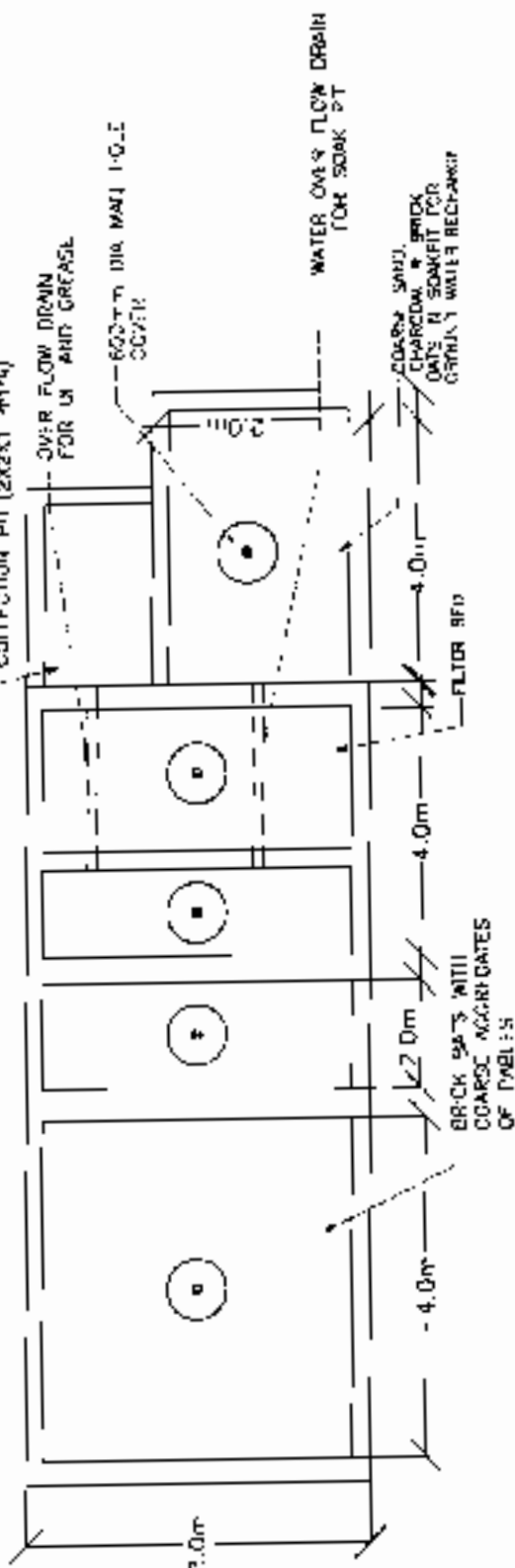
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moj Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@cegroupindia.com

Chief Engineer  
 Chief Engineer  
 World Bank Project Officer  
 EMPLOYER  
 Olo the REMP  
 Rhubanetwar





**SECTION OF SOAK PIT**



**PLAN OF SOAK PIT**

**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
 DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
 ASSISTANCE**

**CONCEPTUAL DESIGN FOR SEPARATION OF OIL-GREASE  
 AND SLUDGE OF TRUCK & BUS TERMINALS & BUS BAY**

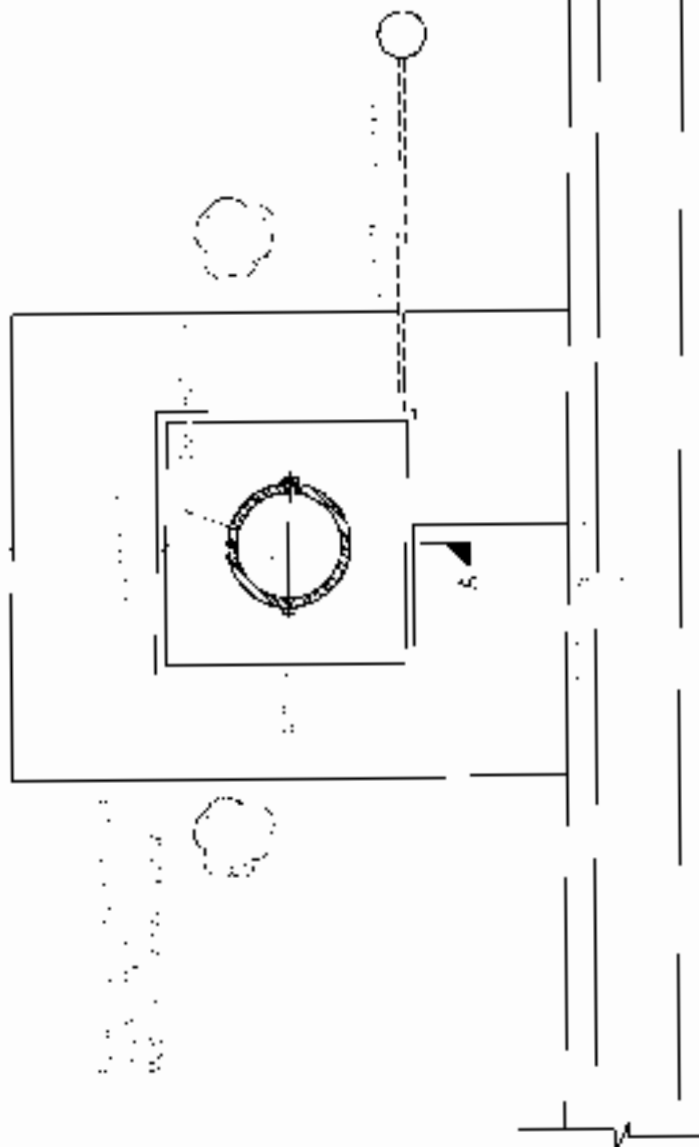
**C O N S U L T I N G  
 ENGINEERS GROUP LTD.**  
 F-12, 4oj Colony, Nalaya Nagar, Jaipur 302017  
 Tel: +91-141-7520699, 252 059, 2520156  
 Fax: 2521314, 6-e-mail: cec@cegindia.com

World Bank Project Under  
 World Bank Project

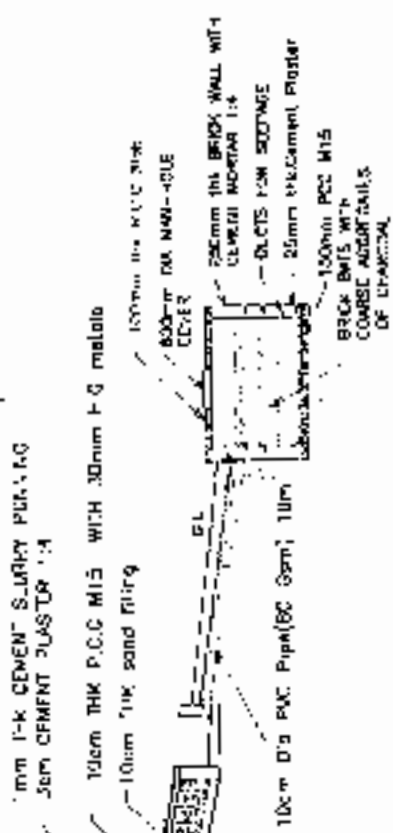
DRG NO.	DATE	BY	CHKD	REV	NO.	ISSUED BY	ISSUED DATE	REVISED BY	REVISED DATE
SCALE					NTS				
					M		JYDII		
					G.P.M		S.G		



A



**PLAN**



**SECTION OF SOAK PIT**

**PROJECT:-**

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
 DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
 ASSISTANCE

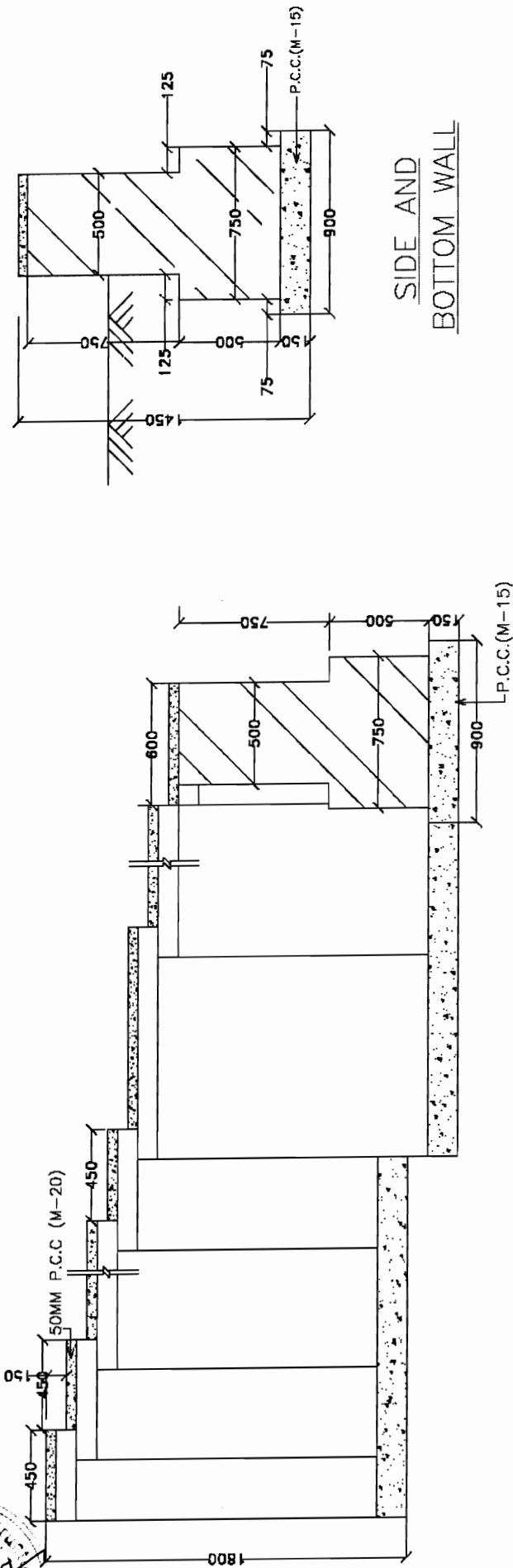
**CONCEPTUAL C.C. PLATFORM AND DRAINAGE DESIGN FOR  
 HAND PUMPS AND TAPS.**

CRG. NO.	15887/002/91/01/001	ESTIMATED COST	150000.00	ESTIMATED DATE	15/01/2000	PREPARED BY	S.G.
SH. NO.	71	DATE		REV.	RG	M	JY071
SCALE	N.T.S.					G.P.M	



**CONSULTING ENGINEERS GROUP LTD.**  
 F-17, Maj. Colony, Malviya Nagar - 110017  
 Tel: 101-141-2370699, 2370699, 2370656  
 Fax: 2370348, e-mail: ceg@rediffmail.com

World Bank Project - Orissa State Road Project  
 EMPLOYER  
 OLETC E.I.C.T.O.



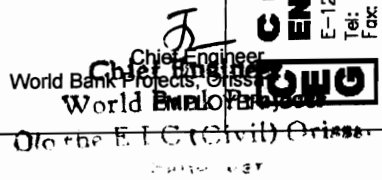
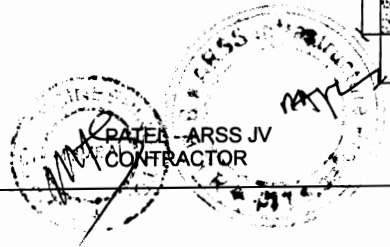
SIDE AND  
BOTTOM WALL

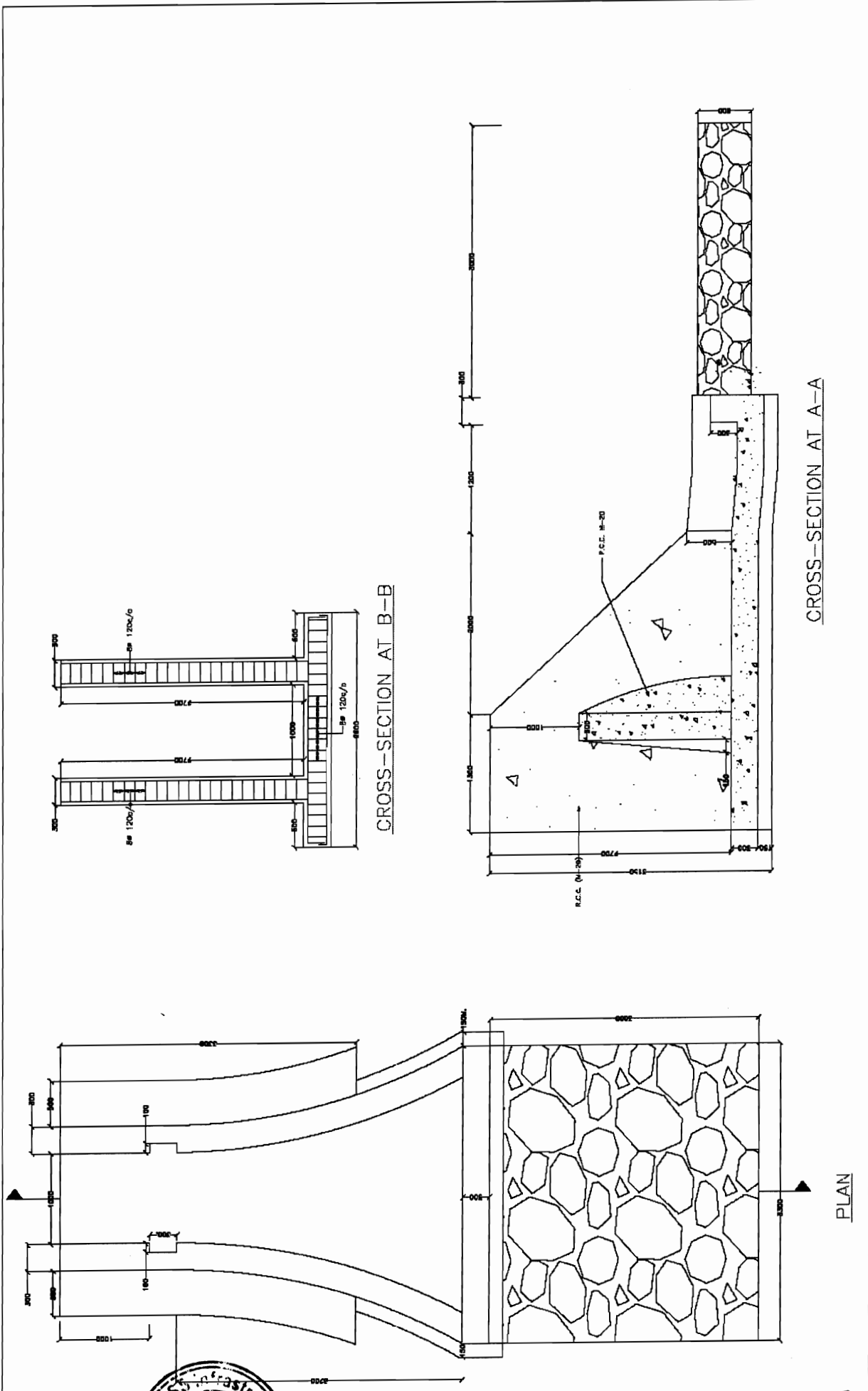
**CONCEPTUAL DESIGN FOR BATHING GHAT**

**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND**  
**DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS**  
**FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK**  
**ASSISTANCE**

**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, Maji Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521348; e-mail: ceg@cegroupindia.com

DRG NO.   DSRP/REG/SH/ENV/09	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.   73	DATE	REV	RO	
SCALE	NTS			
	M	JYOTI	G.P.M	S.G



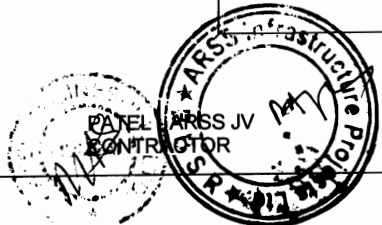
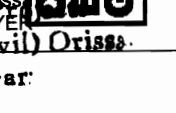


**CONCEPTUAL DESIGN FOR SPILLWAY GATE**

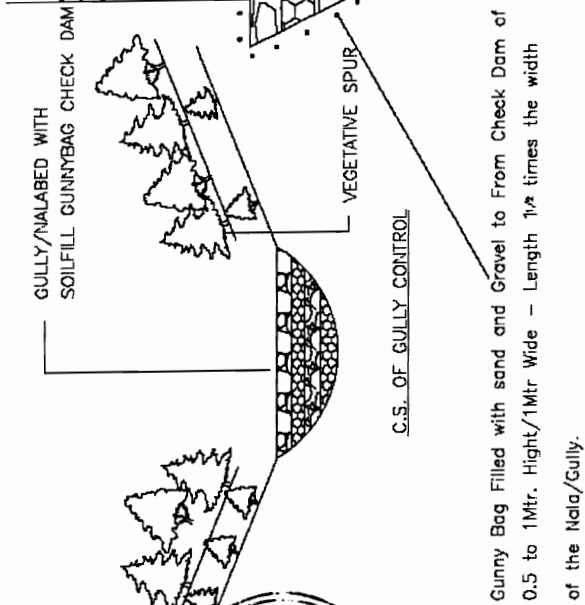
DRG. NO. OSRP/CEG/SH/ENV/10	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO. 74	DATE	REV	RO	
SCALE			NTS	
		M	JYOTI	G.P.M
		S.G		

**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, 2521898, 2520556  
 Fax: 2521346, e-mail: ceg@cegingdia.com



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



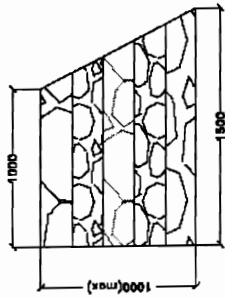
C.S. OF GULLY CONTROL

Gunny Bag Filled with sand and Gravel to Form Check Dam of 0.5 to 1Mtr. Height/1Mtr Wide - Length  $1\frac{1}{2}$  times the width of the Nala/Gully.

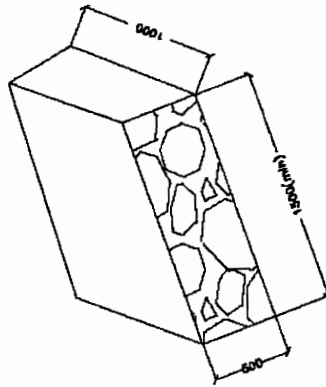
APPROXIMATE DISTANCE OF SPURS WILL BE ON THE NUMBER OF TURNS/ BENDS ON THE WATER FLOW AND GRADIENT STEEPER THE GRADIENT MORE THE NUMBER OF SPUR & DAM.

PLAN OF NALLA/ GULLY CONTROL

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  
 Props to Stabilise the Dam



SECTION ON A-A



SECTION ON B-B

**PROJECT:-**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
 DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
 ASSISTANCE

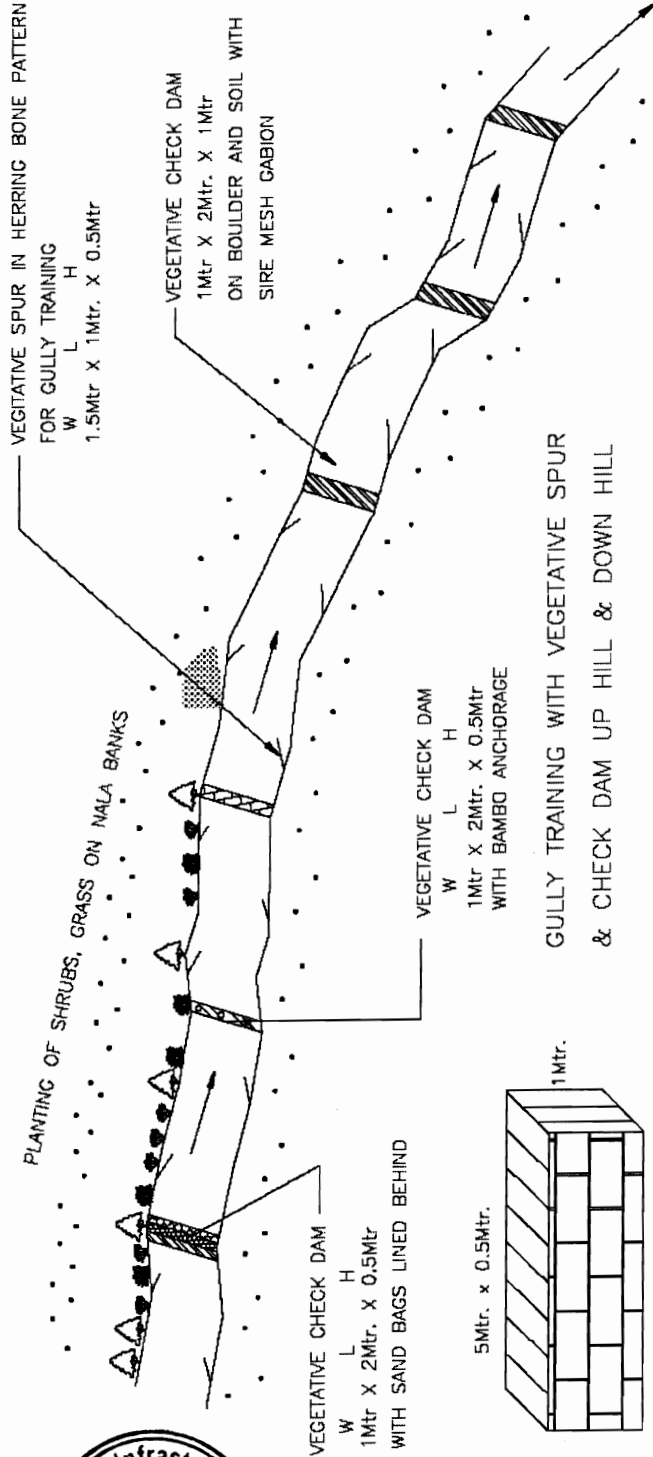
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moji Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

**SOIL AND WATER CONSERVATION MEASURES  
 (GULLY PLUGGING AND CHECK DAMING)**

DRG NO.	OSRP/CEG/SH/EIN/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.

MAXIMUM HIGHT OF THE SPUR SHOULD NOT BE EXCEEDING LENGTH 1.5Mtr. WIDTH 1Mtr. HEIGHT 0.5Mtrs

THE TREES/ GRASSES/ SHRUBS/HERBS (ROOTED CUTTINGS) TOBE PLANED AT 1 Mtr. INTERIOR LENGTH AS PER LOCAL CONDITION.

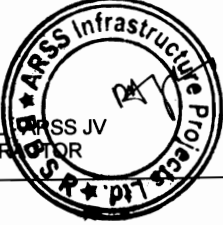
AROUND 5 nala on Bramhapur Bangi Jr. to be Gully Plugged and Check dams done.

**PROJECT:-**

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

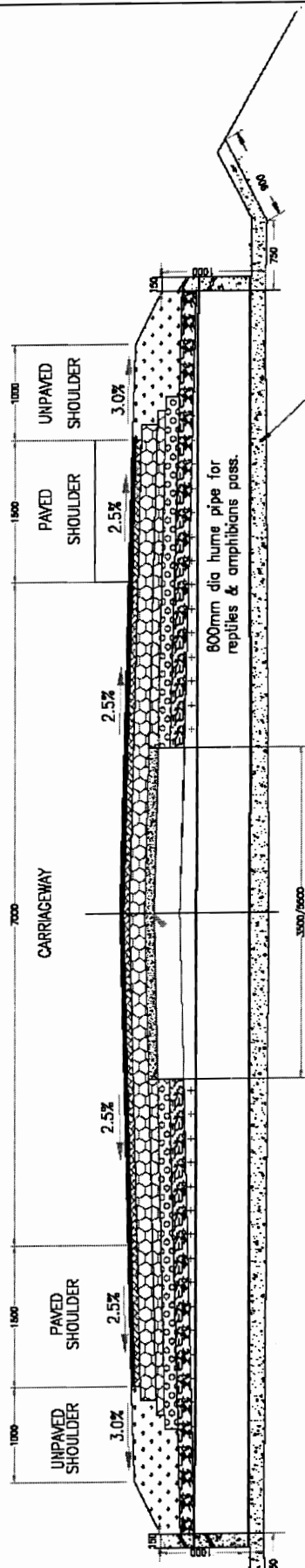
**SOIL AND WATER CONSERVATION MEASURES (GULLY PLUGGING AND CHECK DAMING)**

DRG NO. OSRP/CEG/SH/EIV/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

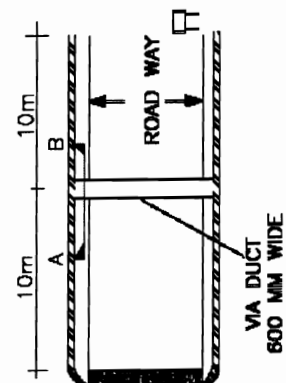
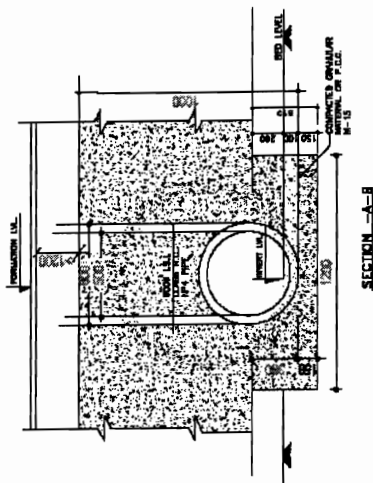


Chief Engineer  
 World Bank Projects, Orissa  
 World Bank  
 (to the E.I.C (Civil) Office)  
 "Hubaneswar"





CROSS SECTION OF REPTILES & AMPHIBIANS UNDERPASS WITH TRAP DRAINS AT WET LANDS



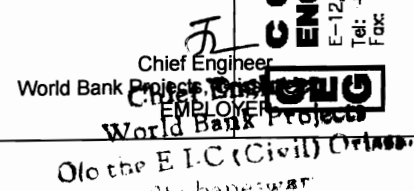
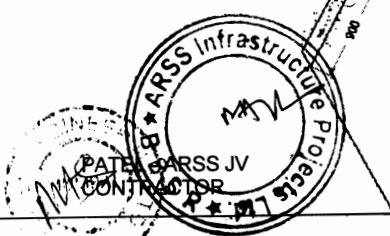
PLAN OF REPTILES & AMPHIBIANS UNDERPASS WITH TRAP DRAINS

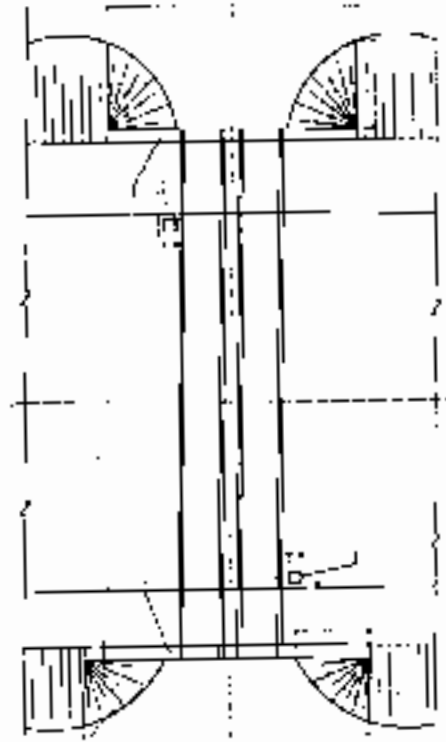
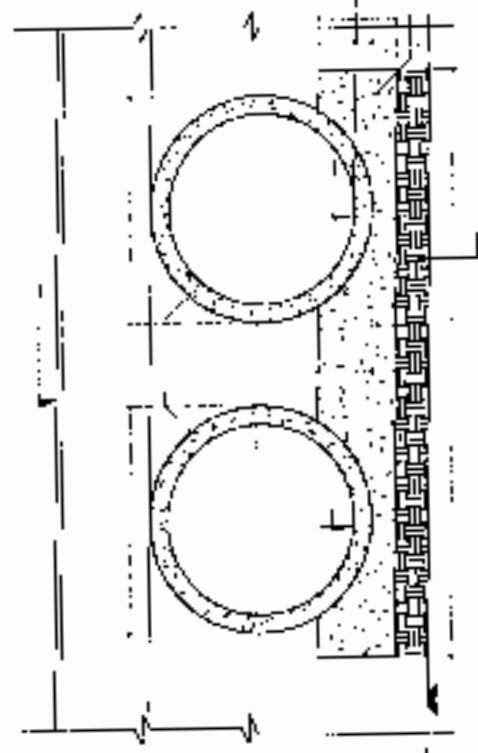
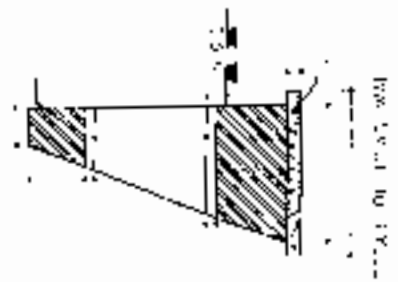
**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND**  
**DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS**  
**FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK**  
**ASSISTANCE**

TRAP DRAIN WITH HUME PIPE VIA DUCT PASSAGE AT  
 WET LAND LOCATIONS TO FACILITATE MOVEMENT ACROSS  
 SH BY RODENTS/AMPHIBIANS/REPTILES/SMALL ANIMALS.

**CONSULTING**  
**ENGINEERS GROUP LTD.**  
 E-12, Moji Colony, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520899, 2521898, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

DRG NO. DSIRP/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





**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, Mid 3, Calcutta, Kolkata, India - 700 017  
 Tel: +91-33-2520899, 2520699, 2520656  
 Fax: 2521344, e-mail: cege@cegrdo.com

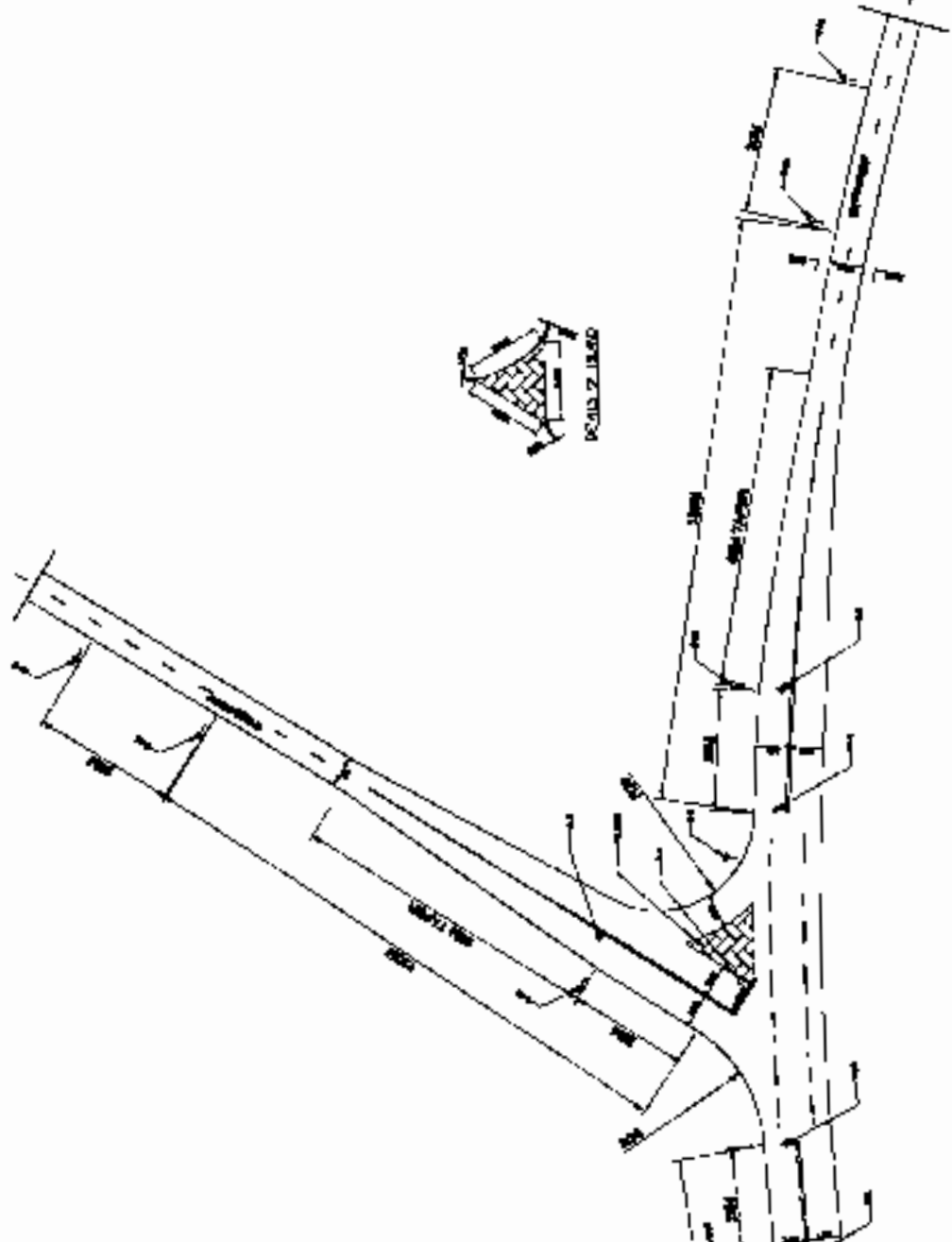
**TYPICAL ARRANGEMENT FOR**  
**UTILITY DUCT**

DRG. NO. CSEP/06/21/03/01  
 SI. NO. 75 : 30T : 18.5 : 80 : M : JTOB : A-J : S.C

SCALE : NTS



- 1. ALL DIMENSIONS ARE IN METERS.
- 2. FOR DETAILS OF ROAD CROSS SECTIONS SEE DRAWING NO. 100/000/000/000 - 00.
- 3. FOR PARTICULARS OF MATERIALS AND SPECIFICATIONS SEE DRAWING NO. 100/000/000/000 - 00.
- 4. NOTES OF CONTRACTOR TO BE MADE AT PARTIAL STAGES AND WHAT ALTERATIONS IN TERMS OF SOBBAN SHALL BE MADE AT THE TIME OF EACH VISIT.



**CONSULTING ENGINEERING GROUP LTD.**  
 15th Floor, Green Park Hotel, Upper 17,  
 No. 151-151A, Connaught Place, New Delhi - 110048, India.  
 Tel: 2312415, 2312416, 2312417, 2312418

**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**

ORISSA STATE ROAD PROJECT

NO.	REV.	DATE	BY	CHKD.	SCALE	DATE
1	0					

# ORISSA STATE ROAD PROJECT

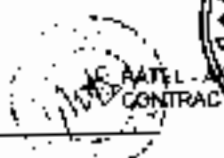
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT  
UNDER WORLD BANK ASSISTANCE

FINAL DETAIL ENGINEERING REPORT FOR PHASE - I ROADS  
( BHAWANIPATNA TO KHARIAR, SH-16)

DRAWING OF BRIDGES & CULVERTS

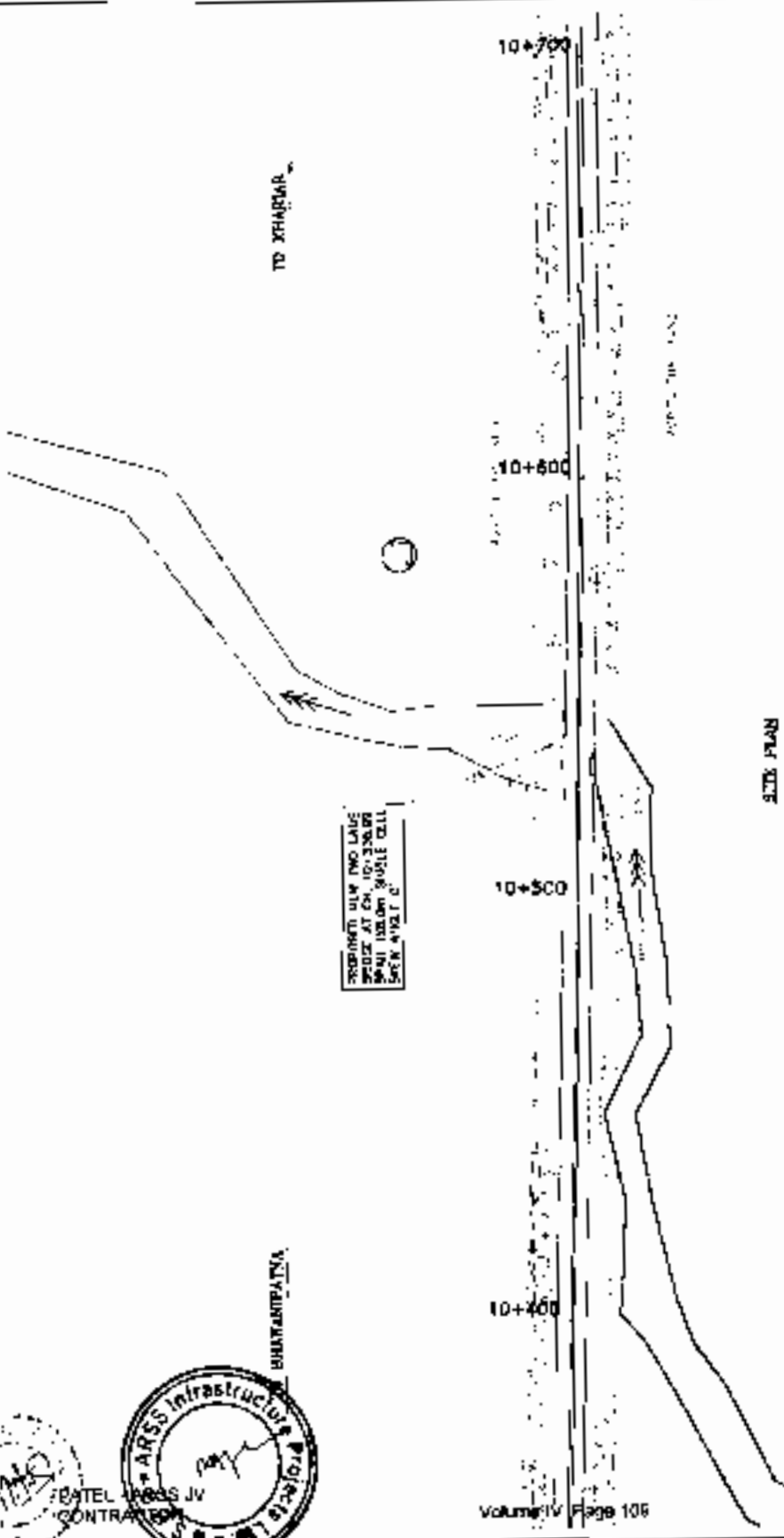
MAY 2007

**CEG**  
**CONSULTING**  
**Engineers Group Ltd.**  
E-12, Maj Colony, Mahavya Nagar, Jaipur-17  
Tel.: +91-141 2520999, 2521099, 2520556  
Fax: 2521349, E-Mail: ceg@cegindia.com  
Website: www.cegindia.com



Chief Engineer  
World Bank Project: OISSA  
EMPLOYER  
Director, E.C.C. (Civil) Office  
Bhubaneswar

NOTES -



DATE: 10/10/2011  
TIME: 10:10:11  
PROJECT: ROAD AT PROPOSED CH. 10+300.00 (BANGALORE)

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR GURMA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANT: ARSS INFRASTRUCTURA PROYECTOS S.A.S.  
ADDRESS: BOGOTA, COLOMBIA  
TEL: +57 (1) 477 4000  
WWW.ARSSINFRASTRUCTURA.COM

CONTRACT NO: 10/10/2011  
PROJECT NO: 10/10/2011  
DRAWING NO: 10/10/2011

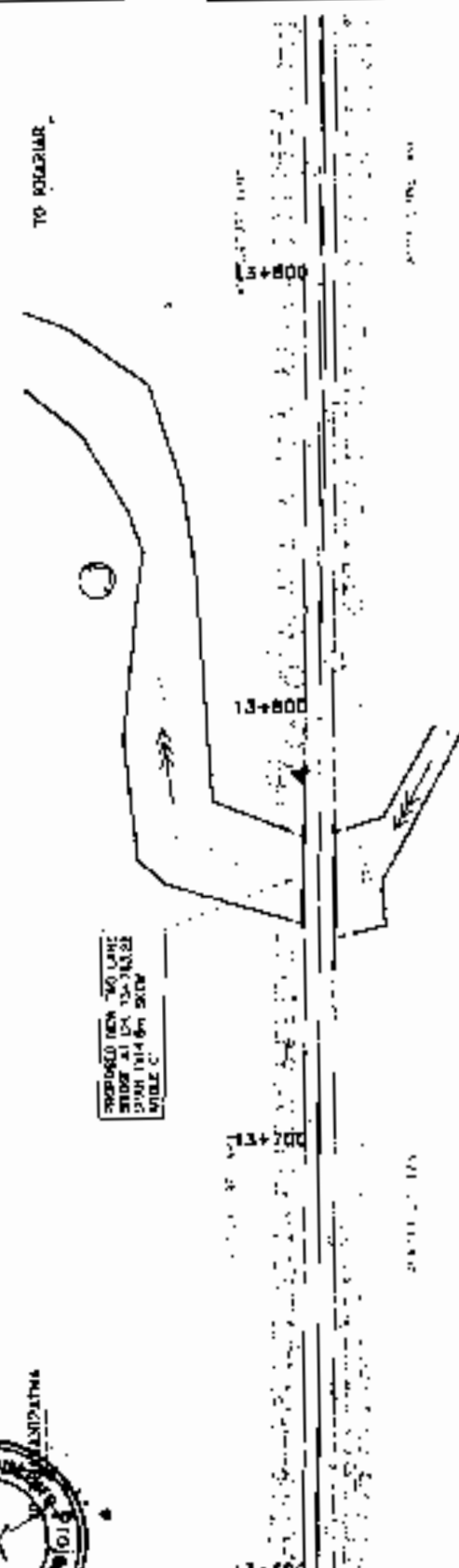
Chief Engineer  
World Bank  
World Bank Projects  
Dr. E. C. (Ganga) Ghosh  
Bhubaneswar





NOTES: -

TO KOLHAPUR



PROPOSED NEW TWO LANE  
BRIDGE AT DK 13+743.23  
SPAN 131.46m SKIN  
MIDDLE C

SITE PLAN

DATE	13/01/2018
SCALE	1:1000
PROJECT	CONSTRUCTION OF PHASE - 01 ROAD FOR DASHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE
CLIENT	MAHARASHTRA STATE ROAD DEVELOPMENT CORPORATION (MSRD)

CONSULTANT SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - 01 ROAD FOR DASHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING  
 PARSS Infrastructures Pvt. Ltd.  
 C-101, 3rd Floor, The Park, Sector 16, Gurgaon, Haryana  
 Ph: 012-921-1234





TO : 60 50

TO : 60 50

TO : 60 50

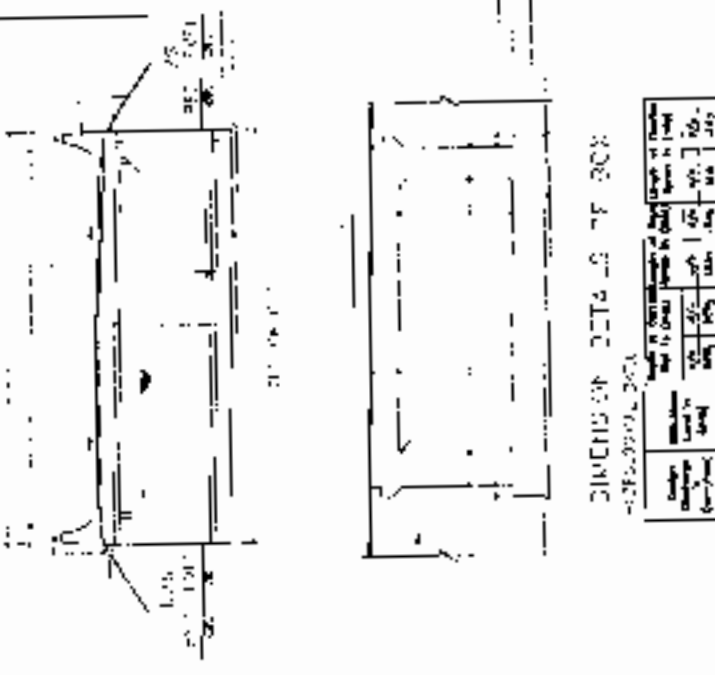
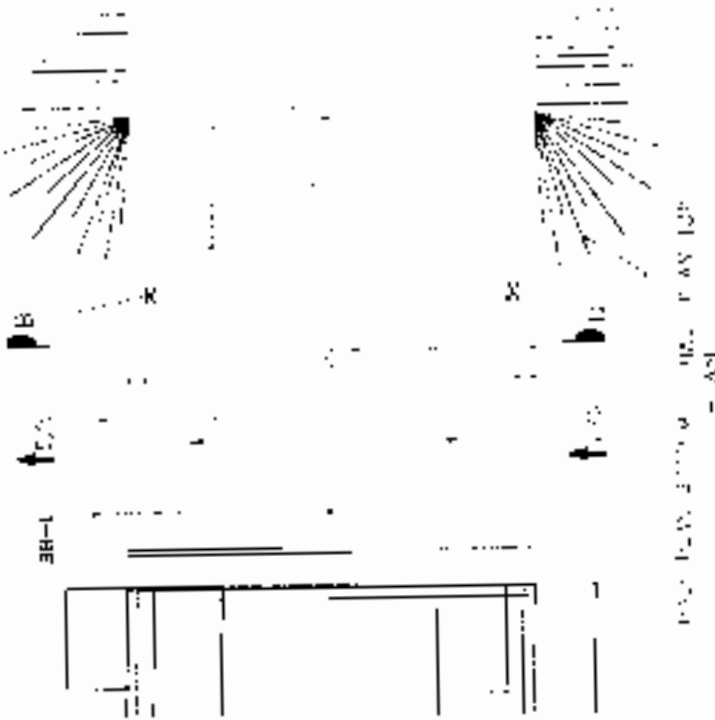
PATEL CONTRACTORS



SECTION A-A

NO. 102	NO. 103	NO. 104	NO. 105	NO. 106	NO. 107
1.50	1.50	1.50	1.50	1.50	1.50
1.50	1.50	1.50	1.50	1.50	1.50

NO. OF PILES	WIDTH (mm)	HEIGHT (mm)	SPACING (mm)	THICKNESS (mm)	PERCENTAGE OF PILE CAPACITY
10	150	150	150	15	100



DIMENSIONS OF PILES

NO.	TYPE	DIAMETER (mm)	LENGTH (mm)	WEIGHT (kg)
1	PH	150	1500	150
2	PH	150	1500	150
3	PH	150	1500	150
4	PH	150	1500	150
5	PH	150	1500	150
6	PH	150	1500	150
7	PH	150	1500	150
8	PH	150	1500	150
9	PH	150	1500	150
10	PH	150	1500	150

LOCATION PLAN OF BRIDGE PILES AT BRIDGE NO. 17/120

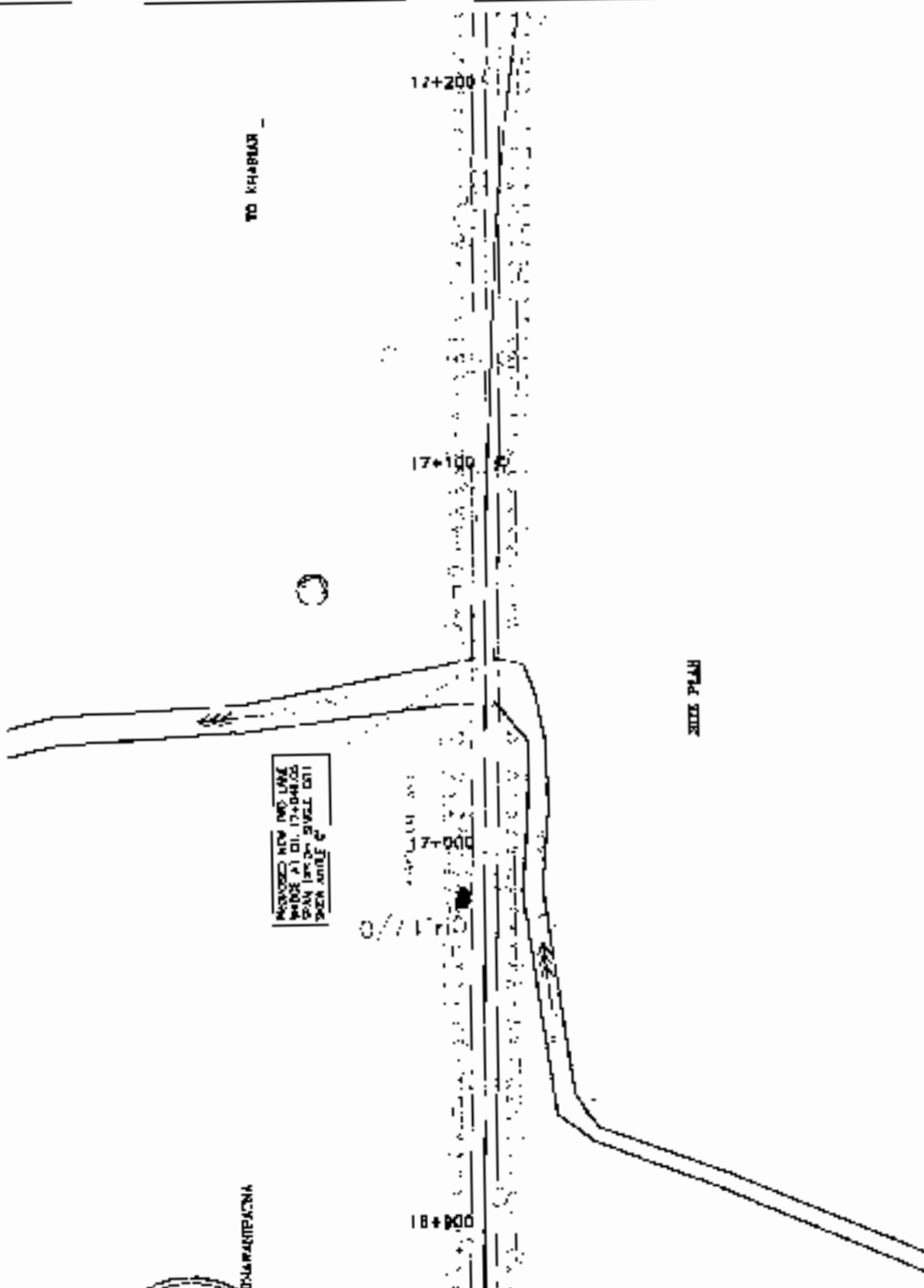
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile
- PH - 150mm dia. PH pile

Chief Engineer  
 World Bank Projects  
 Director FIC (Civil) Office

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR CHENNAI STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

GENERAL AGREEMENT DRAWING NO. BRIDGE AT PROPOSED CH. 17+000.00 (MADRAS)

NOTES:-



DATE	17/04/2018
SCALE	1:1000
PROJECT	...
...	...

**SITE PLAN**  
BRIDGE AT PROPOSED CH. 17+040.00  
(MAMIRAH)

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II WORKS FOR GAMBIA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

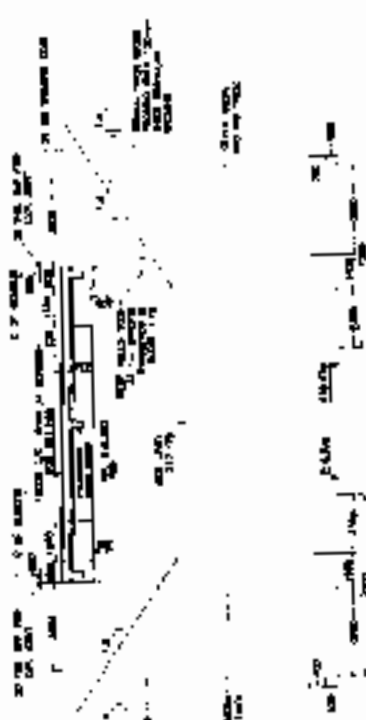
**CONSULTING**  
MAMIRAH ENGINEERING LTD.  
P.O. BOX 171, GAMBIA STATE  
P.O. BOX 171, GAMBIA STATE

PATEL & ASS JV  
CONTRACTORS

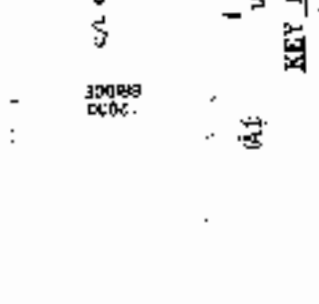


Chief Engineer  
World Bank Project  
EMPLOYER  
Director E.T.C (Civil) Office

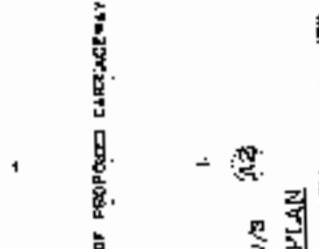
LOCATION PLAN OF HOWE BRIDGE AT BRIDGE NO. 41/5000



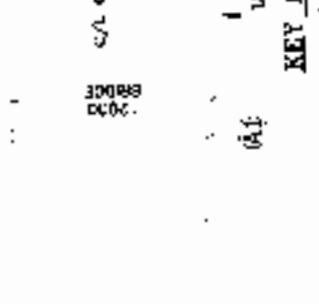
LOCATION PLAN OF HOWE BRIDGE AT BRIDGE NO. 41/5000



TO BHAWANIPATNA



TO KHARJUR



LONGITUDINAL SECTIONAL ELEVATION



KEY PLAN



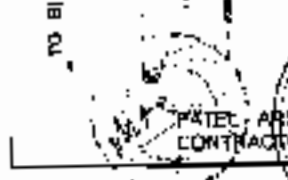
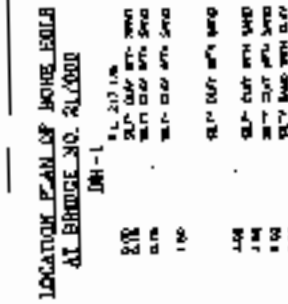
HALF TOP PLAN



HALF BOTTOM PLAN



- NOTES:-
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
  2. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  3. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  4. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  5. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  6. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  7. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  8. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  9. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  10. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  11. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  12. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  13. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  14. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  15. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  16. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  17. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  18. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  19. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.
  20. THE BRIDGE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AND STANDARDS OF THE GOVT. OF BIHAR.



CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR CROSS STATE ROAD PROJECT (UNDER WORLD BANK ASSISTANCE)

CROSS SECTION AT A.B.5

GENERAL ARRANGEMENT DRAWING

BRIDGE AT PROPOSED BR. NO. 41/5000 (HOWE BRIDGE)

DATE: 10/10/2011

SCALE: 1:1000

PROJECT NO: 10/10/2011

DESIGNER: [Signature]

CHECKED: [Signature]

APPROVED: [Signature]

DATE: 10/10/2011



NOTES:-

TO XIJALAM

21+142

21+100

21+000

20+900

20+800

PROPOSED NEW TWO LANE BRIDGE AT CH. 20+800.11 SPAN 12.25M SHOW SCALE 1:1000

SITE PLAN

SITE PLAN

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR CHINA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS  
WORLD BANK PROJECT CONSULTANTS  
CHINA STATE ROAD PROJECT  
PHASE - (I)  
11/2004

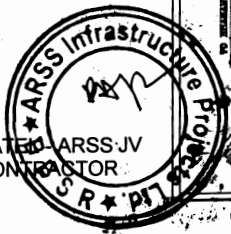
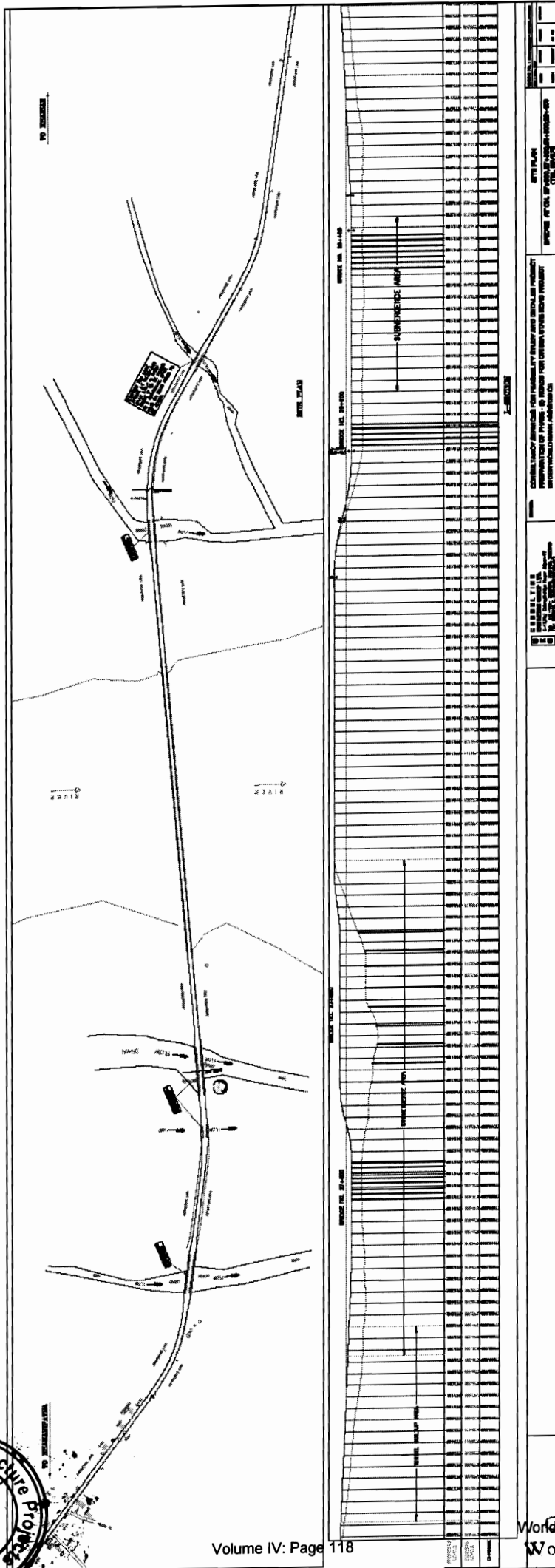
BRIDGE AT PROPOSED CH. 20+800.11 (NATURAL PROSS)

DATE	NO.	REVISION



SATEI - 882 JV  
& CONTRACTOR

Chief Engineer  
World Bank Project Consultants  
of the E.T.C. (Civil) Group  
Scheme 'a'



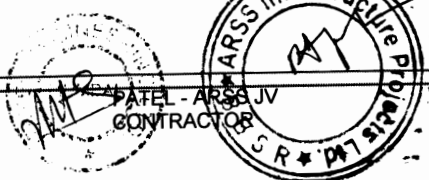
PATEL ARSS JV  
CONTRACTOR

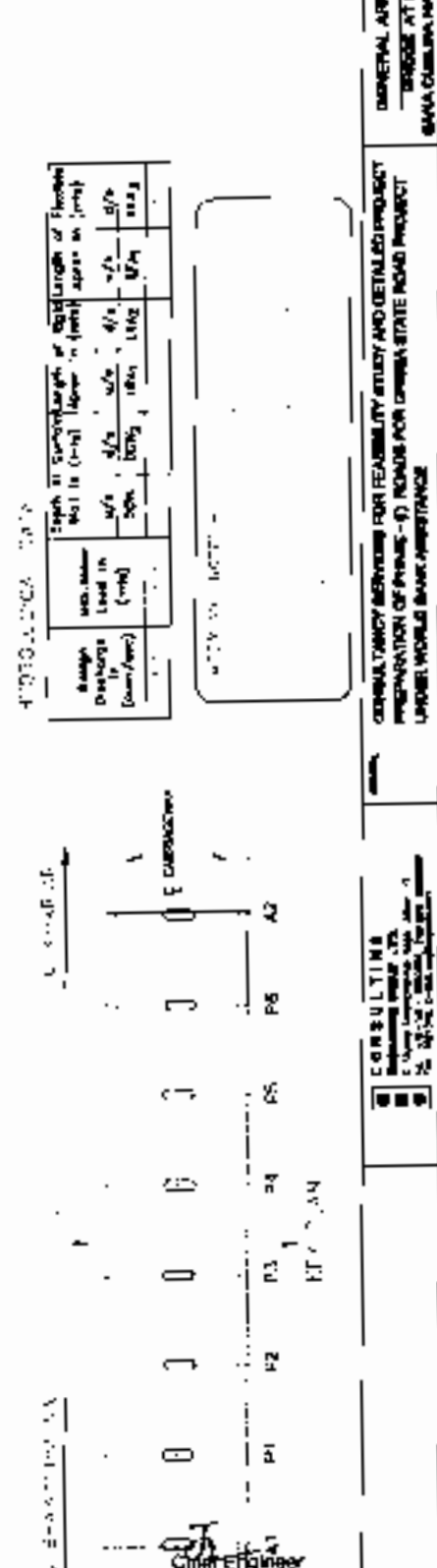
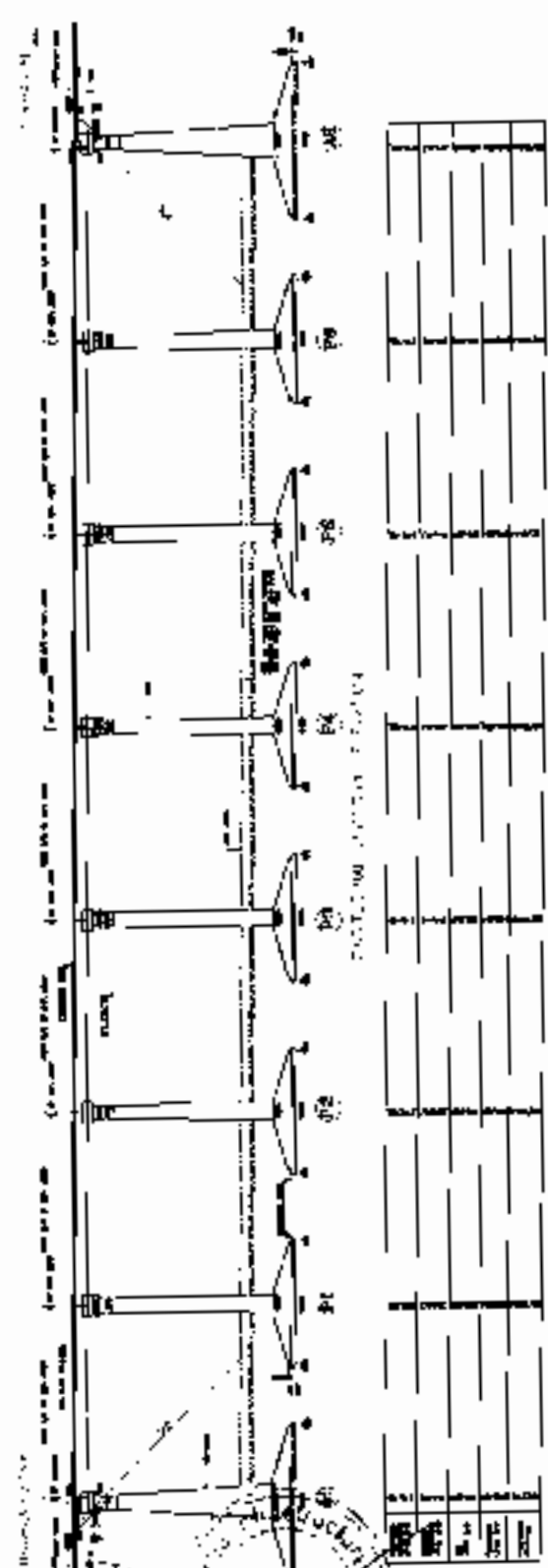
Chief Engineer  
Orissa  
World Bank Projects  
Bhubaneswar

# TABLE OF CONTENTS

S.NO.	DRAWING TITLE	DRAWING NO.
30.	REINFORCEMENT DETAIL OF LONGITUDINAL GIRDERS	OSR/PC/CG/RE-16/RR/29+900/01
31.	REINFORCEMENT DETAIL OF CROSS GIRDERS	OSR/PC/CG/RE-16/RR/29+900/02
32.	REINFORCEMENT DETAIL OF DECK SLAB	OSR/PC/CG/RE-16/RR/29+900/03
33.	SITE PLAN	OSR/PC/CG/RE-16/RR/29+900/04
	BRIDGE AT KM. 28+900	
34.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 1 OF 2)	OSR/PC/CG/RE-16/RR/29+900/01
35.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 2 OF 2)	OSR/PC/CG/RE-16/RR/29+900/02
36.	DIMENSION & REINFORCEMENT DETAILS ABUTMENT CAP & PIER CAP	OSR/PC/CG/RE-16/RR/29+900/03
37.	SITE PLAN	OSR/PC/CG/RE-16/RR/29+900/04
	BRIDGE AT KM. 29+400	
38.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 1 OF 2)	OSR/PC/CG/RE-16/RR/29+400/01
39.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 2 OF 2)	OSR/PC/CG/RE-16/RR/29+400/02
40.	DIMENSION & REINFORCEMENT DETAILS ABUTMENT PIER FOR A1, A2	OSR/PC/CG/RE-16/RR/29+400/03
41.	DIMENSION & REINFORCEMENT DETAILS ABUTMENT PIER FOR P1, P2	OSR/PC/CG/RE-16/RR/29+400/04
42.	DIMENSION & REINFORCEMENT DETAILS OF SLIPPER STRUCTURE	OSR/PC/CG/RE-16/RR/29+400/05
43.	SITE PLAN	OSR/PC/CG/RE-16/RR/29+400/06
	BRIDGE AT KM. 45+700	
44.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/45+700/01
45.	SITE PLAN	OSR/PC/CG/RE-16/RR/45+700/02
	BRIDGE AT KM. 54+600	
46.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/54+600/01
47.	DIMENSION & REINFORCEMENT DETAILS OF SUB STRUCTURE	OSR/PC/CG/RE-16/RR/54+600/02
48.	DIMENSION & REINFORCEMENT DETAILS OF PIER, PIER CAP	OSR/PC/CG/RE-16/RR/54+600/03
49.	SITE PLAN	OSR/PC/CG/RE-16/RR/54+600/04
	BRIDGE AT KM. 58+900	
50.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/58+900/01
51.	DIMENSION & REINFORCEMENT DETAILS OF SUB STRUCTURE	OSR/PC/CG/RE-16/RR/58+900/02
52.	SITE PLAN	OSR/PC/CG/RE-16/RR/58+900/03
	BRIDGE AT KM. 63+650	
53.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/63+650/01
54.	SITE PLAN	OSR/PC/CG/RE-16/RR/63+650/02
	BRIDGE AT KM. 66+500	
55.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/66+500/01
56.	SITE PLAN	OSR/PC/CG/RE-16/RR/66+500/02

S.NO.	DRAWING TITLE	DRAWING NO.
1.	GENERAL NOTES (FOR SLAB BRIDGES)	OSR/PC/CG/RE-16/RR/NOTES/01
2.	GENERAL NOTES (FOR BCC T-BEAM BRIDGES)	OSR/PC/CG/RE-16/RR/NOTES/02
3.	GENERAL NOTES (FOR PCC BRIDGES)	OSR/PC/CG/RE-16/RR/NOTES/03
	BRIDGE AT KM. 8+600	
4.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/8+600/01
5.	SITE PLAN	OSR/PC/CG/RE-16/RR/8+600/02
	BRIDGE AT KM. 10+500	
6.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/10+500/01
7.	SITE PLAN	OSR/PC/CG/RE-16/RR/10+500/02
	BRIDGE AT KM. 13+750	
8.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/13+750/01
9.	DIMENSION & REINFORCEMENT DETAILS OF SUB STRUCTURE	OSR/PC/CG/RE-16/RR/13+750/02
10.	SITE PLAN	OSR/PC/CG/RE-16/RR/13+750/03
	BRIDGE AT KM. 17+120	
11.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/17+120/01
12.	SITE PLAN	OSR/PC/CG/RE-16/RR/17+120/02
	BRIDGE AT KM. 21+000	
13.	GENERAL ARRANGEMENT DRAWING	OSR/PC/CG/RE-16/RR/21+000/01
14.	DIMENSION & REINFORCEMENT DETAILS OF SUB STRUCTURE	OSR/PC/CG/RE-16/RR/21+000/02
15.	SITE PLAN	OSR/PC/CG/RE-16/RR/21+000/03
16.	SITE PLAN	OSR/PC/CG/RE-16/RR/21+000/04
	BRIDGE AT KM. 27+600	
17.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 1 OF 2)	OSR/PC/CG/RE-16/RR/27+600/01
18.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 2 OF 2)	OSR/PC/CG/RE-16/RR/27+600/02
19.	DIMENSION & REINFORCEMENT DETAILS ABUTMENT CAP & PIER CAP	OSR/PC/CG/RE-16/RR/27+600/03
20.	SITE PLAN	OSR/PC/CG/RE-16/RR/27+600/04
	BRIDGE AT KM. 27+800	
21.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 1 OF 2)	OSR/PC/CG/RE-16/RR/27+800/01
22.	GENERAL ARRANGEMENT DRAWING (SHEET NO. 2 OF 2)	OSR/PC/CG/RE-16/RR/27+800/02
23.	DIMENSION DETAILS OF ABUTMENT, ABUTMENT CAP, PIER & PIER CAP	OSR/PC/CG/RE-16/RR/27+800/03
24.	REINFORCEMENT DETAILS OF ABUTMENT & PIER CAP (SHEET 1 OF 2)	OSR/PC/CG/RE-16/RR/27+800/04
25.	REINFORCEMENT DETAILS OF ABUTMENT CAP & PIER (SHEET 2 OF 2)	OSR/PC/CG/RE-16/RR/27+800/05
26.	DIMENSION & REINFORCEMENT DETAIL FOR PIER & PIER CAP	OSR/PC/CG/RE-16/RR/27+800/06
27.	DIMENSION & REINFORCEMENT DETAIL FOR PIER & PIER CAP	OSR/PC/CG/RE-16/RR/27+800/07
28.	DETAILED DIMENSION FOR LONGITUDINAL GIRDERS	OSR/PC/CG/RE-16/RR/27+800/08
29.	DIMENSION & PRESTRESSING CABLES DETAIL OF LONGITUDINAL GIRDERS	OSR/PC/CG/RE-16/RR/27+800/09

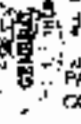











**CONTRACTOR**  
**PATEL ARSS JV**  
**CONTRACTOR**

1. THESE NOTES ARE APPLICABLE FOR ROOF T-BEAM BRIDGES.  
 ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE SPECIFIED. ONLY WHEN DIMENSIONS ARE TO BE FOLLOWED, TO DRAWING SHALL BE SUFFICIENT.  
 DESIGN CRITERIA:  
 (a) DESIGN IS BASED UPON FOLLOWING CODES:  
 (b) IRC : 8-1988  
 (c) IRC : 8-2000  
 (d) IRC : 21-2000  
 (e) IRC : 25-2000  
 (f) IS : 800-PART-1

THE FOLLOWING ITEMS HAVE BEEN CONSIDERED IN THE DESIGN:  
 (a) THE TYPICAL ROADWAY WIDTH OF CLASS A  
 (b) THE TYPICAL ROADWAY WIDTH OF CLASS B  
 (c) THE TYPICAL ROADWAY WIDTH OF CLASS C  
 (d) THE TYPICAL ROADWAY WIDTH OF CLASS D  
 (e) THE TYPICAL ROADWAY WIDTH OF CLASS E

11. THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (a) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (b) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (c) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (d) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (e) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:

12. THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (a) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (b) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (c) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (d) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (e) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:

13. THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (a) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (b) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (c) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (d) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (e) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:

14. THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (a) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (b) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (c) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (d) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (e) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:

15. THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (a) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (b) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (c) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (d) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (e) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:

16. THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (a) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (b) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (c) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (d) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:  
 (e) THE DESIGN AND CONSTRUCTION SHALL BE AS FOLLOWS:

**WATER**  
 WATER TO BE USED IN CONCRETING AND CURING SHALL BE CONTAINING TO CLASS: IS: 21-2000

**EXPANSION JOINT**  
 THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

THE EXPANSION JOINTS ARE TO BE PROVIDED IN THE T-BEAM BRIDGES AT THE FOLLOWING LOCATIONS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

3. GENERAL OF REINFORCEMENT BARS SHALL BE AS PER IS: 456  
 4. SUPPORTING CHAIRS OF 12 MM DIAMETER SHALL BE PROVIDED AT SUITABLE INTERVALS AS PER IS: 456

5. CONCRETE SHALL BE PROVIDED IN A MINIMUM WIDTH OF 100 MM AT THE TOP AND 50 MM AT THE BOTTOM OF THE T-BEAM BRIDGES.  
 6. AUTOMATIC WATER CURING AND CURING SHALL BE PROVIDED AT SUITABLE INTERVALS AS PER IS: 456

7. THE LOCATION OF JOINTS FOR JOINING OF THE SUPERSTRUCTURE TO THE PILES SHALL BE AS FOLLOWS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

8. THE LOCATION OF JOINTS FOR JOINING OF THE SUPERSTRUCTURE TO THE PILES SHALL BE AS FOLLOWS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

9. THE LOCATION OF JOINTS FOR JOINING OF THE SUPERSTRUCTURE TO THE PILES SHALL BE AS FOLLOWS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

10. THE LOCATION OF JOINTS FOR JOINING OF THE SUPERSTRUCTURE TO THE PILES SHALL BE AS FOLLOWS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

11. THE LOCATION OF JOINTS FOR JOINING OF THE SUPERSTRUCTURE TO THE PILES SHALL BE AS FOLLOWS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

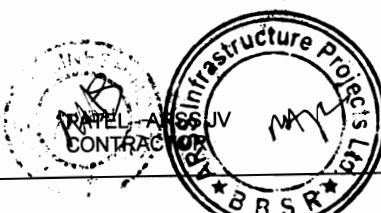
12. THE LOCATION OF JOINTS FOR JOINING OF THE SUPERSTRUCTURE TO THE PILES SHALL BE AS FOLLOWS:  
 (a) AT THE POINTS OF CHANGE OF GRADE  
 (b) AT THE POINTS OF CHANGE OF SECTION  
 (c) AT THE POINTS OF CHANGE OF MATERIAL  
 (d) AT THE POINTS OF CHANGE OF SUPPORTS  
 (e) AT THE POINTS OF CHANGE OF SPAN LENGTH

**NOTES :-**

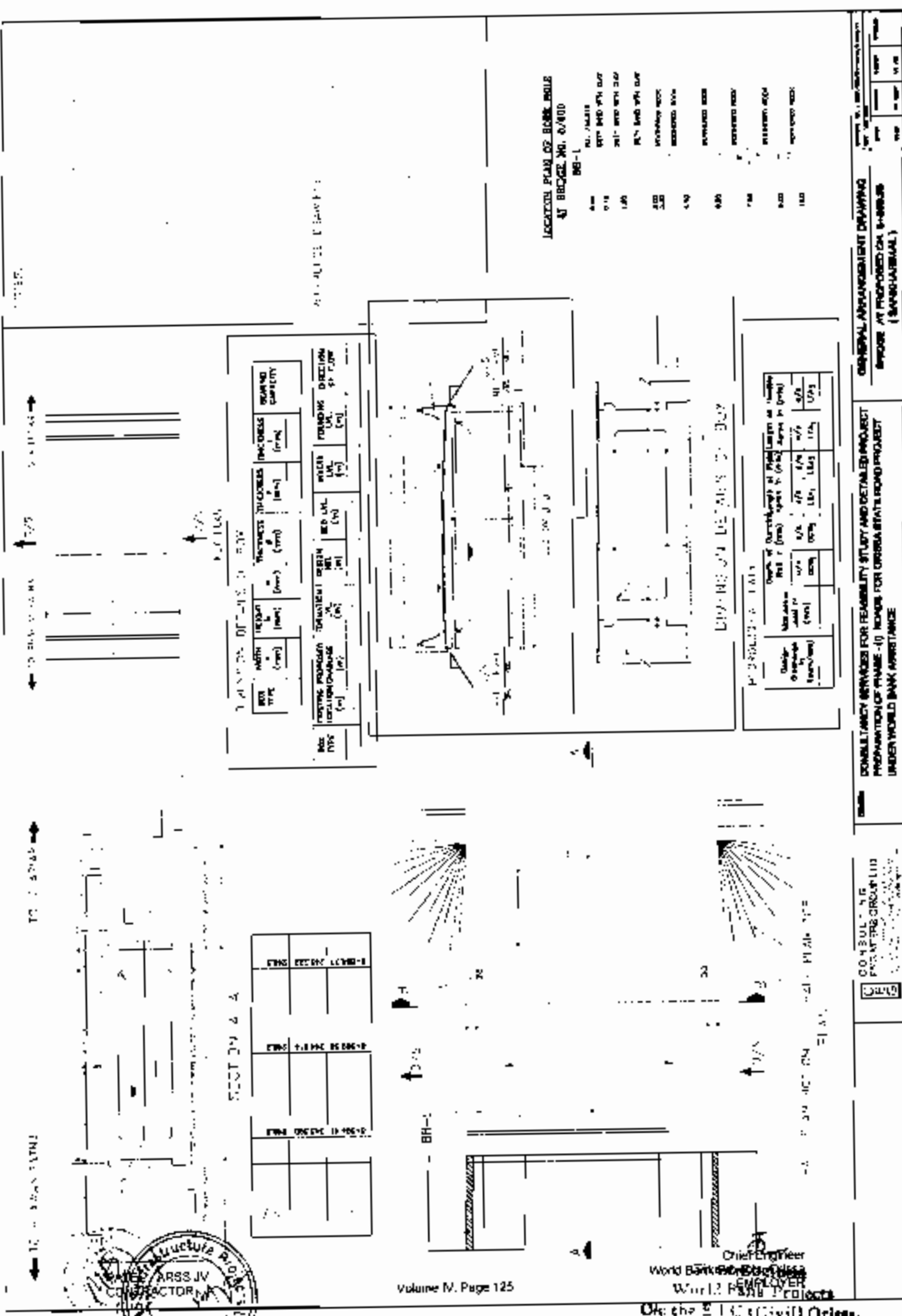
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE MENTIONED.
2. TYPE OF ANCHORAGE - RT13 CONFORMING TO IS:6306  
 TYPE OF ONE CABLE - 224.8 T  
 MODULUS OF ELASTICITY OF HIGH TENSILE STEEL STRANDS =  $2.0 \times 10^5$  Kg/Cm<sup>2</sup>  
 TYPE OF SHEATHING - BRIGHT METAL SHEATHING 75 mm ID CONFORMING TO IRC:18 (APPENDIX-1).
3. LENGTH OF PERSTRESSING CABLES GIVEN IN TABLE - II INCLUDES AN EXTRA LENGTH OF 750 mm AT EACH END REQUIRED FOR ATTACHING THE STRANDS TO JACK.
4. ABSOISSA OF ALL SALENT POINTS ON CABLE PROFILE ARE GIVEN WITH REFERENCE TO MID SPAN. ORDINATES OF ALL SALENT POINTS ON CABLE PROFILE ARE GIVEN WITH REFERENCE TO BOTTOM OF GIRDER.
5. MAXIMUM ELONGATION OF CABLES SHOULD NOT EXCEED 1.05 TIMES THE CALCULATED ELONGATION ALSO MAXIMUM PRESSURE SHOULD NOT EXCEED 1.05 TIMES THE GAUGE PRESSURE.
6. IF ACTUAL VALUE OF AREA AT AND /OR MODULUS OF ELASTICITY E1 ARE DIFFERENT FROM ASSUMED VALUES (A=1184.4 mm<sup>2</sup> AND E=2x10<sup>5</sup> Kg/Cm<sup>2</sup>), THEORETICAL ELONGATION SHALL BE MODIFIED AS UNDER REVISED  $\Delta = \Delta \times (A/A1) \times (E/E1)$  WHERE A & E ARE ASSUMED VALUES IN DESIGN AND A1 & E1 ARE ACTUAL VALUES AT SITE.
7. STRESSING OF CABLES SHALL BE DONE FROM BOTH THE ENDS SIMULTANEOUSLY. ELONGATIONS GIVEN IN THIS DRAWING ARE WITHOUT SLIP, TO BE MEASURED AT THE TIME OF STRESSING.
8. EXTRA LENGTH OF THE STRAND PROJECTING BEYOND END BLOCK SHALL NOT BE CUT AFTER THE STRESSING. THESE SHALL BE CUT ONLY WHEN INSTRUCTIONS FOR GROUTING ARE ISSUED BY ENGINEER.
9. GROUTING SHALL BE DONE AS PER RELEVANT PROVISIONS OF IRC : 18 AS EARLY AS POSSIBLE AFTER COMPLETING STRESSING OF ALL CABLES AND APPROVAL OF STRESSING RESULTS OBTAINED FROM ENGINEER.
10. THE START OF TENSIONING OPERATION FROM BOTH THE ENDS SHALL BE SIMULTANEOUS AT EACH STAGE AND RATE OF INCREASE OF STRESS IN THE TENDON AT BOTH ENDS SHALL BE EQUAL.
11. ANCHORAGE RECESSES TO BE SEALED WITH PREPACKED NON SHRINK MORTAR. END FACES OF GIRDERS TO BE COATED WITH 2 COATS OF EPDXY.
12. CONCRETE MIX SHALL BE M - 40.
13. REINFORCEMENT H.Y.S.D. CONFORMING TO IS:1786.Fe = 415N/mm<sup>2</sup>.
14. LAP LENGTH 65xØ DIA OF BAR.
15. NOT MORE THAN 25% OF BARS SHALL BE LAPPED AT A SECTION AND LAPPING SHALL BE STAGGERED.
16. CLEAR COVER TO ANY REINFORCEMENT = 40mm.
17. SLIP ASSUMED = 6mm.
18. CONCRETE SHALL BE CONTROLLED CONCRETE WITH DESIGN MIX AS PER IS:10262.

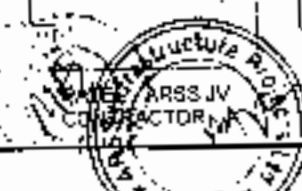
**IMPORTANT NOTES :-**

1. IF THE CALCULATED ELONGATION  $\Delta_s$  IS REACHED BEFORE THE GIVEN GAUGE READING  $\sigma_s$  FOR THE CABLE, CONTINUE STRESSING TILL  $\sigma_s$  IS ACHIEVED PROVIDED THE ELONGATION DOES NOT EXCEED 1.05  $\Delta_s$  IN CASE THE ELONGATION 1.05  $\Delta_s$  IS REACHED BEFORE  $\sigma_s$  STOP STRESSING AND INFORM ENGINEER -IN-CHARGE.
2. IF AT THE GAUGE READING  $\sigma_s$  FOR A CABLE THE ELONGATION  $\Delta_s$  HAS NOT BEEN REACHED CONTINUE STRESSING BY INTERVALS OF 5 Kg/Cm<sup>2</sup> UNTIL THE ELONGATION  $\Delta_s$  HAS BEEN REACHED OR A PRESSURE NOT GREATER THAN 1.05  $\sigma_s$  IS ACHIEVED.



NO.	REVISED	DATE	BY	CHKD	APP'D



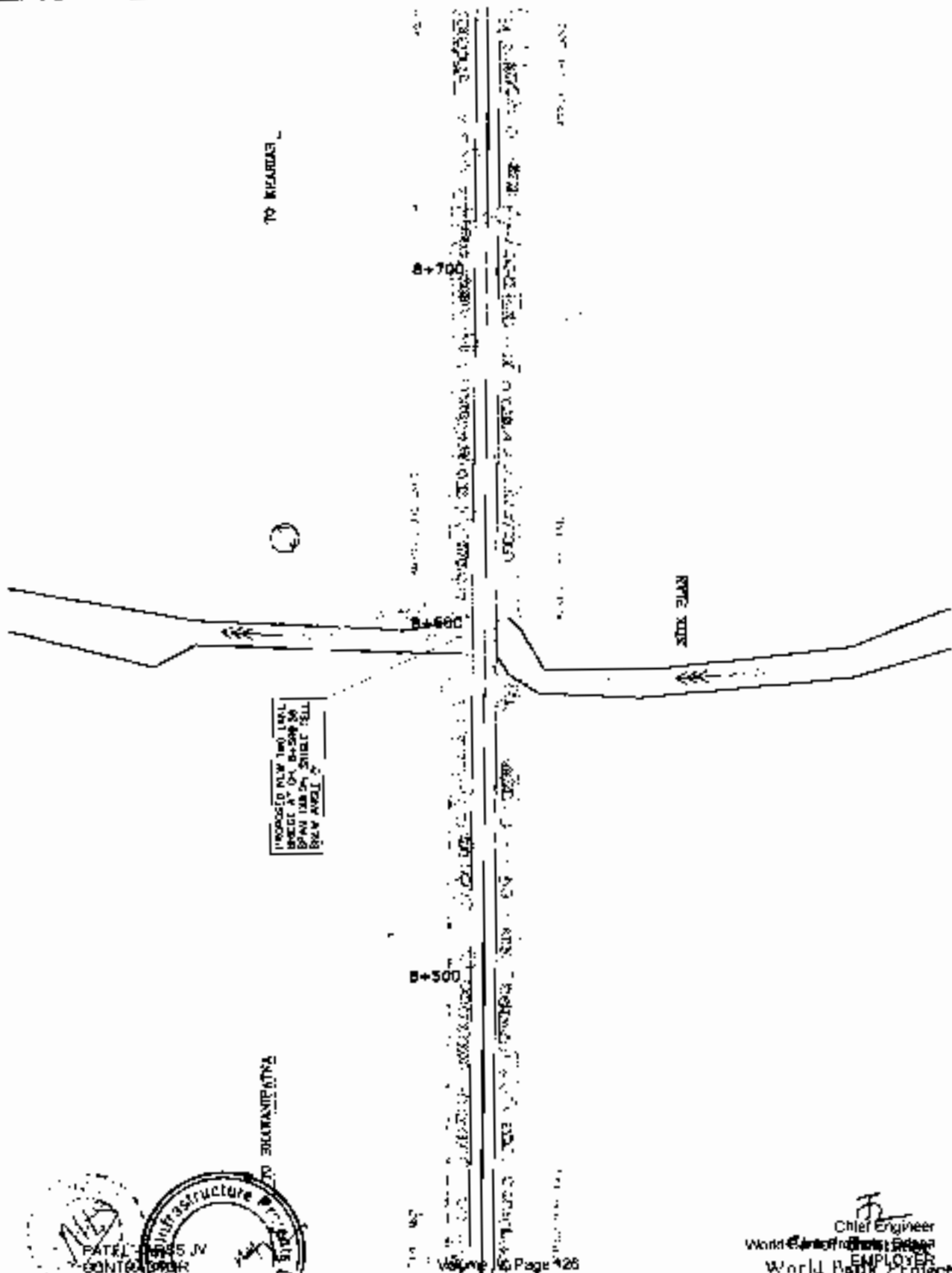

  
**ARSS JV**  
**CONSTRUCTORS**

Volume IV, Page 125

Chief Engineer  
 World Bank Group Ltd  
 World Bank Projects  
 On the E.T.C. (Civil) Office,  
 Phnom Penh

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. 0+885.25  
 (MANUAL)

NOTES:-

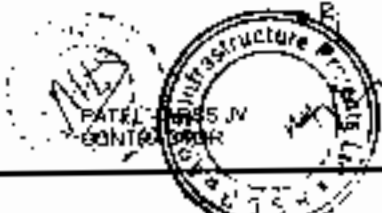


DATE: 11/11/2011  
 TIME: 10:30 AM  
 SHEET NO: 11/11/2011/01  
 SCALE: 1:1000  
 PROJECT: ROAD AT MIDIAS (BANGALURU)

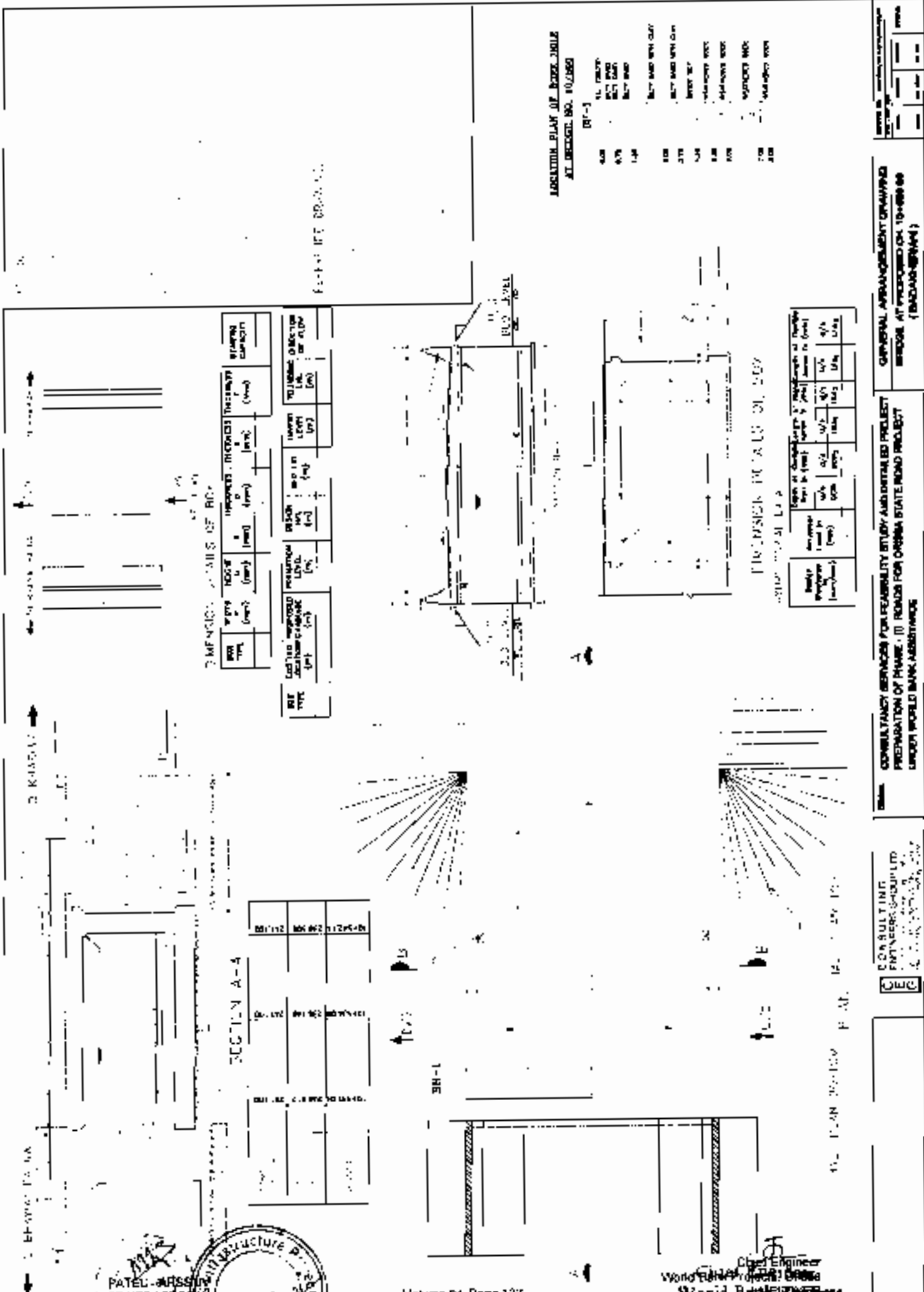
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II) ROAD AT MIDIAS STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANT  
 CONSULTING GROUP LTD.  
 10/11/2011/01

Chief Engineer  
 World Bank  
 EMPLOYER  
 World Bank Projects



Chief Engineer  
 World Bank  
 EMPLOYER  
 World Bank Projects  
 (to the E.T.C.(Civil) Office,  
 Bangalore)



**LOCATION PLAN OF BORE JAILS**  
AT BOREGAL NO. 10/2850

DT-1

4.00	1/2" PLATE
6.75	1/2" PLATE
1.24	1/2" PLATE
8.00	1/2" PLATE WITH GUT
3.75	1/2" PLATE WITH GUT
1.24	1/2" PLATE
8.00	1/2" PLATE WITH GUT
1.24	1/2" PLATE
8.00	1/2" PLATE WITH GUT
1.24	1/2" PLATE
8.00	1/2" PLATE WITH GUT
1.24	1/2" PLATE

**FUNCTIONS & DIMS OF RC**

ITEM NO	DESCRIPTION	QUANTITY	UNIT	REMARKS
1	1/2" PLATE	4.00	SQ. FT.	
2	1/2" PLATE	6.75	SQ. FT.	
3	1/2" PLATE	1.24	SQ. FT.	
4	1/2" PLATE WITH GUT	8.00	SQ. FT.	
5	1/2" PLATE WITH GUT	3.75	SQ. FT.	
6	1/2" PLATE	1.24	SQ. FT.	
7	1/2" PLATE WITH GUT	8.00	SQ. FT.	
8	1/2" PLATE	1.24	SQ. FT.	
9	1/2" PLATE WITH GUT	8.00	SQ. FT.	
10	1/2" PLATE	1.24	SQ. FT.	

**FLOOR PLAN OF BORE JAIL**

ITEM NO	DESCRIPTION	QUANTITY	UNIT	REMARKS
1	1/2" PLATE	4.00	SQ. FT.	
2	1/2" PLATE	6.75	SQ. FT.	
3	1/2" PLATE	1.24	SQ. FT.	
4	1/2" PLATE WITH GUT	8.00	SQ. FT.	
5	1/2" PLATE WITH GUT	3.75	SQ. FT.	
6	1/2" PLATE	1.24	SQ. FT.	
7	1/2" PLATE WITH GUT	8.00	SQ. FT.	
8	1/2" PLATE	1.24	SQ. FT.	
9	1/2" PLATE WITH GUT	8.00	SQ. FT.	
10	1/2" PLATE	1.24	SQ. FT.	

**GENERAL ARRANGEMENT DRAWING**  
PROJECT AT PROJECT NO. 10-000-00  
(BANDAR-BANAR)

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND PRELIMINARY PROJECT PREPARATION OF PHASE - II ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

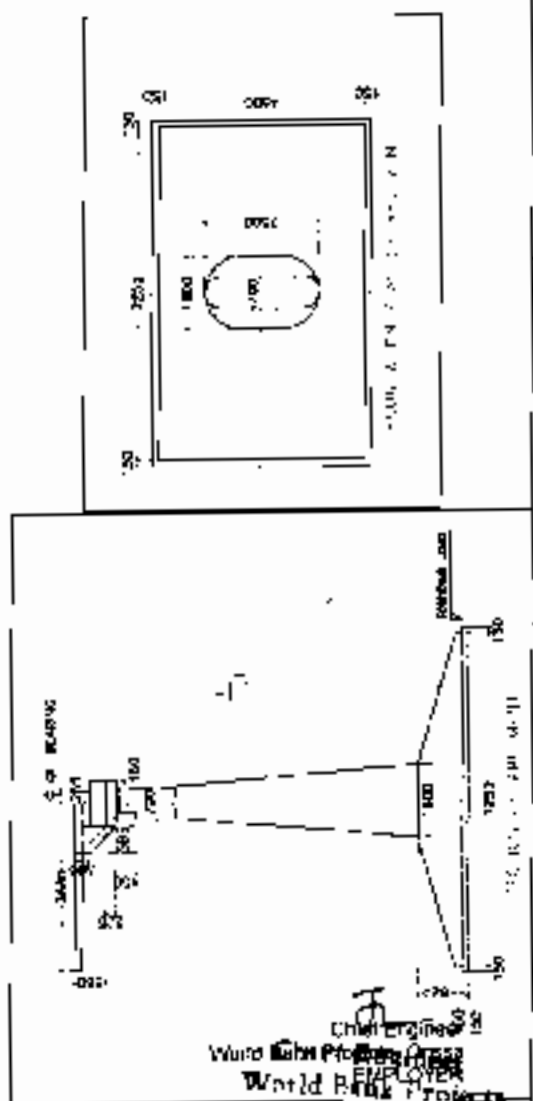
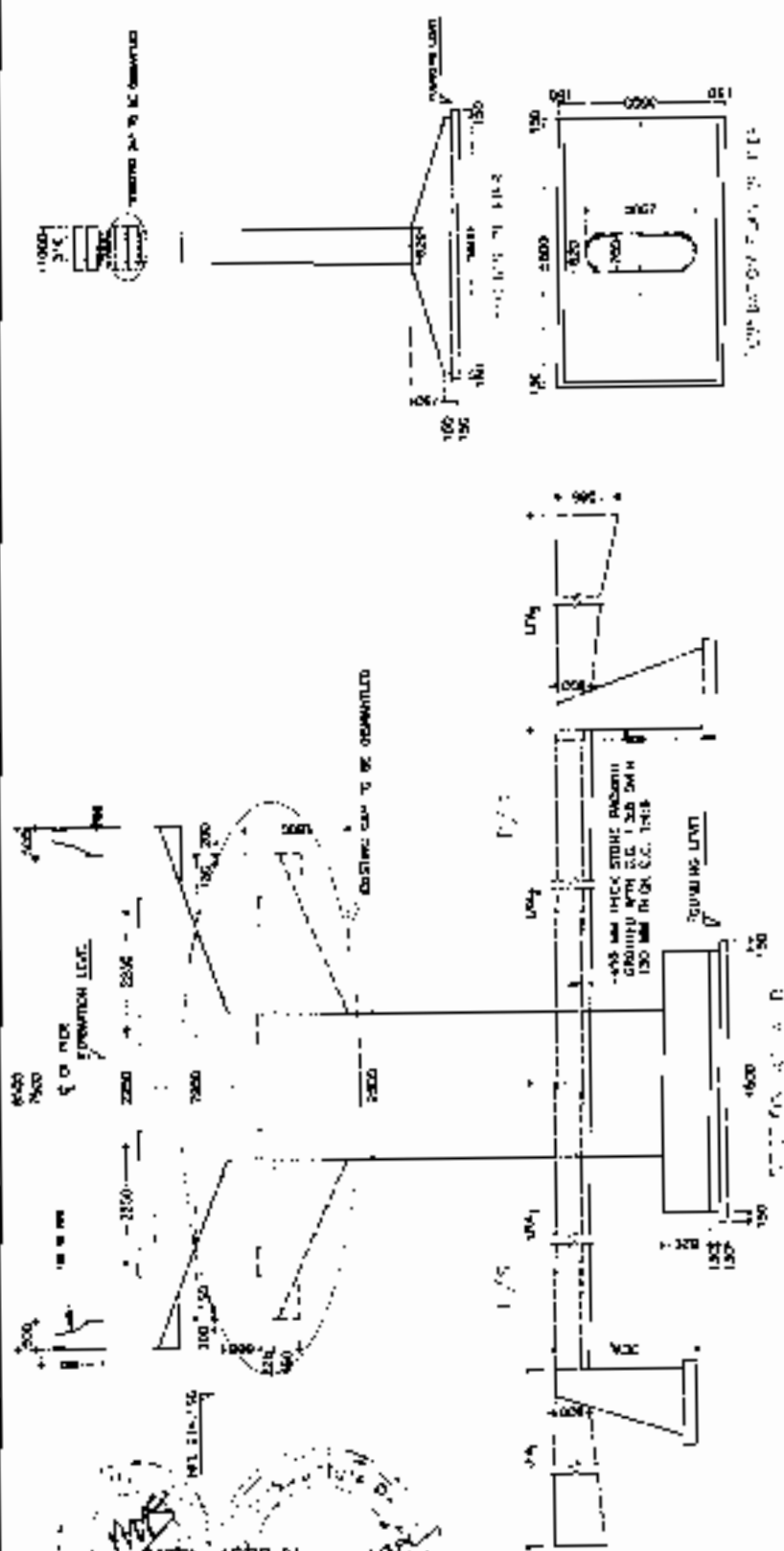
**CONSULTING ENGINEERS LTD**  
PLOT NO. 12, SECTOR 12, GATEWAY INDUSTRIAL ESTATE, CUTTACK, INDIA

**Chief Engineer**  
World Bank Project: Orissa  
World Bank Engineers

**Orisbe E.I.C.(Civil) Orissa.**  
Bhubaneswar

**Volume IV Page 127**

PROJECT: P-123-123



1000  
150  
100

EXISTING CAN BE OBTAINED

PATEL ARS J V  
CONTRACTOR

Volume IV Page 128

Chief Engineer  
World Bank Project Office  
World Bank Project

On the E.T.C (Civil) Office.  
Bhubaneswar

CONSULTING ENGINEERS M/S. SANKU CONSULTANTS PLOT NO. 123, PHASE II INDIA	GENERAL ARRANGEMENT DRAWING PIERRE AT PROPOSED ONCE OFFICE SANKU DALBURA MALLAH BRIDGE PROJECT NO. - 11	DATE: 12/12/2023 SCALE: 1/25
---	---	---------------------------------



NOT

W.14075.00 0 25.00%

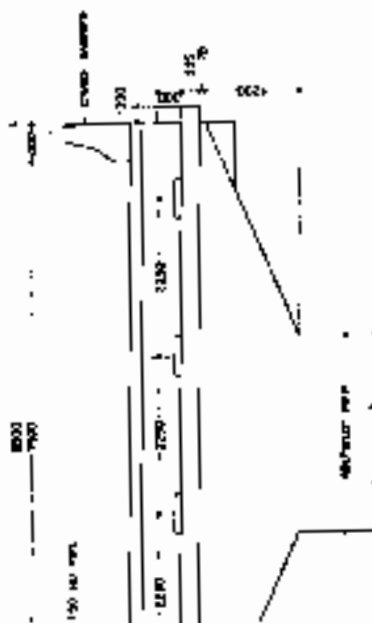
REVISION: 25/08/2002



SECTION 1000 x 400 x 200



SECTION 1000 x 400 x 200



SECTION 1000 x 400 x 200



SECTION 1000 x 400 x 200

SECTION 1000 x 400 x 200

NO.	DESCRIPTION	QTY	UNIT	AMOUNT
1	...	20	m <sup>3</sup>	400
2	...	16	m <sup>3</sup>	320
3	...	10	m <sup>3</sup>	200
4	...	19	m <sup>3</sup>	380
5	...	12	m <sup>3</sup>	240
6	...	10	m <sup>3</sup>	200

Chief Engineer  
World Bank  
World Bank Projects

**CONSULTING**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DESIGN PROJECT  
 PREPARATION OF PHASE - (I) ROAD FOR CHANG STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

**ESTIMATION & PROCUREMENT DETAILS**  
 OF MATERIALS AND SERVICES  
 SPECIFIC AT PREPARED BY: [Name]  
 BANK CONSULTING (PHILIPPINES) INCORPORATED (REG-1)



5.7 L.S.

TO KHARBAR

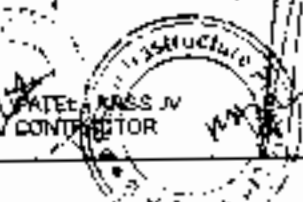
TO DIRMARDPATNA

BRIDGE	
STATION	27+650
LENGTH	5.58
NO OF SPANS	2
PROPOSED LEVEL	219.158

CURVE NO. 52	
AMP	27+511.0
V	90
R	240M
I	29° 58' 51.2"
DL	90.0M
TL	108.7M
LC	11.80M
TR	9.70
TA	0.50

REFER TO THE ABOVE DRAWING FOR THE EXISTING ROAD

SITE PLAN



DATE	13/05/2008
VOLUME	IV
PAGE	130
NO	1
REV	0
BY	
CHKD	
APPD	

Chief Engineer  
 World Bank Project, Durga  
 EMPLOYER  
 World Bank Projects

M. S. Prasad (Civil) Orissa

CONSULTING ENGINEERS  
 M/S. S. S. Prasad & Co. Pvt. Ltd.  
 15, J. J. Road, Hyderabad - 500 001, India  
 TEL: 040-26111111, 26111112, 26111113, 26111114, 26111115, 26111116, 26111117, 26111118, 26111119, 26111120, 26111121, 26111122, 26111123, 26111124, 26111125, 26111126, 26111127, 26111128, 26111129, 26111130, 26111131, 26111132, 26111133, 26111134, 26111135, 26111136, 26111137, 26111138, 26111139, 26111140, 26111141, 26111142, 26111143, 26111144, 26111145, 26111146, 26111147, 26111148, 26111149, 26111150, 26111151, 26111152, 26111153, 26111154, 26111155, 26111156, 26111157, 26111158, 26111159, 26111160, 26111161, 26111162, 26111163, 26111164, 26111165, 26111166, 26111167, 26111168, 26111169, 26111170, 26111171, 26111172, 26111173, 26111174, 26111175, 26111176, 26111177, 26111178, 26111179, 26111180, 26111181, 26111182, 26111183, 26111184, 26111185, 26111186, 26111187, 26111188, 26111189, 26111190, 26111191, 26111192, 26111193, 26111194, 26111195, 26111196, 26111197, 26111198, 26111199, 26111200

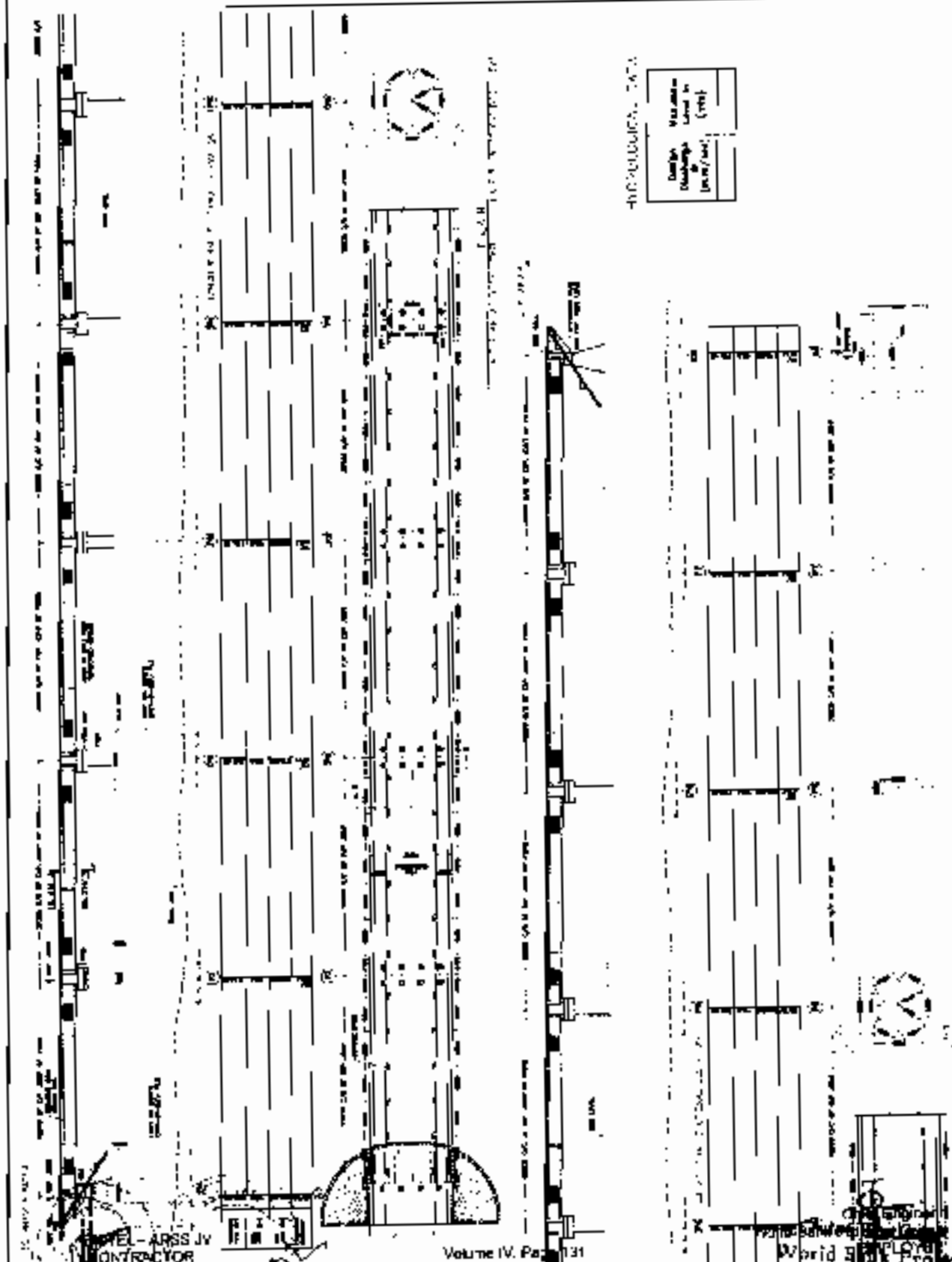
PROJECT: ROAD FOR ORISSA STATE ROAD PROJECT  
 DRAWING NO: 1153/130/1  
 DATE: 13/05/2008

DESIGNED BY: M. S. Prasad  
 CHECKED BY: M. S. Prasad  
 APPROVED BY: M. S. Prasad

SCALE: 1:1000

DATE: 13/05/2008

PROJECT: ROAD FOR ORISSA STATE ROAD PROJECT  
 DRAWING NO: 1153/130/1  
 DATE: 13/05/2008



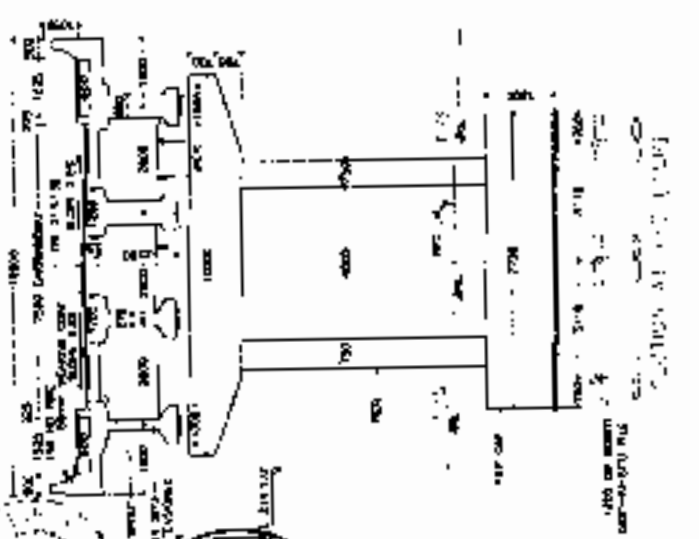
REFERENCE DRAWINGS:

- 1 09/20/78-10/05/78 (1/10/78)
- 2 09/20/78-10/05/78 (1/10/78)
- 3 09/20/78-10/05/78 (1/10/78)
- 4 09/20/78-10/05/78 (1/10/78)
- 5 09/20/78-10/05/78 (1/10/78)
- 6 09/20/78-10/05/78 (1/10/78)
- 7 09/20/78-10/05/78 (1/10/78)
- 8 09/20/78-10/05/78 (1/10/78)
- 9 09/20/78-10/05/78 (1/10/78)
- 10 09/20/78-10/05/78 (1/10/78)
- 11 09/20/78-10/05/78 (1/10/78)
- 12 09/20/78-10/05/78 (1/10/78)
- 13 09/20/78-10/05/78 (1/10/78)
- 14 09/20/78-10/05/78 (1/10/78)

HYDROLOGICAL DATA

Design Discharge (cum/sec)	Volume (m <sup>3</sup> )

	CONSULTING ENGINEERS PHOENIX CONSULTING 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	GENERAL ARRANGEMENT DRAWING BRIDGE AT PROGRESS CR. 37 HBR ARCHN. DRAWING - 9 ITS APPROACH
	CONTRACTOR ARSS JV CONTRACTOR	TITLE CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE



LOCATION PLAN OF ROAD BRIDGE AT BRIDGE NO. 12/140

1	100' x 100'	100' x 100'
2	100' x 100'	100' x 100'
3	100' x 100'	100' x 100'
4	100' x 100'	100' x 100'
5	100' x 100'	100' x 100'
6	100' x 100'	100' x 100'
7	100' x 100'	100' x 100'
8	100' x 100'	100' x 100'
9	100' x 100'	100' x 100'
10	100' x 100'	100' x 100'
11	100' x 100'	100' x 100'
12	100' x 100'	100' x 100'
13	100' x 100'	100' x 100'
14	100' x 100'	100' x 100'
15	100' x 100'	100' x 100'
16	100' x 100'	100' x 100'
17	100' x 100'	100' x 100'
18	100' x 100'	100' x 100'
19	100' x 100'	100' x 100'
20	100' x 100'	100' x 100'
21	100' x 100'	100' x 100'
22	100' x 100'	100' x 100'
23	100' x 100'	100' x 100'
24	100' x 100'	100' x 100'
25	100' x 100'	100' x 100'
26	100' x 100'	100' x 100'
27	100' x 100'	100' x 100'
28	100' x 100'	100' x 100'
29	100' x 100'	100' x 100'
30	100' x 100'	100' x 100'
31	100' x 100'	100' x 100'
32	100' x 100'	100' x 100'
33	100' x 100'	100' x 100'
34	100' x 100'	100' x 100'
35	100' x 100'	100' x 100'
36	100' x 100'	100' x 100'
37	100' x 100'	100' x 100'
38	100' x 100'	100' x 100'
39	100' x 100'	100' x 100'
40	100' x 100'	100' x 100'
41	100' x 100'	100' x 100'
42	100' x 100'	100' x 100'
43	100' x 100'	100' x 100'
44	100' x 100'	100' x 100'
45	100' x 100'	100' x 100'
46	100' x 100'	100' x 100'
47	100' x 100'	100' x 100'
48	100' x 100'	100' x 100'
49	100' x 100'	100' x 100'
50	100' x 100'	100' x 100'
51	100' x 100'	100' x 100'
52	100' x 100'	100' x 100'
53	100' x 100'	100' x 100'
54	100' x 100'	100' x 100'
55	100' x 100'	100' x 100'
56	100' x 100'	100' x 100'
57	100' x 100'	100' x 100'
58	100' x 100'	100' x 100'
59	100' x 100'	100' x 100'
60	100' x 100'	100' x 100'
61	100' x 100'	100' x 100'
62	100' x 100'	100' x 100'
63	100' x 100'	100' x 100'
64	100' x 100'	100' x 100'
65	100' x 100'	100' x 100'
66	100' x 100'	100' x 100'
67	100' x 100'	100' x 100'
68	100' x 100'	100' x 100'
69	100' x 100'	100' x 100'
70	100' x 100'	100' x 100'
71	100' x 100'	100' x 100'
72	100' x 100'	100' x 100'
73	100' x 100'	100' x 100'
74	100' x 100'	100' x 100'
75	100' x 100'	100' x 100'
76	100' x 100'	100' x 100'
77	100' x 100'	100' x 100'
78	100' x 100'	100' x 100'
79	100' x 100'	100' x 100'
80	100' x 100'	100' x 100'
81	100' x 100'	100' x 100'
82	100' x 100'	100' x 100'
83	100' x 100'	100' x 100'
84	100' x 100'	100' x 100'
85	100' x 100'	100' x 100'
86	100' x 100'	100' x 100'
87	100' x 100'	100' x 100'
88	100' x 100'	100' x 100'
89	100' x 100'	100' x 100'
90	100' x 100'	100' x 100'
91	100' x 100'	100' x 100'
92	100' x 100'	100' x 100'
93	100' x 100'	100' x 100'
94	100' x 100'	100' x 100'
95	100' x 100'	100' x 100'
96	100' x 100'	100' x 100'
97	100' x 100'	100' x 100'
98	100' x 100'	100' x 100'
99	100' x 100'	100' x 100'
100	100' x 100'	100' x 100'

LOCATION PLAN OF ROAD BRIDGE AT BRIDGE NO. 12/140

1	100' x 100'	100' x 100'
2	100' x 100'	100' x 100'
3	100' x 100'	100' x 100'
4	100' x 100'	100' x 100'
5	100' x 100'	100' x 100'
6	100' x 100'	100' x 100'
7	100' x 100'	100' x 100'
8	100' x 100'	100' x 100'
9	100' x 100'	100' x 100'
10	100' x 100'	100' x 100'
11	100' x 100'	100' x 100'
12	100' x 100'	100' x 100'
13	100' x 100'	100' x 100'
14	100' x 100'	100' x 100'
15	100' x 100'	100' x 100'
16	100' x 100'	100' x 100'
17	100' x 100'	100' x 100'
18	100' x 100'	100' x 100'
19	100' x 100'	100' x 100'
20	100' x 100'	100' x 100'
21	100' x 100'	100' x 100'
22	100' x 100'	100' x 100'
23	100' x 100'	100' x 100'
24	100' x 100'	100' x 100'
25	100' x 100'	100' x 100'
26	100' x 100'	100' x 100'
27	100' x 100'	100' x 100'
28	100' x 100'	100' x 100'
29	100' x 100'	100' x 100'
30	100' x 100'	100' x 100'
31	100' x 100'	100' x 100'
32	100' x 100'	100' x 100'
33	100' x 100'	100' x 100'
34	100' x 100'	100' x 100'
35	100' x 100'	100' x 100'
36	100' x 100'	100' x 100'
37	100' x 100'	100' x 100'
38	100' x 100'	100' x 100'
39	100' x 100'	100' x 100'
40	100' x 100'	100' x 100'
41	100' x 100'	100' x 100'
42	100' x 100'	100' x 100'
43	100' x 100'	100' x 100'
44	100' x 100'	100' x 100'
45	100' x 100'	100' x 100'
46	100' x 100'	100' x 100'
47	100' x 100'	100' x 100'
48	100' x 100'	100' x 100'
49	100' x 100'	100' x 100'
50	100' x 100'	100' x 100'
51	100' x 100'	100' x 100'
52	100' x 100'	100' x 100'
53	100' x 100'	100' x 100'
54	100' x 100'	100' x 100'
55	100' x 100'	100' x 100'
56	100' x 100'	100' x 100'
57	100' x 100'	100' x 100'
58	100' x 100'	100' x 100'
59	100' x 100'	100' x 100'
60	100' x 100'	100' x 100'
61	100' x 100'	100' x 100'
62	100' x 100'	100' x 100'
63	100' x 100'	100' x 100'
64	100' x 100'	100' x 100'
65	100' x 100'	100' x 100'
66	100' x 100'	100' x 100'
67	100' x 100'	100' x 100'
68	100' x 100'	100' x 100'
69	100' x 100'	100' x 100'
70	100' x 100'	100' x 100'
71	100' x 100'	100' x 100'
72	100' x 100'	100' x 100'
73	100' x 100'	100' x 100'
74	100' x 100'	100' x 100'
75	100' x 100'	100' x 100'
76	100' x 100'	100' x 100'
77	100' x 100'	100' x 100'
78	100' x 100'	100' x 100'
79	100' x 100'	100' x 100'
80	100' x 100'	100' x 100'
81	100' x 100'	100' x 100'
82	100' x 100'	100' x 100'
83	100' x 100'	100' x 100'
84	100' x 100'	100' x 100'
85	100' x 100'	100' x 100'
86	100' x 100'	100' x 100'
87	100' x 100'	100' x 100'
88	100' x 100'	100' x 100'
89	100' x 100'	100' x 100'
90	100' x 100'	100' x 100'
91	100' x 100'	100' x 100'
92	100' x 100'	100' x 100'
93	100' x 100'	100' x 100'
94	100' x 100'	100' x 100'
95	100' x 100'	100' x 100'
96	100' x 100'	100' x 100'
97	100' x 100'	100' x 100'
98	100' x 100'	100' x 100'
99	100' x 100'	100' x 100'
100	100' x 100'	100' x 100'

REFERENCE BIBLIOGRAPHY

1. ...
2. ...
3. ...
4. ...
5. ...
6. ...
7. ...
8. ...
9. ...
10. ...
11. ...
12. ...
13. ...
14. ...
15. ...
16. ...
17. ...
18. ...
19. ...
20. ...



<p>CONSULTING          ENGINEERS          7-11-1976</p>	<p>GENERAL ARRANGEMENT DRAWING          BRIDGE AT BRIDGE NO. 12/140          SHEET NO. 1 OF 1</p>	<p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II BRIDGE FOR GREEN ISLAND ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>	<p>SCALE: 1:100</p>
---	---	---	---------------------

**NOTES:**

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL WALLS TO BE CONCRETE WITH REINFORCEMENT.
3. ALL ROOFS TO BE FLAT WITH SLOPE OF 1% TOWARDS DRAINAGE.
4. ALL DOORS TO BE 2.1M X 2.1M WITH GLASS PANELS.
5. ALL WINDOWS TO BE 1.8M X 1.2M WITH ALUMINUM FRAMES.
6. ALL FLOORS TO BE 150MM CONCRETE WITH 100MM SAND AND 15MM GRANULAR FILL.
7. ALL CEILING TO BE 2.4M HIGH WITH 100MM CONCRETE SLAB.
8. ALL ELECTRICAL AND PLUMBING TO BE AS PER SEPARATE DRAWINGS.
9. ALL MATERIALS TO BE OF STANDARD QUALITY AND AS PER SPECIFICATIONS.
10. ALL WORK TO BE DONE IN ACCORDANCE WITH THE LOCAL BUILDING CODES.
11. ALL FOUNDATIONS TO BE 150MM CONCRETE WITH 100MM SAND AND 15MM GRANULAR FILL.
12. ALL ROOFS TO BE FLAT WITH SLOPE OF 1% TOWARDS DRAINAGE.
13. ALL DOORS TO BE 2.1M X 2.1M WITH GLASS PANELS.
14. ALL WINDOWS TO BE 1.8M X 1.2M WITH ALUMINUM FRAMES.
15. ALL FLOORS TO BE 150MM CONCRETE WITH 100MM SAND AND 15MM GRANULAR FILL.
16. ALL CEILING TO BE 2.4M HIGH WITH 100MM CONCRETE SLAB.
17. ALL ELECTRICAL AND PLUMBING TO BE AS PER SEPARATE DRAWINGS.
18. ALL MATERIALS TO BE OF STANDARD QUALITY AND AS PER SPECIFICATIONS.
19. ALL WORK TO BE DONE IN ACCORDANCE WITH THE LOCAL BUILDING CODES.
20. ALL FOUNDATIONS TO BE 150MM CONCRETE WITH 100MM SAND AND 15MM GRANULAR FILL.

**REFERENCE DRAWINGS:**

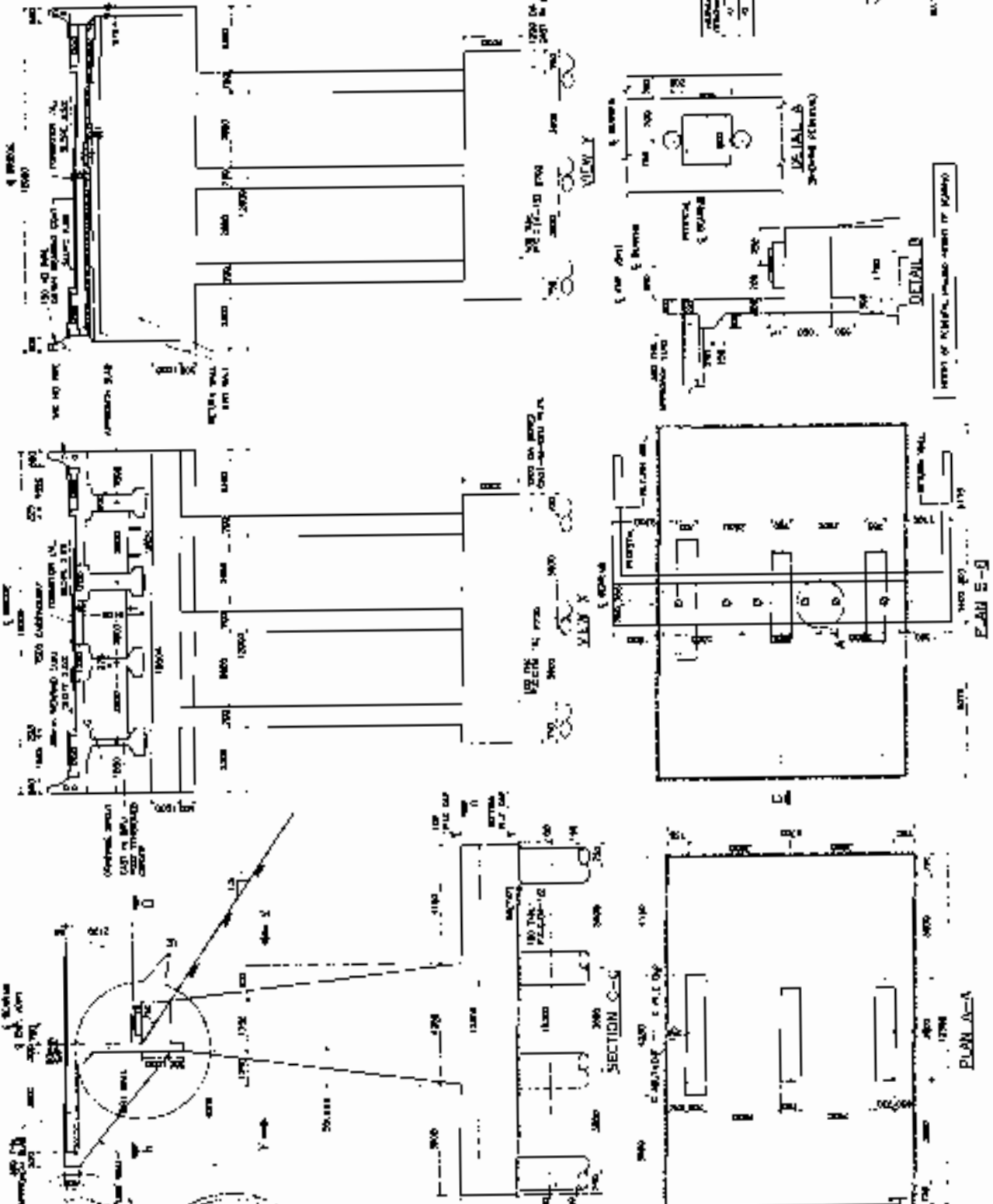
- 1. 1000/1000/1000/1000/1000/1000
- 2. 1000/1000/1000/1000/1000/1000
- 3. 1000/1000/1000/1000/1000/1000

**LEVELS (METERS FROM M.S.L.)**

LEVEL	DESCRIPTION	FINISH	MIN.	MAX.	AVG.
0.00	GROUND LEVEL	FINISH			
0.15	1ST FLOOR	FINISH			
0.30	2ND FLOOR	FINISH			
0.45	ROOF	FINISH			

**LEVELS (METERS FROM M.S.L.)**

LEVEL	DESCRIPTION	FINISH	MIN.	MAX.	AVG.
0.00	GROUND LEVEL	FINISH			
0.15	1ST FLOOR	FINISH			
0.30	2ND FLOOR	FINISH			
0.45	ROOF	FINISH			



Volume IV: Page 123

Patel Arsh W Contractor  
 100/100/100/100/100/100  
 100/100/100/100/100/100  
 100/100/100/100/100/100

<p>CONSULTING ENGINEERS</p> <p>100/100/100/100/100/100</p>	<p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (D) ROAD FOR CROSS STATE ROAD PROJECT UNDER NATIONAL BUDGET ASSISTANCE</p>	<p>DATE: 2024</p> <p>SCALE: 1:500</p>	<p>DIMENSION DETAILS OF ADJUSTMENT COMPONENTS</p> <p>SCALE: 1:50</p>
--	--	---------------------------------------	--

**NOTES:**

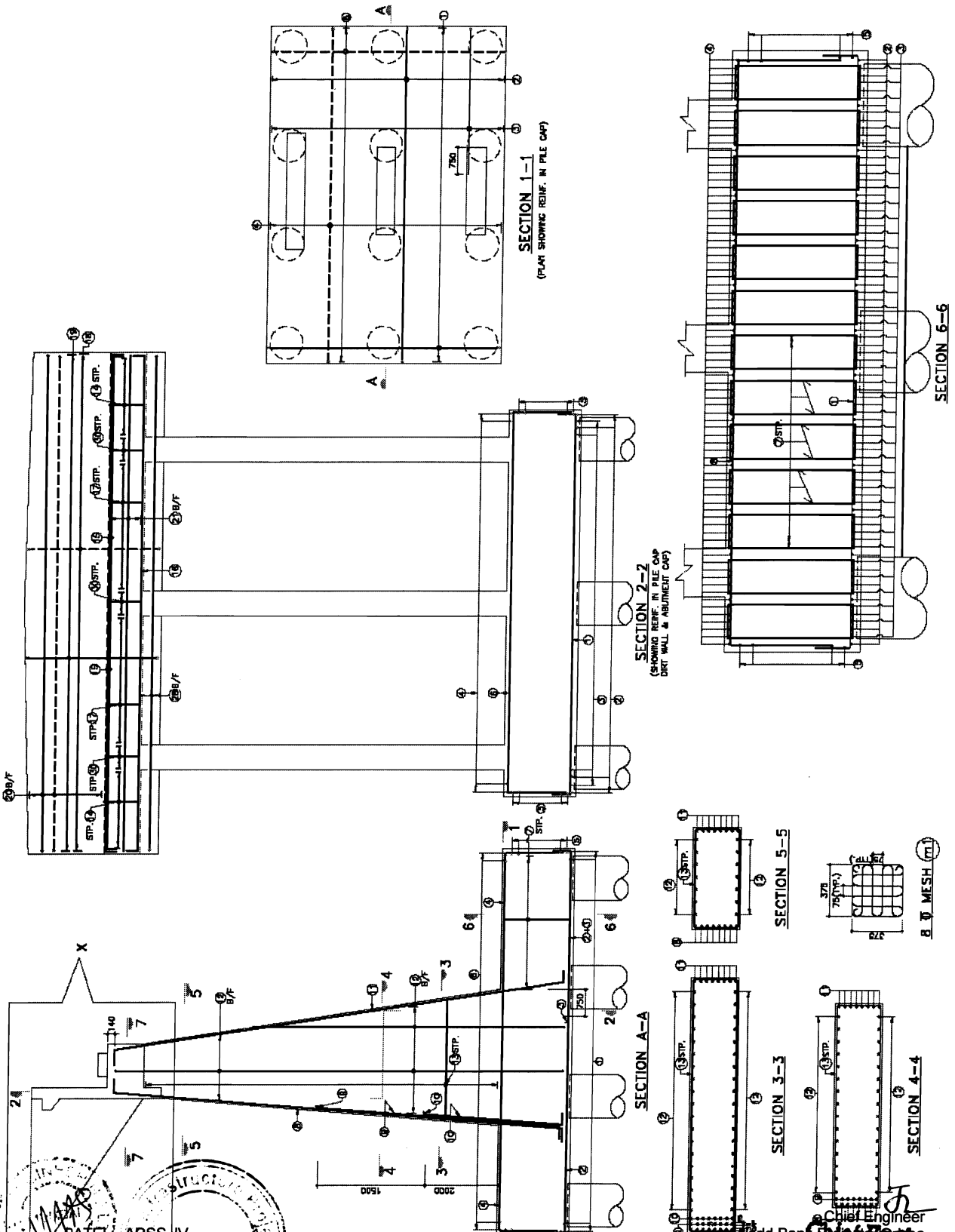
1. ALL DIMENSIONS ARE IN MM
2. FOR OTHER NOTES REFER SHEET 2 OF 2 OF THIS DRAWING.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH SHEET NO. 2 OF 2 OF THIS DRAWING.

**REFERENCE DRAWINGS:**

1. ORSP/CEG/SR-16/BR/SUB/01
2. ORSP/CEG/SR-16/BR/SUB/02
3. ORSP/CEG/SR-16/BR/SUB/03 (SHEET 2 OF 2)

**REINFORCEMENT DETAILS:**

BAR MKD.	DIA	SPACING/NO.	SHAPE
1	20	125 c/c	□
2	32	42 Nos.	□
3	16	41 Nos.	□
4	16	54 Nos.	□
5	10	200 c/c	□
6	20	125 c/c	□
7	12	200 c/c	□
8	25	3x6 Nos.	□
9	25	3x6 Nos.	□
10	25	3x6 Nos.	□
11	16	3x6 Nos.	□
12	12	18 Nos.	□
13	10	150 c/c	□
14	12	175 c/c	□
15	25	2x11 Nos.	□
16	16	11 Nos.	□
17	10	200 c/c	□
18	16	160 c/c	□
19	10	200 c/c	□
20	10	200 c/c	□
21	13	2x4 Nos.	□
22	20	175 c/c	□
23	10	200 c/c	□
24	10	200 c/c	□
25	10	200 c/c	□
26	16	30 Nos.	□
27	10	190 c/c	□
28	10	200 c/c	□
29	12	175 c/c	□
30	16	3x6 Nos.	□



**PATEL - ARSS IV**  
**CONTRACTOR**

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

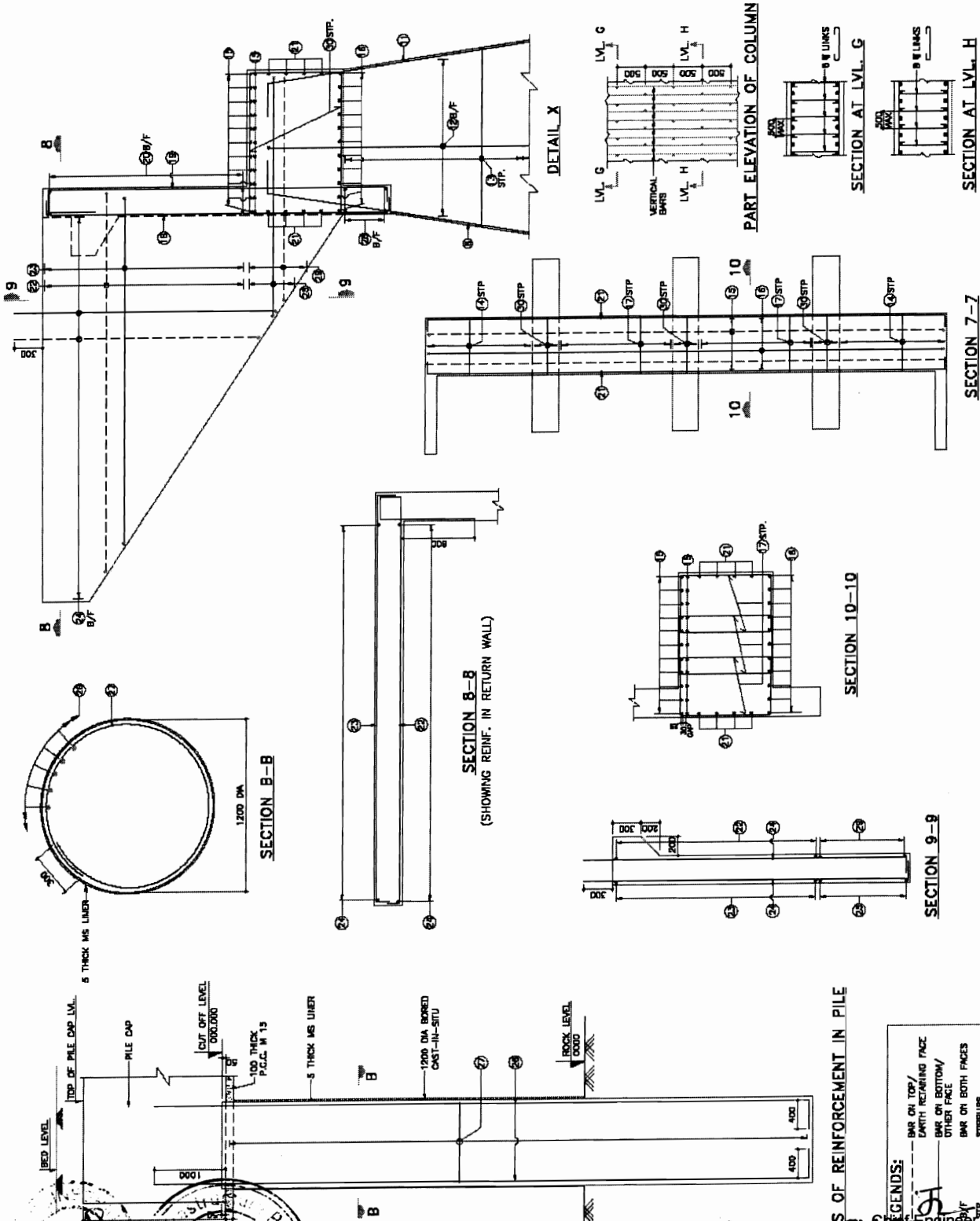
**CONSULTING ENGINEER**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE  
 PROJECT NO. 27-9489  
 BRIDGE AT PROPOSED CH. 27-9489  
 MINOR BRIDGE NO - 2 (TEL. APPROX-4)

**NOTES:**

1. ALL DIMENSIONS ARE IN MM LEVELS IN METER.
2. ALL HV.3.0. BARS IS CONFORM TO IS1786 GRADE Fe 415.
3. CLEAR COVER TO ANY REIN.
4. ALL OTHER COMPONENTS --- 40 mm.
5. LAPS IS STaggerED AND NOT MORE THAN ONE OF BARS IS LAPPED AT ANY LOCATION. LAP LENGTH IS 30 TIMES DIA OF BAR FOR BARS MARKED ①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, ⑫, ⑬, ⑭, ⑮, ⑯, ⑰, ⑱, ⑲ AND 72 TIMES DIA OF BAR FOR ALL OTHER BARS.
6. 5 THICK MS LINER TO PILES IS PROVIDED FROM BOTTOM OF PILE CAP TO ROCK LEVEL.
7. MESH (m) IS PROVIDED IN THE ABUTMENT CAP AT JACK LOCATIONS.
8. FOR DETAILS OF REINFORCEMENT FOR CRUSH BARRIER IS ENDED INTO RETURN WALL REFER DRG NO. 200/MSB/2-01
9. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH SHEET NO.1 OF 2 OF THIS DRAWING.

**REFERENCE DRAWINGS:**

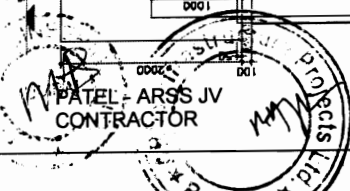
1. DRP/CEG/SH-16/BR/SUB/01
2. DRP/CEG/SH-16/BR/SUB/02
3. DRP/CEG/SH-16/BR/SUB/03 (SHEET 1 OF 2)



**LEGENDS:**

- BAR ON TOP/ BOTTOM REINFORCING FACE
- BAR ON BOTTOM/ OTHER FACE
- BAR ON BOTH FACES
- STIRRUPS

<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>REINFORCEMENT DETAILS OF ABUTMENT CAP &amp; PILE BRIDGE AT PROPOSED CH: 87+948 MINOR BRIDGE NO - 2 (TEL. APPROACH)</p>	
<p><b>C O N S U L T I N G ENGINEERS GROUP LTD.</b>                  C-12/10/1 Colony, Sakinaka, Bhubaneswar - 751004                  Tel: +91-674-2520088, 2521199, 2520548                  Fax: 2521194, E-mail: ce@cegroupindia.com</p>		<p>PROJECT NO. 1: ORISSA STATE ROAD PROJECT                  SHEET NO. 1 OF 2</p>	

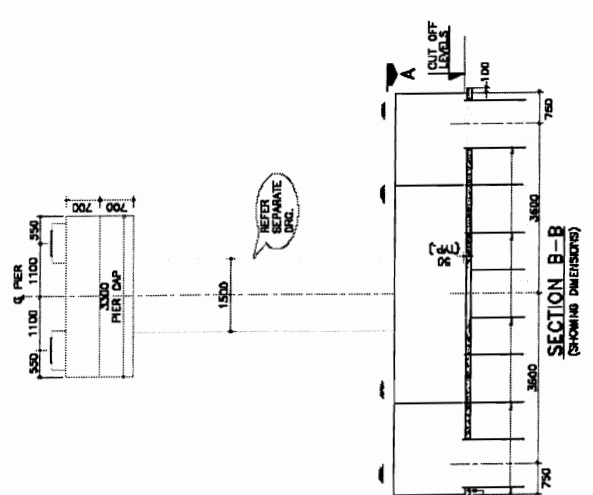
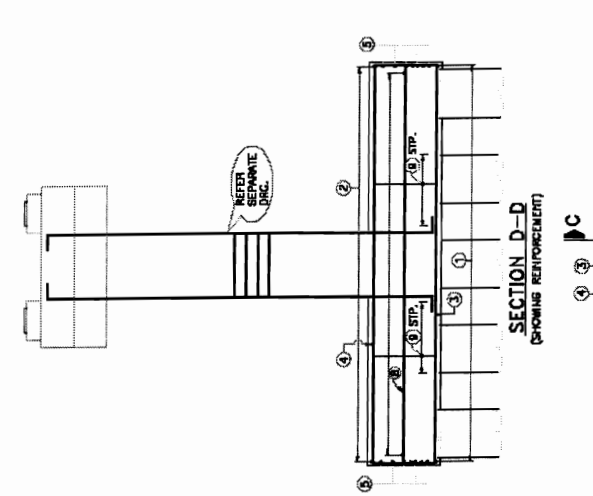
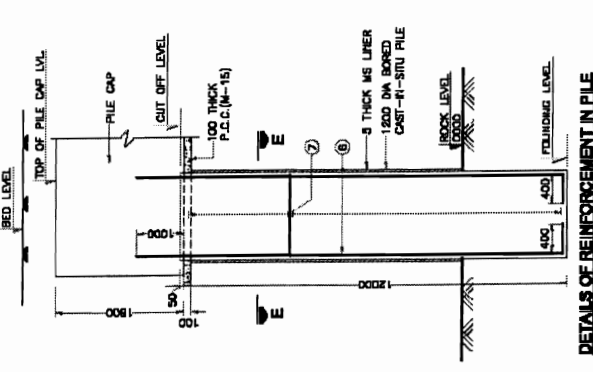


**NOTES:**

1. ALL DIMENSIONS ARE IN METRE AND LEVELS IN METRE.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE AS FOLLOWS  
 PIER & PILE CAP ..... M-35  
 LEVELLING COURSE ..... M-13  
 ALL H.V.S.D. BARS SHALL CONFORM TO IS:1786 GRADE F415.  
 LAPS SHALL BE STAGGERED AND NOT MORE THAN SOME OF BARS SHALL BE LAPPED AT A SECTION. LAP LENGTH SHALL BE 63 TIMES THE DIA OF BAR.  
 CLEAR COVER TO ANY REINFORCEMENT  
 PILE CAP ..... 75mm  
 PIER ..... 40mm
4. FOR PIER HEAD DETAIL REFER SEPARATE DRAWING.
5. AS PER CLAUSE 8.07(6) OF RIT, LAYER OF 125 @ 250 C/C (B.M. @ BOTH WAYS SHOULD BE PROVIDED AT 1/30 HEIGHT OF PILE CAP.

**REFERENCE DRAWINGS:**

- 1 CSRP/CEG/SH-16/BR/SUB/01
- 2 CSRP/CEG/SH-16/BR/SUB/02



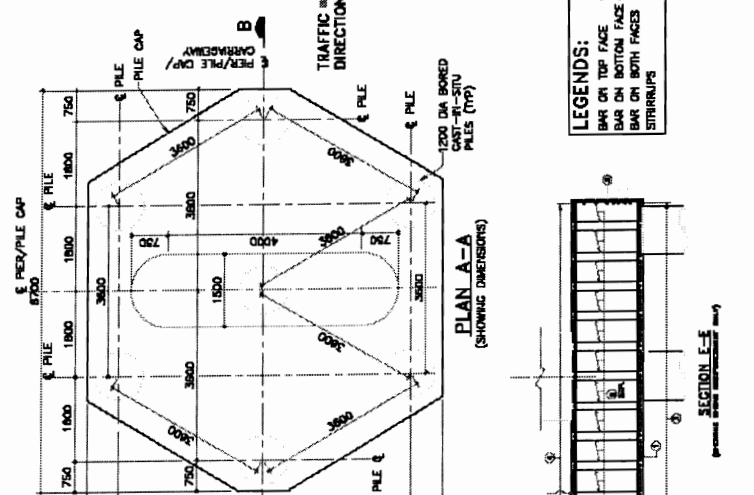
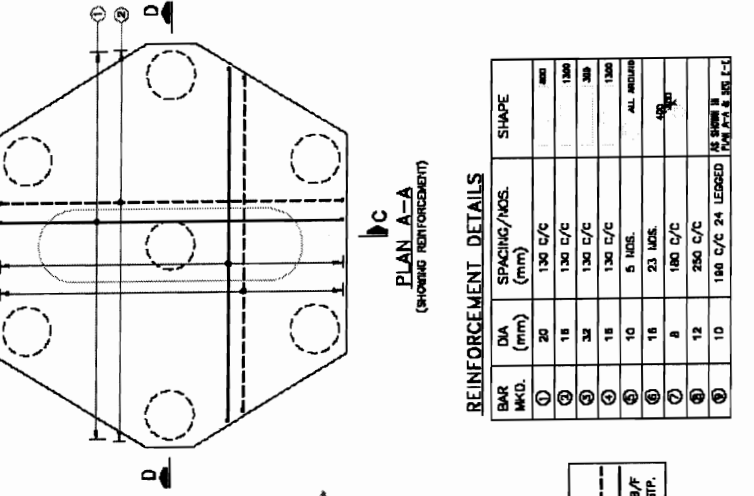
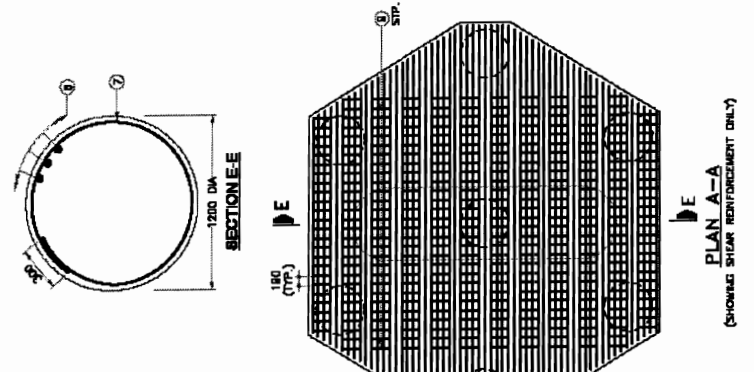
CONTRACTOR: PATEL ARSS JV

Stamp: Infrastructure Projects Ltd. (Mumbai)

Stamp: Chief Engineer, World Bank Projects, Orissa

**LEVELS CHART FOR PILE CAP LAYOUT**  
AT BRIDGE NO. 27+800

PIER DESCRIPTION	BED LEVELS	TOP OF PILE CAP LEVELS	CUT OFF LEVELS	FOUNDING LEVELS
P1	210.978	208.478	207.725	197.500
P2	210.842	208.842	208.082	197.500
P3	210.519	209.518	207.768	197.500
P4	208.770	208.720	208.87	197.500
P5	208.995	207.995	205.945	197.500
P6	208.599	207.599	205.849	197.500
P7	208.802	207.802	206.052	197.500



CONSULTANT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

Stamp: CONSULTING ENGINEERS GROUP LTD. (Bhubaneswar)

Stamp: Chief Engineer, World Bank Projects, Orissa

Stamp: O/o the E.I.C (Civil) Orissa, Bhubaneswar.

PROJECT NO.: CSRP/CEG/SH-16/BR/SUB/01

DATE: 11.01.2017

SCALE: AS SHOWN

APPROVED: [Signature]

DATE: 11.01.2017

PROJECT: BRIDGE AT PROPOSED CH. 27+848

MINOR BRIDGE NO. - 2 (TEL. APPROACH)

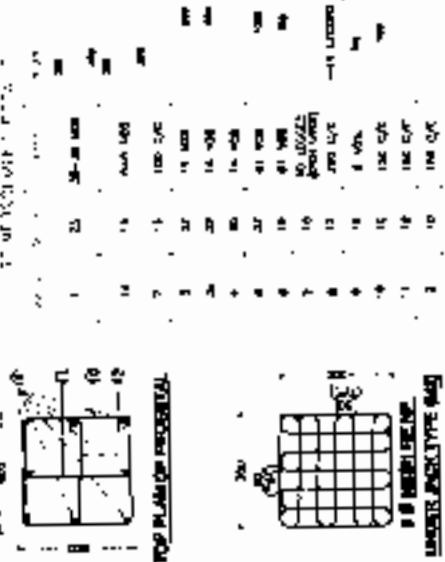


**NOTES:**

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
3. FINISH FLOOR LEVEL IS AS SHOWN.
4. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
6. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
7. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
8. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
9. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
10. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.

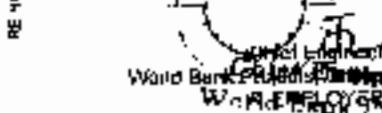
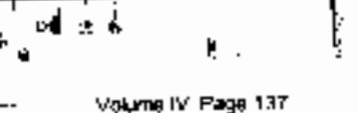
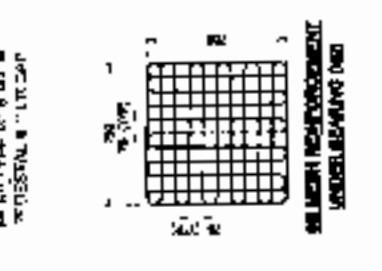
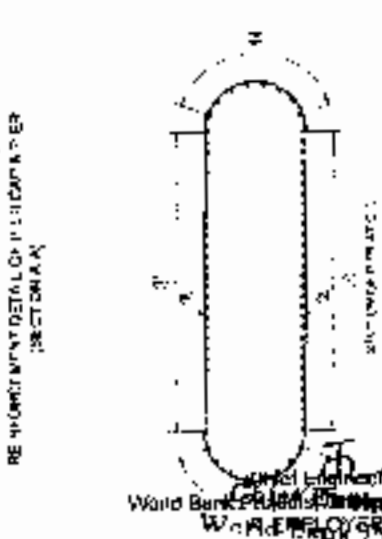
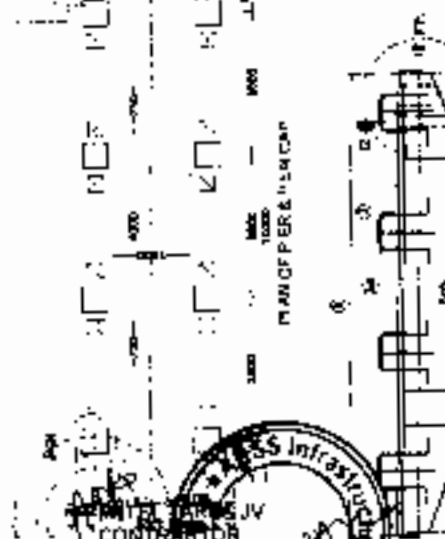
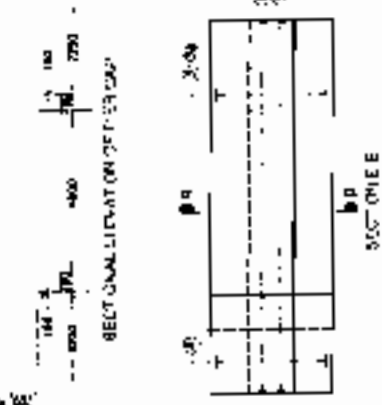
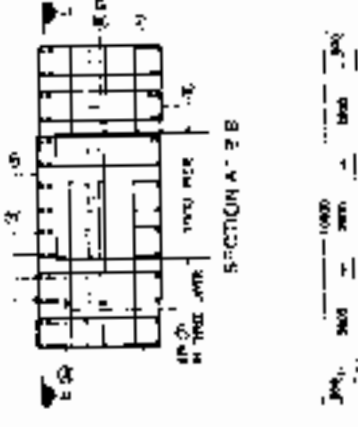
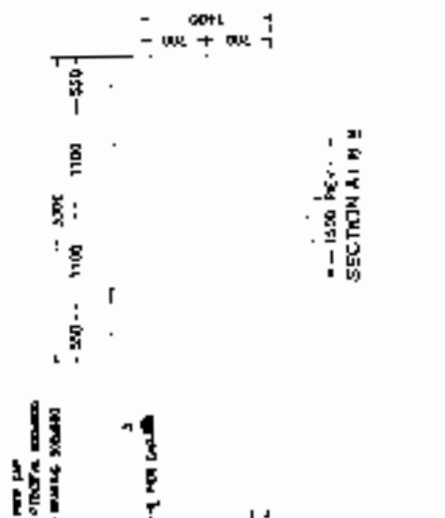
**REFERENCE DRAWINGS:**

1. DRAWING NO. 14.01/01/01
2. DRAWING NO. 14.01/01/02



**TABLE CHART FOR REINFORCEMENT**

NO.	SECTION	NO. OF BARS	DIAMETER	LENGTH	WEIGHT	TOTAL WEIGHT
1	1	1	12	1000	0.377	0.377
2	2	1	12	1000	0.377	0.377
3	3	1	12	1000	0.377	0.377
4	4	1	12	1000	0.377	0.377
5	5	1	12	1000	0.377	0.377
6	6	1	12	1000	0.377	0.377
7	7	1	12	1000	0.377	0.377
8	8	1	12	1000	0.377	0.377
9	9	1	12	1000	0.377	0.377
10	10	1	12	1000	0.377	0.377



**CONSULTING ENGINEER**  
**WORLD BANK PROJECTS**  
**DR. B. C. (Civil) DR.**  
**Chhatrapati**

**COMBINATION SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE II PROJECT FOR CHHATRAPATI WORLD BANK PROJECT UNDER WORLD BANK ASSISTANCE**

**DATE:** 14/01/2014  
**SCALE:** 1:100  
**PROJECT NO.:** 14.01/01/01

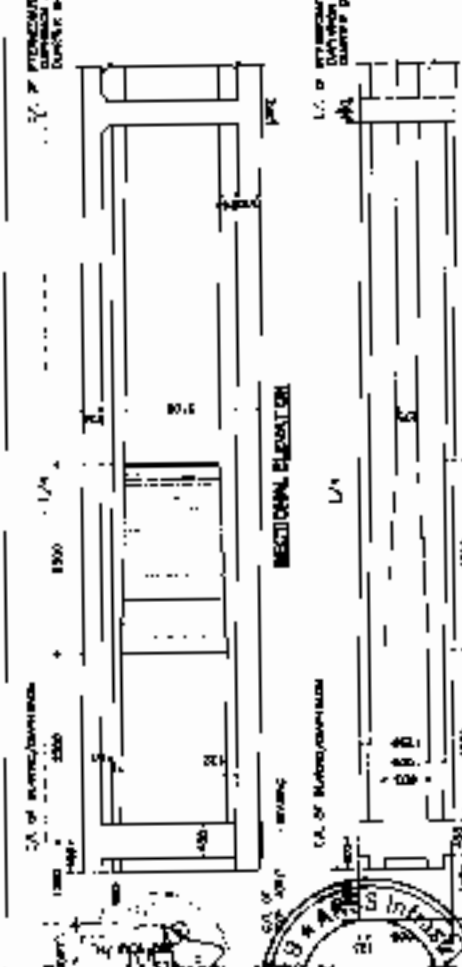
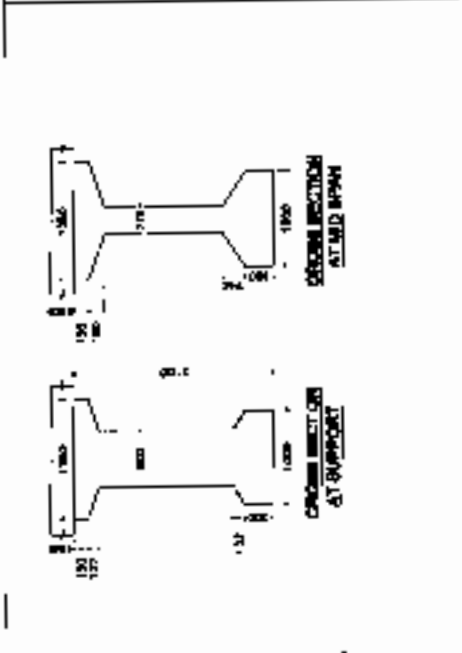
**REVISIONS:**

NO.	DESCRIPTION	DATE
1	ISSUED FOR TENDER	14/01/2014
2	ISSUED FOR TENDER	14/01/2014
3	ISSUED FOR TENDER	14/01/2014
4	ISSUED FOR TENDER	14/01/2014
5	ISSUED FOR TENDER	14/01/2014
6	ISSUED FOR TENDER	14/01/2014
7	ISSUED FOR TENDER	14/01/2014
8	ISSUED FOR TENDER	14/01/2014
9	ISSUED FOR TENDER	14/01/2014
10	ISSUED FOR TENDER	14/01/2014

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METERS.
2. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED.
3. THIS DRAWING SHALL BE USED IN CONNECTION WITH SPECIFICATION NO. 2 (FEL APPROXIMATIONS).

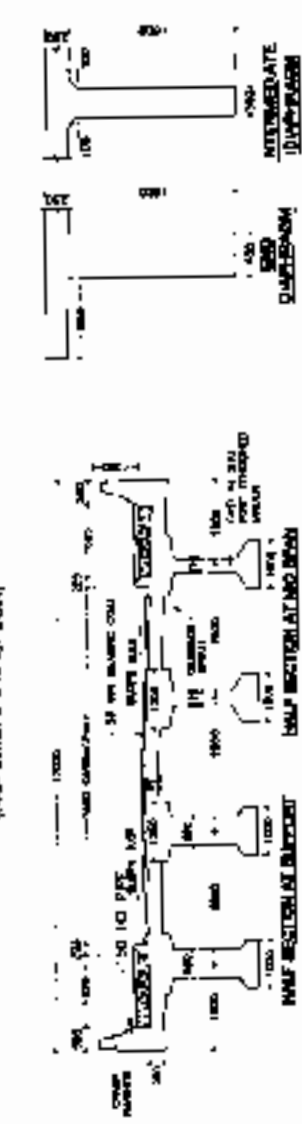
**REFERENCE DRAWINGS:**

1. CIVIL/ARCH/INT-10/000/000/000/000
2. CIVIL/ARCH/INT-10/000/000/000/000
3. CIVIL/ARCH/INT-10/000/000/000/000
4. CIVIL/ARCH/INT-10/000/000/000/000



**DETAIL OF END CROSS DIMENSIONS**  
(Refer to sheet 2, level of ground)

**HALF SECTION AT MID SPAN**



<p><b>CONSULTING ENGINEER'S SIGNATURE</b></p> <p>World Bank Group Engineering &amp; Architecture 1000 17th Street, N.W. Washington, D.C. 20036</p>		<p><b>CONSULTING ENGINEER'S NAME</b></p> <p>World Bank Group Engineering &amp; Architecture</p>	
<p><b>CONTRACT NO.</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>		<p><b>PROJECT NO.</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>	
<p><b>DATE OF DRAWING</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>		<p><b>SCALE</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>	
<p><b>PROJECT TITLE</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>		<p><b>PROJECT LOCATION</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>	
<p><b>PROJECT DESCRIPTION</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>		<p><b>PROJECT STATUS</b></p> <p>1000 17th Street, N.W. Washington, D.C. 20036</p>	

World Bank Group  
Engineering & Architecture  
1000 17th Street, N.W.  
Washington, D.C. 20036

NOTES :-

- 1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METRES.
- 2 DIMENSIONS ARE NOT TO BE SCALD. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- 3 THE SEQUENCE OF STRESSING OF CABLES SHALL BE AS FOLLOWS:-  
STAGE 1:- NOS. 1, 2, 3, 4, 7  
(14 DAYS AFTER CASTING OF GIRDER OR WHEN CONCRETE ATTAINS STRENGTH OF 33 MPa WHICHEVER IS LATER)  
STAGE 2:- CABLE NO. 5, 6  
(14 DAYS AFTER CASTING OF DECK SLAB OR 28 DAYS AFTER CASTING.

REFERENCE DRAWINGS:

- 1 OSRP/CEG/SH-16/06/2016/08
- 2 OSRP/CEG/SH-16/06/2016/08
- 3 OSRP/CEG/SH-16/06/2016/08
- 4 OSRP/CEG/SH-16/06/2016/08
- 5 OSRP/CEG/SH-16/06/2016/08

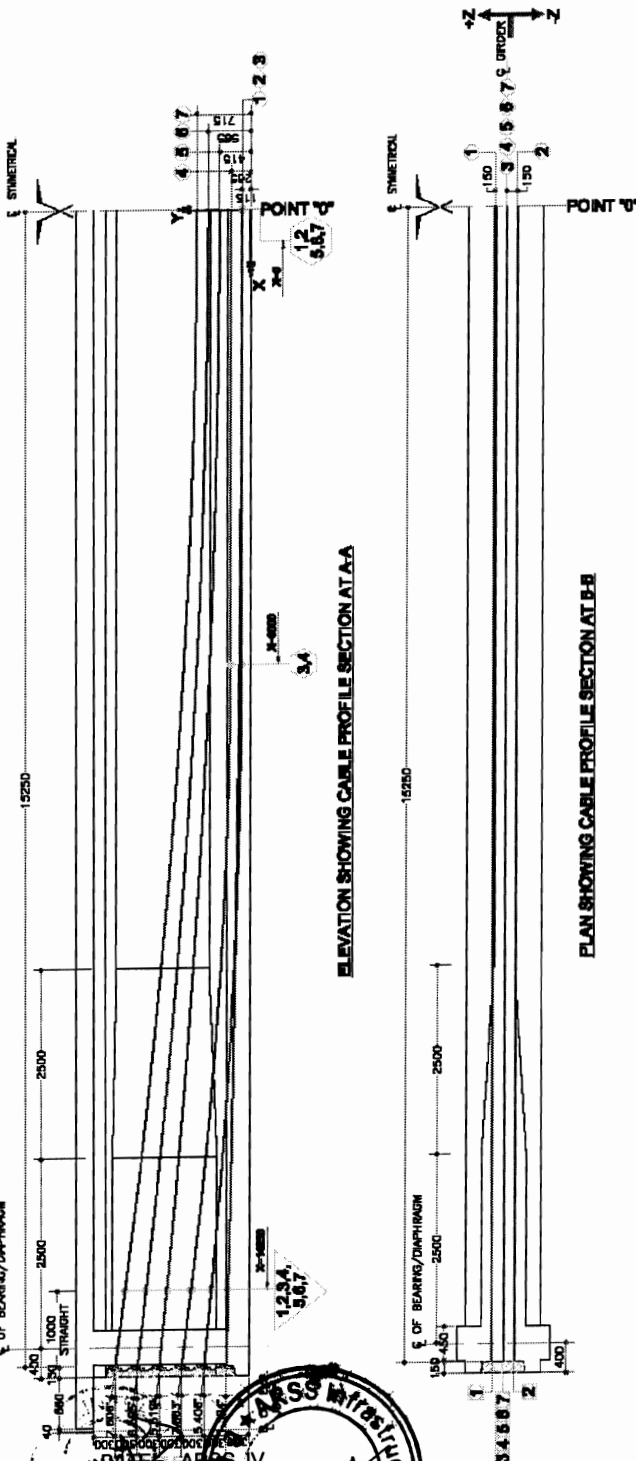


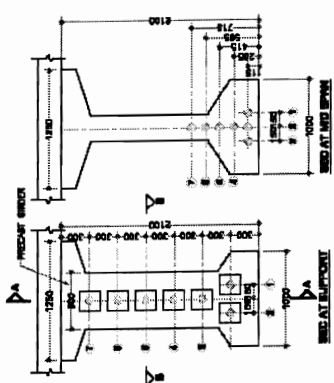
TABLE -1 CABLE CO-ORDINATES CO-ORDINATE AT DIFFERENT DISTANCE 'X' FROM POINT 'Y'

Cable No.	41000	41500	42000	42500	43000	43500	44000	44500	45000	45500	46000	46500	47000	47500	48000	48500	49000	49500	50000
1	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700
2	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700
3	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700
4	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700
5	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700
6	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700
7	0.000	0.150	0.300	0.450	0.600	0.750	0.900	1.050	1.200	1.350	1.500	1.650	1.800	1.950	2.100	2.250	2.400	2.550	2.700

TABLE -2 GIRDER, CABLE LENGTH & ELONGATION

GIRDER IDENTIFICATION	GIRDER LENGTH	CABLE NO.	NO. OF STRANDS IN CABLE	JACKING FORCE OF CABLE	TOTAL LENGTH OF CABLE	TENSIONAL INCREASE EACH END (mm)	EMERGENCE ANGLE (°)
G1/CAL/04/04	50.000	1	12	150.0	50.000	100.00	1.324
		2	12	150.0	50.000	100.00	1.324
		3	12	150.0	50.000	100.00	1.324
		4	12	150.0	50.000	100.00	1.324
		5	12	150.0	50.000	100.00	1.324
		6	12	150.0	50.000	100.00	1.324
		7	12	150.0	50.000	100.00	1.324

- NOTE :-
1. X & Z CO-ORDINATES OF ADDITIONAL LENGTH 'Y' WILL BE SAME AS THAT OF POINT 'Y'
  2. AT SHOULD BE CLEARLY NOTED THAT THE CO-ORDINATES ARE FROM POINT 'Y'



LEGEND:-

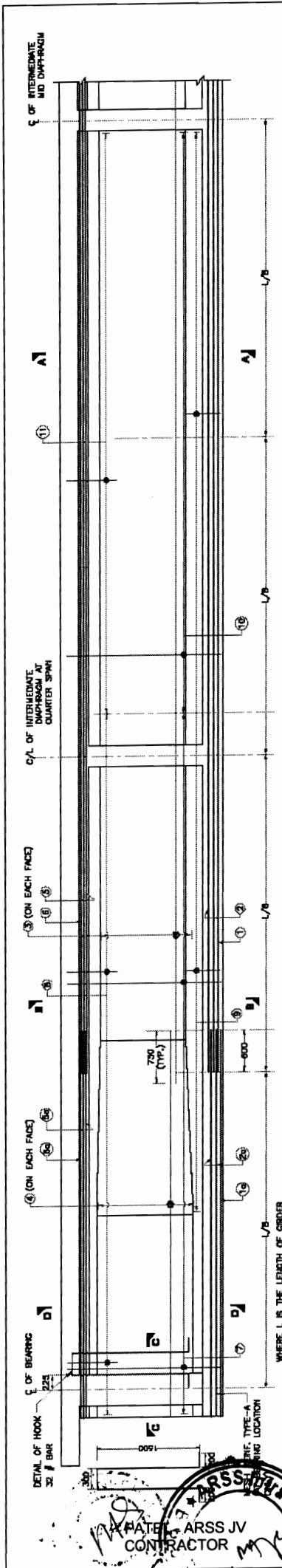
- INDICATES START OF CURVE IN ELEVATION
- INDICATES END OF CURVE IN ELEVATION
- INDICATES START OF CURVE IN PLAN
- INDICATES END OF CURVE IN PLAN
- INDICATES END OF CABLE
- INDICATES CABLE NUMBER

CONSULTING ENGINEERS GROUP LTD.   
 17, B-Block, Sector-17, Faridkot, Punjab-147001, India   
 Tel: +91-1741-232008, 232005, 2320055   
 Fax: +91-1741-232006, 2320061, 2320062

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION & PRESTRESSING CABLE DETAIL OF LONGITUDINAL GIRDERS BRIDGE AT PROPOSED CH: 27+848 MINOR BRIDGE NO - 2 (TEL APPROACH)

DATE	NO.	BY	CHECKED	APPROVED



LONGITUDINAL SECTION OF MAIN BEAM

WHERE L IS THE LENGTH OF GRADE BETWEEN C/C OF BEARING

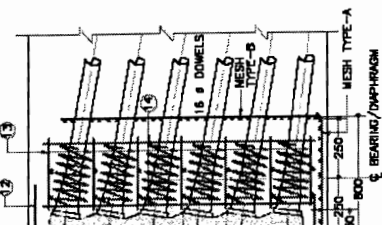
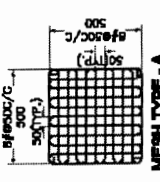
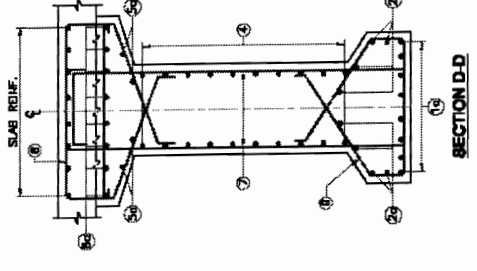
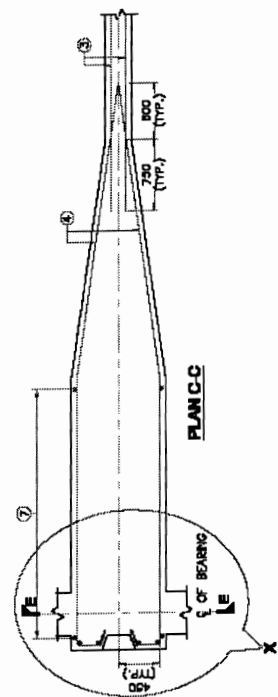
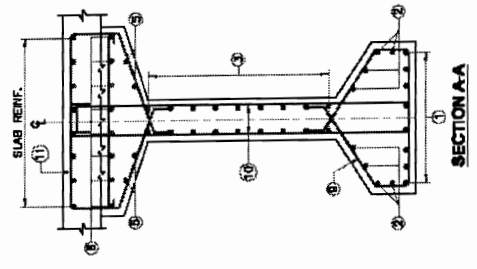
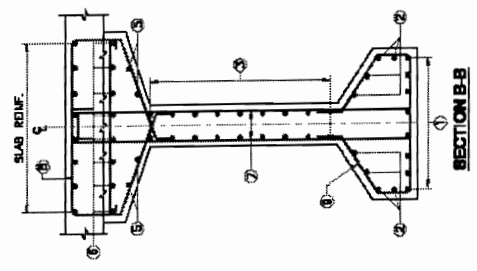
**NOTES :-**

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METRES.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. CLEAR COVER TO REINFORCEMENT SHALL BE 40 mm.
4. CONCRETE IN VARIOUS ELEMENTS SHALL BE M-40 GRADE.
5. ALL REINFORCEMENT SHALL BE OF TMC/CBS OF GRADE S: 415 CONFORMING TO IS:1786.
6. ALL LAP SHALL BE STAGGERED NOT MORE THAN SIDE OF THE REINFORCEMENT SHALL BE LAPPED AT ANY SECTION LAP LENGTH WHEREVER PROVIDED SHALL BE 50 TIMES DIAMETER
7. MINIMUM BOND LENGTH WILL BE 35 TIMES THE DIA. OF BAR
8. CENTRAL BEAM IS DESIGNATED AS INNER BEAM.

**REFERENCE DRAWINGS:**

1. GSRP/CEG/SR-16/RW/SUPR/06
2. GSRP/CEG/SR-16/RW/SUPR/07
3. GSRP/CEG/SR-16/RW/SUPR/09
4. GSRP/CEG/SR-16/RW/SUPR/10

BAR NOS.	BAR DIA.	NO. OF BARS	SHAPE
1	12	8 NOS.	
1a	12	8 NOS.	
2	12	4x2 NOS.	
2a	12	4x2 NOS.	
3	12	8x2 NOS.	
4	12	10x2 NOS.	
5	12	2x2 NOS.	
5a	12	2x2 NOS.	
6	12	8 NOS.	
6a	12	8 NOS.	
7	18	110 C/C	
8	12	125 C/C	
9	12	150 C/C	
10	12	150 C/C	
11	12	200 C/C	
12	10	4 NOS.	
13	10	7 NOS.	
14	10	4 NOS.	



**REINFORCEMENT DETAIL OF LONGITUDINAL GRIDERS**

**BRIDGE AT PROPOSED CH. 27+84.9**

**MINOR BRIDGE NO - 2 (TEL APPROACH)**

---

**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD ASSISTANCE UNDER WORLD BANK ASSISTANCE**

---

**CONSULTING ENGINEERS**

**ENGINEERS GROUP LTD.**

E-13/13, Gali Mahadev, Indraprastha, New Delhi-110017

Tel: +91-11-2610066, 2611893, 2620028

Fax: 2611348, E-Mail: enginfo@egil.com

---

**CONTRACT NO. 1**

**DATE: 10/01/06**

**SCALE: AS SHOWN**

**DESIGNER: [Signature]**

**CHECKED: [Signature]**

**APPROVED: [Signature]**

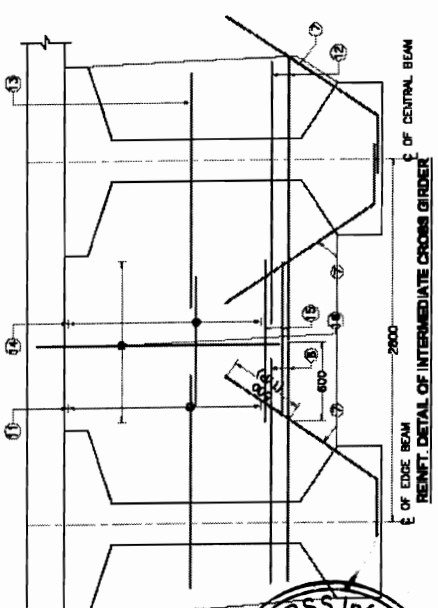
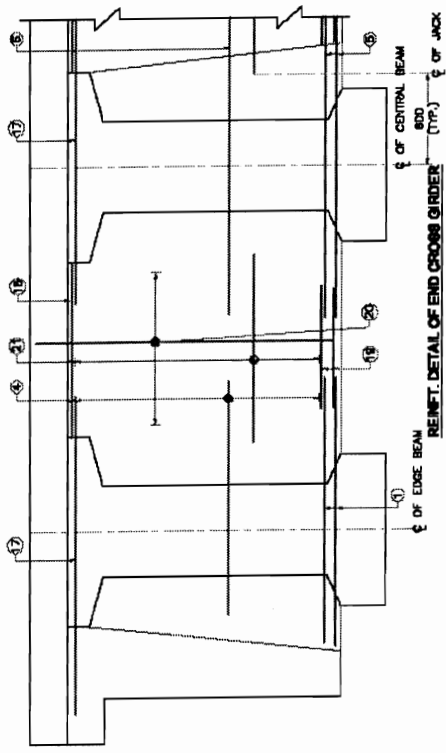
Rhubaneswar

**NOTES :-**

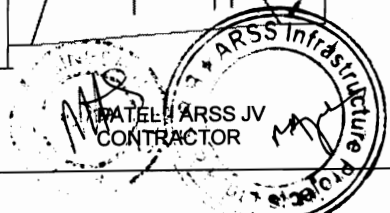
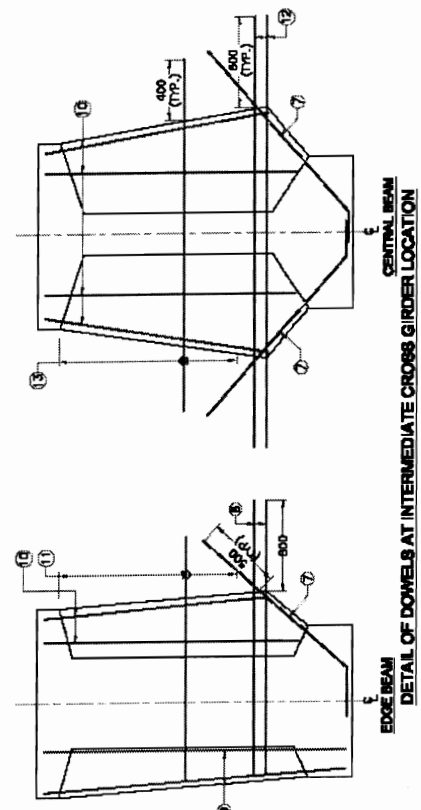
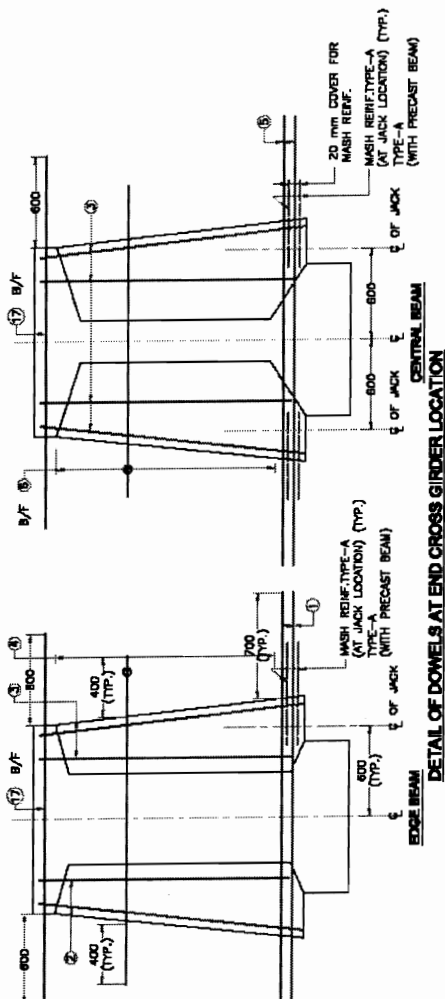
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METRES.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. CLEAR COVER TO REINFORCEMENT SHALL BE 40 mm.
4. CONCRETE IN VARIOUS ELEMENTS SHALL BE M-40 GRADE.
5. ALL REINFORCEMENT SHALL BE OF TMC/ONS OF GRADE S: 415 CONFORMING TO IS:1786.
6. ALL LAP SHALL BE STAGGERED NOT MORE THAN 50% OF THE REINFORCEMENT SHALL BE LAPPED AT ANY SECTION LAP LENGTH WHEREVER PROVIDED SHALL BE 50 TIMES DIAMETER.
7. CENTRAL BEAM IS DESIGNATED AS INNER BEAM.
8. FOR DECK SLAB REINF. REFER SEPARATE DRG.

**REFERENCE DRAWINGS:**

1. DRP/CEG/SH-16/BR/SUPER/06
2. DRP/CEG/SH-16/BR/SUPER/07
3. DRP/CEG/SH-16/BR/SUPER/08
4. DRP/CEG/SH-16/BR/SUPER/10



BAR NO.	BAR DIA.	NO. OF BARS	SHAPE
1	20	6 NOS.	□
2	12	2 NOS.	□
3	12	2 NOS.	□
4	18	6 NOS.	□
5	20	6 NOS.	□
6	18	6 NOS.	□
7	10	2 NOS.	□
8	18	6 NOS.	□
9	12	2 NOS.	□
10	12	2 NOS.	□
11	18	6 NOS.	□
12	20	6 NOS.	□
13	18	6 NOS.	□
14	18	6 NOS. R/F	□
15	20	6 NOS.	□
16	12	125 C/C	□
17	16	1 NOS.	□
18	18	1 NOS.	□
19	20	6 NOS.	□
20	18	125 C/C	□
21	18	6 NOS.	□



Chief Engineer  
World Bank Project  
Project Director  
Project Engineer  
(Civil) Orissa

REINFORCEMENT DETAIL OF CROSS GIRDERS  
BRIDGE AT PROPOSED CH. 27+949  
MINOR BRIDGE NO - 2 (TEL APPROACH)

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-12/103 Canal Road, New Delhi-110028  
Tel: 261-3411, 261-3412, 261-3413, 261-3414

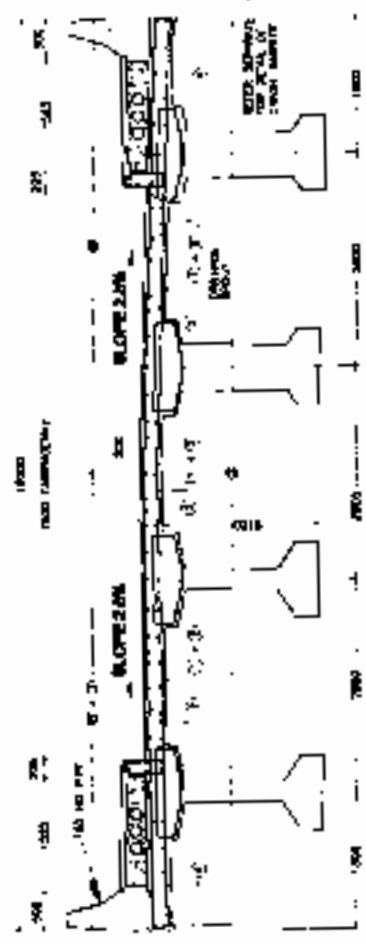
DATE: 10/01/2009  
SCALE: AS SHOWN  
DRAWN BY: [Name]  
CHECKED BY: [Name]  
APPROVED BY: [Name]

**REINFORCEMENT DETAILS**

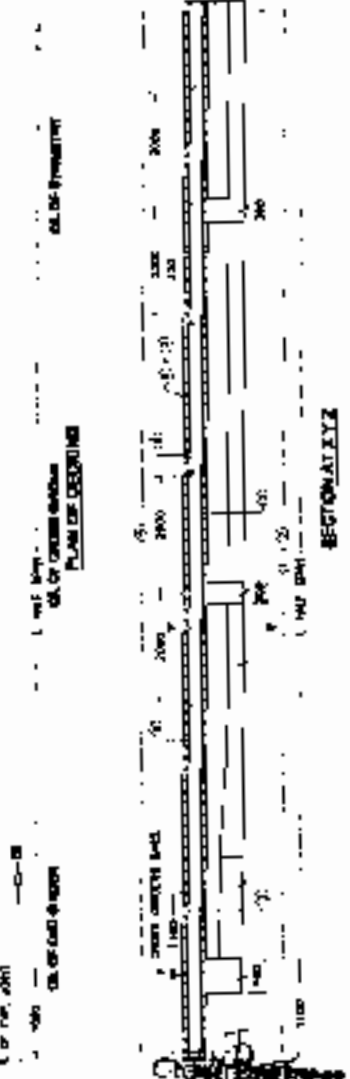
BAR NO.	BAR DIA.	NO. SPACING	SHAPE
1	12	300 T/C	
2	16	300 S/C	
3	12	150 S/C	
4	10	200 C/C	
5	20	140 C/C	
6	12	140 T/C	
7	10	160 C/C	
8	14	150 S/C	

**REFERENCE DRAWINGS:**

1. DRAWING NO. 11/08/2004/01
2. DRAWING NO. 11/08/2004/02
3. DRAWING NO. 11/08/2004/03
4. DRAWING NO. 11/08/2004/04



SECTION AT A-B HALF SECTION AT MID



SECTION AT X-Y-Z

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED (UNLESS NOTED OTHERWISE)
2. DIMENSIONS ARE NOT TO BE EXCEEDED ONLY AFTER CONSULTING WITH THE ENGINEER
3. CONCRETE SHALL BE CLASSIFIED AS M20 OR M25 AS PER IS 456:2000
4. REINFORCEMENT SHALL BE AS PER IS 1786
5. THE DESIGN OF CURBS SHALL BE AS PER IS 456:2000
6. FINISH THE SURFACE OF ROAD AS PER IS 456:2000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEER  
 M. S. SINGH  
 P. NO. 11/12, 2ND FLOOR, 15th CROSS, 11th MILE, BANGALORE

REINFORCEMENT DETAIL OF CONCRETE BRIDGE AT PROPOSED O.L. 20+100  
 DRAWING NO. - 2 (REF. APPROACH)



10/10/2013

TO BHARIAR

27+800

27+900

28+000

28+006

28+100

CURVE NO. 53	
HIP	27+871.5
V	90 kmph
R	=400m
Δ	12° 13' 40.7"
Dir	Left
Ls	55.0m
Ts	70.4m
Lc	30.37m
Ea	2.5m
Ca	7%
Wa	NA

0.5% GRADE  
 1:100 SCALE  
 10m

BRIDGE	
CHAINAGE:	27+949
TYPE:	PSC GIRDER
LENGTH:	20.50
NO OF SPANS:	2 X 10.25
PROPOSED LEVEL:	218.150

CURVE NO. 54	
HIP	28+055.5
V	100 kmph
R	1800m
Δ	15° 41.5'
Dir	Left
Ls	NA
Ts	0.0m
Lc	56.52m
Ea	0.0m
Ca	N.C.
Wa	NA

TO BHAWANIPATNA

M. PATEL ARSS JV  
 CONTRACTOR

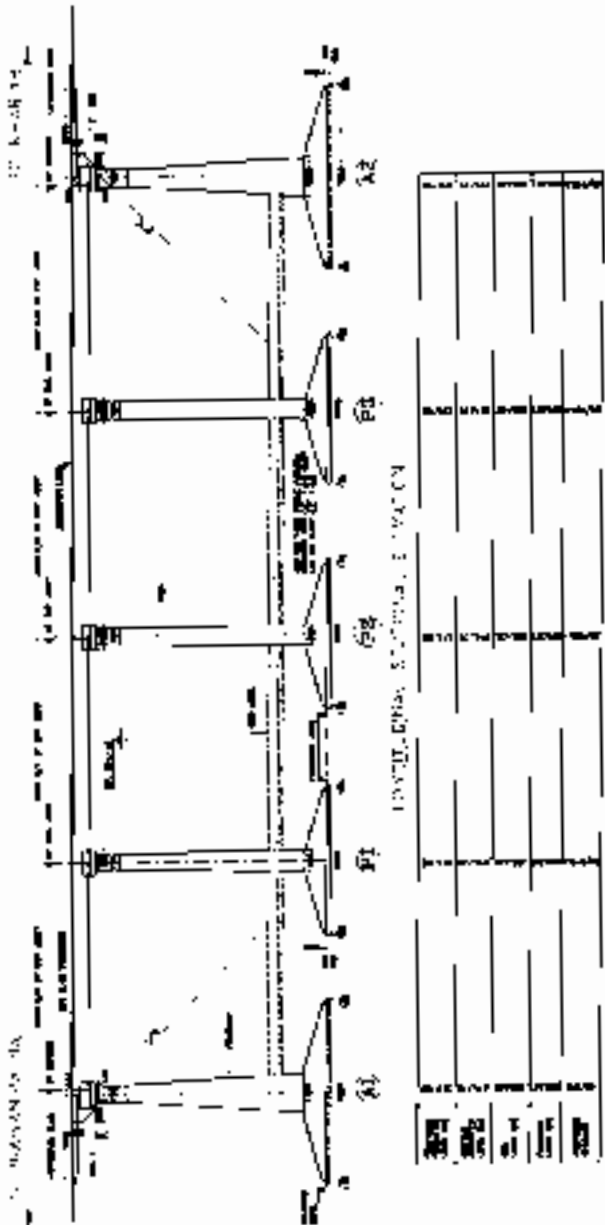


J. K. SINGH  
 Chief Engineer  
 World Bank Project  
 World Bank Projects

SCALE

VERTICAL CURVE

PLAN VIEW



Design Discharge (cumecs)	W/S (m)	L/S (m)	R/S (m)	Depth at Substructure at 50% Length of Span in (m)	
				W/S	L/S
1000	10.0	10.0	10.0	10.0	10.0

VERTICAL CURVE



World Bank Projects Office  
 World Bank Projects Office  
 Dhaka, Bangladesh  
 P. O. Box 1023, Dhaka-1000

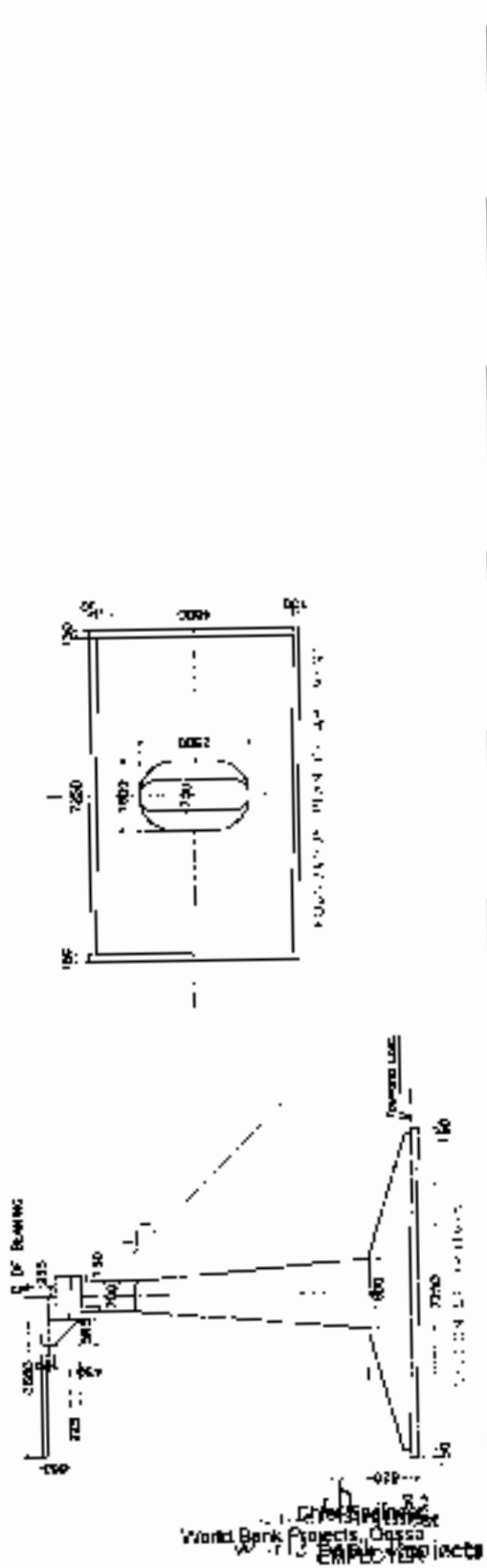
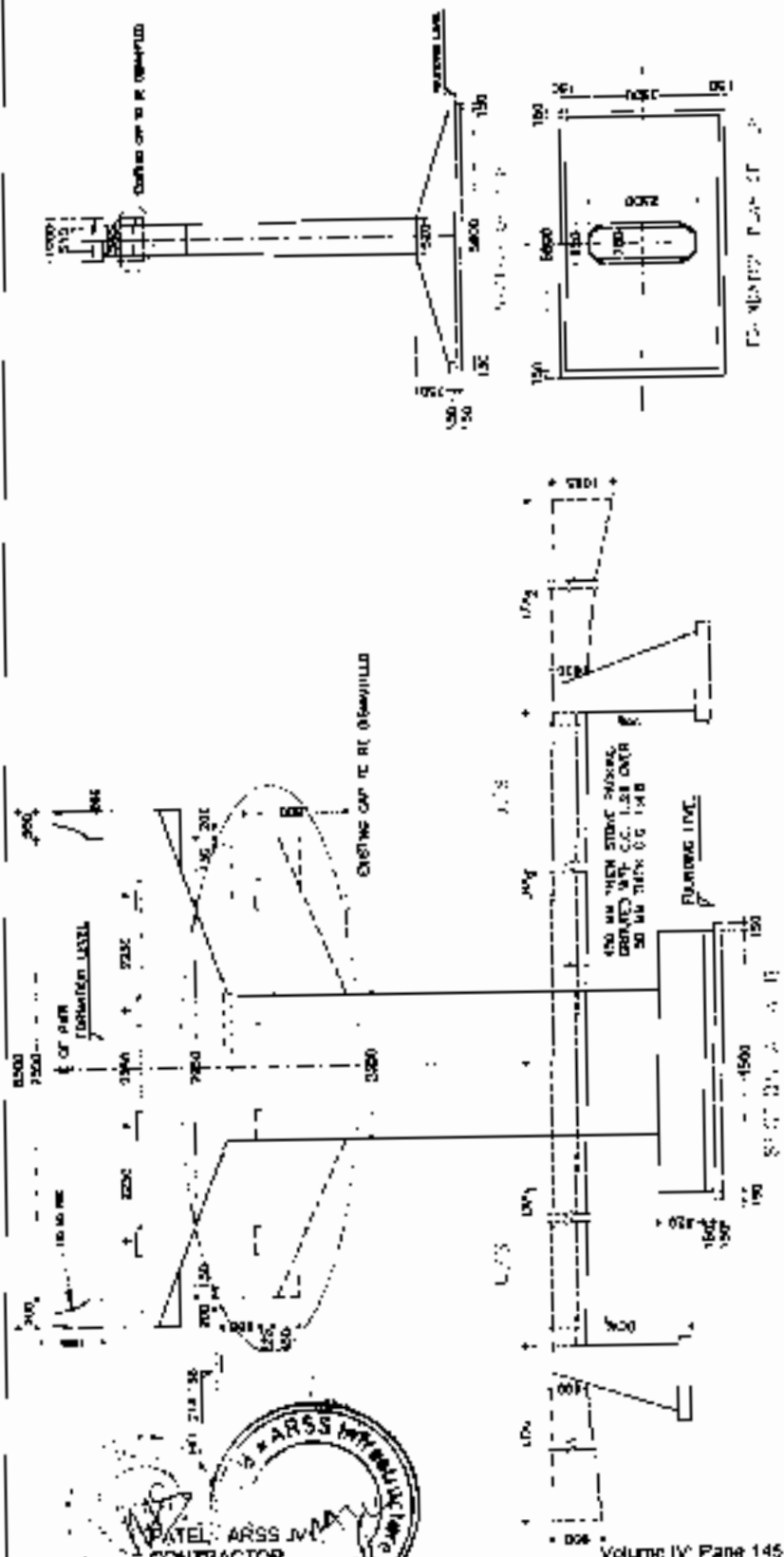
CONSULTING ENGINEERS BUREAU LTD.  
 10, RAJABAZAR, DHAKA-1000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DESIGN PROJECT PREPARATION OF PHASE - (I) ROADWAY FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DESIGN APPROVAL DRAWING  
 BRIDGE AT PROJECTIONS 28-285  
 M/NCH/BRIDGE NO - 3 APPROACH OF USHANTE



STRUCTURAL CONTRACT



World Bank Projects, Ganga  
 Early Works  
 Dr. G. E. (Civil) Oriya  
 Hhubtlp-waz

CONSULTING	ARSS INTERNATIONAL PVT. LTD.	CONTRACTOR	ARSS JV.
PROJECT NO.	10000	PROJECT NAME	STRUCTURAL CONTRACT
DATE	10/10/2010	SCALE	AS SHOWN
BY	DR. G. E. (Civil)	CHECKED	DR. G. E. (Civil)
APPROVED	DR. G. E. (Civil)	DATE	10/10/2010
PROJECT NO.	10000	PROJECT NAME	STRUCTURAL CONTRACT
DATE	10/10/2010	SCALE	AS SHOWN
BY	DR. G. E. (Civil)	CHECKED	DR. G. E. (Civil)
APPROVED	DR. G. E. (Civil)	DATE	10/10/2010

CONTRACT NO. 10000  
 PROJECT NAME: STRUCTURAL CONTRACT  
 DATE: 10/10/2010  
 SCALE: AS SHOWN  
 BY: DR. G. E. (Civil)  
 CHECKED: DR. G. E. (Civil)  
 APPROVED: DR. G. E. (Civil)  
 DATE: 10/10/2010

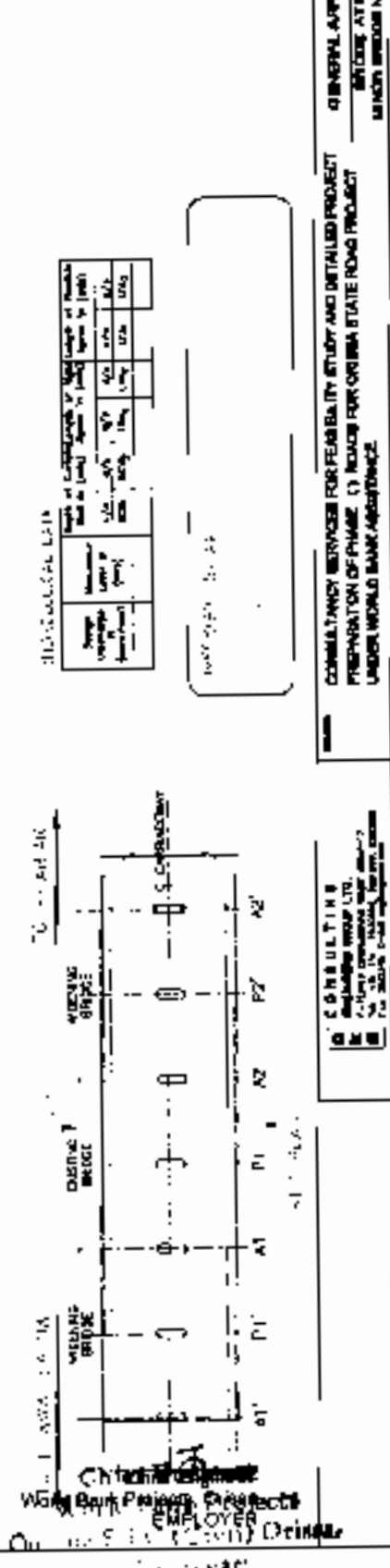
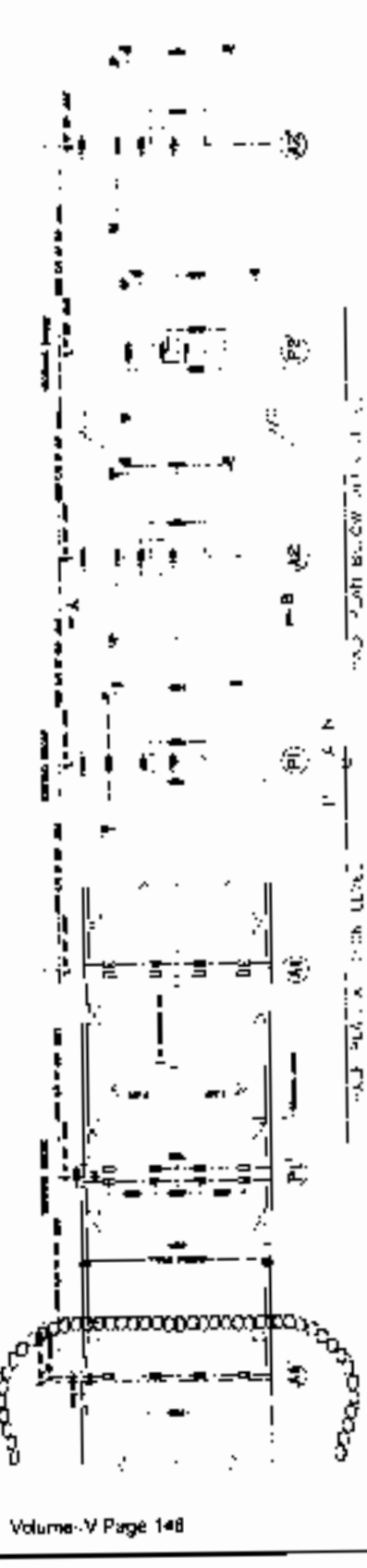
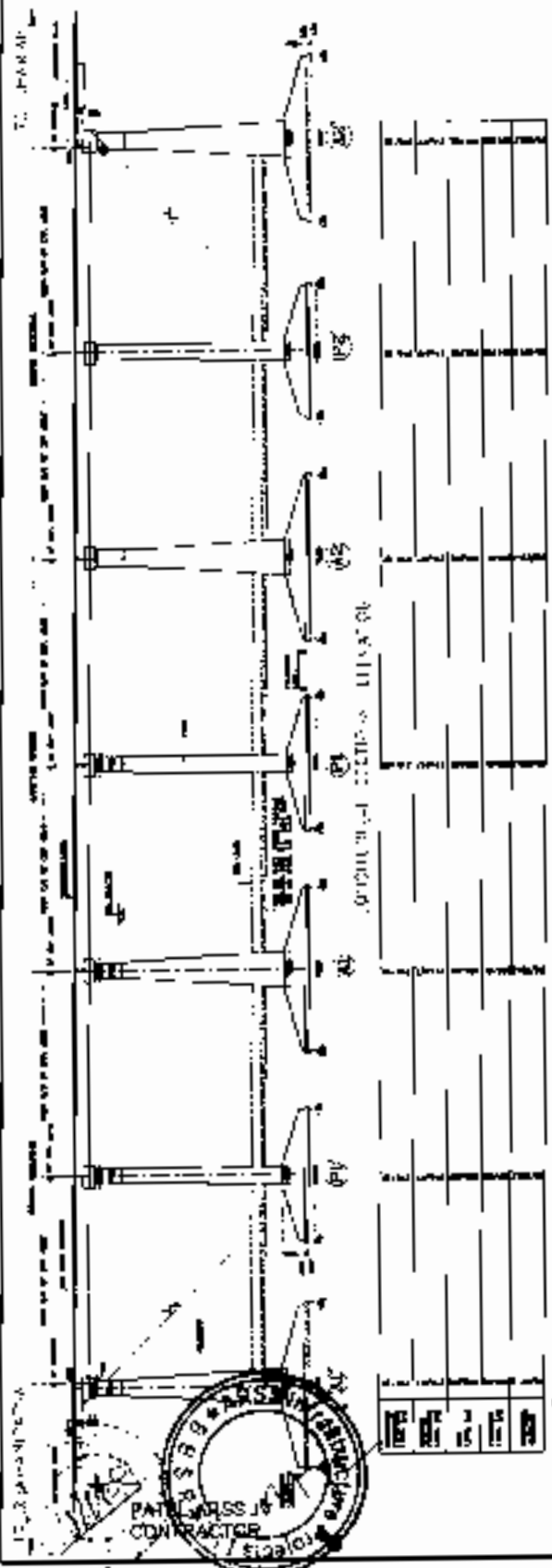
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II) ROAD FOR ORISSA STATE RORO PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING  
 ARSS INTERNATIONAL PVT. LTD.  
 10000, 10000, 10000  
 10000, 10000, 10000

CONTRACT NO. 10000  
 PROJECT NAME: STRUCTURAL CONTRACT  
 DATE: 10/10/2010  
 SCALE: AS SHOWN  
 BY: DR. G. E. (Civil)  
 CHECKED: DR. G. E. (Civil)  
 APPROVED: DR. G. E. (Civil)  
 DATE: 10/10/2010







GENERAL ARRANGEMENT DRAWING

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (1) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DATE: 15/05/2011

Volume-V Page 148

CONTRACTOR: PATIL BROS. & CO. ENGINEERS & ARCHITECTS

CONSULTING ENGINEER: M/S. S. S. CONSULTANTS



1072

11.5.2019

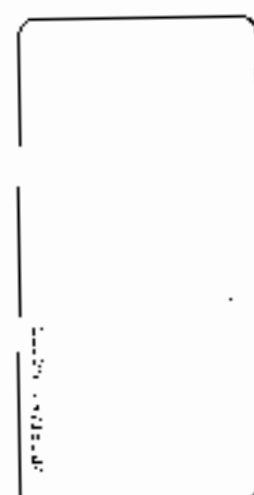
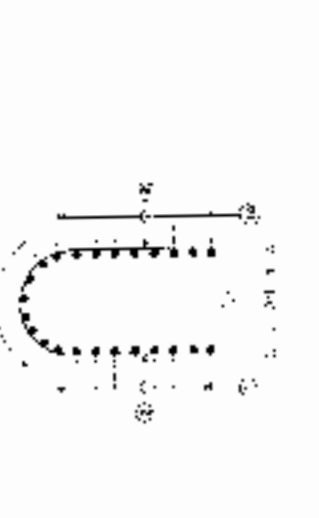
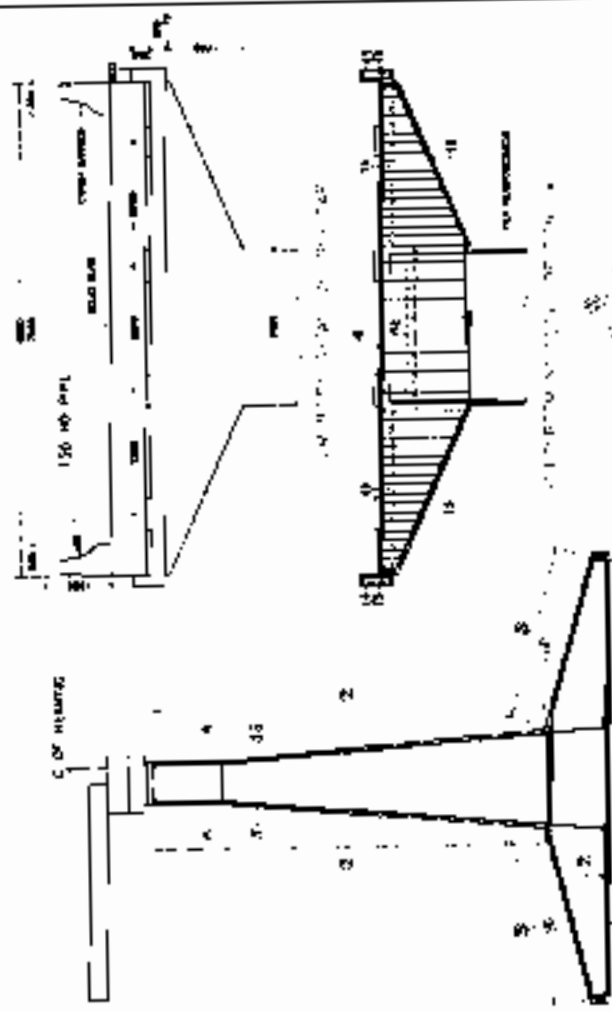
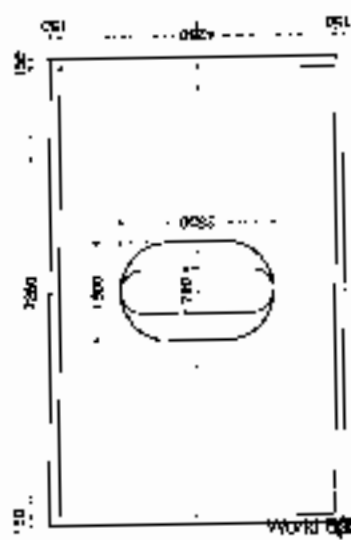
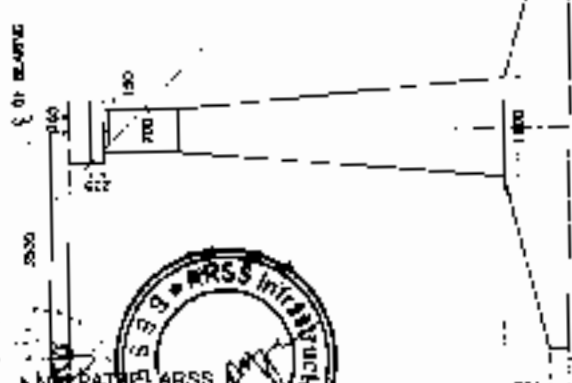


Table with 14 rows and 2 columns. The first column contains numbers 1 through 14. The second column contains various numerical values and units.

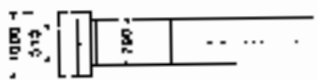
1	32 18 1026
2	16 18 1099
3	16 150 C/C
4	16 4+6 1065
5	25 122 C/C
6	14 123 C/C
7	12 150 C/C
8	16 120 C/C
9	12 300 C/C
10	23 8 - 8 1022
11	12 8 105
12	12 150 C/C
13	12 300 C/C
14	12 4+4 1026
15	12 150 C/C



Chief Engineer  
 World Bank Projects  
 EMPLOYER  
 World Bank Projects

CONSULTING  
 PATEL ARSS INFRASTRUCTURE  
 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

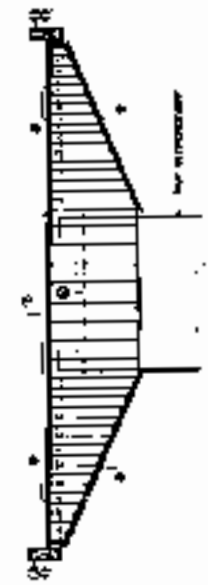
1000



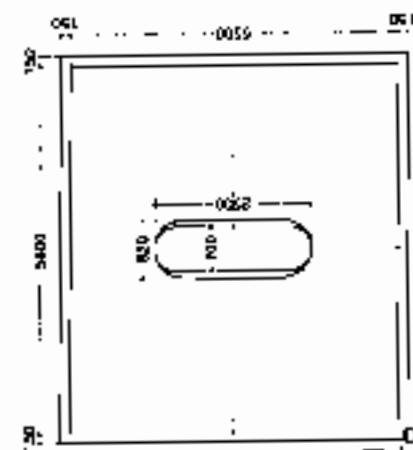
Volume IV: Page 151



1000

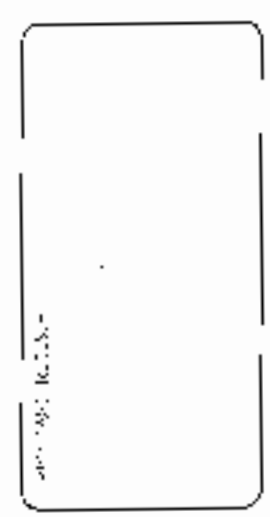


1000



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

1	20	18+2 W/S	
2	12	120 C/C	
3	12	150 C/C	
4	12	200 C/C	
5	25	150 C/C	
6	12	200 C/C	
7	25	B + B 1125	800
8	18	B 4025	
9	10	120 C/C	
10	10	300 C/C	
11	12	4+4 W/S	
12	10	150 C/C	



CONSULTING		CONSULTANT SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PAPER - (C) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE		DIMENSION & REINFORCEMENT DETAILS OF BR FOR P1, P2 BRIDGE AT PROPOSED DA 28+000	
S. S. KARSS MITZUNKHAIRI & CO. PVT. LTD. PATIL - ARSS JV CONTRACTOR				MANAGER BRIDGE NO. - 4, Bhubaneswar (Orissa)	
Date: 10/01/2011		Scale: 1:100		Sheet No: 151	

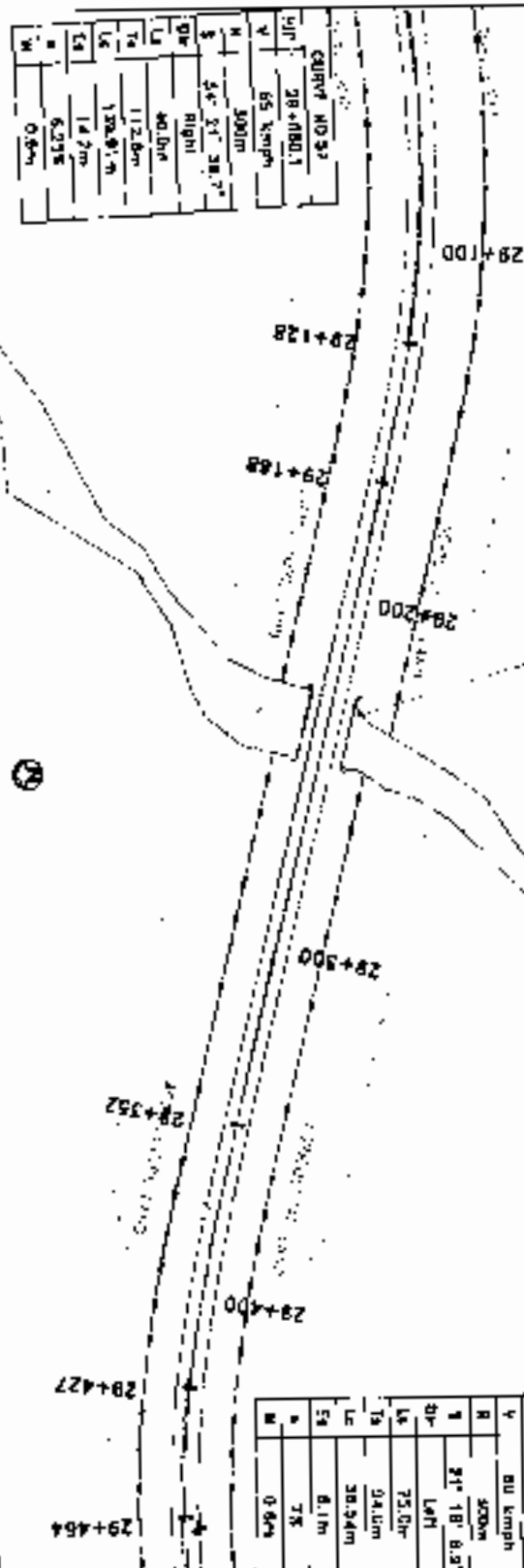




TO BHAWANIPARA



ARSS JV CONTRACTOR



CURVE NO. 58	
HIP	28+445.9
V	BU kmph
R	3000m
W	81° 18' 8.8"
LA	75.07°
Ts	94.0m
Lc	30.94m
Ss	8.1m
M	7%
M	0.64%

CURVE NO. 58	
HIP	28+445.9
V	BU kmph
R	3000m
W	81° 18' 8.8"
LA	75.07°
Ts	94.0m
Lc	30.94m
Ss	8.1m
M	7%
M	0.64%

TO THE GROUP AT THE END OF ROAD SHALL BE 100 M & AHEAD. ROAD TO BE 100 M & AHEAD. ROAD TO BE 100 M & AHEAD. ROAD TO BE 100 M & AHEAD.

SITE PLAN

World Bank Project  
 World Bank Project  
 World Bank Project

DATE: 15/11/2011  
 TIME: 11:30 AM

SITE PLAN  
 CROSS SECTION NO. 4 BRANCH OF UDANTE

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR UDANTE STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTING ENGINEERS PVT. LTD.  
 No. 22/1/1, 2nd Floor, Anna Salai, Chennai - 600 002

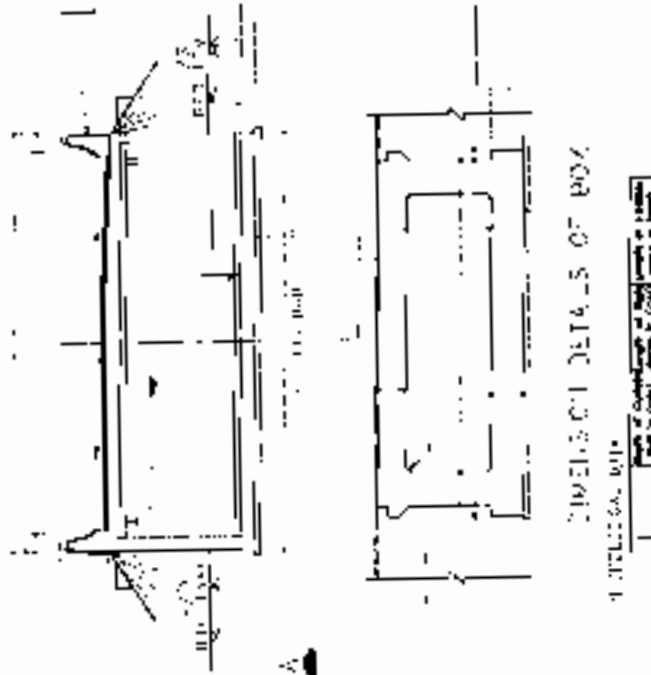
11/22/2014



SPECIFICATION

NO.	DESCRIPTION	UNIT	QUANTITY
1	CONCRETE	m <sup>3</sup>	1000
2	STEEL	kg	5000
3	LABOR	man-days	2000
4	FORMWORK	m <sup>2</sup>	10000
5	REINFORCEMENT	m <sup>2</sup>	5000
6	PAINT	kg	1000
7	GRANULAR FILL	m <sup>3</sup>	2000
8	ROCK FILL	m <sup>3</sup>	1000
9	PILE DRIVING	m	1000
10	PILE CAPS	no.	1000

NO.	DESCRIPTION	UNIT	QUANTITY
1	CONCRETE	m <sup>3</sup>	1000
2	STEEL	kg	5000
3	LABOR	man-days	2000
4	FORMWORK	m <sup>2</sup>	10000
5	REINFORCEMENT	m <sup>2</sup>	5000
6	PAINT	kg	1000
7	GRANULAR FILL	m <sup>3</sup>	2000
8	ROCK FILL	m <sup>3</sup>	1000
9	PILE DRIVING	m	1000
10	PILE CAPS	no.	1000



ELEVATION DETAILS OF PIER

NO.	DESCRIPTION	UNIT	QUANTITY
1	CONCRETE	m <sup>3</sup>	1000
2	STEEL	kg	5000
3	LABOR	man-days	2000
4	FORMWORK	m <sup>2</sup>	10000
5	REINFORCEMENT	m <sup>2</sup>	5000
6	PAINT	kg	1000
7	GRANULAR FILL	m <sup>3</sup>	2000
8	ROCK FILL	m <sup>3</sup>	1000
9	PILE DRIVING	m	1000
10	PILE CAPS	no.	1000

LOCATION PLAN OF BORE HOLE

NO.	DESCRIPTION	UNIT	QUANTITY
1	CONCRETE	m <sup>3</sup>	1000
2	STEEL	kg	5000
3	LABOR	man-days	2000
4	FORMWORK	m <sup>2</sup>	10000
5	REINFORCEMENT	m <sup>2</sup>	5000
6	PAINT	kg	1000
7	GRANULAR FILL	m <sup>3</sup>	2000
8	ROCK FILL	m <sup>3</sup>	1000
9	PILE DRIVING	m	1000
10	PILE CAPS	no.	1000

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

WORLD BANK GROUP LTD. ENGINEERING GROUP LTD.

CHAND TARA

BRIDGE AT PROPOSED CHL 451-852.71 (CHAND TARA)

NOTES -

TO SHANANIPATNA

TO KIDARBAR

PROVIDE NEW TWO LANE  
BRIDGE AT STA 45+927.71  
WITH APPROXIMATE 5MILL C/L  
SEE DRAWING 2

NM 4E/C

46+100

48+000

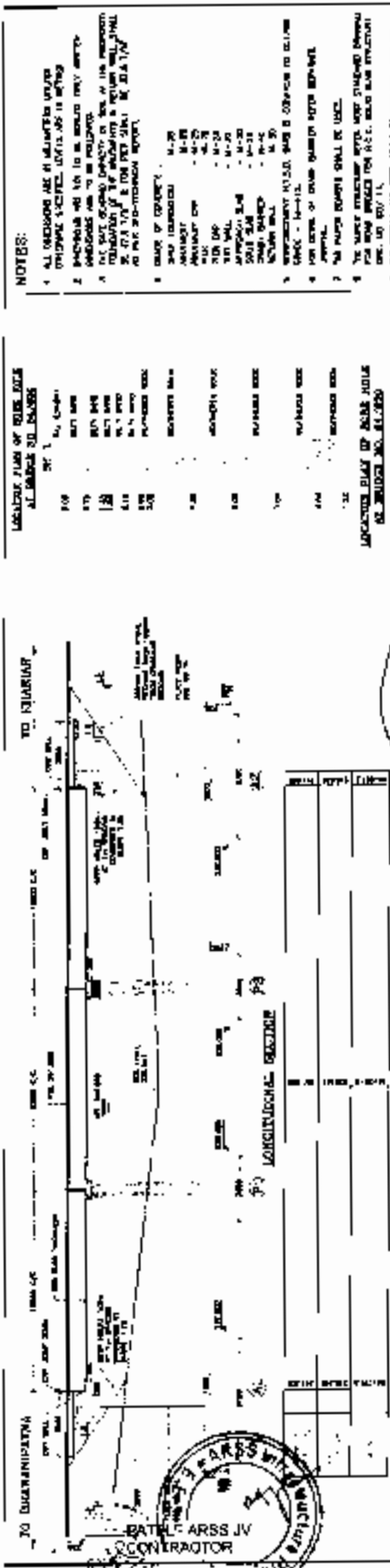
45+900

SCALE PLAN



Chief Engineer  
World Bank Projects, District  
World Bank Projects  
District Engineer  
19/11/2014

CONSULTANT	ARSS INFRASTRUCTURES
DATE	19/11/2014
PROJECT	BRIDGE AT PROPOSED C/L STA 45+927.71 (DWARAKA)
SHEET NO.	155
TOTAL SHEETS	155
SCALE	AS SHOWN
DATE	19/11/2014
PROJECT	COMBINATION STUDY FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II BRIDGE FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE
CONSULTANT	ARSS INFRASTRUCTURES
DATE	19/11/2014
PROJECT	BRIDGE AT PROPOSED C/L STA 45+927.71 (DWARAKA)
SHEET NO.	155
TOTAL SHEETS	155
SCALE	AS SHOWN
DATE	19/11/2014



**NOTES:**

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. APPROACH ROAD TO BE CONSTRUCTED AS PER SPECIFICATIONS.
3. THE BRIDGE SHALL BE CONSTRUCTED ON THE EXISTING FLOOR LEVELS.
4. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
5. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
6. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
7. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
8. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
9. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
10. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
11. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
12. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.
13. THE BRIDGE SHALL BE CONSTRUCTED AS PER THE SPECIFICATIONS.

NO.	DESCRIPTION	QUANTITY	UNIT	PRICE	TOTAL
1	CEMENT CONCRETE	1000	M <sup>3</sup>	1000	1000000
2	STEEL STRUCTURE	500	M <sup>2</sup>	500	250000
3	REINFORCEMENT	200	M <sup>3</sup>	200	100000
4	PAVING	1500	M <sup>2</sup>	1500	750000
5	DRAINAGE	100	M <sup>2</sup>	100	50000
6	LANDSCAPING	50	M <sup>2</sup>	50	25000
7	CONCRETE	100	M <sup>3</sup>	100	50000
8	STEEL	50	M <sup>2</sup>	50	25000
9	PAVING	1000	M <sup>2</sup>	1000	500000
10	DRAINAGE	50	M <sup>2</sup>	50	25000
11	LANDSCAPING	25	M <sup>2</sup>	25	12500
12	CONCRETE	50	M <sup>3</sup>	50	25000
13	STEEL	25	M <sup>2</sup>	25	12500



**COMPLIANCE SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - 2) BRIDGE FOR CROSS STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**CONSULTING ENGINEER:** **PRASAD CONSULTANTS**

**PROJECT OFFICE:** **BRIDGE AT BHARATHA (KUNDA PALLA)**

**DATE:** **20/10/2024**

**SCALE:** **1/20**

**PROJECT NO.:** **BR/2024/10/01**

**PROJECT NAME:** **BRIDGE AT BHARATHA (KUNDA PALLA)**

**PROJECT LOCATION:** **BRIDGE AT BHARATHA (KUNDA PALLA)**

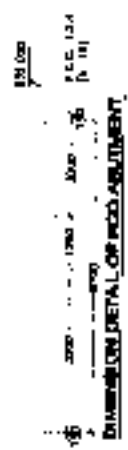
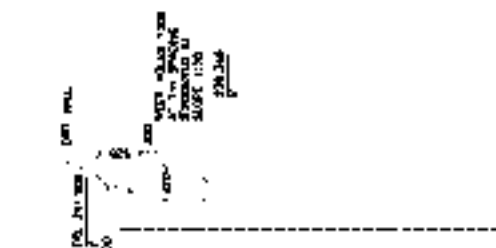
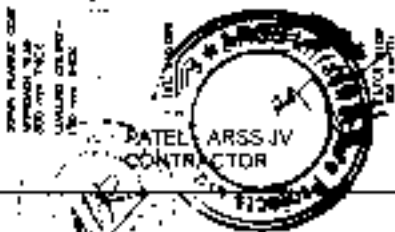
**PROJECT OWNER:** **INDIAN RAILWAYS**

**PROJECT NO.:** **BR/2024/10/01**

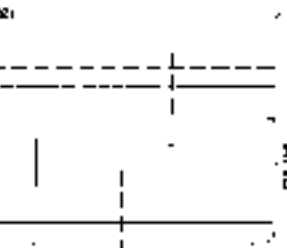
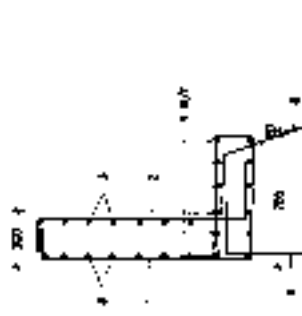
**PROJECT NAME:** **BRIDGE AT BHARATHA (KUNDA PALLA)**

**PROJECT LOCATION:** **BRIDGE AT BHARATHA (KUNDA PALLA)**

**PROJECT OWNER:** **INDIAN RAILWAYS**



Volume IV Page 157



- NOTES:
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED UNLESS NOTED OTHERWISE.
  2. DIMENSIONS ARE TO BE SHOWN ONLY WHEN DIMENSIONS ARE TO BE FOLLOWED.
  3. THE MINIMUM QUANTITY OF REINFORCEMENT SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS. THE MINIMUM QUANTITY OF REINFORCEMENT SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
  4. GRADE OF CONCRETE SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
  5. ALL REINFORCEMENT SHALL BE USED.
  6. THE MINIMUM QUANTITY OF REINFORCEMENT SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.

DATE: 11/11/11  
 DRAWN BY: [Signature]

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE (RUNDIA WALL)

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

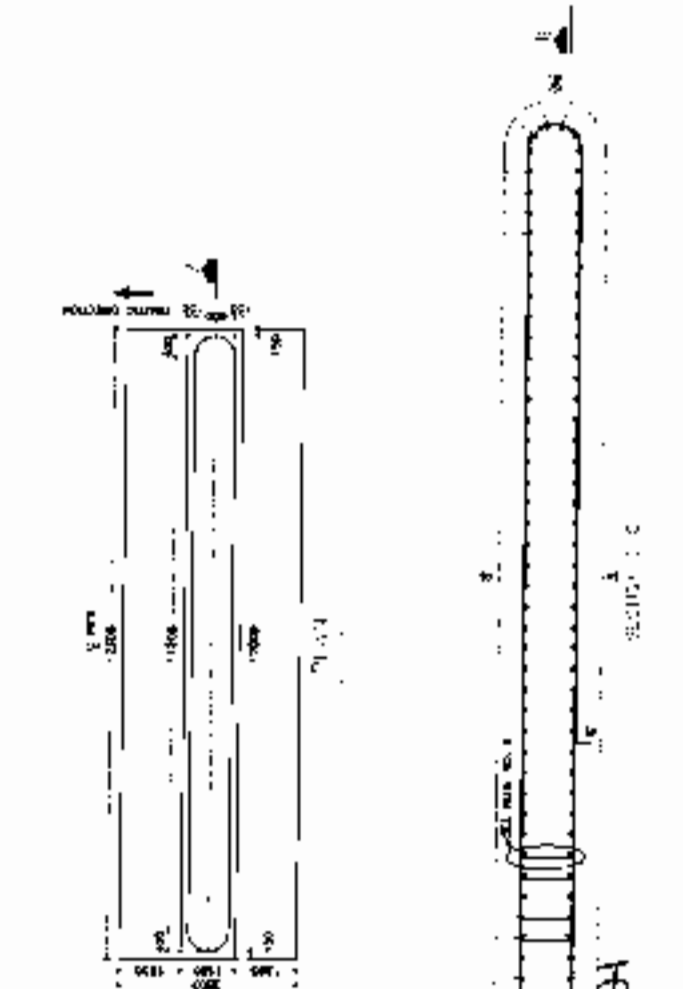
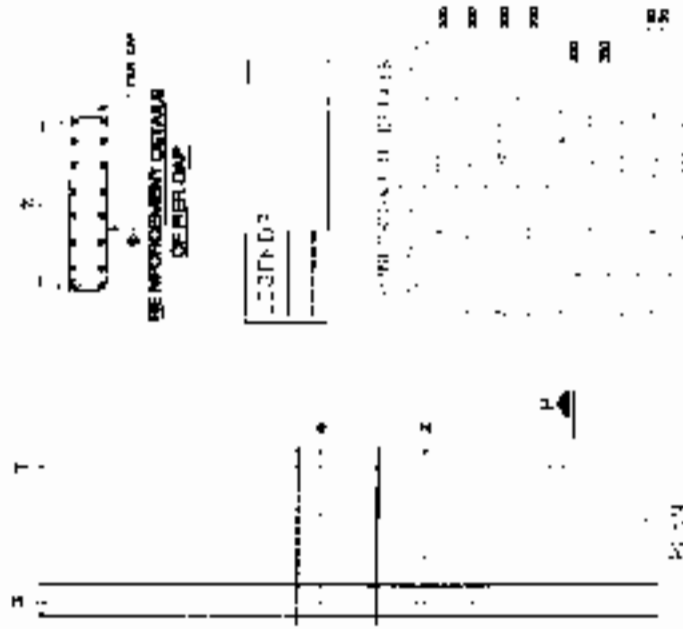
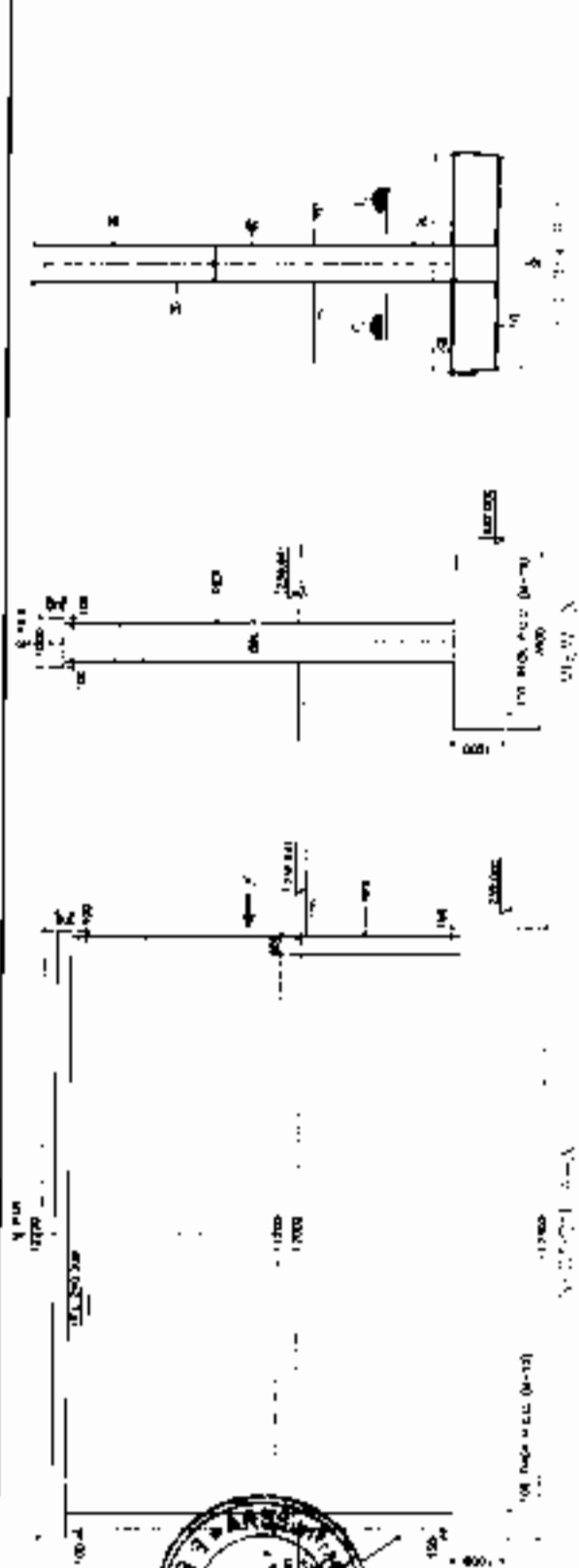
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR OHIO STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**NOTES:-**

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. DIMENSIONS ARE TO BE TAKEN TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
3. THE MATERIAL SPECIFICATIONS ARE TO BE AS PER IS: 456-1978.
4. CURB OF CONCRETE:
  - 100 mm thick
  - 1:1.5:3
5. MANHOLE RINGS SHALL BE OF 150 mm TO 200 mm DIA. AS PER IS: 456-1978.
6. ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
7. ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.

DATE: 15/05/2018  
 DRAWN BY: [Signature]

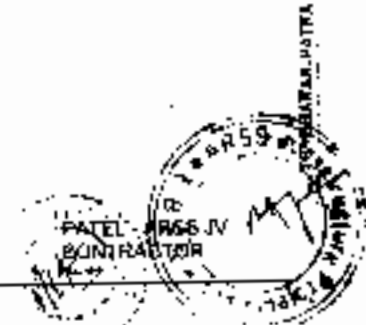
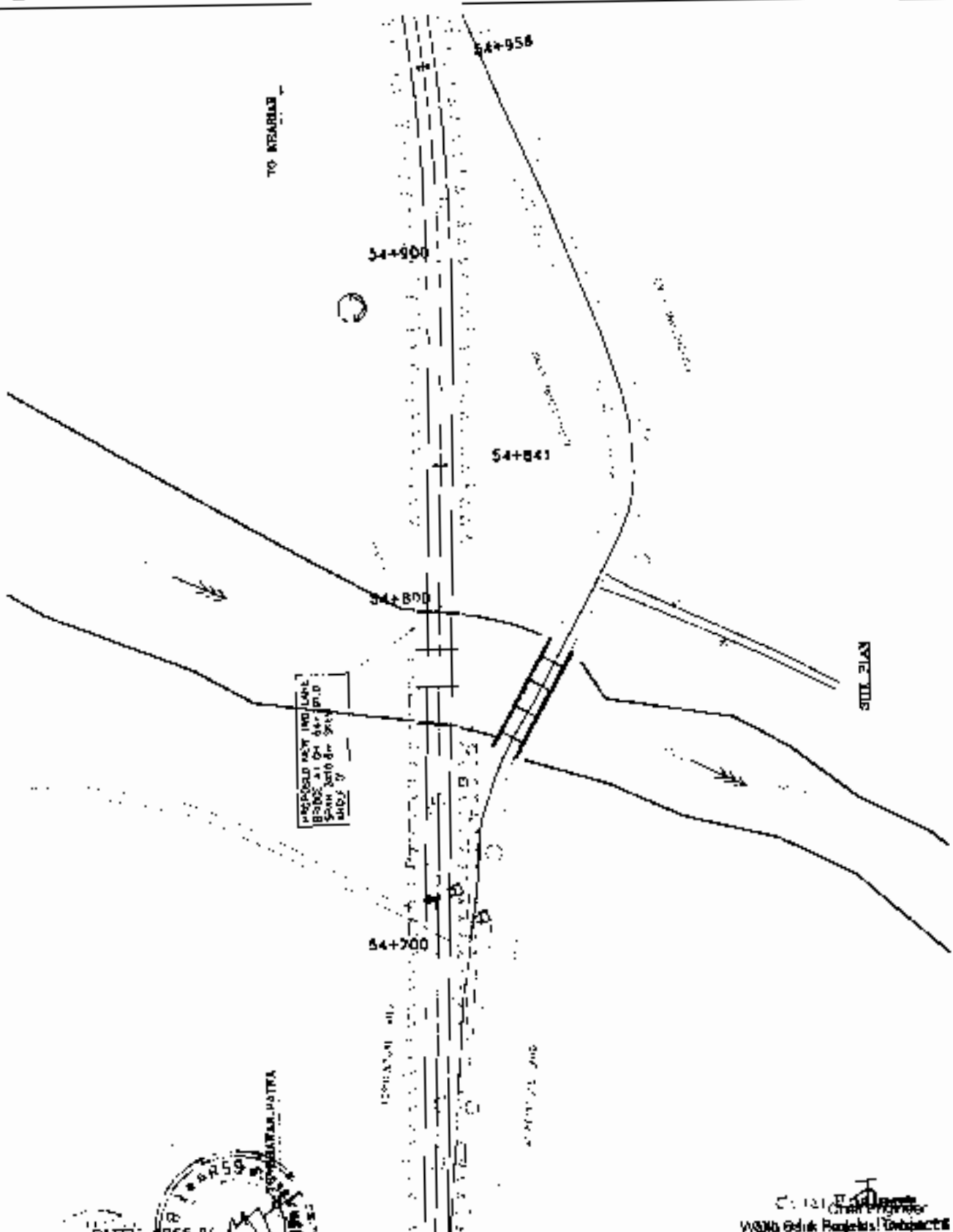


Chief Engineer  
 World Bank Project  
 Odisha State Road Project  
 Bhubaneswar

**CONSULTING ENGINEER**  
 CHANDRA GROUP LTD.  
 10/10, Chandrasekhara Park, (C-10/10)  
 Plot No. 20/20, 1st Floor, Sector 10, Bhubaneswar

**COMPLIANCE SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROAD FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**  
 (KUNDA NALLA)  
 SPECIFIC AT PROPOSED CH. 26+000

NOTES:-



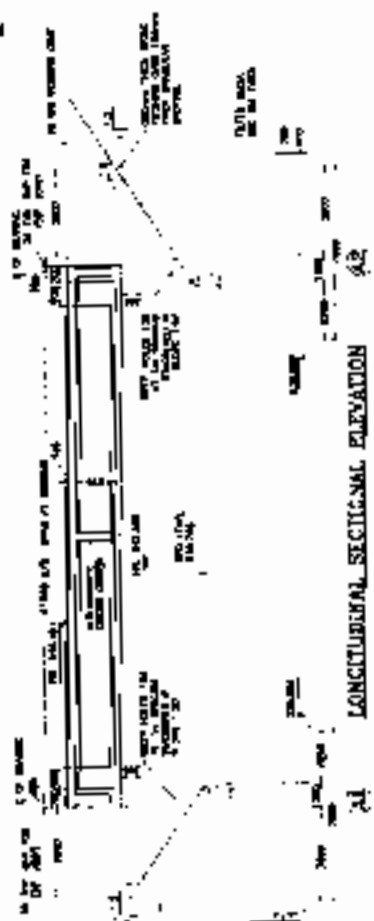
Chief Engineer  
 WSDM & Road Projects, District  
 Engineer, District  
 EMPLOYER  
 P. No. 10/2015/10000

CONSULTING (C) <b>CONCEPT ENGINEERING LTD.</b> 1-11-13, Connaught Place, New Delhi-110054 Ph: 26104111, 26104112, 26104113	DRAWN CONCEPT ENGINEERING LTD. PREPARATION OF PHASE - II ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	SHEET NO. 10/2015/10000-159 DATE SCALE PROJECT NO. 10/2015/10000
---	--	---

SITE PLAN  
 BRIDGE AT PROPOSED CH 54+781  
 (MUNDA NALLA)

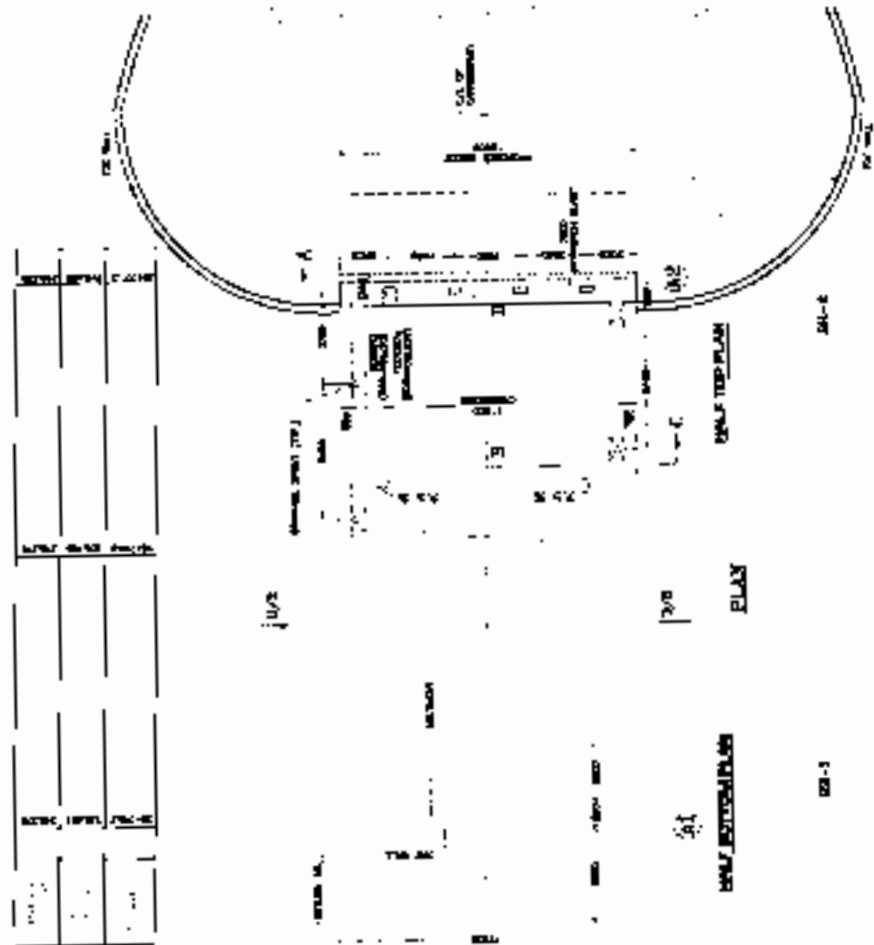
NO EXISTING

TO BILAWANTPANA



LONGITUDINAL SECTIONAL ELEVATION (A-B)

Station	Elevation
6+00	215.00
6+10	215.00
6+20	215.00
6+30	215.00
6+40	215.00
6+50	215.00
6+60	215.00
6+70	215.00
6+80	215.00
6+90	215.00
7+00	215.00
7+10	215.00
7+20	215.00
7+30	215.00
7+40	215.00
7+50	215.00
7+60	215.00
7+70	215.00
7+80	215.00
7+90	215.00
8+00	215.00

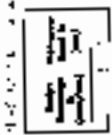


LOCATION PLAN OF SOME ROAD AT BILAWANTPANA

Station	Description
6+00	Right Hand Side
6+10	Right Hand Side
6+20	Right Hand Side
6+30	Right Hand Side
6+40	Right Hand Side
6+50	Right Hand Side
6+60	Right Hand Side
6+70	Right Hand Side
6+80	Right Hand Side
6+90	Right Hand Side
7+00	Right Hand Side
7+10	Right Hand Side
7+20	Right Hand Side
7+30	Right Hand Side
7+40	Right Hand Side
7+50	Right Hand Side
7+60	Right Hand Side
7+70	Right Hand Side
7+80	Right Hand Side
7+90	Right Hand Side
8+00	Right Hand Side

TO BILAWANTPANA

6/5 AT PROPOSED CROSSSECTION

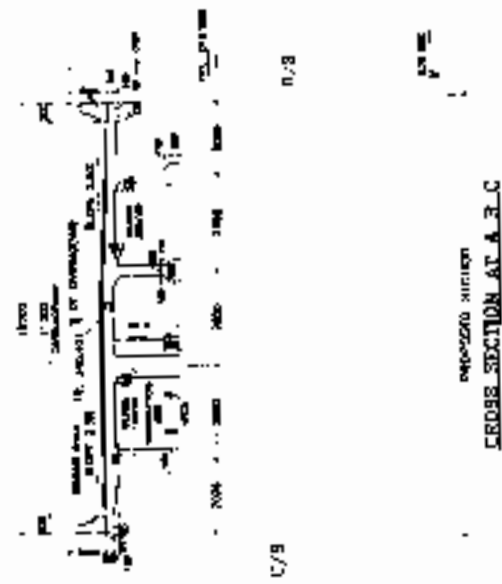


TO BILAWANTPANA

6/5 AT PROPOSED CROSSSECTION

RIGHT HAND SIDE

LEFT HAND SIDE

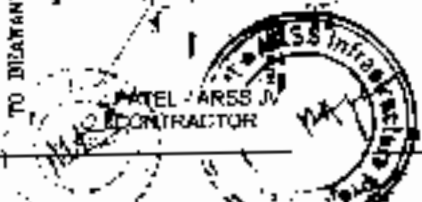
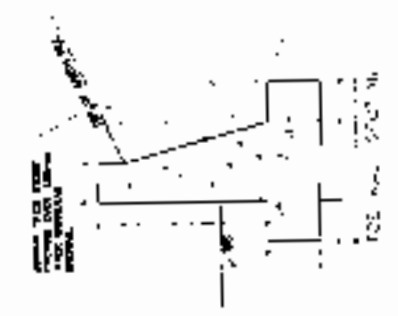


CROSS SECTION AT A-B-C

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
3. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
4. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
5. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
6. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
7. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
8. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
9. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
10. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
11. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
12. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
13. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.
14. THE ROAD WIDTH SHALL BE AS SHOWN IN THE DRAWING.

- REVISIONS
1. CORRECTED
  2. CORRECTED
  3. CORRECTED
  4. CORRECTED



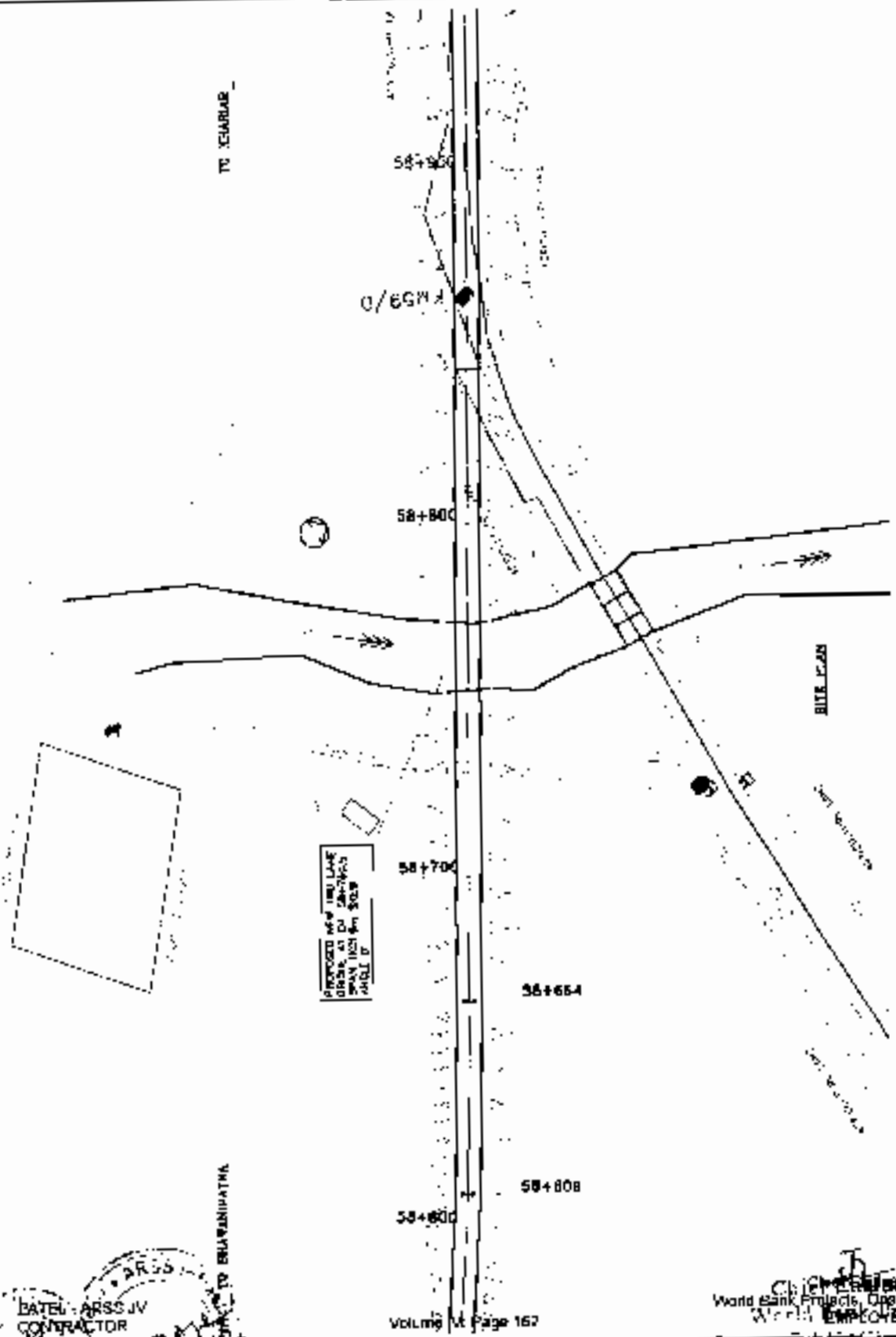
Project Engineer  
 Bilawantpana  
 Infrastructure  
 www.infra.gov.in

CONSULTING INFRASTRUCTURE CORPORATION	CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROADS FOR DRISA STAFF ROAD PROJECT UNDER WELLD BANK AID STANCE	GENERAL ARRANGEMENT DRAWING
DR. H. S. SINGH Project Engineer		ENGINEER-IN-CHARGE (DRISA)
DATE: 20/07/2018		





NOTES:



TO XHARIAB

KMS/0

58+900

58+800

58+700

58+654

58+808

58+800

BITE PLAN

PROPOSED NEW BRIDGE  
ORIGIN AT CHAINAGE  
58+700 FROM CHAINAGE  
58+654

BATEL ARSS JV  
CONTRACTOR

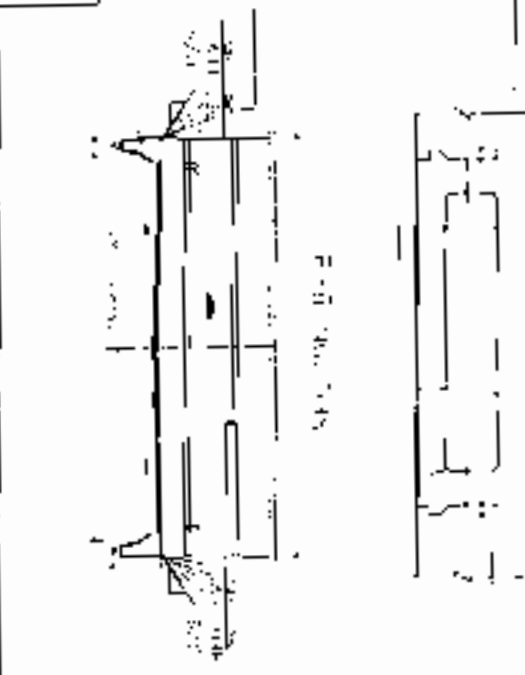
World Bank Projects, Open  
World EMPLOYER

CONSULTING BATEL ARSS JV 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) INCLUDES FOR DESIGN STUDY ROAD PROJECT UNDER WORLD BANK ASSISTANCE	BITE PLAN ENCLOSURE AT PROPOSED CHAINAGE & (CHANGING)
	DATE: 15/07/2011	SCALE: 1:1000



SECTION 1-4

NO.	DESCRIPTION	THICKNESS (mm)	SPACING (mm)	REINFORCING CAPACITY
1	TOP FLANGE	100	150	...
2	WEB	100	150	...
3	BOTTOM FLANGE	100	150	...



GENERAL ARRANGEMENT DRAWING NO. BRIDGE AT PROPOSED OH. BR+382.77 (RABUSCHKE MALLAH)

STATISTICAL DATA

Category	Value
Span	40.00
Clearance	4.00
...	...

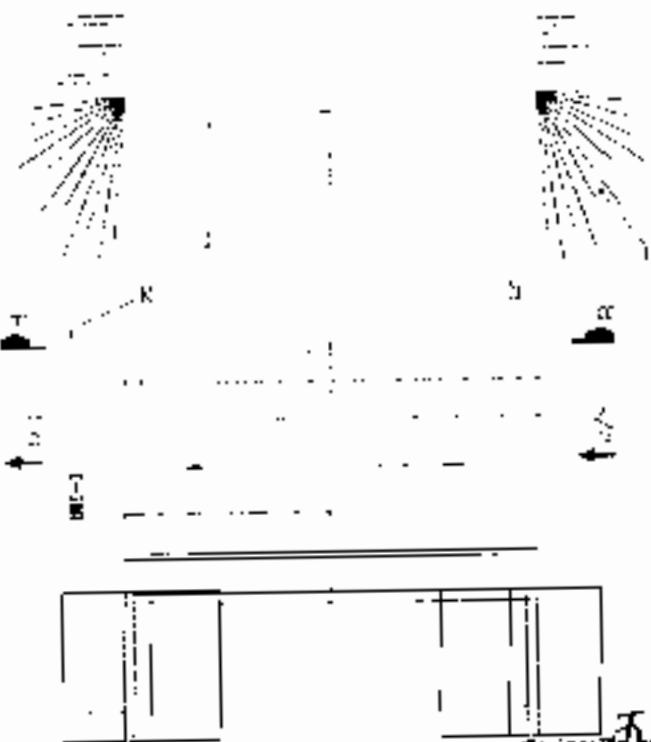
LOCATION PLAN OF WORK ITEMS AT BIRUNJAL NO. BR/650

Item No.	Description
000	ALL ITEMS
001	SLIT SIDE WITH CURB
002	SLIT SIDE WITH CURB
003	SLIT SIDE WITH CURB
100	SLIT SIDE WITH CURB
200	SLIT SIDE WITH CURB
300	SLIT SIDE WITH CURB
400	REINFORCED SIDE
401	REINFORCED SIDE
402	REINFORCED SIDE
403	REINFORCED SIDE
404	REINFORCED SIDE
405	REINFORCED SIDE
406	REINFORCED SIDE
407	REINFORCED SIDE
408	REINFORCED SIDE
409	REINFORCED SIDE
410	REINFORCED SIDE
411	REINFORCED SIDE
412	REINFORCED SIDE
413	REINFORCED SIDE
414	REINFORCED SIDE
415	REINFORCED SIDE
416	REINFORCED SIDE
417	REINFORCED SIDE
418	REINFORCED SIDE
419	REINFORCED SIDE
420	REINFORCED SIDE



SECTION 1-4

NO.	DESCRIPTION	THICKNESS (mm)	SPACING (mm)	REINFORCING CAPACITY
1	TOP FLANGE	100	150	...
2	WEB	100	150	...
3	BOTTOM FLANGE	100	150	...



PATEL - ARSS JV CONTRACTOR

Chicago Bridge & Iron  
 World Bank Project, Oreska  
 Employer  
 The Lane Group

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (I) ROAD FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

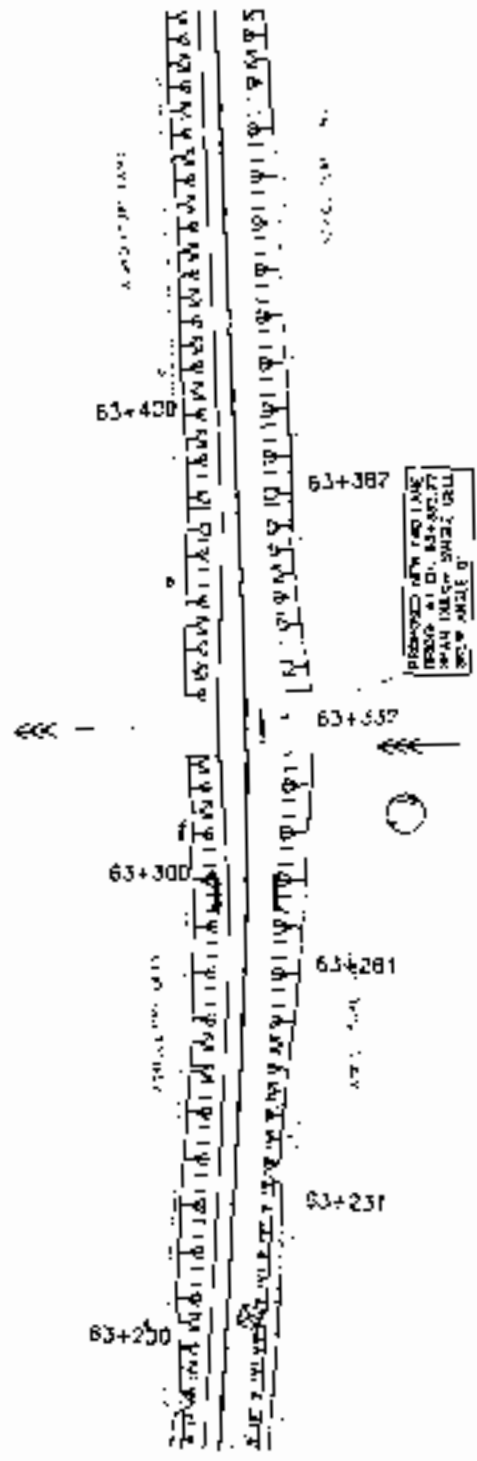
GENERAL ARRANGEMENT DRAWING NO. BRIDGE AT PROPOSED OH. BR+382.77 (RABUSCHKE MALLAH)

Scale: 1:100

NOTES:-

TO KIRARIAP.

TO SIKAMBATANA



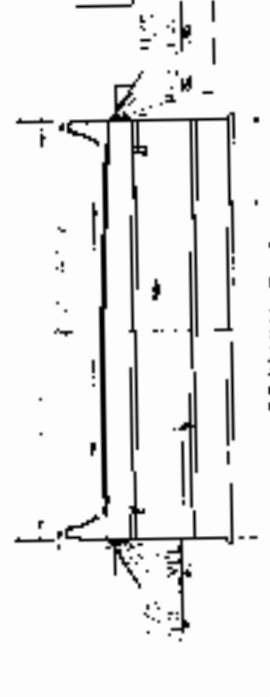
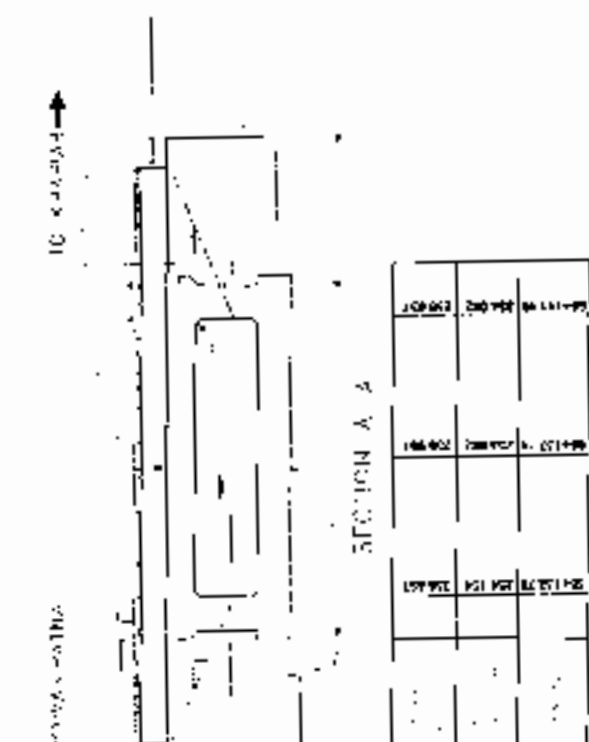
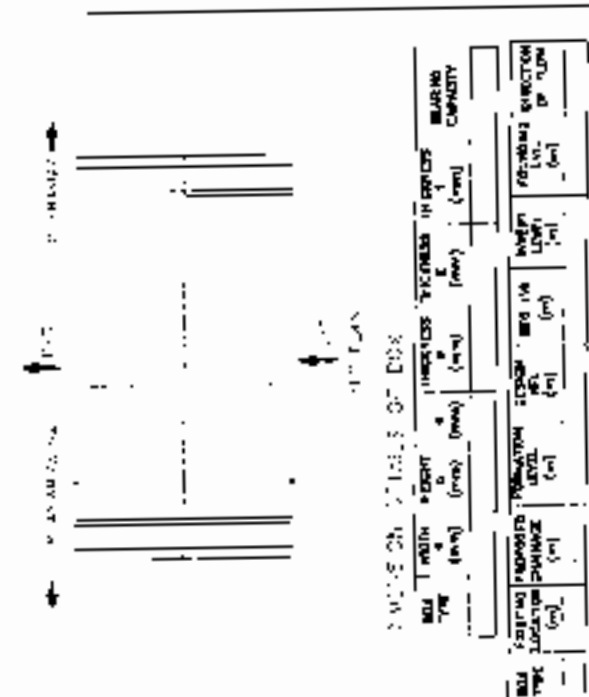
SITE PLAN

<p>DATE: 1998</p> <p>SCALE: 1:1000</p>	<p>SITE PLAN</p>	<p>STATION: AT PROPOSED ON 80+282.77 (NARAYANMULLAH)</p>
<p>CONSULTANT SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II ROAD FOR ONDRA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>	<p>CONSULTING</p> <p>1. M/S. ARSS INFRASTRUCTURE</p> <p>2. M/S. ARSS JV</p> <p>3. M/S. ARSS JV</p>	<p>DATE: 1998</p>



Chief Engineer  
World Bank Projects, Orissa  
Bhubaneswar  
Date: 11.10.98  
Sd/-

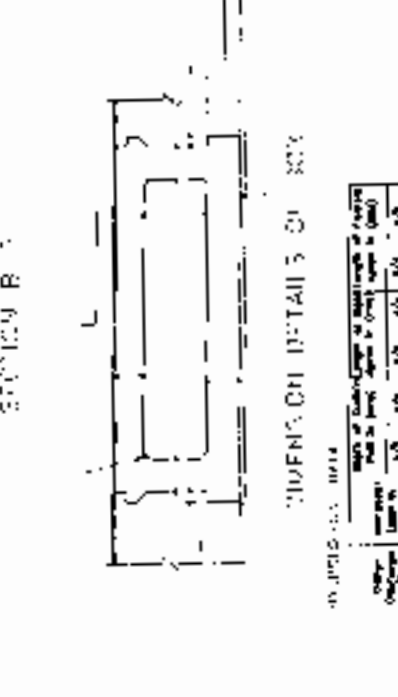
NOTES



LOCATION PLAN OF BORE PILES AT BRIDGE NO. 28/2500

BN-1

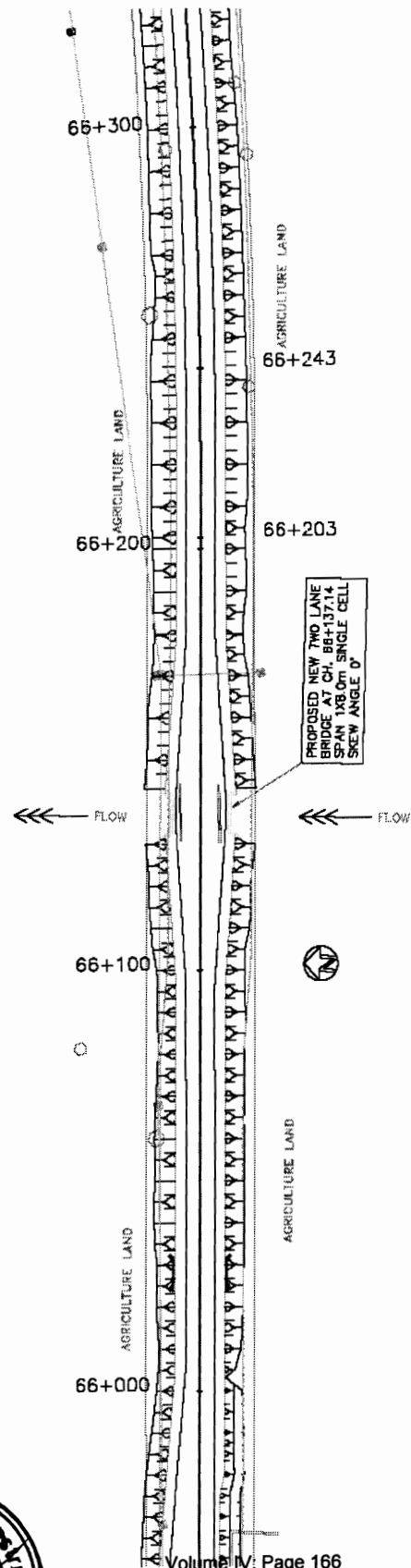
NO.	TYPE	DEPTH (m)	REMARKS
1	PH	25.500	ALL PH
2	PH	25.500	PH WITH CLAY
3	PH	25.500	PH WITH CLAY
4	PH	25.500	PH WITH CLAY
5	PH	25.500	PH WITH CLAY
6	PH	25.500	PH WITH CLAY
7	PH	25.500	PH WITH CLAY
8	PH	25.500	PH WITH CLAY
9	PH	25.500	PH WITH CLAY
10	PH	25.500	PH WITH CLAY
11	PH	25.500	PH WITH CLAY
12	PH	25.500	PH WITH CLAY
13	PH	25.500	PH WITH CLAY
14	PH	25.500	PH WITH CLAY
15	PH	25.500	PH WITH CLAY
16	PH	25.500	PH WITH CLAY
17	PH	25.500	PH WITH CLAY
18	PH	25.500	PH WITH CLAY
19	PH	25.500	PH WITH CLAY
20	PH	25.500	PH WITH CLAY
21	PH	25.500	PH WITH CLAY
22	PH	25.500	PH WITH CLAY
23	PH	25.500	PH WITH CLAY
24	PH	25.500	PH WITH CLAY
25	PH	25.500	PH WITH CLAY
26	PH	25.500	PH WITH CLAY
27	PH	25.500	PH WITH CLAY
28	PH	25.500	PH WITH CLAY
29	PH	25.500	PH WITH CLAY
30	PH	25.500	PH WITH CLAY
31	PH	25.500	PH WITH CLAY
32	PH	25.500	PH WITH CLAY
33	PH	25.500	PH WITH CLAY
34	PH	25.500	PH WITH CLAY
35	PH	25.500	PH WITH CLAY
36	PH	25.500	PH WITH CLAY
37	PH	25.500	PH WITH CLAY
38	PH	25.500	PH WITH CLAY
39	PH	25.500	PH WITH CLAY
40	PH	25.500	PH WITH CLAY
41	PH	25.500	PH WITH CLAY
42	PH	25.500	PH WITH CLAY
43	PH	25.500	PH WITH CLAY
44	PH	25.500	PH WITH CLAY
45	PH	25.500	PH WITH CLAY
46	PH	25.500	PH WITH CLAY
47	PH	25.500	PH WITH CLAY
48	PH	25.500	PH WITH CLAY
49	PH	25.500	PH WITH CLAY
50	PH	25.500	PH WITH CLAY
51	PH	25.500	PH WITH CLAY
52	PH	25.500	PH WITH CLAY
53	PH	25.500	PH WITH CLAY
54	PH	25.500	PH WITH CLAY
55	PH	25.500	PH WITH CLAY
56	PH	25.500	PH WITH CLAY
57	PH	25.500	PH WITH CLAY
58	PH	25.500	PH WITH CLAY
59	PH	25.500	PH WITH CLAY
60	PH	25.500	PH WITH CLAY
61	PH	25.500	PH WITH CLAY
62	PH	25.500	PH WITH CLAY
63	PH	25.500	PH WITH CLAY
64	PH	25.500	PH WITH CLAY
65	PH	25.500	PH WITH CLAY
66	PH	25.500	PH WITH CLAY
67	PH	25.500	PH WITH CLAY
68	PH	25.500	PH WITH CLAY
69	PH	25.500	PH WITH CLAY
70	PH	25.500	PH WITH CLAY
71	PH	25.500	PH WITH CLAY
72	PH	25.500	PH WITH CLAY
73	PH	25.500	PH WITH CLAY
74	PH	25.500	PH WITH CLAY
75	PH	25.500	PH WITH CLAY
76	PH	25.500	PH WITH CLAY
77	PH	25.500	PH WITH CLAY
78	PH	25.500	PH WITH CLAY
79	PH	25.500	PH WITH CLAY
80	PH	25.500	PH WITH CLAY
81	PH	25.500	PH WITH CLAY
82	PH	25.500	PH WITH CLAY
83	PH	25.500	PH WITH CLAY
84	PH	25.500	PH WITH CLAY
85	PH	25.500	PH WITH CLAY
86	PH	25.500	PH WITH CLAY
87	PH	25.500	PH WITH CLAY
88	PH	25.500	PH WITH CLAY
89	PH	25.500	PH WITH CLAY
90	PH	25.500	PH WITH CLAY
91	PH	25.500	PH WITH CLAY
92	PH	25.500	PH WITH CLAY
93	PH	25.500	PH WITH CLAY
94	PH	25.500	PH WITH CLAY
95	PH	25.500	PH WITH CLAY
96	PH	25.500	PH WITH CLAY
97	PH	25.500	PH WITH CLAY
98	PH	25.500	PH WITH CLAY
99	PH	25.500	PH WITH CLAY
100	PH	25.500	PH WITH CLAY



NOTES:-

TO KEARIAR

TO BHAVANIPATNA



SITE PLAN

PATEL ARSS JV  
CONTRACTOR



Chief Engineer  
World Bank Projects, Orissa  
World Bank EMPLOYEES

O/o the E.I.C (Civil) Orissa  
Bhubaneswar

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, Ind. Colony, Bhubaneswar, Orissa  
Tel: 2535141, 2535142, 2535143  
Fax: 2535144, 2535145, 2535146

SITE PLAN  
BRIDGE AT PROPOSED CH. 66+137.14  
(LACHHPUR NALLAH)

NO.	DATE	REVISION

1. CLARIFY S.O.C. BE 30% FOR THIS COURSE ONLY IF NECESSARY SPECIFICATIONS FOR ROAD AND BRIDGE WORK.

NOTES

EXISTING BRIDGE DETAILS		
1	Building Location	3000
2	Proposed Change	3-100-04
3	Name of contractor	Point Bridge
4	Type of superstructure	TRUSS
5	Type of bridge	High level bridge
6	Clearance over roadway	1 x 10 ft
7	Height of bridge	5.5 m
8	Clearance of superstructure	5.0 m
9	Type of foundation	Open foundation
10	Type of abutment	PCC wall type
11	Type of approach	RCF with side
12	Building Material used	RCF, steel
13	Year of construction	1975/81 m
14	Span length	31.00 m
15	Clearance of P.C. wall	1.00 m

**REHABILITATION MEASURES RECOMMENDED**

Sl. No.	Item	Rehabilitation Measure	Particulars/Remarks
1	Bed preparation	Bed preparation to be done and outside wall shall be provided as per U.S. 1000 code.	CONSTRUCTION OF CONCRETE
2	Superstructure	Rehabilitation joint and structural bed shall be replaced by fiber type reinforcement joint.	CONCRETE REPAIRS
3	Founding con.	CC. masonry work shall be replaced.	CONCRETE REPAIRS
4	Finishing of base wall	Top wall to be abandoned and finishing shall be done in all the side.	CONCRETE REPAIRS
5	Clearance of superstructure	Top edge of deck shall be provided by 25 mm slab.	CONCRETE REPAIRS
6	Chimney	Finishing chimney in right side removed from it (check side) shall be abandoned before starting the chimney masonry.	CONCRETE REPAIRS

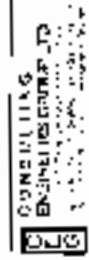
TO BRIDGEHEAD TO REMAIN



KEY PLAN

WING LOG CAL 10 A

Design Discharge (cum/hrs)	Max. scour		Depth of scour		Length of Right Apron		Length of Flexible Apron	
	W/S (m)	BCW	W/S (m)	BCW	W/S (m)	BCW	W/S (m)	BCW
	d/s	DCW <sub>1</sub>	d/s	DCW <sub>2</sub>	W/S	DCW <sub>1</sub>	W/S	DCW <sub>2</sub>



CONSULTING ENGINEERING GROUP LTD

COMBINED BRIDGE FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - II FOR OR MA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

REHABILITATION BRIDGE DETAILS

BRIDGE AT CH. 3+000

DATE	SCALE	BY	CHECKED



Chief Engineer  
Wong Bank Projects, District  
EMPLOYER  
The State Road

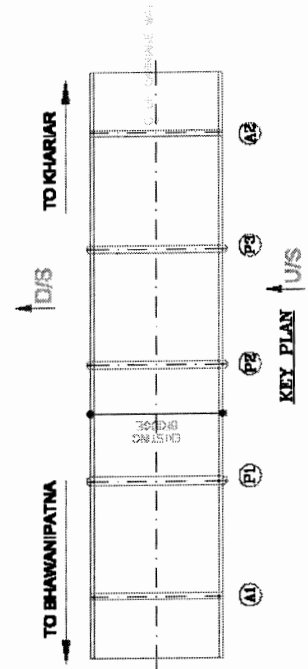
NOTES:

**EXISTING BRIDGE DETAILS**

1	Existing Location	4/450
2	Proposed Chainage	4+418.87
3	Name of the naallah	Bulat Nallah
4	Year of construction	1987
5	Type of bridge	Submersible Bridge
6	Existing span arrangement	4 x 9.9 m
7	Existing carriage way width	6.7 m
8	Thickness of superstructure	0.8 m
9	Type of foundation	Open foundation
10	Type of substructure	PCC wall type
11	Type of superstructure	RCC solid slab
12	Existing Formation Level	262.952 m
13	Final Formation Level	262.952 m
14	Bed Level	255.901 m
15	Distance of PCL w.r.t ECL	0.16 Left

**REHABILITATION MEASURES SUGGESTED**

S. no.	Items	Rehabilitation Measures	Reference Drawings
1	Expansion joint	Expansion joint not functioning due to overlay of BT to be replaced by filler type	OSRP/CEG/BR/MISC-02
2	Wearing coat	Heavy cracks seen on BT wearing coat and shall be replaced completely by 56 mm thick bituminous wearing coat	OSRP/CEG/BR/MISC-02
3	Railting	Guard post shall be replaced by crash barrier	OSRP/CEG/BR/MISC-02

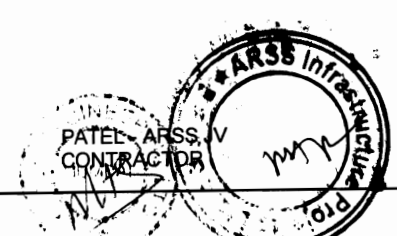


DATE: 19/09/2024	SCALE: 1:1000
DRAWN: [Signature]	CHECKED: [Signature]
DESIGNED: [Signature]	APPROVED: [Signature]

REHABILITATION BRIDGE DETAILS  
BRIDGE AT CH. 4+450

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.  
10/1, 2nd Floor, Market Street, Cuttack, Odisha - 753001, India.  
Tel: +91-674-2521888, 2521889, 2521890, 2521891, 2521892  
Fax: +91-674-2521844, 2521845, 2521846, 2521847  
www.ceggroup.com



Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the P.T.O.





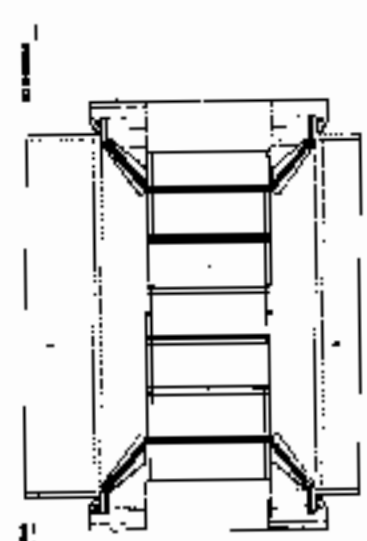
10/11/11

1. DRAWING SHALL BE CHECKED BY THE DESIGNER BEFORE ANY COMMENCEMENT OF WORK.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE DRAWING.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE DRAWING.

EXISTING BRIDGE DETAILS	
1. Bridge Location	SR 100
2. Proposed Changes	REPAIRS TO THRU PIERS
3. Name of Engineer	10/11/11
4. Title of Specification	SR 100
5. Type of Bridge	SR 100
6. Span Length	7 x 10.0
7. Substrate	CONCRETE
8. Thickness of Substrate	12.0
9. Type of Reinforcement	REINFORCED CONCRETE
10. Type of Member	PIERS
11. Existing Reinforcement Level	SR 100
12. Road Profile Level	SR 100
13. Bed Level	SR 100
14. Design of Piers	SR 100

REHABILITATION MATERIALS RECOMMENDED	
1. Material	Concrete
2. Quantity	As per Bill of Materials
3. Remarks	As per Bill of Materials
4. Remarks	As per Bill of Materials
5. Remarks	As per Bill of Materials



PIER REINFORCEMENT	
Bar Size	4/8
Bar Spacing	12" O.C.
Bar Length	10'0"
Bar Quantity	4
Bar Weight	11.8
Bar Volume	0.047
Bar Area	0.20
Bar Perimeter	15.7
Bar Surface Area	1.18
Bar Volume	0.047
Bar Area	0.20
Bar Perimeter	15.7
Bar Surface Area	1.18

**PATEL ASSOCIATES INC.**  
**PATEL ASSOCIATES INC.**  
**CONTRACTOR**

**Chaitin & Associates**  
**ENGINEERS ARCHITECTS**  
**CONSULTANTS**

<b>REHABILITATION BRIDGE DETAILS</b> <b>BRIDGE AT CA 100-100</b>	
<b>CONTRACTOR</b> <b>PATEL ASSOCIATES INC.</b>	<b>CONSULTANT</b> <b>CHAITIN &amp; ASSOCIATES INC.</b>
<b>PROJECT NO.</b> <b>100-100</b>	<b>DATE</b> <b>10/11/11</b>
<b>SCALE</b> <b>AS SHOWN</b>	<b>BY</b> <b>CHAITIN &amp; ASSOCIATES INC.</b>

- 1. DRAWING SHALL BE SENT TO THE CHIEF EXECUTIVE OFFICER OF MPTA FOR APPROVAL. THE WORK SHALL BE DONE WITHIN THE SPECIFIED PERIOD.
- 2. CONTRACT SHALL BE SIGNED BY THE CHIEF EXECUTIVE OFFICER OF MPTA.
- 3. WORK SHALL BE DONE WITHIN THE SPECIFIED PERIOD.

**EXISTING BRIDGE DETAILS**

1	Spanning Location	BR-700
2	Proposed Crossing	BR-600.00
3	Plan of the work	24-101 (Plan)
4	Year of construction	1973
5	Type of bridge	Single span bridge
6	Spanning length	1 x 12.16
7	Spanning width	12.16 m
8	Spanning height	5.1 m
9	Type of foundation	Open foundation
10	Type of structure	RC Stone masonry wall type
11	Type of superstructure	RC slab deck
12	Spanning Foundation Level	208.000 m
13	Spanning Deck Level	208.000 m
14	Spanning Height	207.500 m
15	Spanning Area	4.00 x 12.16

**REHABILITATION MEASURES TO BE ADOPTED**

1	Conditioning	Conditioning to be done for water table with polyurethane material (if condition is not good)
2	Conditioning	Conditioning to be done for water table with polyurethane material (if condition is not good)
3	Conditioning	Conditioning to be done for water table with polyurethane material (if condition is not good)
4	Conditioning	Conditioning to be done for water table with polyurethane material (if condition is not good)

TO BHARANIPATNA TO BHARANIPATNA

**KEY PLAN**

**HYDROLOGICAL DATA**

Design Discharge (cum/sec)	Mean water level in (m)	Depth of outlet wall in (m)	Length of Right Length of Flexible Apron in (m)	Length of Flexible Apron in (m)
1.5	1.5	1.5	1.5	1.5

WORLD BANK GROUPS  
WESTERN EMPLOYER

CONTRACTING ENGINEERING LTD.

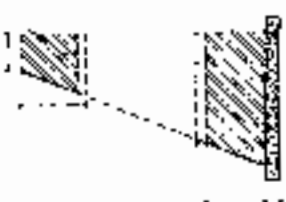
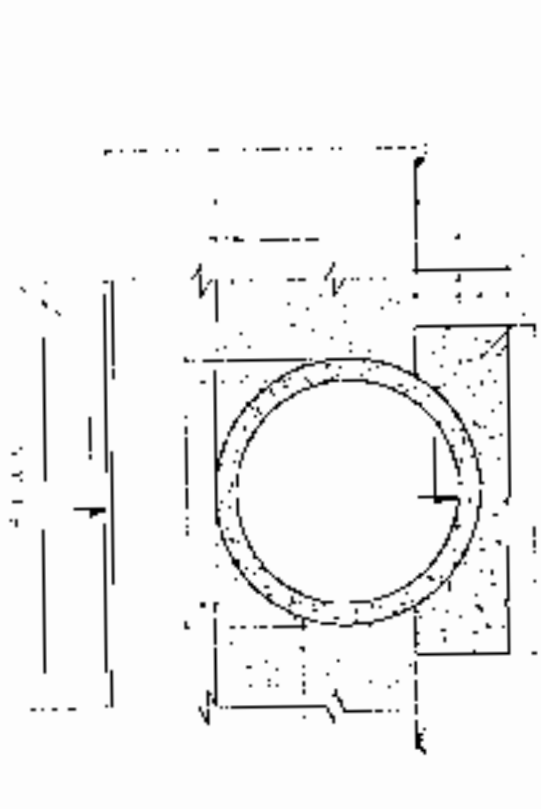
REHABILITATION BRIDGE DETAILS

BRIDGE AT CH. 684-300





SECTION 4-4



SECTION 4-4

SECTION 4-4

P. Location	Proposed Change	Proposed Alternative Lane	Road level		Clearance/Height		Height of RTI		LPH Bars	Description of Bars	Total Length	Shape of Bars	
			Left	Right	Left	Right	Left	Right					
1	4710	4112	283.279	283.640	-2.0%	-2.0%	1.1	1.1	3.2	2.3	L70R	98.4	0.8
2	4740	4424	287.892	287.810	-2.8%	-2.8%	1.5	1.5	4.0	2.8	L70L	57.8	7
3	4745	7640	291.730	292.600	-2.0%	-2.0%	2.7	2.7	6.4	6.4	L70R	23.8	6
4	4745	10266	292.673	297.790	-2.0%	-2.0%	3.2	3.1	6.1	6.3	L70R	24.2	10
5	4745	11140	295.791	295.467	-2.0%	-2.0%	2.5	2.5	6.0	6.0	L70L	23.1	9
6	4745	12086	297.762	298.270	-2.0%	-2.0%	3.0	3.0	6.8	6.8	L70R	24.4	9
7	4745	12748	298.304	298.000	-2.0%	-2.0%	1.5	1.5	3.8	2.8	L70R	17.0	7
8	4745	13028	298.228	298.480	-2.0%	-2.0%	0.8	0.8	1.2	1.1	L70L	5.8	6
9	4745	14288	295.488	293.888	-2.0%	-2.0%	0.7	0.7	1.0	1.3	L70R	5.8	6
10	4745	14918	298.488	292.788	-2.0%	-2.0%	1.9	1.8	3.8	3.8	L70R	16.8	8
11	4745	14918	298.488	292.788	-2.0%	-2.0%	0.7	0.7	1.4	1.4	L70L	14.8	8
12	4745	16020	271.716	271.640	-2.0%	-2.0%	2.9	2.9	4.8	4.8	L70L	27.8	7
13	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
14	4745	20248	279.814	277.810	-2.0%	-2.0%	1.9	1.9	3.0	2.4	L70R	23.8	8.5
15	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
16	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
17	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
18	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
19	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
20	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
21	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
22	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
23	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
24	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
25	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
26	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
27	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
28	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
29	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
30	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
31	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
32	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
33	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7
34	4745	20248	279.814	277.810	-2.0%	-2.0%	1.4	1.4	3.8	2.8	L70R	27.8	7



CONSULTING ENGINEERS GROUP LTD  
 40-41, Cross Street, Singapore 051197  
 Tel: 65-434-1111 Fax: 65-434-1112  
 Email: info@cegroup.com.sg  
 www.cegroup.com.sg

TYPICAL ARRANGEMENT  
 FOR R.O.D BRIDGE PIPE CULVERTS (1.0m DIA)  
 @ HEIGHT OF FILL VARYING FROM 0.8 TO 4.0 M

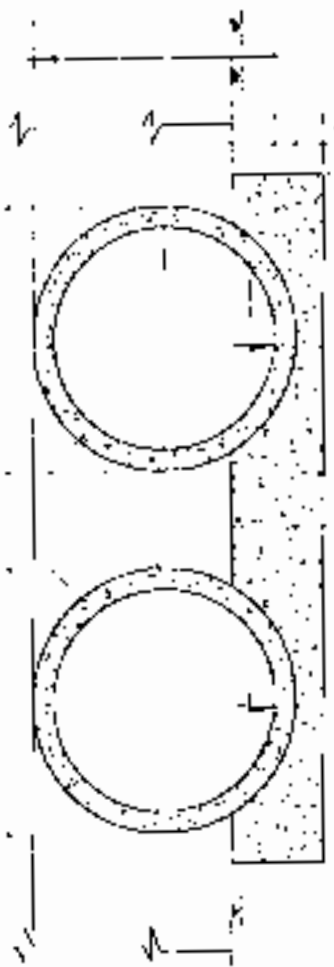
Ref: Consultancy Services for Feasibility Study and Detailed Project Preparation of Phase - I Road for Cross Street Road Project Under World Bank Assistance



ELEVATION A - 2



ELEVATION A - 2



ELEVATION A - 2

SECTION A - 1

No.	Locality	Proposed Structure	Proposed Length (m)	Road width (m)	Construction			Height of Pile (m)	Type of Pile	No. of Piles	Total Length (m)
					Left	Right	Center				
1	...	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...	...	...	...	...
11	...	...	...	...	...	...	...	...	...	...	...
12	...	...	...	...	...	...	...	...	...	...	...
13	...	...	...	...	...	...	...	...	...	...	...
14	...	...	...	...	...	...	...	...	...	...	...
15	...	...	...	...	...	...	...	...	...	...	...
16	...	...	...	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...	...	...	...	...
19	...	...	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...	...	...	...



TYPICAL BRIDGE PIER

**CONSULTANT**  
**ENGINEERING GROUP LTD**  
 10, 11 & 12, Connaught Place, New Delhi - 110028, India  
 Tel. 011-26101111, 26101112, 26101113, 26101114, 26101115, 26101116, 26101117, 26101118, 26101119, 26101120, 26101121, 26101122, 26101123, 26101124, 26101125, 26101126, 26101127, 26101128, 26101129, 26101130, 26101131, 26101132, 26101133, 26101134, 26101135, 26101136, 26101137, 26101138, 26101139, 26101140, 26101141, 26101142, 26101143, 26101144, 26101145, 26101146, 26101147, 26101148, 26101149, 26101150, 26101151, 26101152, 26101153, 26101154, 26101155, 26101156, 26101157, 26101158, 26101159, 26101160, 26101161, 26101162, 26101163, 26101164, 26101165, 26101166, 26101167, 26101168, 26101169, 26101170, 26101171, 26101172, 26101173, 26101174, 26101175, 26101176, 26101177, 26101178, 26101179, 26101180, 26101181, 26101182, 26101183, 26101184, 26101185, 26101186, 26101187, 26101188, 26101189, 26101190, 26101191, 26101192, 26101193, 26101194, 26101195, 26101196, 26101197, 26101198, 26101199, 26101200

**CONTRACTOR**  
**PARSS ENGINEERING**

Volume IV, Page 173

World Bank Project - Under World Bank Assistance

FOR P.C.I.D. DOUBLE P.F.E. COLLECTOR (0.3M DIA) HEIGHT OF PILE VARYING FROM 0.8 TO 4.0 M

**TYPICAL ARRANGEMENT**

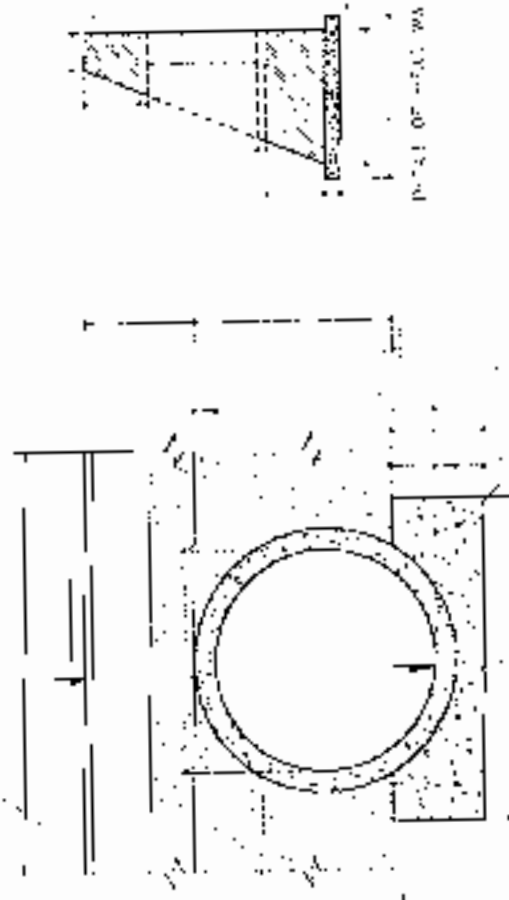
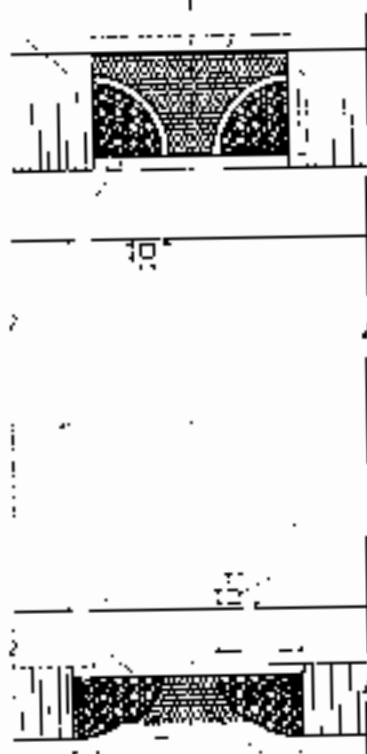


TABLE OF MATERIALS

NO.	DESCRIPTION	UNIT	QTY.	REMARKS
1	Concrete	m <sup>3</sup>	1000	
2	Steel	kg	5000	
3	Gravel	m <sup>3</sup>	2000	
4	Sand	m <sup>3</sup>	1000	
5	Bricks	nos.	10000	
6	Plaster	m <sup>2</sup>	500	
7	Paint	liters	100	
8	Formwork	m <sup>2</sup>	2000	
9	Reinforcement	kg	1000	
10	Other			

MATEO ARSSE IV  
 CONSULTANT

World Bank Projects, Corporate  
 EMPLOYER  
 Ch. de la Cruz

**CONSULTING ENGINEERING GROUP LTD.**  
 11th Floor, 110 Robinson Road, Singapore 068911  
 Tel: 351 2211, Fax: 351 2212

**TYPICAL WIDENING ARRANGEMENT**  
 FOR P.C.C BRIDGES IN THE CULVERTS (1.0M DIA)  
 ONE CHIT. OF PILL. VARYING FROM 0.8 TO 4.0 M

REVISIONS

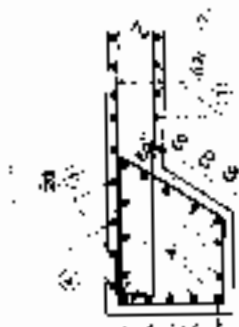
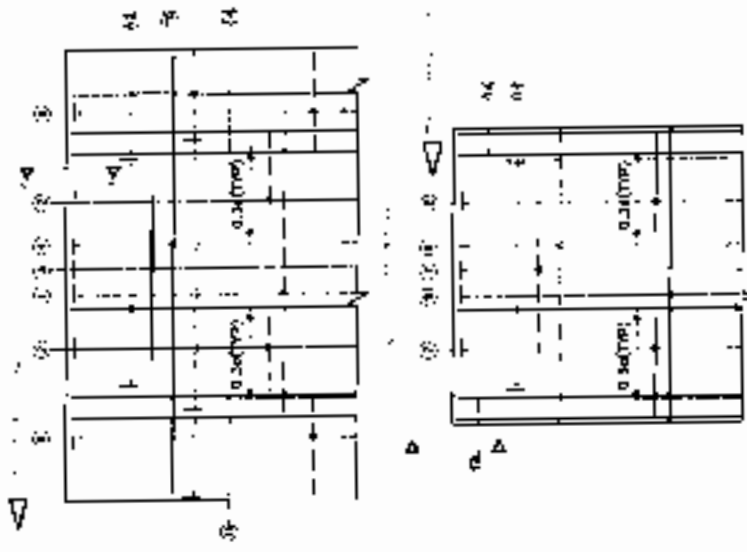
NO.	DESCRIPTION	DATE	BY	CHECKED
1	ISSUED FOR TENDER	1988		
2	REVISED	1988		
3	REVISED	1988		
4	REVISED	1988		
5	REVISED	1988		
6	REVISED	1988		
7	REVISED	1988		
8	REVISED	1988		
9	REVISED	1988		
10	REVISED	1988		
11	REVISED	1988		
12	REVISED	1988		
13	REVISED	1988		
14	REVISED	1988		
15	REVISED	1988		
16	REVISED	1988		
17	REVISED	1988		
18	REVISED	1988		
19	REVISED	1988		
20	REVISED	1988		
21	REVISED	1988		
22	REVISED	1988		
23	REVISED	1988		
24	REVISED	1988		
25	REVISED	1988		
26	REVISED	1988		
27	REVISED	1988		
28	REVISED	1988		
29	REVISED	1988		
30	REVISED	1988		
31	REVISED	1988		
32	REVISED	1988		
33	REVISED	1988		
34	REVISED	1988		
35	REVISED	1988		
36	REVISED	1988		
37	REVISED	1988		
38	REVISED	1988		
39	REVISED	1988		
40	REVISED	1988		
41	REVISED	1988		
42	REVISED	1988		
43	REVISED	1988		
44	REVISED	1988		
45	REVISED	1988		
46	REVISED	1988		
47	REVISED	1988		
48	REVISED	1988		
49	REVISED	1988		
50	REVISED	1988		

NO.	DESCRIPTION	DATE	BY	CHECKED
1	ISSUED FOR TENDER	1988		
2	REVISED	1988		
3	REVISED	1988		
4	REVISED	1988		
5	REVISED	1988		
6	REVISED	1988		
7	REVISED	1988		
8	REVISED	1988		
9	REVISED	1988		
10	REVISED	1988		
11	REVISED	1988		
12	REVISED	1988		
13	REVISED	1988		
14	REVISED	1988		
15	REVISED	1988		
16	REVISED	1988		
17	REVISED	1988		
18	REVISED	1988		
19	REVISED	1988		
20	REVISED	1988		
21	REVISED	1988		
22	REVISED	1988		
23	REVISED	1988		
24	REVISED	1988		
25	REVISED	1988		
26	REVISED	1988		
27	REVISED	1988		
28	REVISED	1988		
29	REVISED	1988		
30	REVISED	1988		
31	REVISED	1988		
32	REVISED	1988		
33	REVISED	1988		
34	REVISED	1988		
35	REVISED	1988		
36	REVISED	1988		
37	REVISED	1988		
38	REVISED	1988		
39	REVISED	1988		
40	REVISED	1988		
41	REVISED	1988		
42	REVISED	1988		
43	REVISED	1988		
44	REVISED	1988		
45	REVISED	1988		
46	REVISED	1988		
47	REVISED	1988		
48	REVISED	1988		
49	REVISED	1988		
50	REVISED	1988		

NO.	DESCRIPTION	REINFORCEMENT		CONCRETE		PAVEMENT		TOTAL	
		Length	Area	Volume	Area	Volume	Area	Volume	
1	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...
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	...	...	...	...	...	...	...	...	...

NO.	DESCRIPTION	REINFORCEMENT		CONCRETE		PAVEMENT		TOTAL	
		Length	Area	Volume	Area	Volume	Area	Volume	
1	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...
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	...	...	...	...	...	...	...	...	...

NO.	DESCRIPTION	REINFORCEMENT		CONCRETE		PAVEMENT		TOTAL	
		Length	Area	Volume	Area	Volume	Area	Volume	
1	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...	...	...
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	...	...	...</						



World Bank Project No. 100-000-0000  
 CONSULTANT'S OFFICE  
 ENGINEERING DEPARTMENT  
 (100-000-0000) (100-000-0000)

- NOTES :-
1. ALL DIMENSIONS ARE IN METERS.
  2. THE DRAWING SHALL BE READ IN CONJUNCTION WITH SPECIFICATIONS/STANDARD DRAWING OF THE CONTRACT.
  3. REINFORCEMENT SHALL BE PROVIDED AS SHOWN IN THIS DRAWING.
  4. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.
  5. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.
  6. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.
  7. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.
  8. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.
  9. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.
  10. THE WALL SHALL BE PROVIDED WITH REINFORCEMENT AS SHOWN IN THIS DRAWING.

REF: SPEC. 100-000-0000

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

NO.	SECTION	REINFORCEMENT	BAR SIZE	SPACING	LENGTH	WEIGHT	TOTAL WEIGHT
1	1-2	10	12	150	1.00	1.13	1.13
2	1-2	10	12	150	1.00	1.13	1.13
3	1-2	10	12	150	1.00	1.13	1.13
4	1-2	10	12	150	1.00	1.13	1.13
5	1-2	10	12	150	1.00	1.13	1.13
6	1-2	10	12	150	1.00	1.13	1.13
7	1-2	10	12	150	1.00	1.13	1.13
8	1-2	10	12	150	1.00	1.13	1.13
9	1-2	10	12	150	1.00	1.13	1.13
10	1-2	10	12	150	1.00	1.13	1.13
11	1-2	10	12	150	1.00	1.13	1.13
12	1-2	10	12	150	1.00	1.13	1.13
13	1-2	10	12	150	1.00	1.13	1.13
14	1-2	10	12	150	1.00	1.13	1.13
15	1-2	10	12	150	1.00	1.13	1.13
16	1-2	10	12	150	1.00	1.13	1.13
17	1-2	10	12	150	1.00	1.13	1.13
18	1-2	10	12	150	1.00	1.13	1.13
19	1-2	10	12	150	1.00	1.13	1.13
20	1-2	10	12	150	1.00	1.13	1.13
21	1-2	10	12	150	1.00	1.13	1.13
22	1-2	10	12	150	1.00	1.13	1.13
23	1-2	10	12	150	1.00	1.13	1.13
24	1-2	10	12	150	1.00	1.13	1.13
25	1-2	10	12	150	1.00	1.13	1.13
26	1-2	10	12	150	1.00	1.13	1.13
27	1-2	10	12	150	1.00	1.13	1.13
28	1-2	10	12	150	1.00	1.13	1.13
29	1-2	10	12	150	1.00	1.13	1.13
30	1-2	10	12	150	1.00	1.13	1.13
31	1-2	10	12	150	1.00	1.13	1.13
32	1-2	10	12	150	1.00	1.13	1.13
33	1-2	10	12	150	1.00	1.13	1.13
34	1-2	10	12	150	1.00	1.13	1.13
35	1-2	10	12	150	1.00	1.13	1.13
36	1-2	10	12	150	1.00	1.13	1.13
37	1-2	10	12	150	1.00	1.13	1.13
38	1-2	10	12	150	1.00	1.13	1.13
39	1-2	10	12	150	1.00	1.13	1.13
40	1-2	10	12	150	1.00	1.13	1.13
41	1-2	10	12	150	1.00	1.13	1.13
42	1-2	10	12	150	1.00	1.13	1.13
43	1-2	10	12	150	1.00	1.13	1.13
44	1-2	10	12	150	1.00	1.13	1.13
45	1-2	10	12	150	1.00	1.13	1.13
46	1-2	10	12	150	1.00	1.13	1.13
47	1-2	10	12	150	1.00	1.13	1.13
48	1-2	10	12	150	1.00	1.13	1.13
49	1-2	10	12	150	1.00	1.13	1.13
50	1-2	10	12	150	1.00	1.13	1.13
51	1-2	10	12	150	1.00	1.13	1.13
52	1-2	10	12	150	1.00	1.13	1.13
53	1-2	10	12	150	1.00	1.13	1.13
54	1-2	10	12	150	1.00	1.13	1.13
55	1-2	10	12	150	1.00	1.13	1.13
56	1-2	10	12	150	1.00	1.13	1.13
57	1-2	10	12	150	1.00	1.13	1.13
58	1-2	10	12	150	1.00	1.13	1.13
59	1-2	10	12	150	1.00	1.13	1.13
60	1-2	10	12	150	1.00	1.13	1.13
61	1-2	10	12	150	1.00	1.13	1.13
62	1-2	10	12	150	1.00	1.13	1.13
63	1-2	10	12	150	1.00	1.13	1.13
64	1-2	10	12	150	1.00	1.13	1.13
65	1-2	10	12	150	1.00	1.13	1.13
66	1-2	10	12	150	1.00	1.13	1.13
67	1-2	10	12	150	1.00	1.13	1.13
68	1-2	10	12	150	1.00	1.13	1.13
69	1-2	10	12	150	1.00	1.13	1.13
70	1-2	10	12	150	1.00	1.13	1.13
71	1-2	10	12	150	1.00	1.13	1.13
72	1-2	10	12	150	1.00	1.13	1.13
73	1-2	10	12	150	1.00	1.13	1.13
74	1-2	10	12	150	1.00	1.13	1.13
75	1-2	10	12	150	1.00	1.13	1.13
76	1-2	10	12	150	1.00	1.13	1.13
77	1-2	10	12	150	1.00	1.13	1.13
78	1-2	10	12	150	1.00	1.13	1.13
79	1-2	10	12	150	1.00	1.13	1.13
80	1-2	10	12	150	1.00	1.13	1.13
81	1-2	10	12	150	1.00	1.13	1.13
82	1-2	10	12	150	1.00	1.13	1.13
83	1-2	10	12	150	1.00	1.13	1.13
84	1-2	10	12	150	1.00	1.13	1.13
85	1-2	10	12	150	1.00	1.13	1.13
86	1-2	10	12	150	1.00	1.13	1.13
87	1-2	10	12	150	1.00	1.13	1.13
88	1-2	10	12	150	1.00	1.13	1.13
89	1-2	10	12	150	1.00	1.13	1.13
90	1-2	10	12	150	1.00	1.13	1.13
91	1-2	10	12	150	1.00	1.13	1.13
92	1-2	10	12	150	1.00	1.13	1.13
93	1-2	10	12	150	1.00	1.13	1.13
94	1-2	10	12	150	1.00	1.13	1.13
95	1-2	10	12	150	1.00	1.13	1.13
96	1-2	10	12	150	1.00	1.13	1.13
97	1-2	10	12	150	1.00	1.13	1.13
98	1-2	10	12	150	1.00	1.13	1.13
99	1-2	10	12	150	1.00	1.13	1.13
100	1-2	10	12	150	1.00	1.13	1.13

CONSULTANT'S OFFICE  
 ENGINEERING DEPARTMENT  
 (100-000-0000) (100-000-0000)

CONSULTANT NO. 100-000-0000  
 CONSULTING GROUP LTD.  
 11000 Lakeshore Blvd. Suite 1100  
 Toronto, Ontario M3J 1P6, Canada

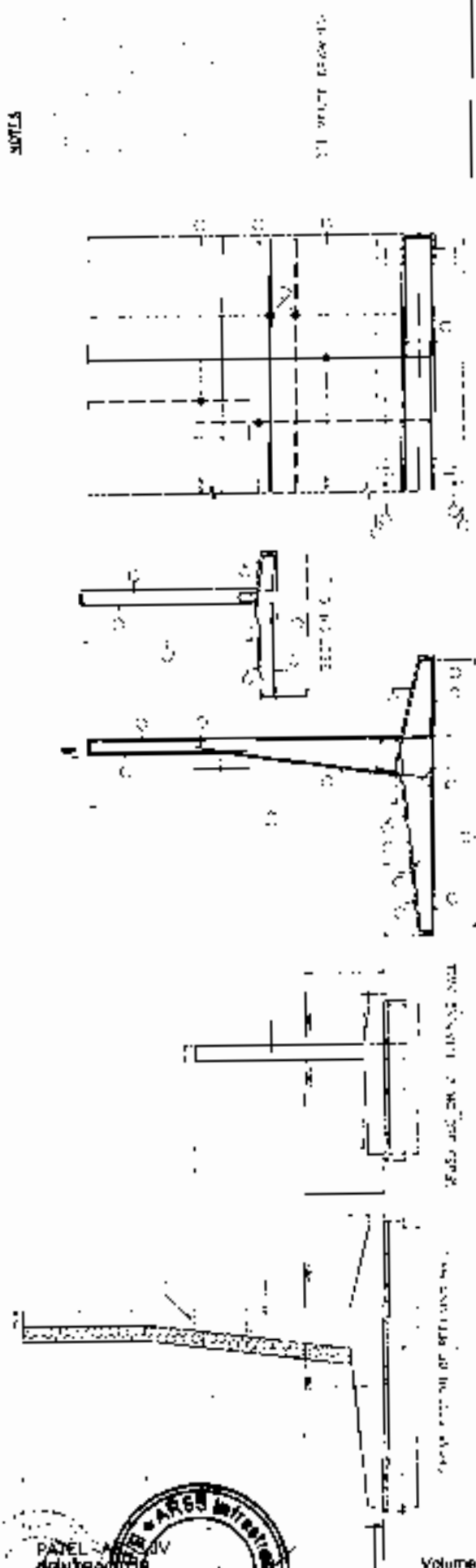
REINFORCEMENT DETAIL OF  
 SINGLE CELL BOX CULVERT

COMBINATION SERVICE FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE - (1) ROAD FOR ORIGINAL STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

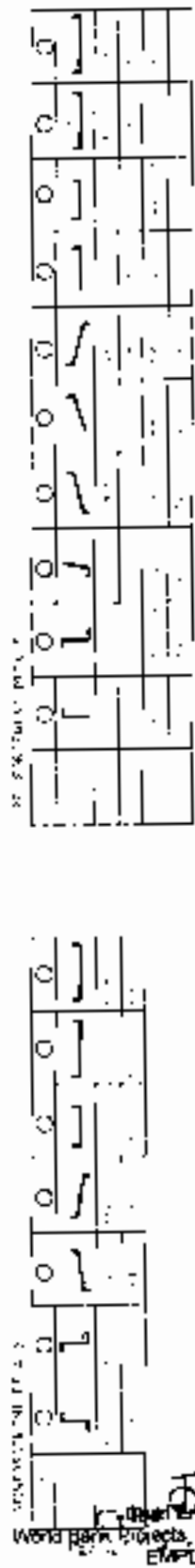
DATE	REV.	BY	CHKD.	APPD.



NOTES



SEE NEXT DRAWING

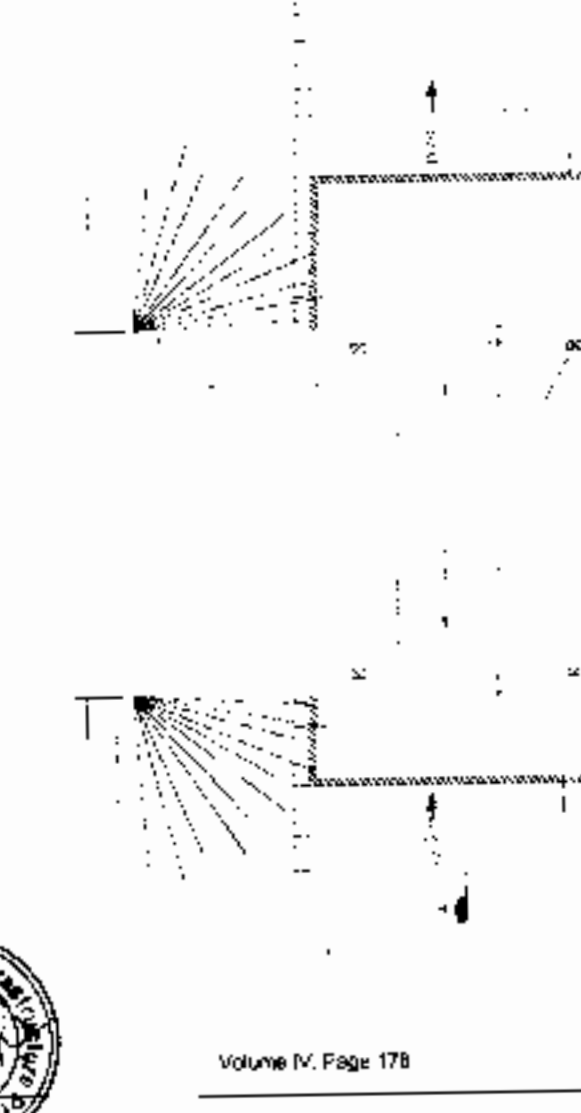
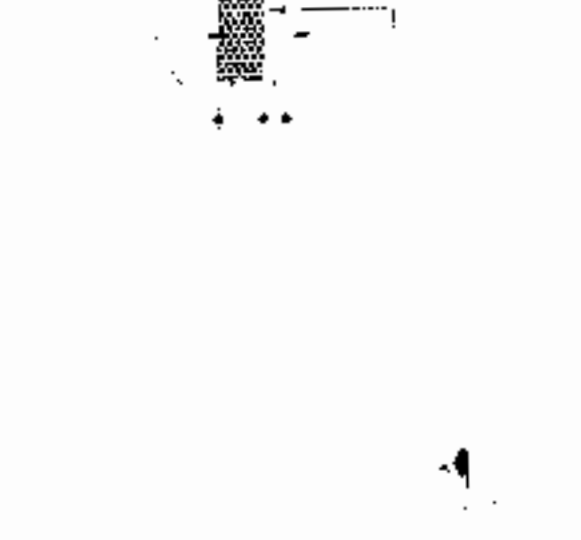
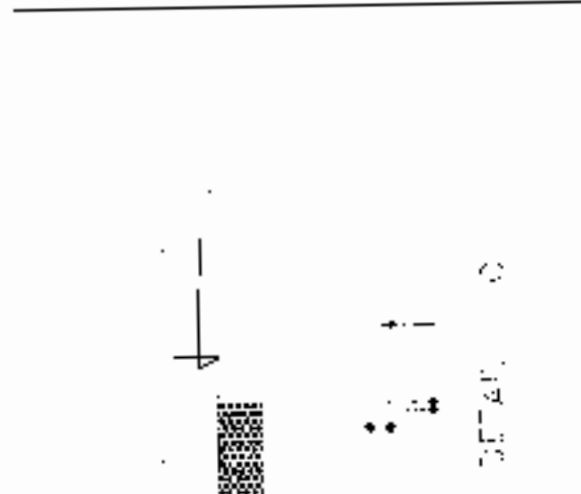
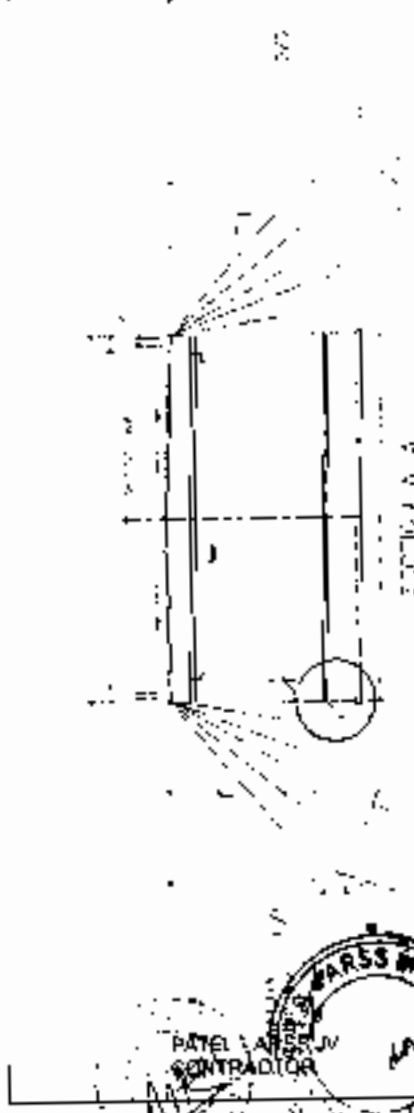
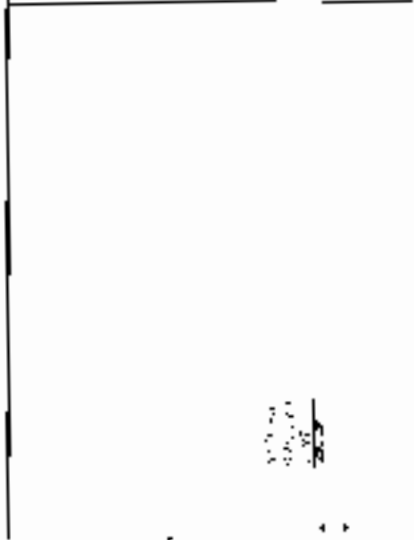


<p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PRELIMINARY DESIGN OF PHASE - 01 ROAD FOR ORISSA STATE ROAD PROJECT (except World Bank assistance)</p>	<p>DATE: _____          DRAWN BY: _____          CHECKED BY: _____          APPROVED BY: _____</p>	<p>DATE: _____          DRAWN BY: _____          CHECKED BY: _____          APPROVED BY: _____</p>	<p>DATE: _____          DRAWN BY: _____          CHECKED BY: _____          APPROVED BY: _____</p>	<p>DATE: _____          DRAWN BY: _____          CHECKED BY: _____          APPROVED BY: _____</p>	<p>DATE: _____          DRAWN BY: _____          CHECKED BY: _____          APPROVED BY: _____</p>
---	--	--	--	--	--



World Bank Projects, Orissa  
 EMPLOYER

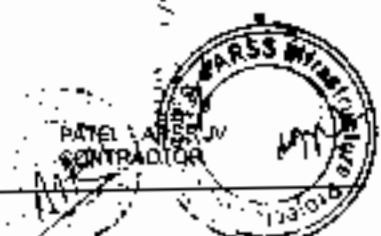
SECTION  
 SECTION TRAY 2.1



DETAIL

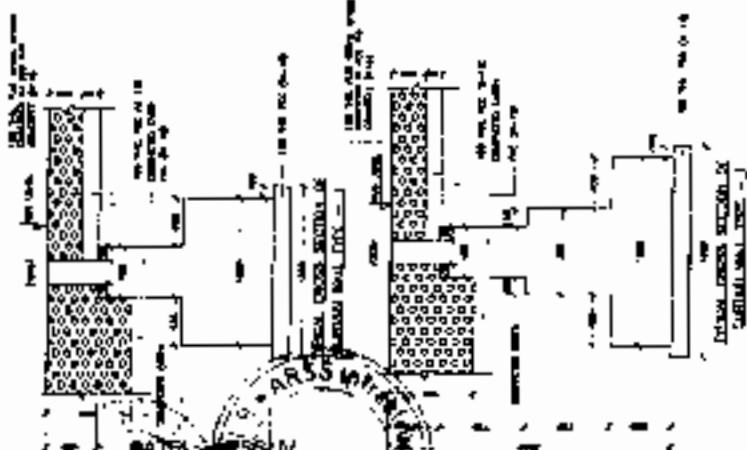
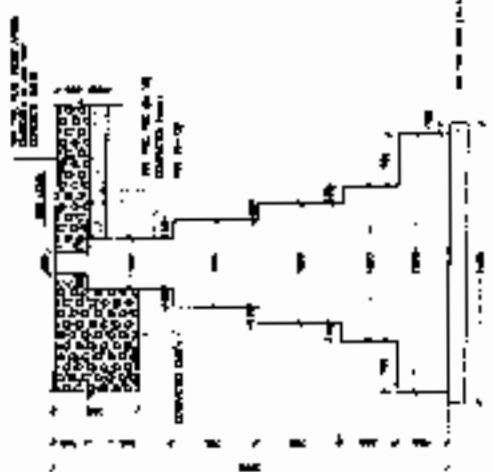
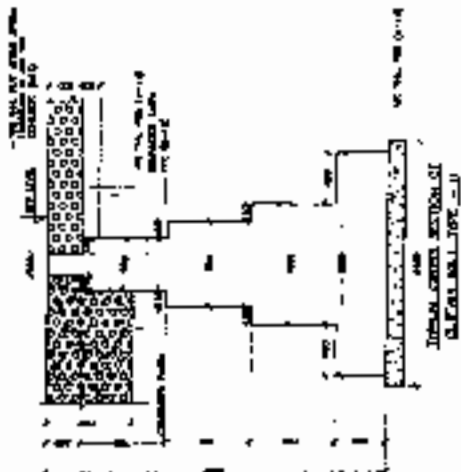
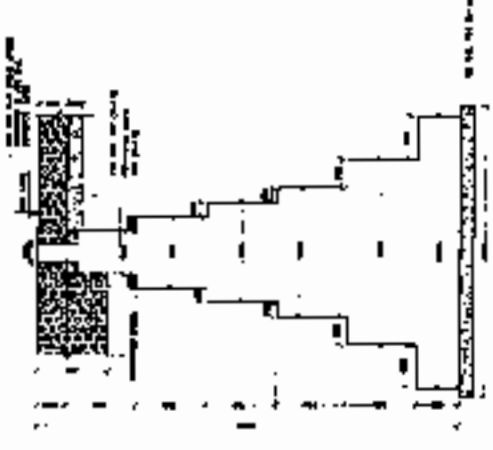


1/1



CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (I) ROAD IN OREGON STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	GENERAL ARRANGEMENT DRAWING NO.	1/1
	TYPICAL DETAILS OF FLOOR PROTECTION WORKS	
CONSULTANT ENGINEER'S SIGNATURE	DATE	
	SCALE	

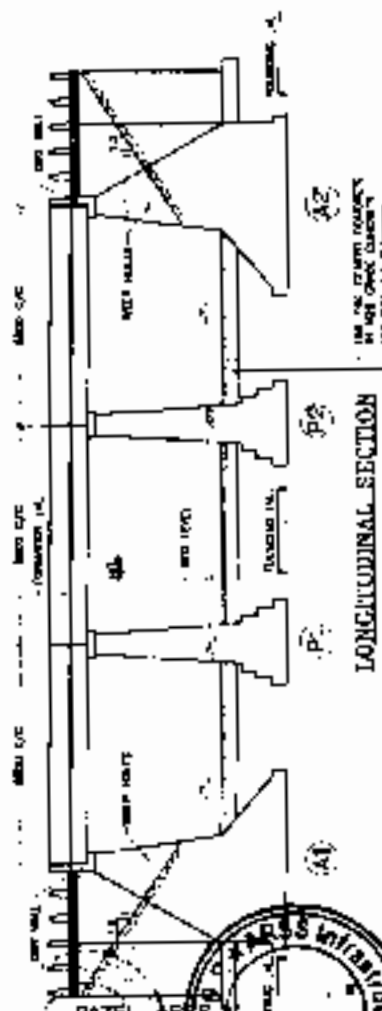
SECTION 101-101



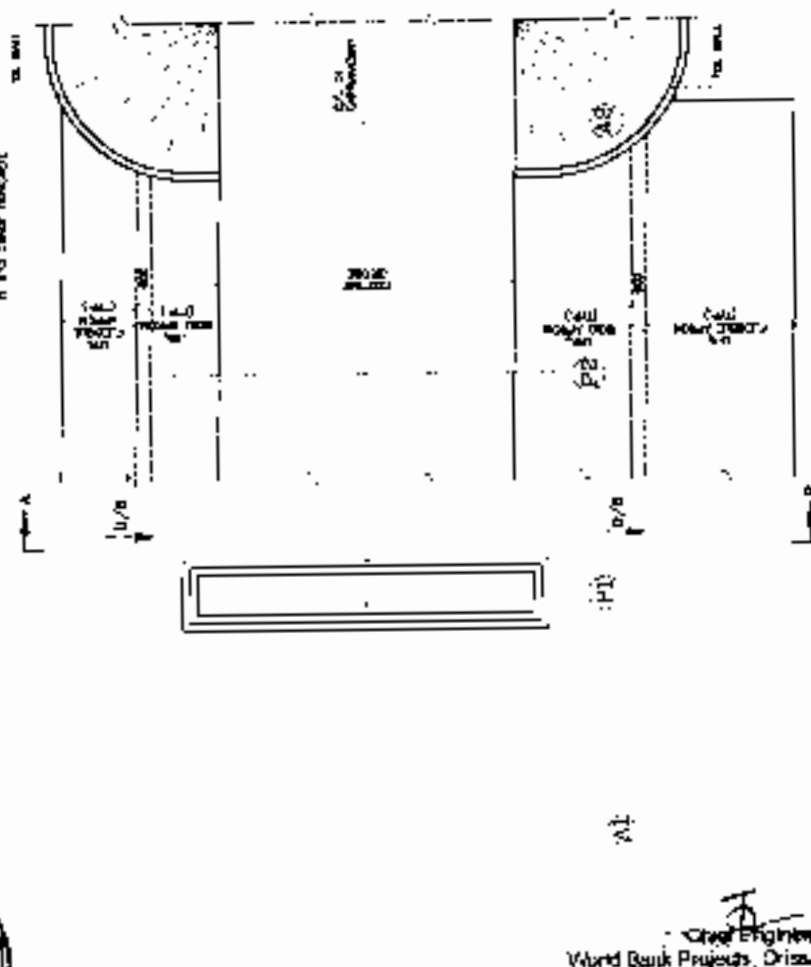
<p>CONSULTING ENGINEERS (PVT.) LTD.</p>	<p>GENERAL ARRANGEMENT DRAWING OF TYPICAL SECTIONS OF CURTAIN WALL</p>	<p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE (I) ROAD ON ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>	<p>ORISSA STATE ROAD PROJECT</p>
---	--	---	----------------------------------

TO BHAWANIPATNA

TO KHARBAR



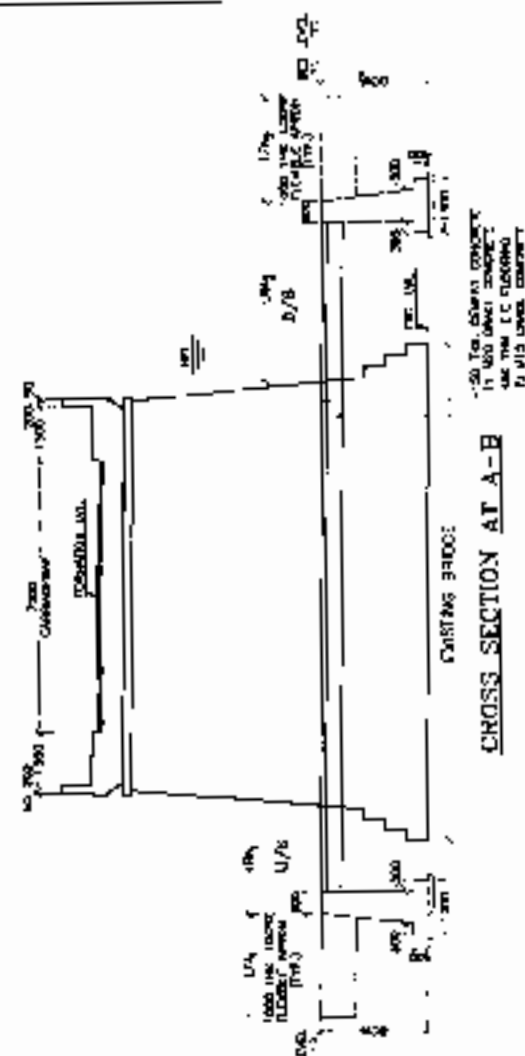
LONGITUDINAL SECTION



HALF BOTTOM PLAN      PLAN      HALF TOP PLAN



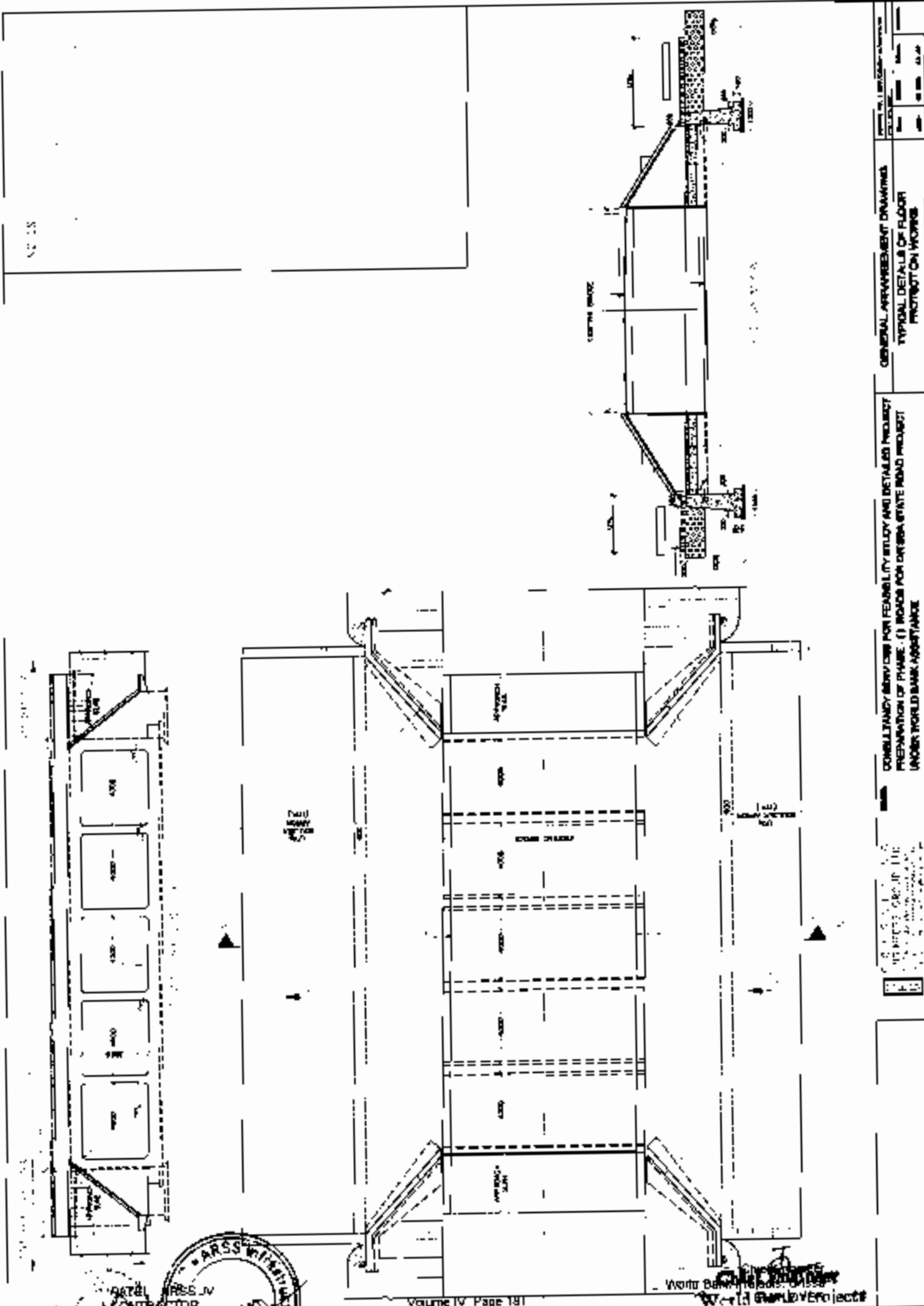
TOP WALL SECTION



CROSS SECTION AT A-B

<p>CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (1) BRIDGE FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE</p>	<p>GENERAL ARRANGEMENT DRAWINGS TYPICAL DETAILS OF FLOOR PROTECTION WORKS</p>	<p>DATE: 11/01/2000</p>
		<p>SCALE: 1/100</p>

13 13



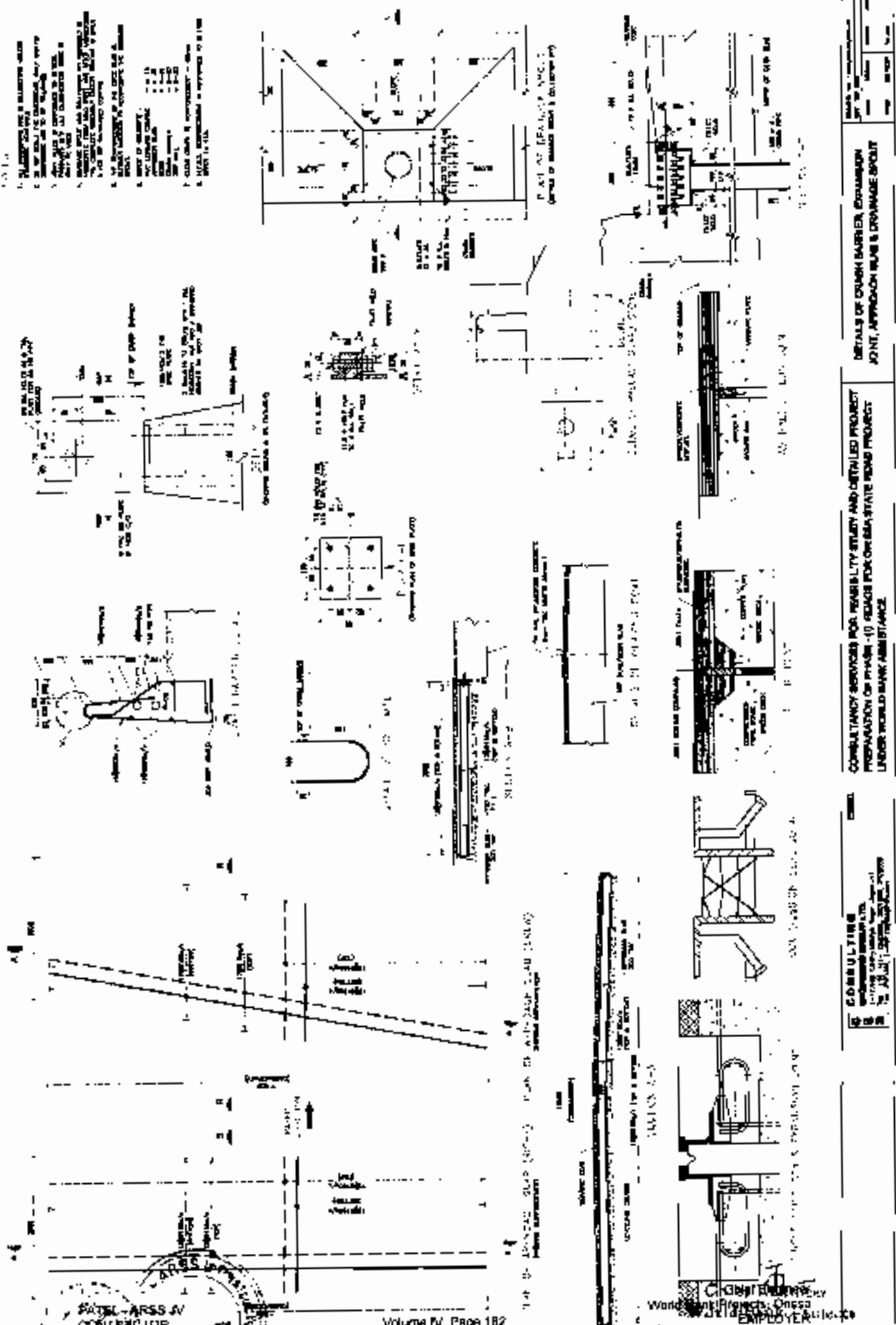
GENERAL ARRANGEMENT DRAWINGS  
 TYPICAL DETAILS OF FLOOR  
 PROTECT ON WORK

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
 PREPARATION OF PHASE - II ROAD FOR DUISBA STATE ROAD PROJECT  
 UNDER WORLD BANK ASSISTANCE

PROJECT GROUP LTD  
 10/10/2000

DATE: 10/10/2000  
 CONTRACTOR





# GOVERNMENT OF ORISSA

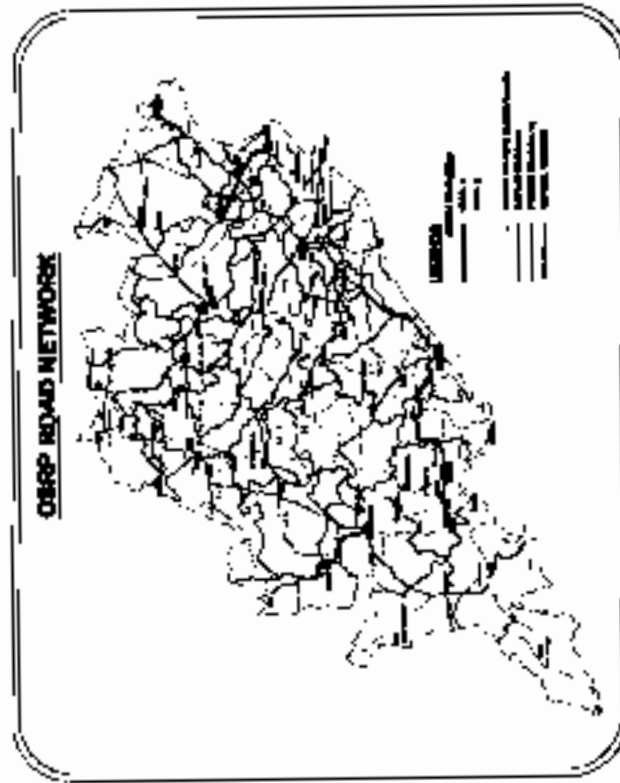
## WORKS DEPARTMENT ORISSA STATE ROAD PROJECT

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT  
PREPARATION OF PHASE (I) ROADS FOR ORISSA STATE ROAD PROJECT  
UNDER WORLD BANK ASSISTANCE

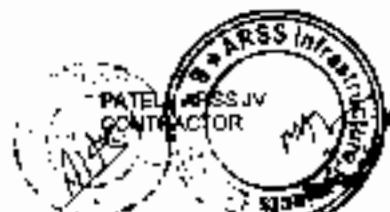
### STANDARD DRAWINGS FOR HIGHWAYS

#### INDEX

- (1) - COVER SHEET
- (2) - INDEX OF DRAWINGS
- (3) - STANDARD DRAWING



FINAL DPR



**CONSULTING ENGINEERS GROUP LTD.**  
B-17, Madhavi Colony, Sakinaka, Bhubaneswar - 751 007  
Tel: +91-674-2520999, 2521599, 2520656  
Fax: 2521548, E-mail: [eng@cegindia.com](mailto:eng@cegindia.com)

# INDEX OF DRAWINGS

Sl. No.	Description	Drawing No.
01	Typical X-section	
02	Typical Cross Section	OSRP/CEG/TCS/01 & 02
03	Typical Cross Section	OSRP/CEG/TCS/03 & 04
04	Typical Cross Section	OSRP/CEG/TCS/05 & 06
05	Typical Cross Section	OSRP/CEG/TCS/07 & 08
06	Typical Cross Section	OSRP/CEG/TCS/09 & 10
07	Typical Cross Section	OSRP/CEG/TCS/11 & 12
08	Typical Cross Section	OSRP/CEG/TCS/13, 14 & 15
09	Typical Cross Section	OSRP/CEG/TCS/16, 17 & 18
10	Typical Slope Protection work	OSRP/CEG/PW
11	Typical Details of Dowel Bar and Tie Bar Arrangement	OSRP/CEG/R/GID/01
12	Typical Details of Transition Slab between Rigid & Flexible Pavement	OSRP/CEG/R/GID/02
13	Typical Details of Pavement Layer	OSRP/CEG/OD
14	Standard Drawings Retaining Wall	OSRP/CEG/RW
15	Typical Details of Transition of Different Road Section	OSRP/CEG/TR
16	Standard Drawings Details of Drain and Kerb	OSRP/CEG/DR
17	Details of Application of Super Elevation	OSRP/CEG/SE
18	Typical 4-Legged Intersection with Single Lane BT Road	OSRP/CEG/IN/01
19	Typical T-Junction with Single Lane BT Road	OSRP/CEG/IN/02
20	Typical Y-Junction with Single Lane BT/Earthen Road	OSRP/CEG/IN/03
21	Standard Drawings Typical - Cross Drain Single Lane BT Road/Earth Road	OSRP/CEG/CDJN

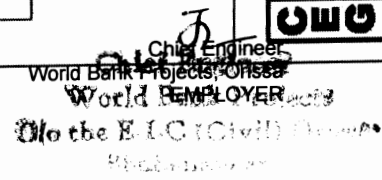
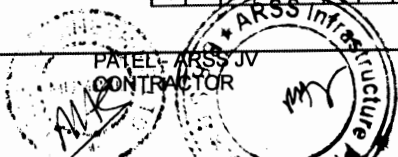
Sl. No.	Description	Drawing No.
22	Road Signs, Markings and Misc. Roadway Furnitures	
23	Standard Drawings Details of Road Hump and Rumble Strips	OSRP/CEG/RH & RS
24	Standard Drawings Details of Footpath Barriers	OSRP/CEG/FB
25	Standard Drawings Metal Beam Crash Barrier Details	OSRP/CEG/CB
26	Standard Drawings Typical KM Stone & 5th Km Stone	OSRP/CEG/KM & GP
27	Standard Drawings Typical Details of 200m Stone & Guard Post	OSRP/CEG/ST & GP
28	Standard Drawings Details of Road Delineators	OSRP/CEG/RD
29	Standard Drawings Details of RPMs & Chevron Markers	OSRP/CEG/RPM
30	Standard Drawings Typical Road Marking Details (Sheet 1 of 2)	OSRP/CEG/RM/01
31	Standard Drawings Typical Road Marking Details (Sheet 2 of 3)	OSRP/CEG/RM/02
32	Standard Drawings Typical Road Signs (Sheet 1 of 4)	OSRP/CEG/RS/01
33	Standard Drawings Typical Road Signs (Sheet 2 of 4)	OSRP/CEG/RS/02
34	Standard Drawings Typical Road Signs (Sheet 3 of 4)	OSRP/CEG/RS/03
35	Standard Drawings Typical Road Signs (Sheet 4 of 4)	OSRP/CEG/RS/04
36	Standard Drawings Typical Bus Bay Type - I	OSRP/CEG/BB/01
37	Standard Drawings Typical Bus Bay Type - II	OSRP/CEG/BB/02
38	Standard Drawings Details of Truck Laybys (Sheet 1 of 2)	OSRP/CEG/TL/01
39	Standard Drawings Details of Truck Laybys (Sheet 2 of 2)	OSRP/CEG/TL/02
40	Toll Plaza Details	
41	Standard Drawings Toll Plaza Layout	OSRP/CEG/TP/01
42	Standard Drawings Toll Plaza Main Office	OSRP/CEG/TP/02
43	Standard Drawings Toll Booth	OSRP/CEG/TP/03
44	Standard Drawings Barrier Gate for Toll Plaza	OSRP/CEG/TP/04
45	Standard Drawings Electrical Layout Toll Plaza and Main Office	OSRP/CEG/TP/05
46	Standard Drawings Electrical Layout Toll Plaza	OSRP/CEG/TP/06
47	Standard Drawings Eplumbing Layout - Toll Plaza	OSRP/CEG/TP/07

**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

## INDEX OF STANDARD DRAWINGS

DRG. NO. OSRP/CEG/INDEX	DATE	REV	RO	DESIGNED (V)	DRAWN (O)	CHECKED (O)	APPROVED (O)
SH. NO.	B	DATE	REV	RO	B.M	R.J	R.P.D.K
SCALE	R/S						S.G

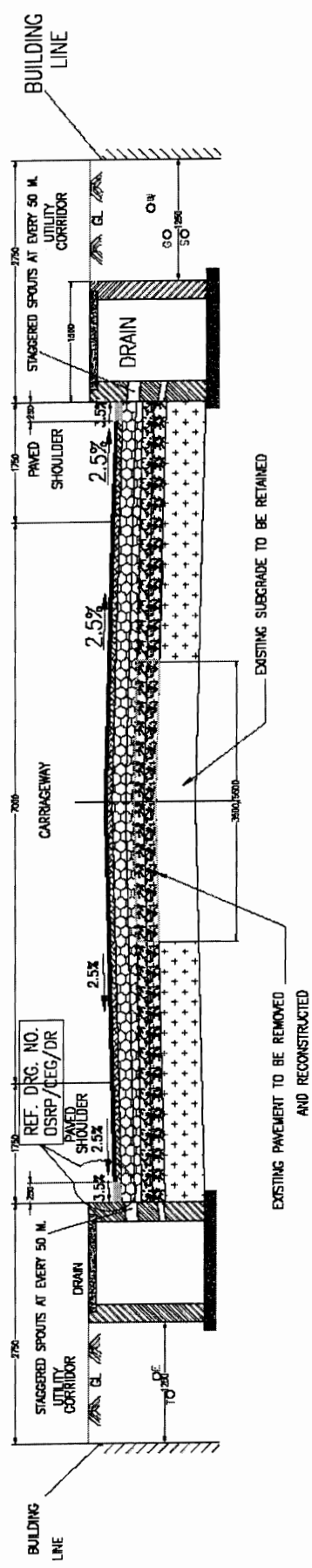






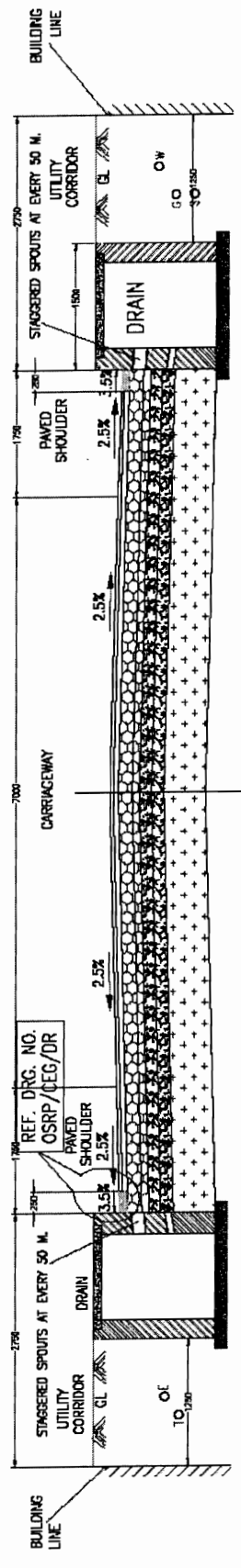


TCS-05



TYPICAL CROSS SECTION IN BUILT-UP AREA FOR RECONSTRUCTION \ WIDENING

TCS-06



TYPICAL CROSS SECTION IN BUILT-UP AREA FOR NEW CONSTRUCTION

LEGENDS

1) W	4) B.C.	7) P.C.	10) E - Base Course Lin
2) D.M.	5) D.M.	8) D.M.	11) U - Top Lin
3) W.M.	6) D.M.	9) E - Existing Drain	12) S - Surf
4) D.M.	7) E - Existing Drain	10) T - Bottom Curb	
5) T.M.			

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO.OSRP/CCE/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/CSE/ROAD D2
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CCE/OD
6. RCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. TO RISE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS.
8. THE DRAINS MAY BE OVERTAKEN AS PER ENGINEERS DIRECTIONS

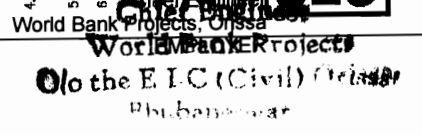
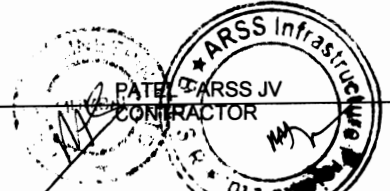
TYPICAL CROSS-SECTION  
TCS - 05 & TCS - 06

**PROJECT:-**  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

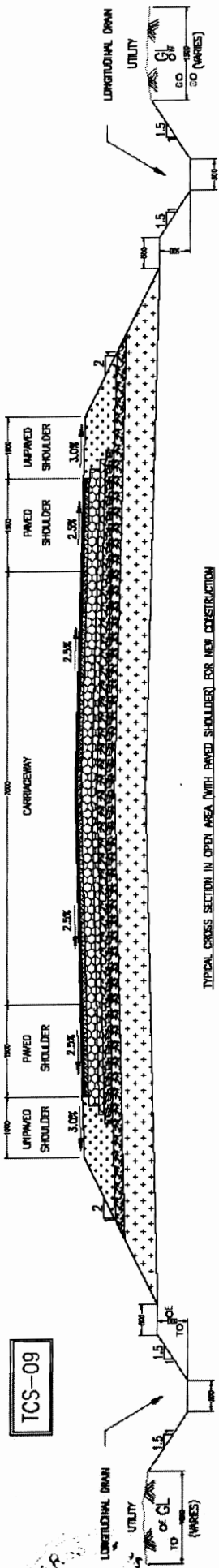
**CONSULTING ENGINEERS GROUP LTD.**  
E-12, Moji Colony, Malviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@cegindia.com

**CEG**

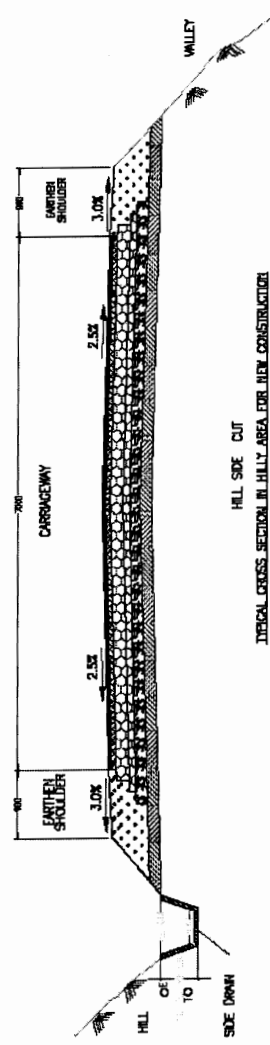
DRG NO.	DATE	REV	RD	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	03				R.J	R.R.D.K	S.G
SCALE					B.M		







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



TYPICAL CROSS SECTION IN HILLY AREA FOR NEW CONSTRUCTION

**LEGENDS**

10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm
10 mm	100 mm	100 mm	100 mm

TCS-09

TCS-10

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO. OSRP/CEG/DR
3. FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WIDENING AND LAYER THICKNESS DETAILS'
4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN RIGID AND FLEXIBLE REFER DRAWING NO. OSRP/CEG/RIGID D2.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/OD
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. INCREASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, OR OF THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

**TYPICAL CROSS-SECTION  
TCS - 09 & TCS - 10**

**PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE**

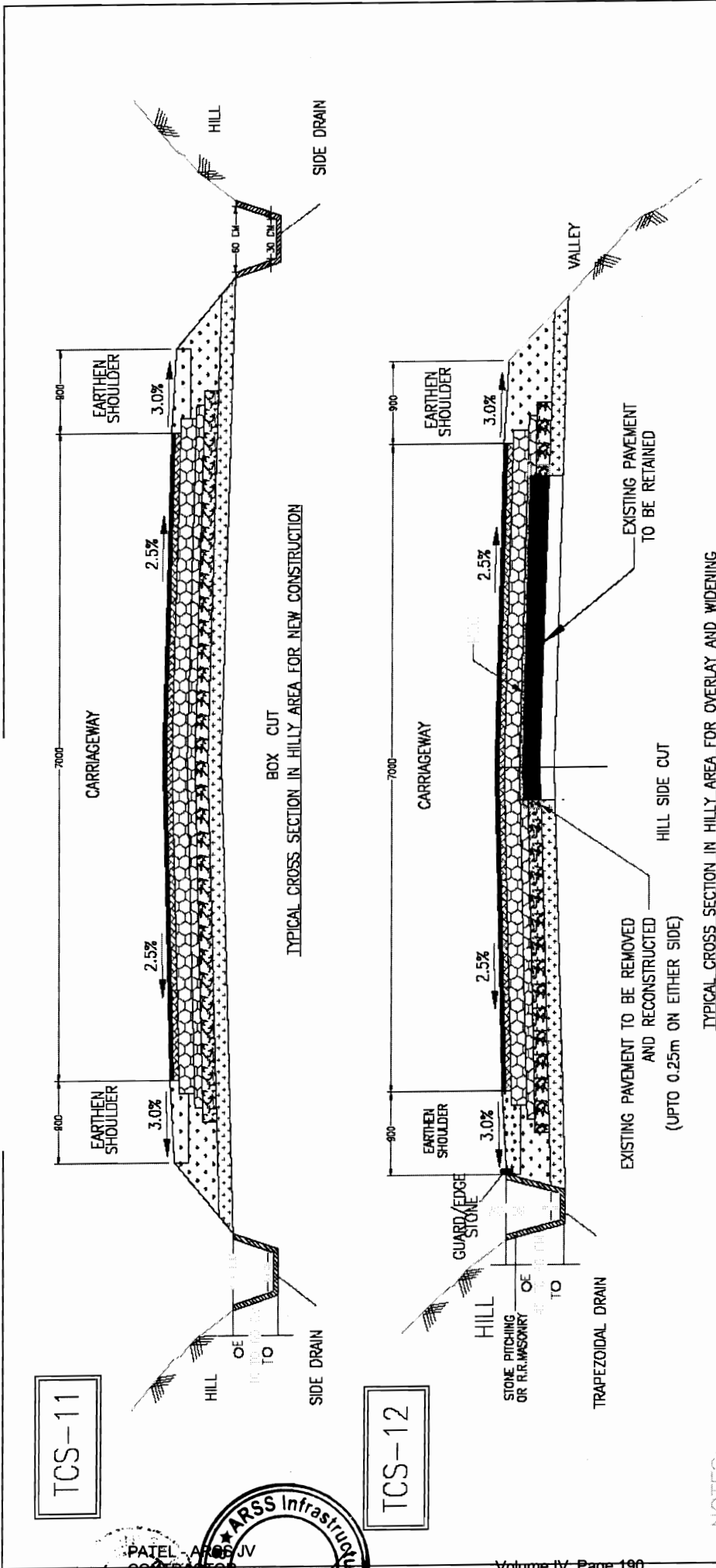
**CONSULTING ENGINEERS GROUP LTD.**  
E-12, Moj Colony, Malviya Nagar, Jaipur-17  
Tel: +91-141-2520899, 2521898, 2520556  
Fax: 2521348, e-mail: ceg@cegroupindia.com

**CEG**

DRG. NO.	OSRP/CEG/09 & 10	DATE	REV	RD	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	05							
SCALE	NTS				B.M	R.J	R.R.D.K	S.G

PATEL ARSS JV  
CONTRACTOR

World Bank Projects, Orissa  
EMPLOYER



**LEGENDS**

1) CC	6) G.C.	11) W - Water Supply Line
2) CM	7) PCC	12) S - Gas Line
3) FMS	8) BENT HILL	13) B - Cable
4) CB	9) E - Existing Drain	
5) SURFACE	10) T - Trench Walls	

TYPICAL CROSS SECTION IN HILLY AREA FOR OVERLAY AND WIDENING

**NOTES:**

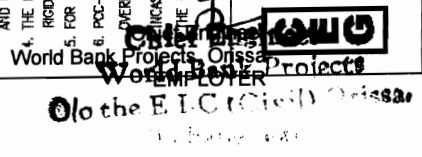
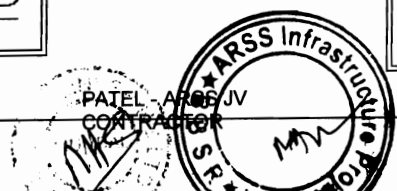
1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO.OSRP/CEG/DR
3. FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WIDENING AND LAYER THICKNESS DETAILS'
4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN RIGID AND FLEXIBLE REFER DRAWING NO.OSRP/CEG/RIGID/02
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/00
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. TO BE REMOVED AND RECONSTRUCTED (UPTO 0.25m ON EITHER SIDE)
8. TO BE RETAINED

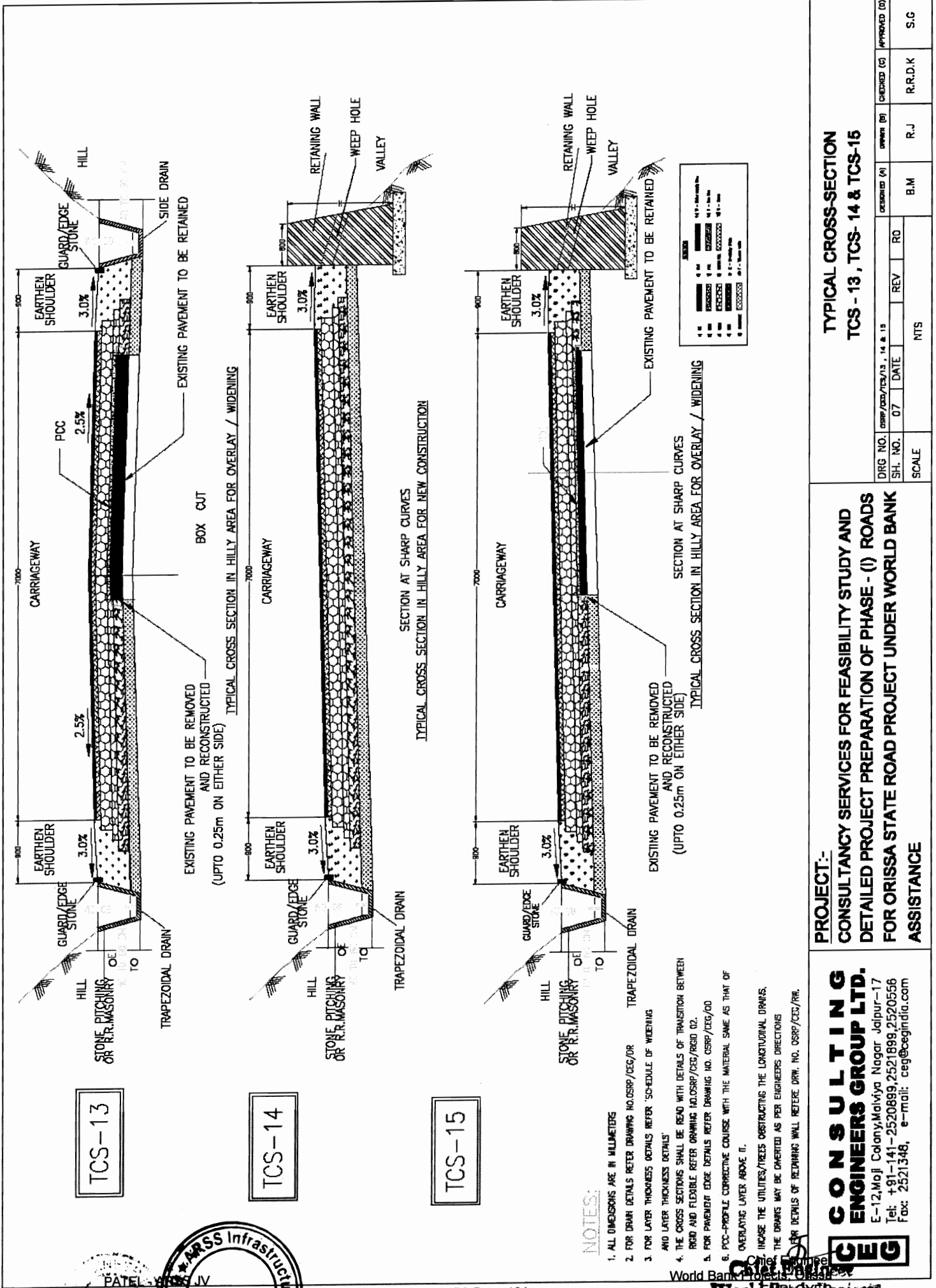
**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

**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 CROSS-SECTION TCS - 11 & TCS - 12**

DRG NO.	OSRP/CEG/TCS/111 & 12	DESIGNED (A)	REV	RO	APPROVED (D)
SH. NO.	06	DATE	REV	R0	CHECKED (C)
SCALE				B.M	R.R.D.K
					S.G





TCS-13

TCS-14

TCS-15

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 ROAD AND FLEXIBLE REFER DRAWING NO.OSRP/CEG/RSD 02.
5. FOR PARALLEL EDGE DETAILS REFER DRAWING NO. OSRP/CEG/OD
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. IN CASE THE UTILITIES/PIES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE CHANGED AS PER ENGINEERS DIRECTIONS
8. FOR DETAILS OF RETAINING WALL REFER DRAW. NO. OSRP/CEG/RW.

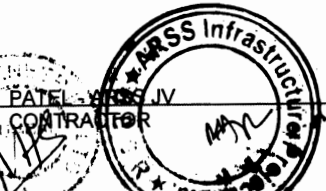
PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

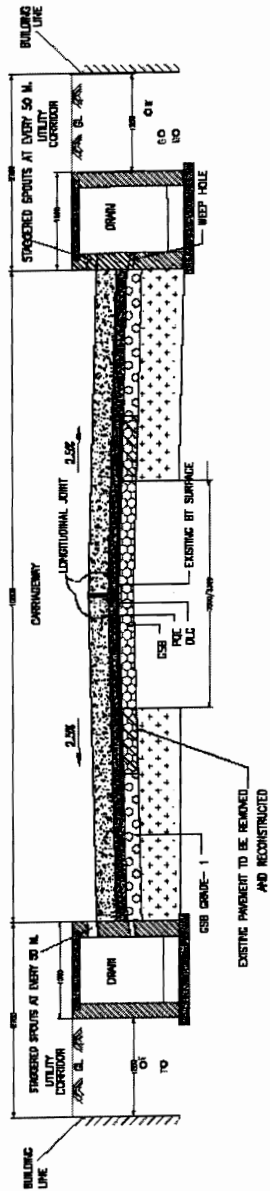
TYPICAL CROSS-SECTION TCS - 13, TCS- 14 & TCS-15

DRG. NO.	OSRP/CEG/TCS/13, 14 & 15	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	07	DATE	REV	RO	
SCALE	NTS		B.M	R.J	R.R.D.K
					S.G

**CEG ENGINEERS GROUP LTD.**  
 E-12, Moji Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520899, 2521898, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

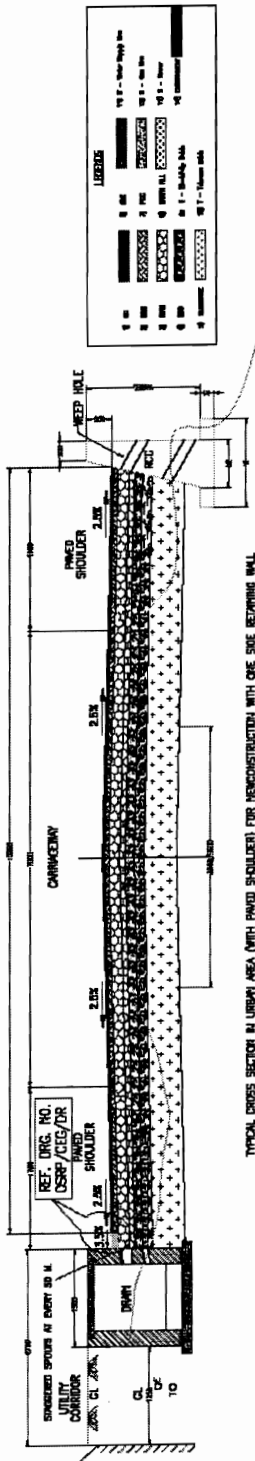


TCS-16



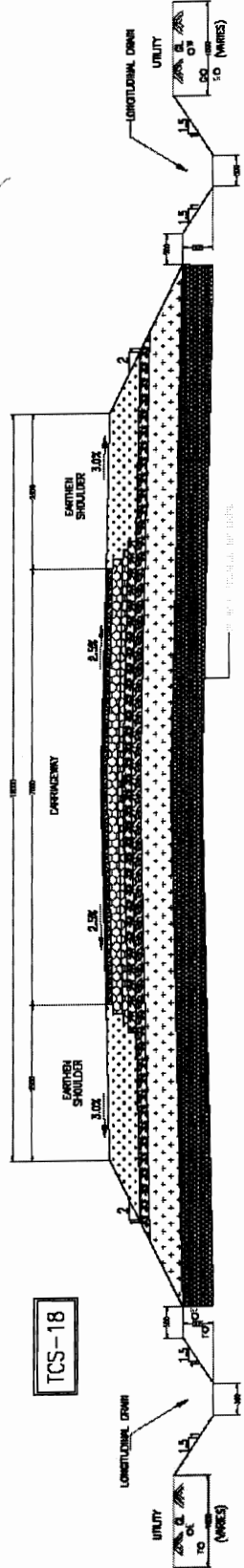
TCS-17

TYPICAL CROSS SECTION OF ROAD PAVEMENT IN BUILT-UP SECTION APPLICABLE FOR CONCRETIC/PASCTIC BITUMING



TCS-18

TYPICAL CROSS SECTION IN OPEN AREA (WITH PAVED SHOULDER) FOR RECONSTRUCTION WITH ONE SIDE RETAINING WALL



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO.OSRP/CEG/DR AND LAYER THICKNESS REFER 'SCHEDULE OF WORKING'
3. FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WORKING'
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 DETAILS REFER DRAWING NO. OSRP/CEG/00
6. P.C.-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 DIVERTED AS PER ENGINEERS DIRECTIONS
8. FOR DETAILS OF RETAINING WALL REFER DRW. NO. OSRP/CEG/RW.

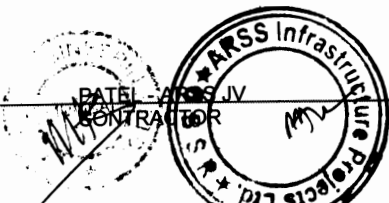
PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

TYPICAL CROSS-SECTION  
TCS - 16, TCS- 17 & TCS- 18

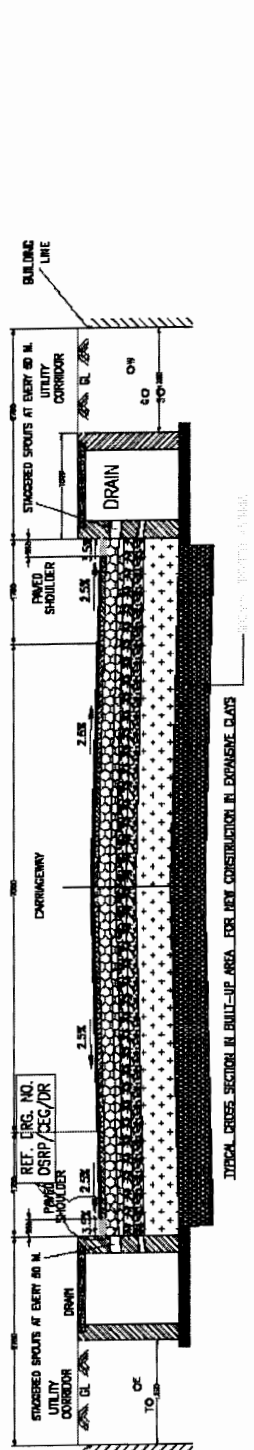
DRG NO.	OSRP/CEG/TCS-16, 17 & 18	DESIGNED (A)	DATE	REV	RD	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	05	05	DATE	REV	RD	R.J	R.R.D.K	S.G
SCALE								

**CEG ENGINEERS GROUP LTD.**  
E-12, Moj Colony, Malviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@ceginia.com

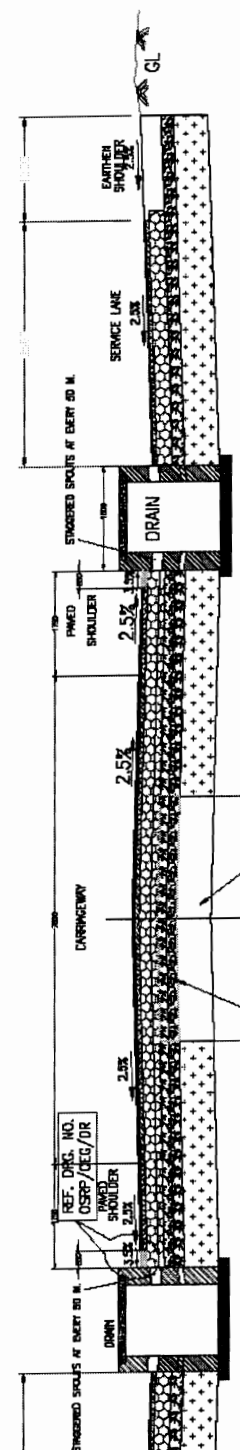




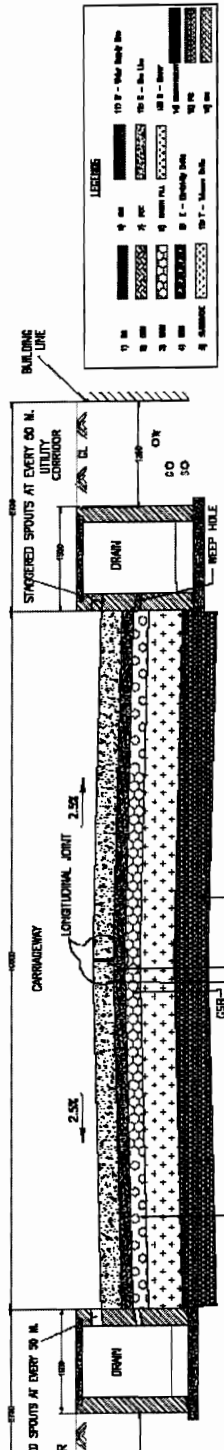
TCS-19



TCS-20



TCS-21



LEGEND

1	100% - 100% Sand Fill
2	100% - 100% Gravel
3	100% - 100% Stone
4	100% - 100% Cement Concrete
5	100% - 100% Bitumen
6	100% - 100% Asphalt
7	100% - 100% Flexible
8	100% - 100% Rigid
9	100% - 100% Earth
10	100% - 100% Water Table
11	100% - 100% Ground Level

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO. OSRP/CEG/DR
3. FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WIDENING AND LAYER THICKNESS DETAILS'
4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN RIGID AND FLEXIBLE REFER DRAWING NO. OSRP/CEG/RIGID 02.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/ED
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 DIVERTED AS PER ENGINEERS DIRECTIONS
8. FOR DETAILS OF RETAINING WALL REFER DRAW. NO. OSRP/CEG/WH.

TYPICAL CROSS-SECTION  
TCS - 19, TCS - 20 & TCS - 21

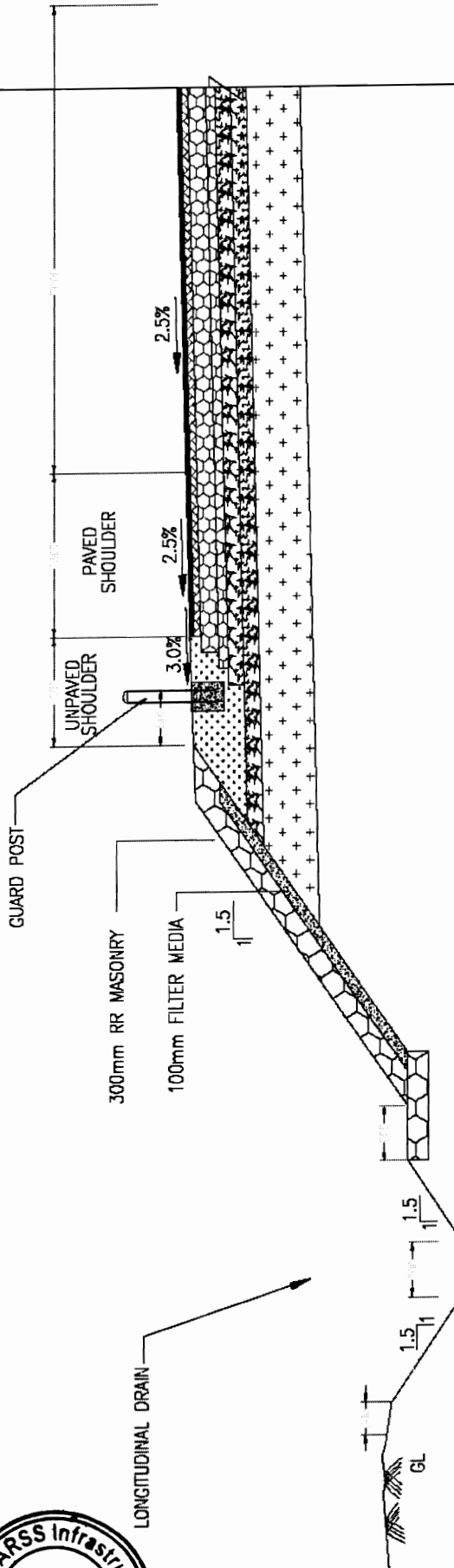
PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

**CONSULTING ENGINEERS GROUP LTD.**  
E-12, Majji Colony, Malviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@cegroupindia.com

DRG. NO.	OSRP/CEG/TCS-19,20 & 21	DESIGNED (A)	DATE	REV	RO	APPROVED (B)	DATE
SH. NO.	09	DATE	09	REV	RO	APPROVED (C)	DATE
SCALE	NTS	DATE	09	REV	RO	APPROVED (D)	DATE
						DRWING (E)	
						DESIGNED (F)	
						CHECKED (G)	
						APPROVED (H)	
						DESIGNED (I)	
						APPROVED (J)	
						DESIGNED (K)	
						APPROVED (L)	
						DESIGNED (M)	
						APPROVED (N)	
						DESIGNED (O)	
						APPROVED (P)	
						DESIGNED (Q)	
						APPROVED (R)	
						DESIGNED (S)	
						APPROVED (T)	
						DESIGNED (U)	
						APPROVED (V)	
						DESIGNED (W)	
						APPROVED (X)	
						DESIGNED (Y)	
						APPROVED (Z)	



CARRIAGEWAY  
C



HIGH EMBANKMENT PROTECTION WORK WITH STONE PITCHING AND CRASH BARRIER

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. THE STONE PITCHING SHALL BE PROVIDED FOR EMBANKMENT HIGHT MORE THEN 3M ALONG WITH METAL CRASH BARRIERS
3. FOR CRASH BARRIERS REFER DWG. NO. OGR/REG/CB.

LEGENDS

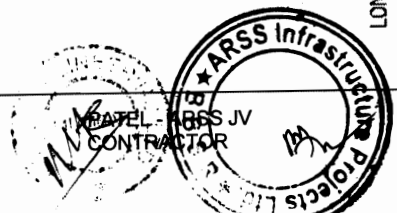
1) 10	1) 10	10) 10 - Metal Safety Line
2) 10	2) 10	11) 10 - 100mm Filter Media
3) 10	3) 10	12) 10 - 300mm RR Masonry
4) 10	4) 10	13) 10 - 2.5% Slope
5) 10	5) 10	14) 10 - 3.0% Slope
6) 10	6) 10	15) 10 - 2.5% Slope
7) 10	7) 10	16) 10 - 3.0% Slope
8) 10	8) 10	17) 10 - 2.5% Slope
9) 10	9) 10	18) 10 - 3.0% Slope
10) 10	10) 10	19) 10 - 2.5% Slope
11) 10	11) 10	20) 10 - 3.0% Slope

TYPICAL SLOPE PROTECTION WORK

PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

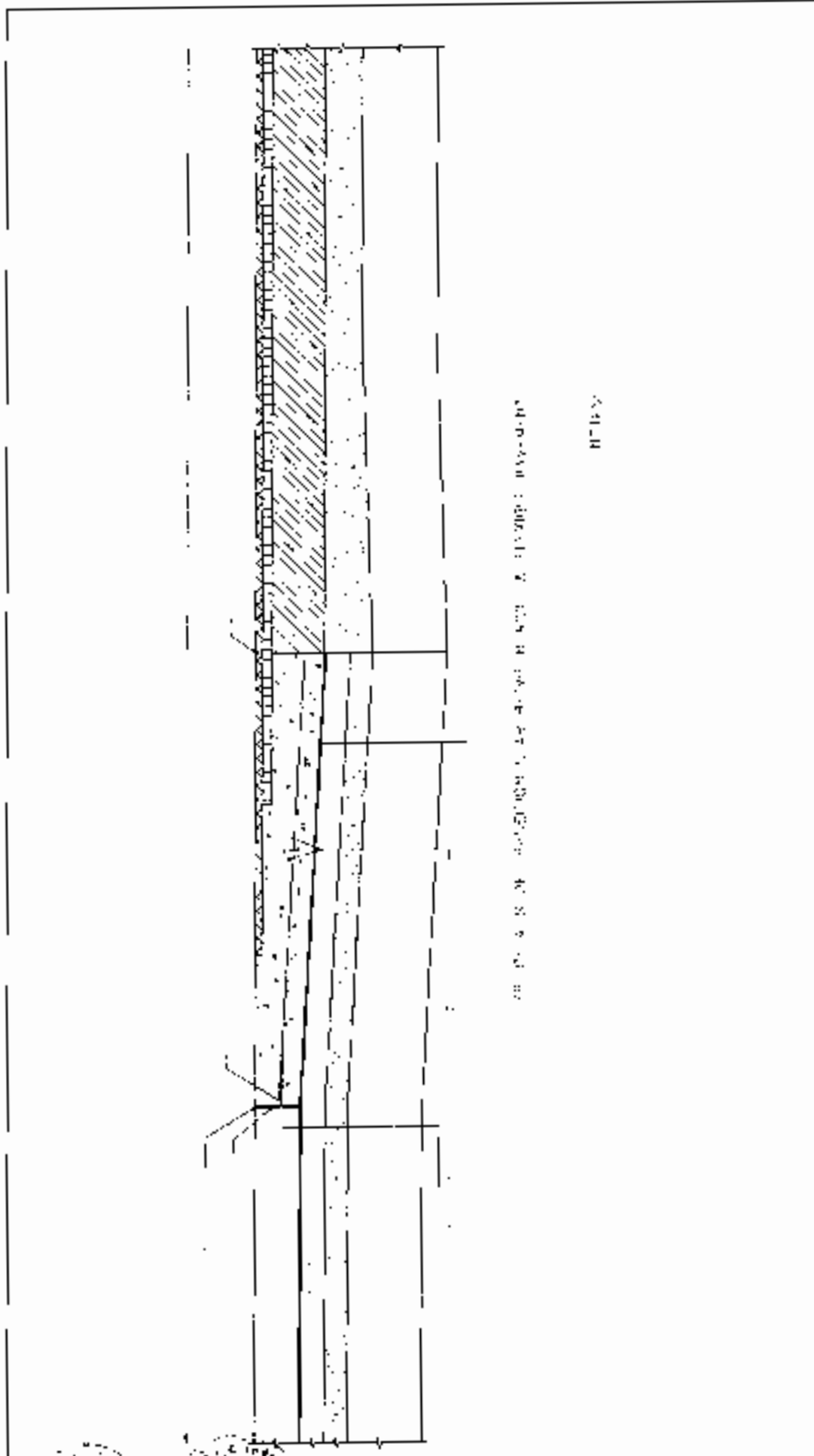
**CEG ENGINEERS GROUP LTD.**  
E-12, Malviya Colony, Malviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@cegindia.com

DRG. NO.	COMP/REG/PM	DATE	REV	RD	APPROVED (D)
SH. NO.	10	10	10	10	10
SCALE	NTS				S.G



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





DRG. NO. S.W. 4025/100/1. 14.4.1993 R. 4/33 P. 11/2000: 1054-0-117

TYPICAL

**TYPICAL DETAILS OF TRANSITION SLAB BETWEEN RIGID AND FLEXIBLE PAVEMENT**

DATE: 12	DATE: 12	REV: 1	NO: 1	SCALE: 1/25
DRG. NO. S.W. 4025/100/1	DATE: 14.4.1993	REV: 1	NO: 1	SCALE: 1/25
DRG. NO. S.W. 4025/100/1	DATE: 14.4.1993	REV: 1	NO: 1	SCALE: 1/25
DRG. NO. S.W. 4025/100/1	DATE: 14.4.1993	REV: 1	NO: 1	SCALE: 1/25

**PROJECT:-**  
 CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
 DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
 FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
 ASSISTANCE

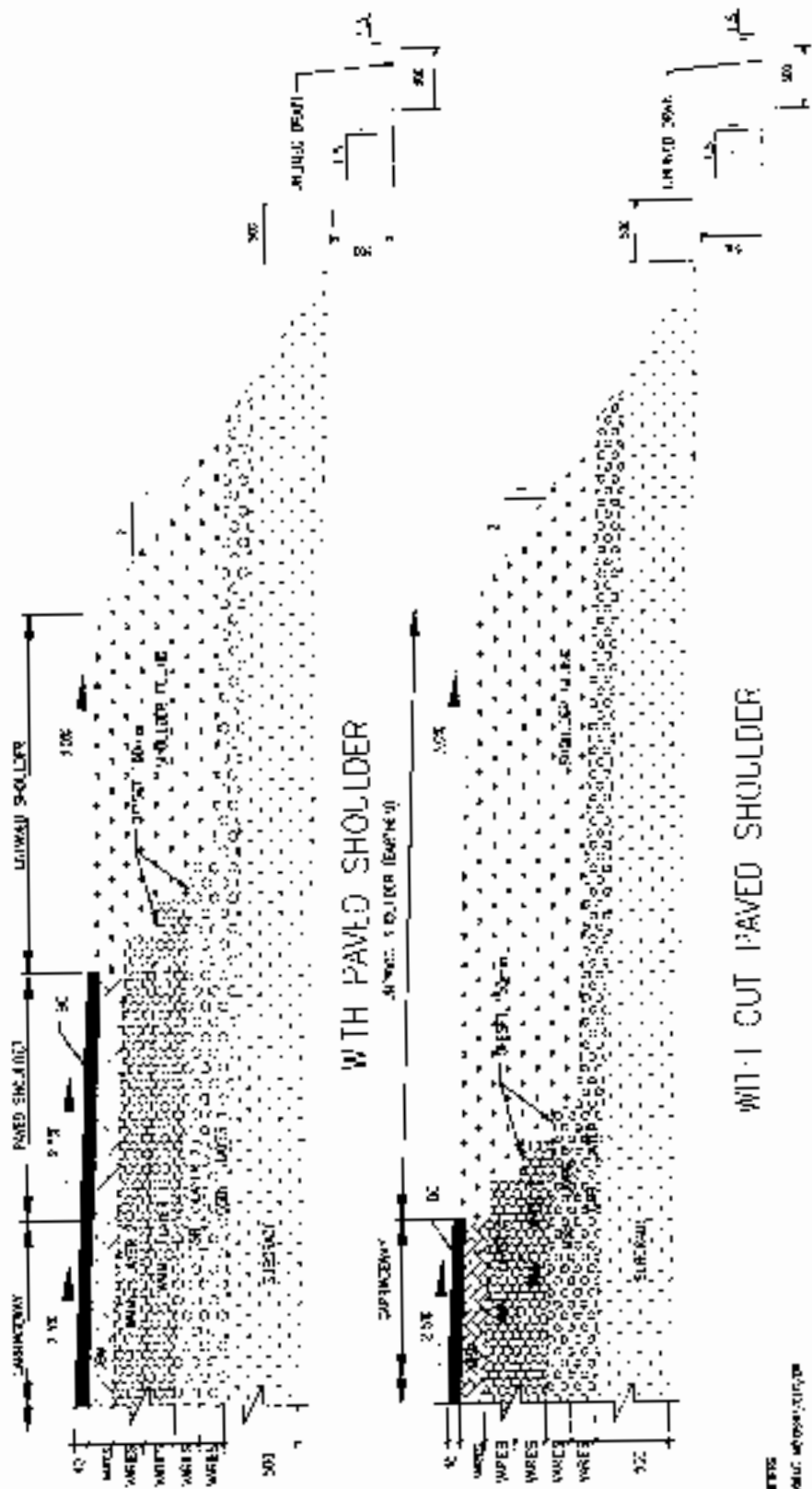
**CONSULTING ENGINEERS GROUP LTD.**  
 C-12, 1st Floor, Co. op. Ind. Bldg. Sector, Jodhpur-342001  
 Tel: +91-1461-232699, 2321899, 2520356  
 Fax: 2521348 e-mail: ceg@vsnl.com

APPROVED  
 CONTRACTOR

World Bank Projects, Orissa  
 World Bank Projects  
 Orissa E.P.C. (Civil) Office  
 Bhubaneswar



Chief Engineer  
 World Bank Projects  
 World Bank Projects  
 Of the E.C. (Civil) Division  
 @hubamwar



**LEGEND**

1.0M	1.5M	2.0M	2.5M	3.0M
1.5M	2.0M	2.5M	3.0M	3.5M
2.0M	2.5M	3.0M	3.5M	4.0M
2.5M	3.0M	3.5M	4.0M	4.5M
3.0M	3.5M	4.0M	4.5M	5.0M

WITH CUT PAVED SHOULDER

1. ALL DIMENSIONS ARE IN METERS
2. FOR CURB (SEES REFER DRAWING 100/100/100)
3. FOR CURB DIMENSIONS REFER TO THE DRAWING 100/100/100
4. THE CURB DIMENSIONS SHALL BE AS SHOWN IN THE DRAWING 100/100/100
5. THE CURB DIMENSIONS SHALL BE AS SHOWN IN THE DRAWING 100/100/100
6. FOR CURB DIMENSIONS REFER TO THE DRAWING 100/100/100
7. FOR CURB DIMENSIONS REFER TO THE DRAWING 100/100/100

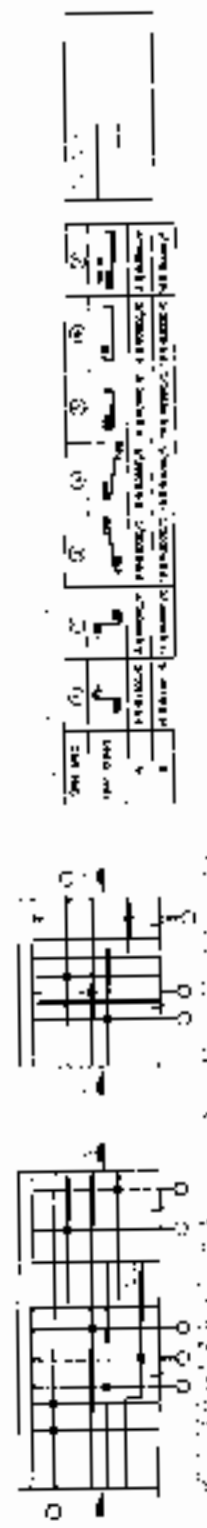
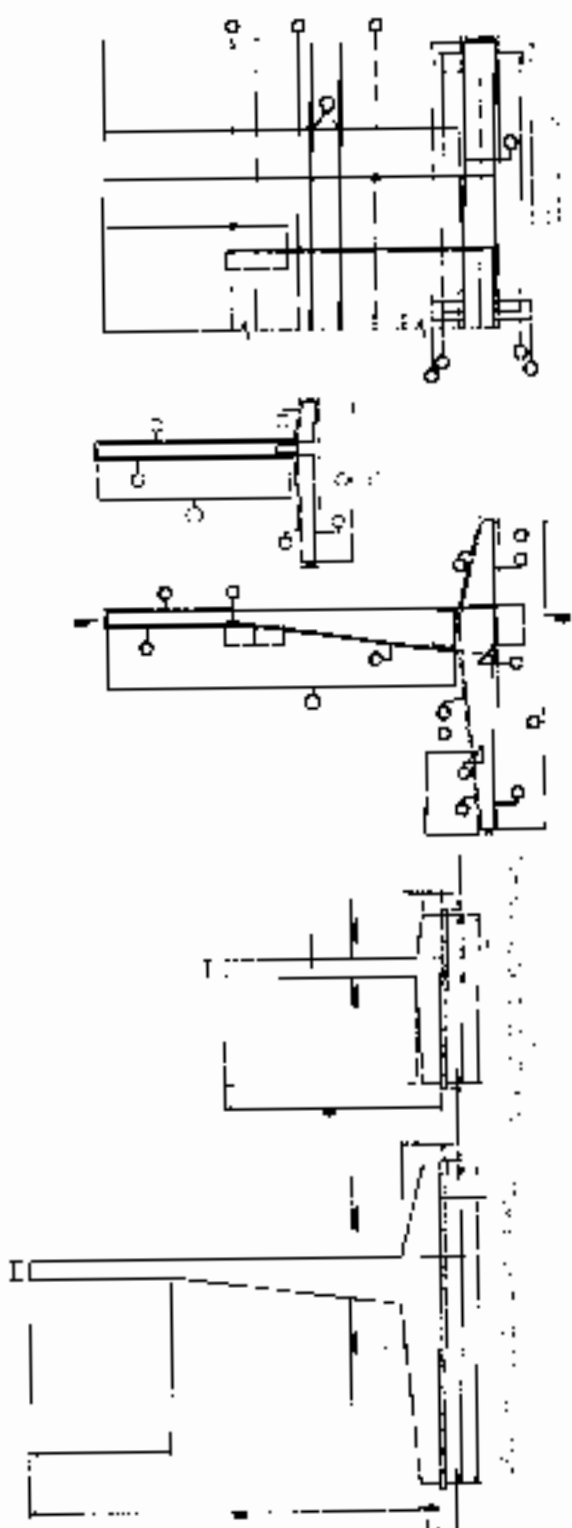
TYPICAL DETAILS OF PAVEMENT LAYER

DATE	13	DATE	13	DATE	13
SCALE	1:1	SCALE	1:1	SCALE	1:1
DESIGNED BY	DESIGNED BY	DESIGNED BY	DESIGNED BY	DESIGNED BY	DESIGNED BY
CHECKED BY	CHECKED BY	CHECKED BY	CHECKED BY	CHECKED BY	CHECKED BY
APPROVED BY	APPROVED BY	APPROVED BY	APPROVED BY	APPROVED BY	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

**CEG ENGINEERS GROUP LTD.**  
 E-12, 1st Floor, Convent, New Market, Cuttack - 753 001  
 Tel: +91-674-2520999, 2520956  
 Fax: 2520348, 4711111, 2520956  
 www.cebgroupindia.com

NOTES



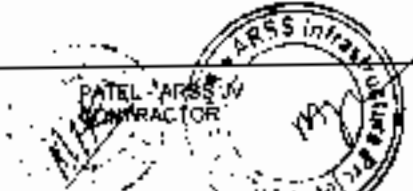
Sl. No.	Part	Material	Quantity	Unit	Remarks
1	Concrete	M20	100	m <sup>3</sup>	
2	Reinforcement	Fe 415	100	kg	
3	Formwork	15mm Ply	100	m <sup>2</sup>	
4	Labour		100	man-days	
5	Excavation		100	m <sup>3</sup>	
6	Backfill		100	m <sup>3</sup>	
7	Paint		100	kg	
8	Other		100	kg	

STANDARD DRAWINGS  
RETAINING WALL

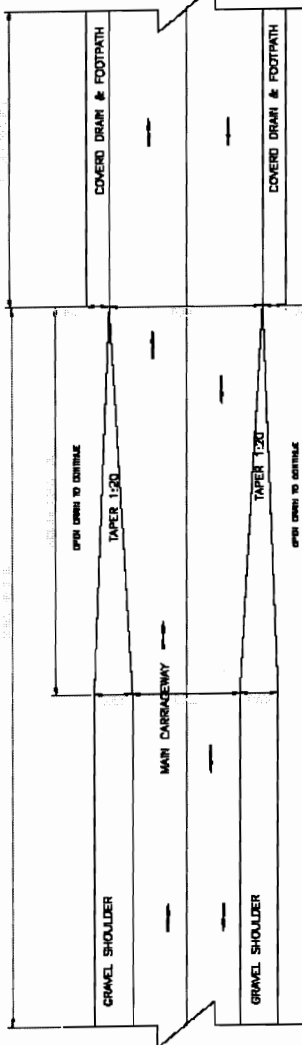
**PROJECT:**  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

**CEG**  
**CONSULTING ENGINEERS GROUP LTD.**  
F-12, N.J. Colony, Ma. alyn, Jaipur - 1 /  
Tel: +91-141-2320099, 2321899, 2520556  
Fax: 2321348, e-mail: ceg@cepnltd.com

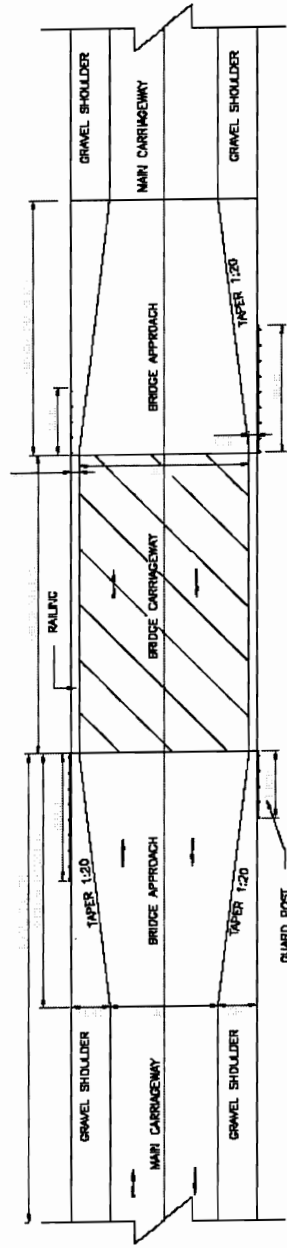
DRG. NO.	DATE	BY	CHECKED BY	DATE	SCALE
14	14	DATE	DATE	DATE	DATE
14	14	DATE	DATE	DATE	DATE



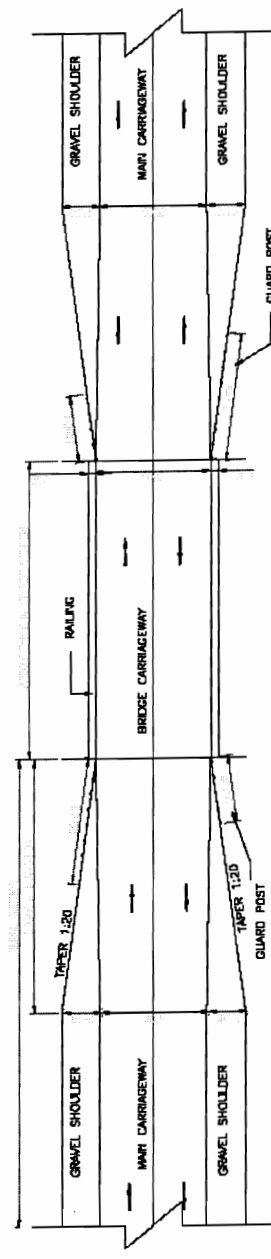
Water Estim. Project Office  
Water Estimation Office  
G/O the F.L.C. (Civil) Office  
Indra Bahar



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 BRIDGES SECTION

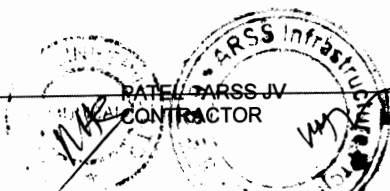
- NOTE**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS INDICATED OTHERWISE.
  2. FOR DETAILS OF STRUCTURES REFER STRUCTURAL DRS.
  3. GUARD POSTS ARE INSTALLED WHERE EMBANKMENT HEIGHT IS MORE THAN 3 METRES & AT BRIDGE APPROACHES.
  4. FOR GUARD POST DETAIL REFER DWS. NO. CSR/CEG/AM & GP.
  5. FOR APPROACHES REFER TO THE DETAIL REFER TYPICAL ROAD SIGN & LEGENDS OF ROAD BELTURNS.
  6. DRAWING TO BE READ WITH TDS- 1 TO TDS-15 AND DMC. NO. CSR/CEG/RSD/02

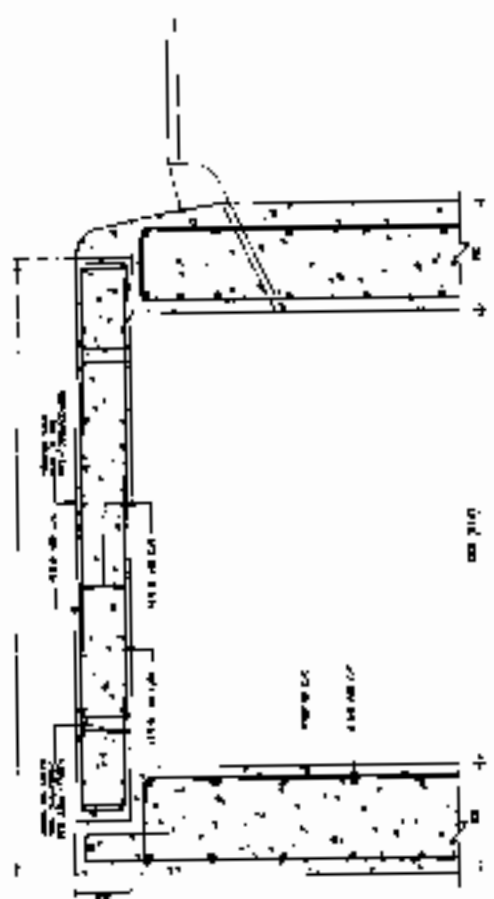
**TYPICAL DETAILS OF TRANSITION OF DIFFERENT ROAD SECTION**

**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE**

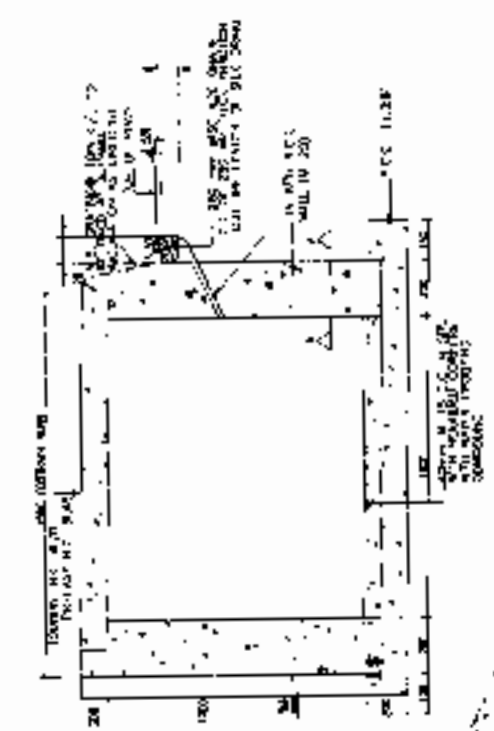
DRG. NO.	CSR/CEG/78	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	15	DATE	REV	RO	
SCALE	N.T.S.				
			B.M.	R.J.	R.R.D.K
					S.G

**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Moj Colony, Malviya Nagar Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2520556  
 Fax: 2521348, e-mail: ceg@cegindia.com

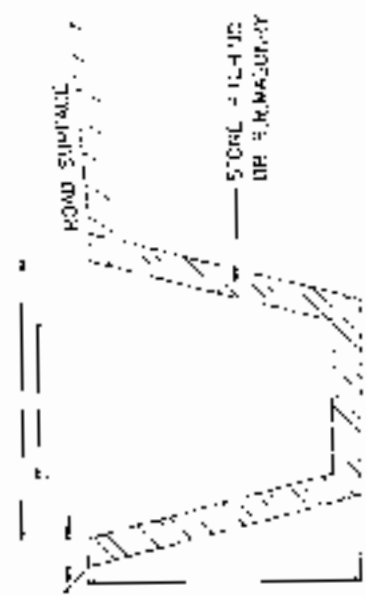




PLAN OF DRAINAGE



SECTION OF DRAINAGE



STANDARD DRAWINGS  
DETAILS OF DRAIN AND KERB

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.	DATE	SCALE	REV.	NO.	REVISION
1-1-250	18			0.1M	
SHEET			VTS		
			R.R.C.K		
			S.G		

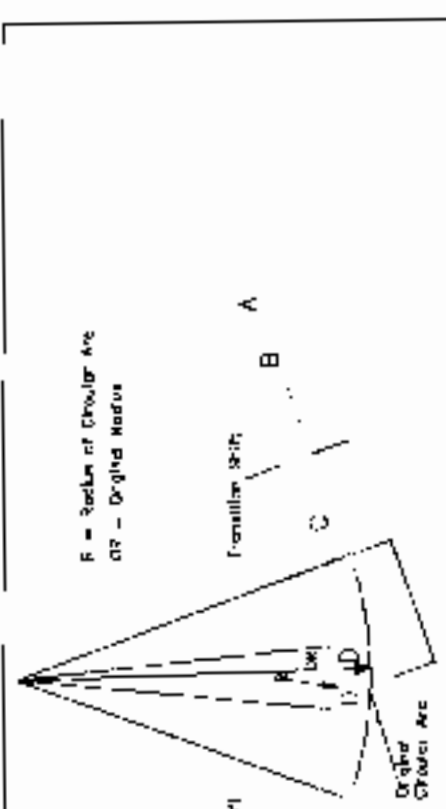
**CONSULTING ENGINEERS GROUP LTD.**  
G-2, No. 1, Co-Op, Mulvya Nagar, Colaba, Mumbai 400 056  
Tel: +91-11-2521899, 2520556  
Fax: 2521348, e-mail: ceg@cegroupindia.com



World Bank Project  
Chief Engineer  
D/o the E.C.C. (Civil) Div.  
New Delhi



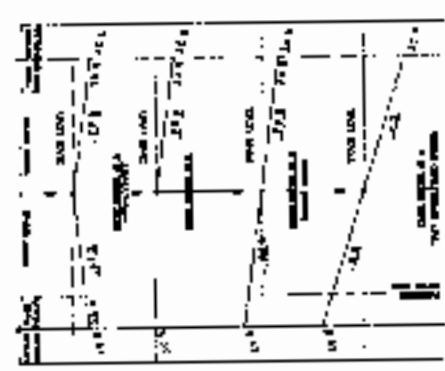




**APPLICATION OF SUPER-ELEVATION**



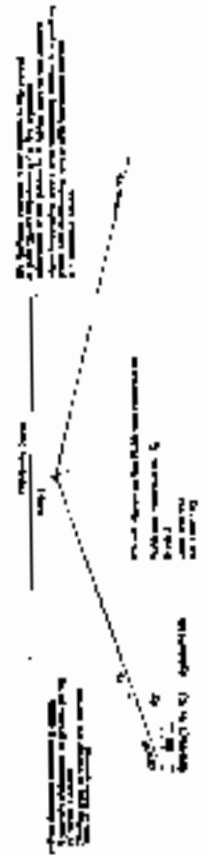
**LONGITUDINAL SECTION THROUGH HORIZONTAL CURVE**



1. The road is to be constructed on a level ground.
2. The road is to be constructed on a level ground.
3. The road is to be constructed on a level ground.
4. The road is to be constructed on a level ground.
5. The road is to be constructed on a level ground.
6. The road is to be constructed on a level ground.
7. The road is to be constructed on a level ground.
8. The road is to be constructed on a level ground.
9. The road is to be constructed on a level ground.
10. The road is to be constructed on a level ground.



The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground. The road is to be constructed on a level ground.

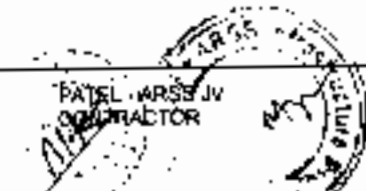


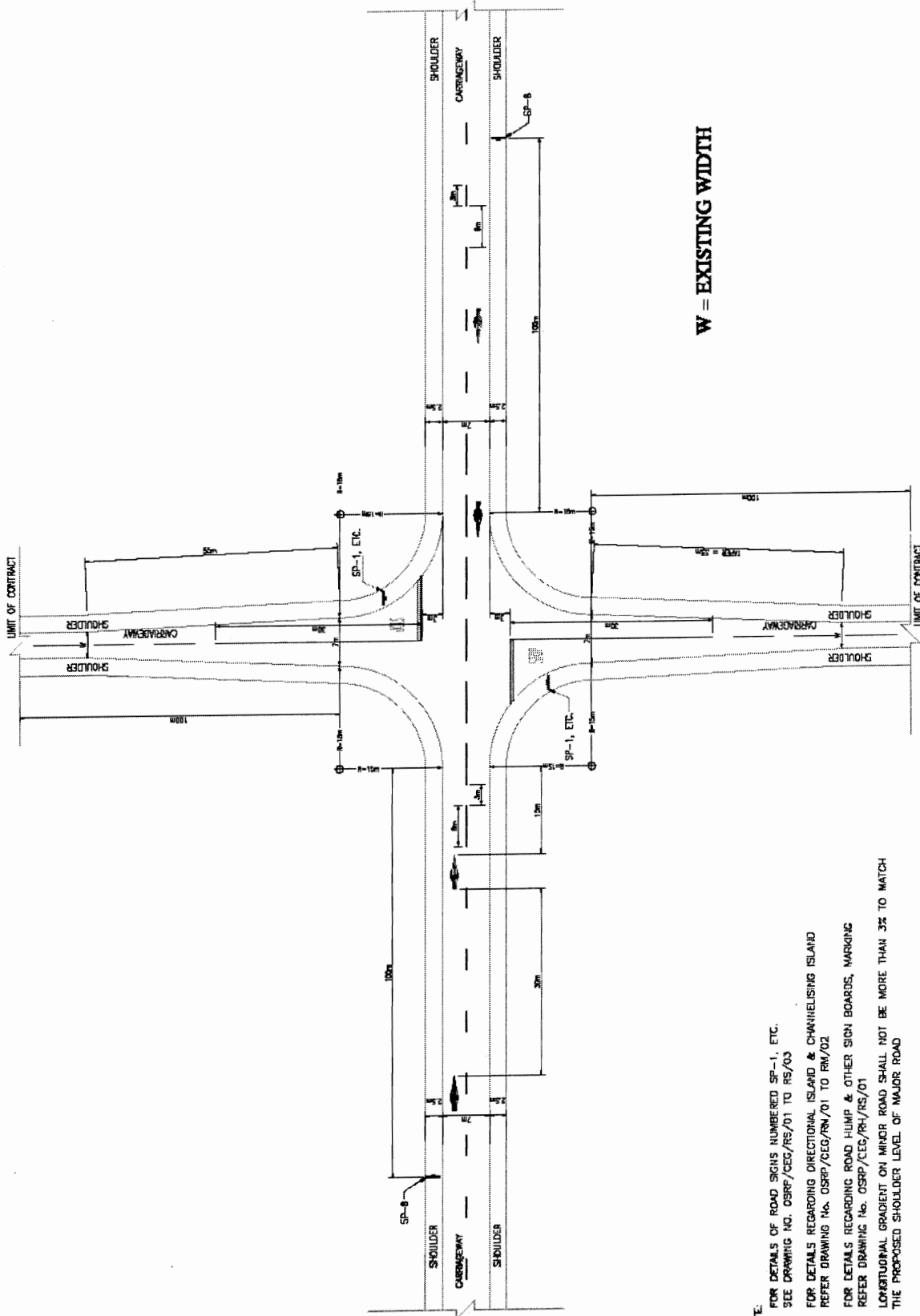
**DETAILS OF APPLICATION OF SUPER-ELEVATION**

DATE	NO.	BY	CHKD.	DATE	NO.	BY	CHKD.
17	17	DA	DA	17	17	DA	DA
SCALE				1/75			
R.J.				R.J.C.K			
S.G.				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.**  
 C-1, Hajj Colony, Mukhyo Nagar, Jaipur-17  
 Tel: +91-141-2570831, 2571899, 2520206  
 Fax: 2527348, e-mail: ceg@rajnet-3a.com





W = EXISTING WIDTH

NOTE:

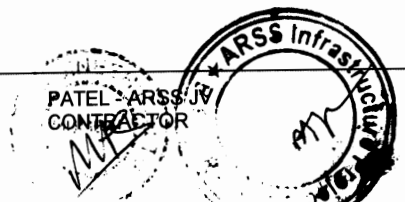
1. FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, ETC. SEE DRAWING NO. ODRP/CEG/RS/01 TO RS/03
2. FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING No. ODRP/CEG/RN/01 TO RN/02
3. FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING No. ODRP/CEG/RN/RS/01
4. LONGITUDINAL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

**STANDARD DRAWINGS  
TYPICAL 4-LEGGED INTERSECTION WITH  
WITH SINGLE LANE BT ROAD**

DRG NO.	ODRP/CEG/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.G

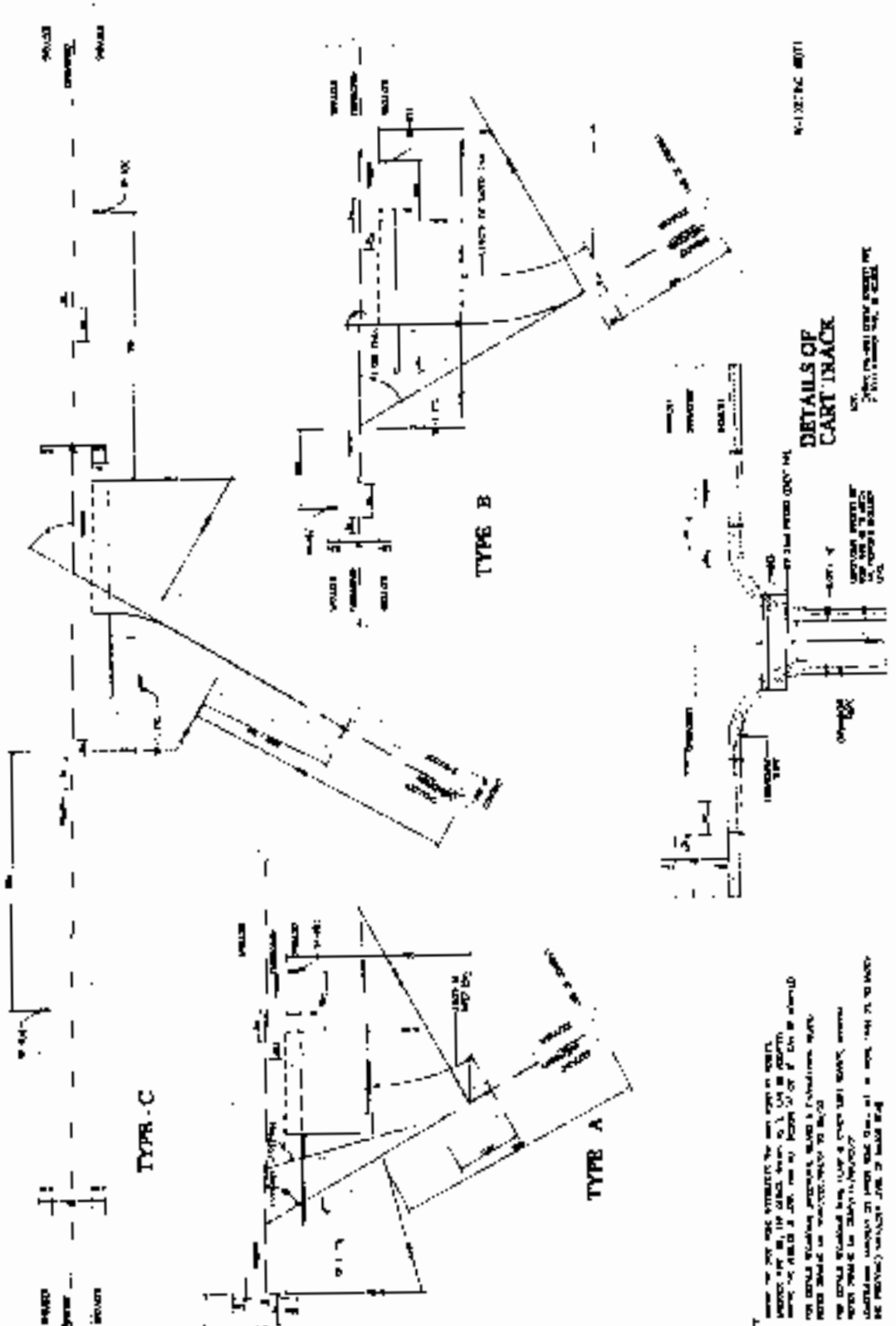
**PROJECT:-  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE**

**CEG ENGINEERS GROUP LTD.**  
E-12, Maji Colony, Maliviya Nagar Jaipur-17  
Tel: +91-141-2520899, 2521899, 2520556  
Fax: 2521348, e-mail: ceg@ceginia.com

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





- NOTE: THE DRAWING IS FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE EXISTING CONDITIONS AND THE DIMENSIONS OF THE ROAD AND CART TRACK AT THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR FOR THE CONSTRUCTION OF THE BRIDGE AND ROAD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR FOR THE CONSTRUCTION OF THE BRIDGE AND ROAD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR FOR THE CONSTRUCTION OF THE BRIDGE AND ROAD.

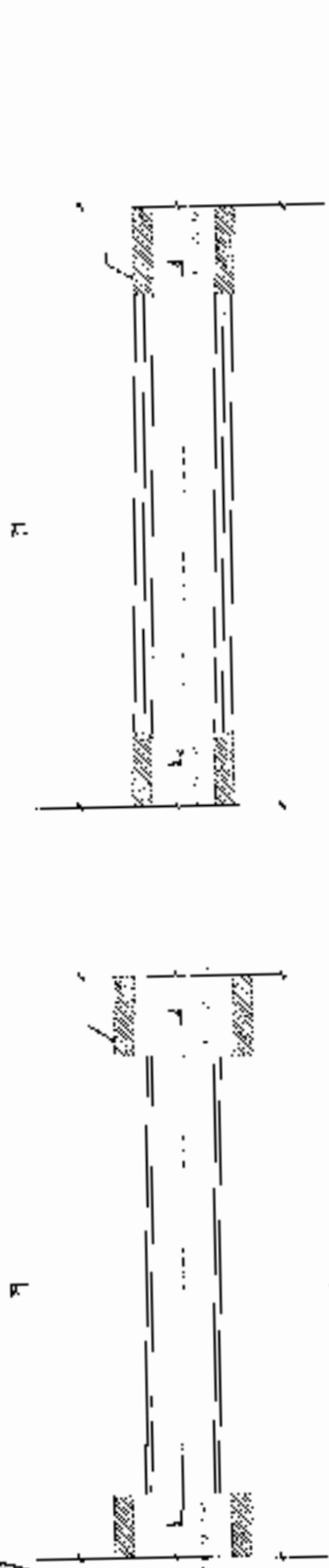
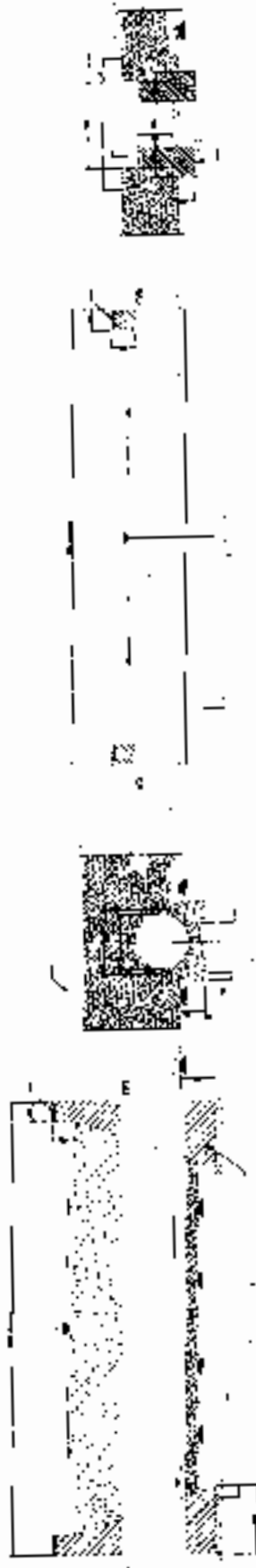
STANDARD DRAWINGS  
TYPICAL Y. JUNCTION WITH  
SINGLE LANE BT ROAD/EARTHEN ROAD

DATE	REV	BY	DATE	BY	SCALE
01/01/00	01	01	01/01/00	01	1:1
PROJECT NO.			SHEET NO.		
01/01/00			01		
PROJECT NAME			SHEET TITLE		
01/01/00			01		
PROJECT LOCATION			SHEET NO.		
01/01/00			01		
PROJECT NO.			SHEET NO.		
01/01/00			01		
PROJECT NAME			SHEET TITLE		
01/01/00			01		
PROJECT LOCATION			SHEET NO.		
01/01/00			01		

**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, May Colony, Bhubaneswar, Orissa, India  
Tel: 661-141-2523059, 23271890, 25206556  
Fax: 2327343, e-mail: ceg@cegindia.com





1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL CONCRETE WORK SHALL BE OF STANDARD SPECIFICATION.
3. THE ROAD SHALL BE 10% GRADE TOWARDS THE DRAIN.
4. THE DRAIN SHALL BE 1.5m DEEP AND 0.3m WIDE AT THE BOTTOM.
5. THE DRAIN SHALL BE COVERED WITH A CONCRETE SLAB.
6. THE DRAIN SHALL BE COVERED WITH A CONCRETE SLAB.
7. THE DRAIN SHALL BE COVERED WITH A CONCRETE SLAB.



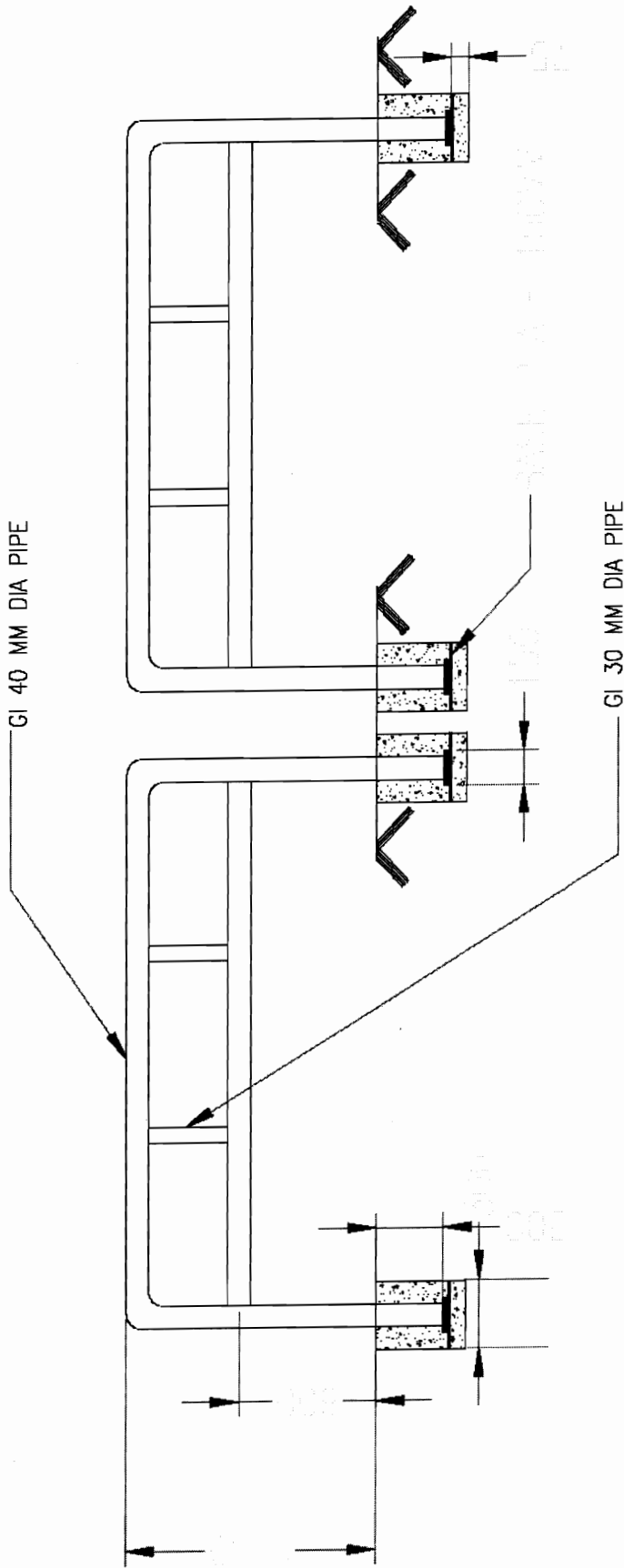
**PROJECT:-**  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

**STANDARD DRAWINGS**  
**TYPICAL - CROSS DRAIN**  
**SINGLE LANE BT ROAD/EARTHEN ROAD**

**CEG**  
**CONSULTING ENGINEERS GROUP LTD.**  
6-1, Raj Colony, Malviya Nagar, Jaipur-17  
Tel: +91-141-2520359, 2520366  
Fax: 2520368, e-mail: ceg@cegindia.com

DATE: 21/05/2011  
REV: 01  
BY: R.R.D.A.  
S.D.





**ELEVATION OF FOOTPATH BARRIER**

**STANDARD DRAWINGS**  
**DETAILS OF FOOTPATH BARRIERS**

DRG NO.	COMP/REV/PS	DATE	REV	RO	DESIGNED (A)	DRAWN (B)	CHECKED (C)	APPROVED (D)
SH. NO.	23						R.J	R.R.D.K
SCALE	NTS				B.M			S.G

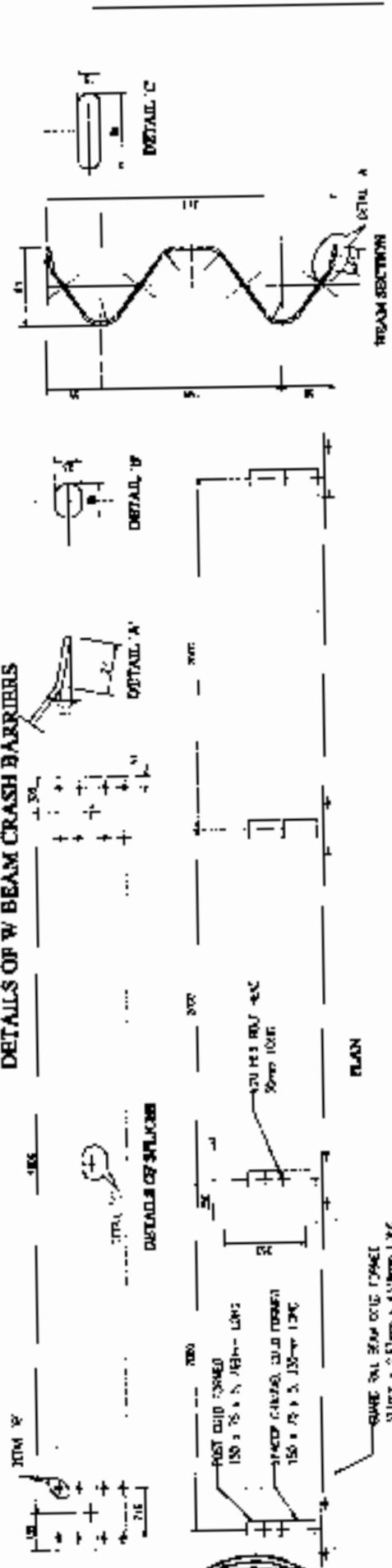
**PROJECT:-**  
**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND**  
**DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS**  
**FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK**  
**ASSISTANCE**

**CEG**  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Ma Ji 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  
 O/o the E.I.C.T (Civil) Division  
 Bhubaneswar

**DETAILS OF W BEAM CRASH BARRIERS**



1. MATERIALS TO BE USED SHALL BE AS PER THE FOLLOWING TABLE.
2. GRADE OF STEEL SHALL BE AS PER IS 2062.
3. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
4. ALL MEMBERS OF THE STRUCTURE SHALL BE WELDED TOGETHER AT ALL JOINTS.
5. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
6. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
7. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
8. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
9. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
10. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
11. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
12. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
13. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
14. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
15. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
16. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
17. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
18. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
19. THE GRADE OF STEEL SHALL BE AS PER IS 2062.
20. THE GRADE OF STEEL SHALL BE AS PER IS 2062.

**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**

SCALE	DATE	REV	BY	CHKD BY
	24	30	B.M	R.S.C.K

**CEG**  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, Haf C, Sector, Malviya Nagar, Jaipur-17  
 Tel: +91-141-2520899, 2521899, 2521888  
 Fax: 2521248, 2521888, 2521888

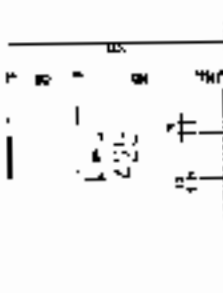




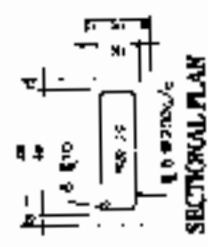
FACE 1



FACE 2



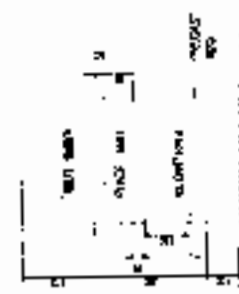
SIDE ELEVATION



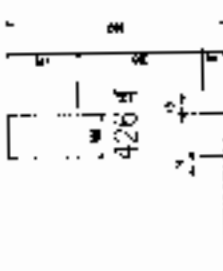
SECTIONAL PLAN



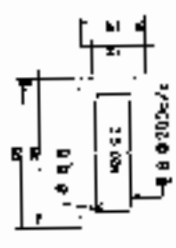
FACE 1



FACE 2



SIDE ELEVATION



SECTIONAL PLAN

- | NO | REV | DESCRIPTION                                | DATE |
|----|-----|--|------|
| 0  | 0   | INITIAL QUANTITY FOR 400 X 400 MEDIUM TYPE |      |
| 1  | 1   | FOR 400 X 400 MEDIUM TYPE                  |      |
| 2  | 2   | FOR 400 X 400 MEDIUM TYPE                  |      |
| 3  | 3   | FOR 400 X 400 MEDIUM TYPE                  |      |
| 4  | 4   | FOR 400 X 400 MEDIUM TYPE                  |      |
| 5  | 5   | FOR 400 X 400 MEDIUM TYPE                  |      |
| 6  | 6   | FOR 400 X 400 MEDIUM TYPE                  |      |
| 7  | 7   | FOR 400 X 400 MEDIUM TYPE                  |      |

FACE FOR DRAWING STONES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. HIGH TOPPED STONE SHALL BE IN ACCORDANCE WITH CLAUSE 5 OF M.O.R.T. & II SPEC.
3. FOR TYPE & STYLE SIZE OF LETTERING REFER TO RC CODE ON PRACTICE SHEET DC REFURD.
4. LETTERING IS DONE WITH APPROVED QUALITY BLACK PANEL 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**

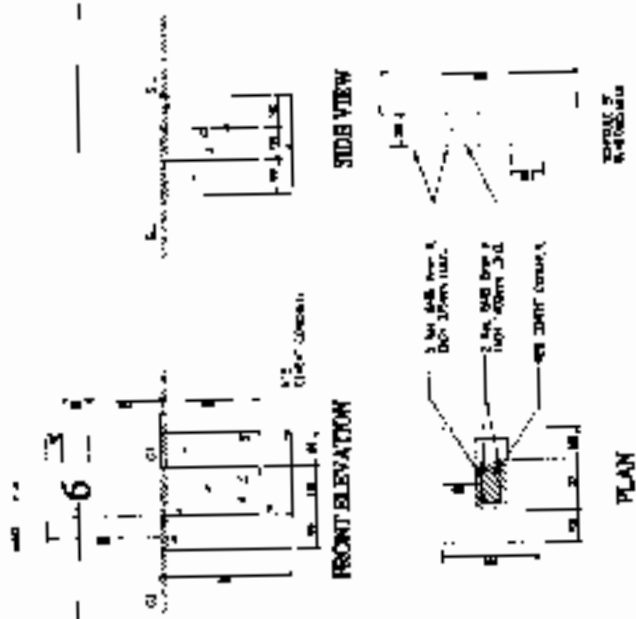
**STANDARD DRAWINGS**  
**TYPICAL KM STONE & 5TH KM STONE**

DRG NO	DATE	REV	BY	CHK	APP	SCALE
511	25					

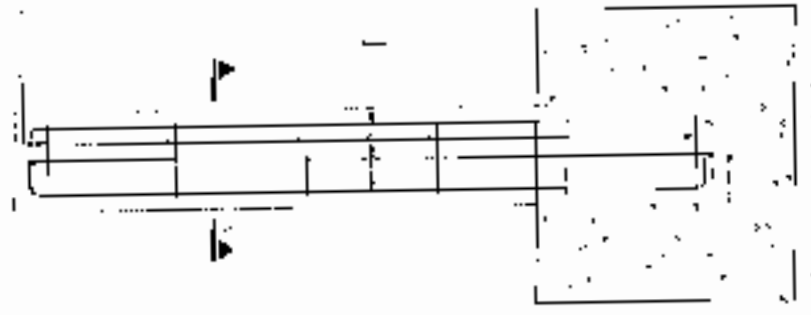
**CONSULTING ENGINEERS GROUP LTD.**  
 C-2, 4th Floor, Colony, Kirtikalya Nagar, Jabalpur-17  
 Tel: +91-141-2520355, 2727899, 2520666  
 Fax: 2520348 e-mail: ceg@bangalore.com



World Bank Projects, Open Access  
 No to E.L.C (Civil) Drive



1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THE TOP PORTION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS OF IS: 10163 & IS: 10164 FOR TYPE & STYLE SIZE OF LETTERING BELIEVED TO BE SUITABLE FOR THE PURPOSE.
3. THE LETTERING SHALL BE IN BLACK.
4. THE LETTERING IS TO BE WITH APPROVED QUALITY BLACK GRANITE PAINT AS PER SPECIFICATION.



1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. P.O.C. GUARD POSTS TO BE INSTALLED WHERE EMBANKMENT HEIGHT IS GREATER THAN 3 M. AT OTHER HAZARDOUS LOCATIONS.



FIXING DETAILS OF GUARD POST



EMPLOYER'S PROJECTS  
 EMPLOYER'S PROJECTS  
 EMPLOYER'S PROJECTS

**CONSULTING ENGINEERS GROUP LTD.**  
 E-17, 603 Colony, Malviya Nagar, Jaipur-302017  
 Tel: +91-141-2520898, 2521536  
 Fax: 2521348, e-mail: ceg@cegroupindia.com

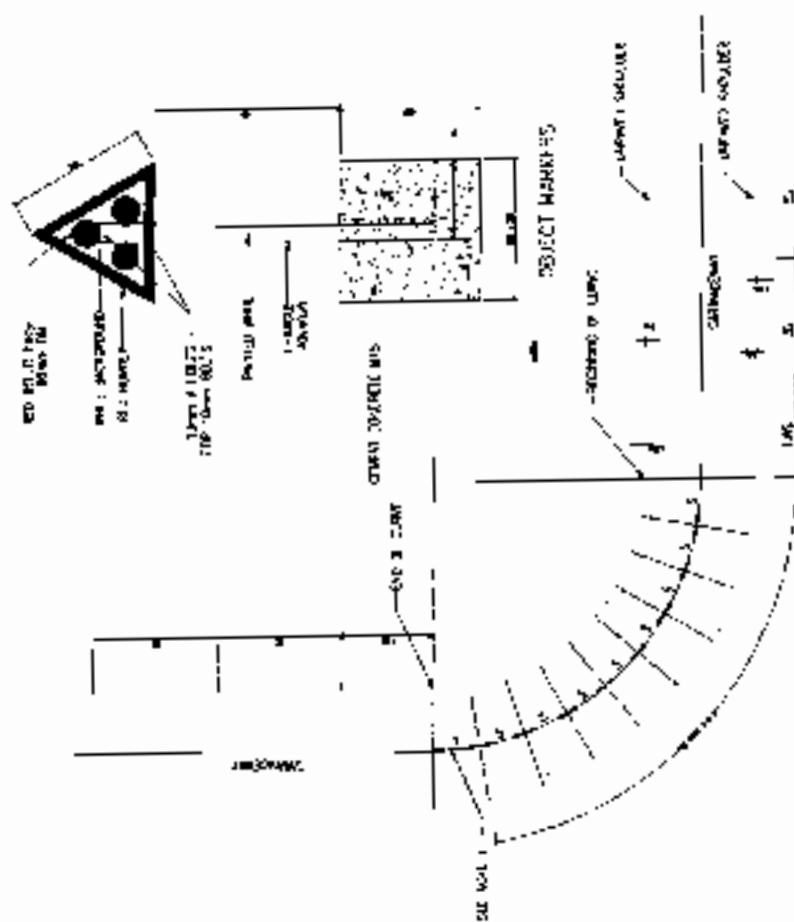
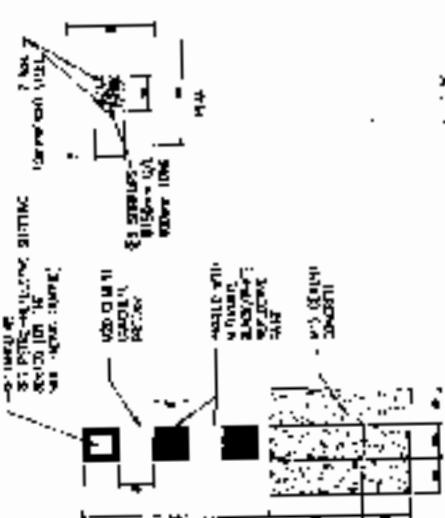
**PROJECT:-**

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

**STANDARD DRAWINGS**

TYPICAL DETAILS OF 200MM STONE & GUARD POST

DRG. NO.	DATE	REV.	BY	CHKD. BY	APPROVED BY
SP. NO.	30	01	04	04	04
SCALE					R.N.E.K.
					R.C.



NO. OF CURVES (METERS)	NO. OF DELINEATORS (METERS)	SPACING OF DELINEATORS (METERS)
1	24	6
2	24	8
3	24	12
4	300	20
5	300	25
6	300	30
7	300	35
8	300	40
9	300	45
10	300	50
11	300	55
12	300	60

- NOTES:**
1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
  2. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  3. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  4. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  5. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  6. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  7. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  8. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  9. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  10. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  11. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  12. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.
  13. ALL DIMENSIONS ARE TO BE TAKEN AS SHOWN IN THE DRAWING UNLESS OTHERWISE SPECIFIED.



World Bank Projects and other projects  
 EMPLOYEE  
 Director of P&T, O.R.S.A.  
 Hyderabad

**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**  
**DETAILS OF ROAD DELINEATORS**

DATE: 27/04/12  
 SCALE: 1:50  
 DRAWN BY: R.J.  
 CHECKED BY: S.C.

**CEG CONSULTING ENGINEERS GROUP LTD.**  
 C-2, 1st Floor, Colony, Market, Raipur, Chhatisgarh, India  
 Tel: +91-781-2527088, 2527089, 2527090  
 Fax: 2527346, 2527347  
 www.cecgroup.com

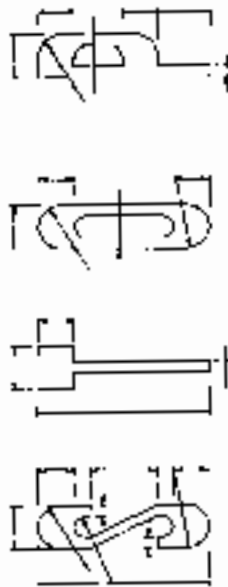




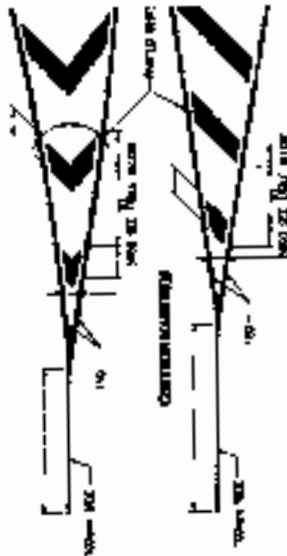
**DIRECTIONAL ARROWS**



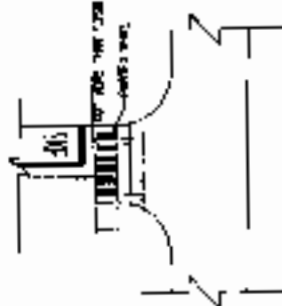
**SIZE OF LETTERS**



**DIRECTIONAL MARKINGS**



**RESTRICTION CROSSING**



**STOP SIGN**



TABLE 1: ROAD MARKING SYMBOLS

SYMBOL	DESCRIPTION	SIZE (mm)	HEIGHT (mm)	WIDTH (mm)
(Symbol)	STOP SIGN	100	100	100
(Symbol)	RESTRICTION CROSSING	100	100	100
(Symbol)	DIRECTIONAL MARKING	100	100	100
(Symbol)	DIRECTIONAL ARROW	100	100	100



**PEDESTRIAN CROSSING**

1. ALL LETTERS AND SYMBOLS IN THIS DRAWING SHALL BE IN BLACK ON A WHITE BACKGROUND.
2. THE SIZE OF LETTERS AND SYMBOLS SHALL BE AS SPECIFIED IN THE DRAWING.
3. THE SPACING BETWEEN LETTERS AND SYMBOLS SHALL BE AS SPECIFIED IN THE DRAWING.
4. THE SPACING BETWEEN WORDS SHALL BE AS SPECIFIED IN THE DRAWING.
5. THE SPACING BETWEEN SENTENCES SHALL BE AS SPECIFIED IN THE DRAWING.
6. THE SPACING BETWEEN PARAGRAPHS SHALL BE AS SPECIFIED IN THE DRAWING.

**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**  
**TYPICAL ROAD MARKING DETAILS**  
**(SHEET 2 OF 2)**

SCALE	DATE	REV	BY	CHKD BY	DATE

**CEG ENGINEERS GROUP LTD.**  
 C-12, 1st Colony, Minikalya, Bhubaneswar, Orissa - 751017  
 Tel: +91-674-2521899, 2521899, 2520556  
 Fax: 2521343, e-mail: ceg@ceg.com

**PATEL - ARSS**  
**CONTRACTOR**

World Bank Project  
 Employer  
 Project  
 (Civil) Office



SP-1506



STAGGERED INTERSECTION

SP-1540



Y INTERSECTION

SP-1505



STAGGERED INTERSECTION

SP-1469



GAP IN MIDEAN

SP-1503



MAJOR ROAD AHEAD

SP-1468



OVERHEAD CABLE

SP-1502



MAJOR ROAD AHEAD

SP-1504



NARROW BRIDGE

SP-1460



Y INTERSECTION

SP-1509



DUAL C WAY STARTS

SP-1461



Y INTERSECTION

SP-1508



DUAL C WAY ENDS

SP-1500



SERIES OF BENDS

SP-1460



LUMP OR ROUGH ROAD

SP-1400



BARRIER AHEAD

SP-24



PUBLIC TELEPHONE

SP-23



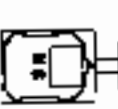
PETROL BUNK

SP-22



HOSPITAL

SP-17



STATE ROUTE MARKER SIGN

SP-18 (a)



GUARDED RAILWAY CROSSING AT 200m

SP-18 (b)



GUARDED RAILWAY CROSSING AT 50-100m

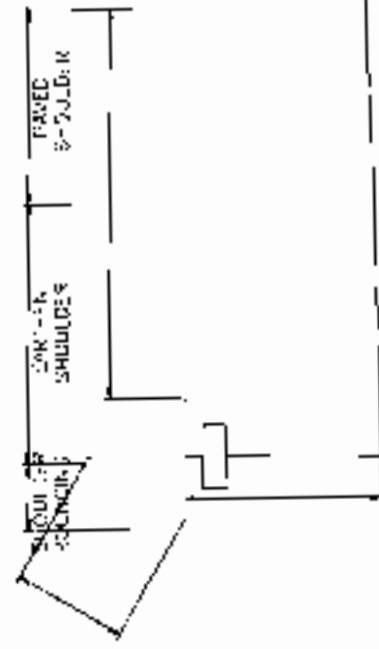


STANDARD DRAWINGS  
TYPICAL ROAD SIGNS (SHEET 2 OF 4)

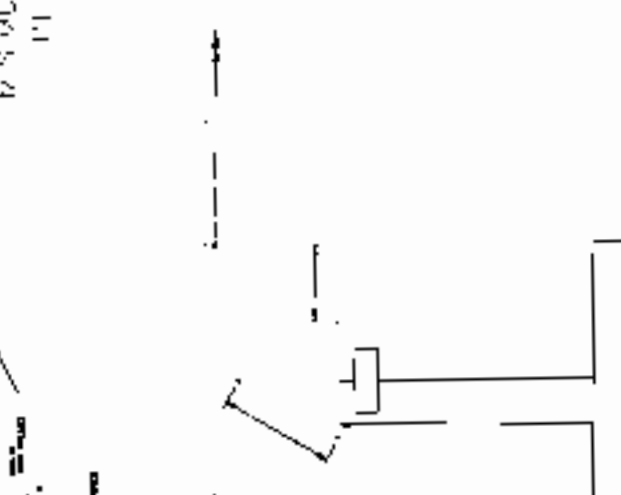
PROJ. NO.	REVISION NO.	DATE	BY	CHECKED BY	DATE
SH. NO.	17	197	60		
SCALE	1/15		B.M.	R.J.	R.E.C.K.
					S.G.



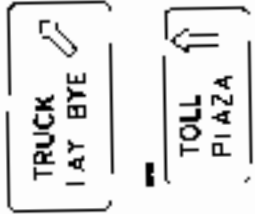
CONCRETE CURB



MINIMUM CLEARANCE OF SIGNS IN URBAN SECTION

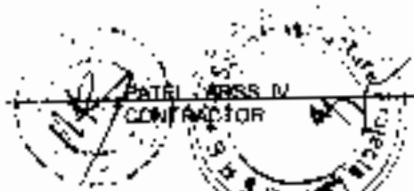


MINIMUM CLEARANCE OF SIGNS IN RURAL SECTION



NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED OTHERWISE.
2. ROAD MARKINGS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
3. ALL ROAD MARKINGS SHALL BE IN WHITE UNLESS SPECIFIED OTHERWISE.
4. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
5. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
6. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
7. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
8. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
9. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.
10. ALL DIMENSIONS SHALL BE AS PER THE STANDARD SPECIFICATIONS FOR ROAD MARKINGS.



STANDARD DRAWINGS  
TYPICAL ROAD SIGNS (SHEET 3 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

**CEG**  
**CONSULTING ENGINEERS GROUP LTD.**  
E-12, Mid. Colony, Malviya Nagar, Jaipur-317  
Ph: +91 141-2520655, 2527869, 2520328  
Fax: 2521348, e-mail: ceg@cegnet.co.in

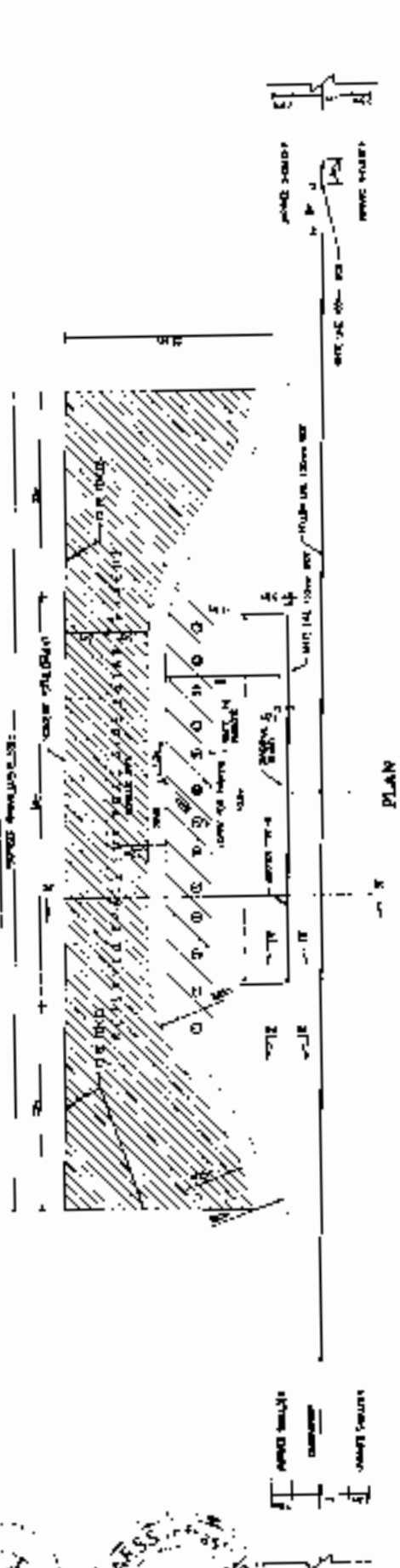
DRG NO.	REV	DATE	BY	CHKD	APPD
SR. NO.	33				
SCALE		UNIT			
			R4	MJ	ERD/E
					S.C.







**DETAILS OF TRUCK LAYBYE**



PLAN



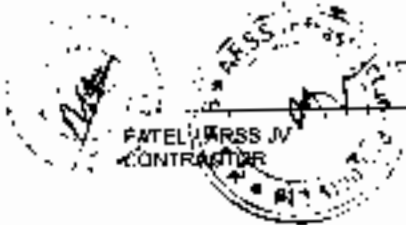
CROSS SECTION X-X

SECTION Y-Y

SECTION Z-Z

- 1. GRAVEL - 20% OVERSIZ
- 2. GRAVEL - 10% OVERSIZ
- 3. GRAVEL - 5% OVERSIZ
- 4. GRAVEL - 2% OVERSIZ
- 5. GRAVEL - 1% OVERSIZ
- 6. GRAVEL - 0.75% OVERSIZ

1. INDICATED BY 4 IN WHITE PAINTING MARKS
2. THE RULES OF ROADWAY MARKING SHALL BE AS PER IS:SP:11-1997
3. THE RULES OF ROADWAY MARKING SHALL BE AS PER IS:SP:11-1997
4. THE RULES OF ROADWAY MARKING SHALL BE AS PER IS:SP:11-1997
5. THE RULES OF ROADWAY MARKING SHALL BE AS PER IS:SP:11-1997
6. THE RULES OF ROADWAY MARKING SHALL BE AS PER IS:SP:11-1997



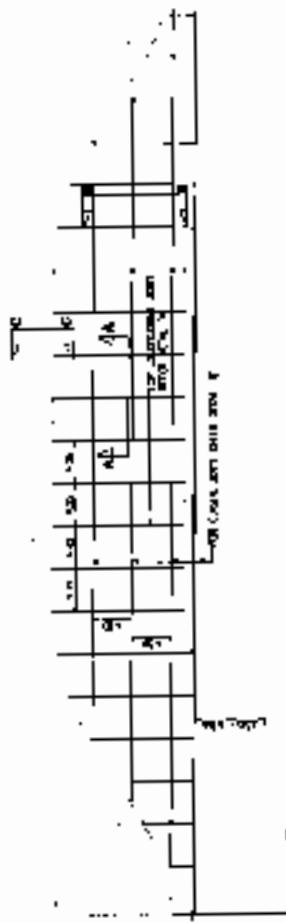
**STANDARD DRAWINGS  
DETAILS OF TRUCK LAYBYES (SHEET 1 OF 2)**

**PROJECT:**  
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND  
DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS  
FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK  
ASSISTANCE

**CGE CONSULTING ENGINEERS GROUP LTD.**  
 C-12, Maj. Colony, Mukhyata Nagar, Bhubaneswar - 751017  
 Tel: 491-141-2321876, 2521899, 2521806  
 Fax: 2521349, e-mail: info@cgeltd.com

DATE: 03/07/2011	TIME: 10:00 AM	SCALE: 1:100	REV: 01	NO: 01	DATE: 03/07/2011	TIME: 10:00 AM	SCALE: 1:100	REV: 01	NO: 01
DRAWN BY: N.S.					CHECKED BY: N.S.				
DESIGNED BY: N.S.					APPROVED BY: N.S.				

World Bank Project, Orissa  
EMPLOYER  
CGE CONSULTING ENGINEERS GROUP LTD.



LAYOUT PLAN OF CEMENT CONCRETE PAVEMENT



SECTION A-A

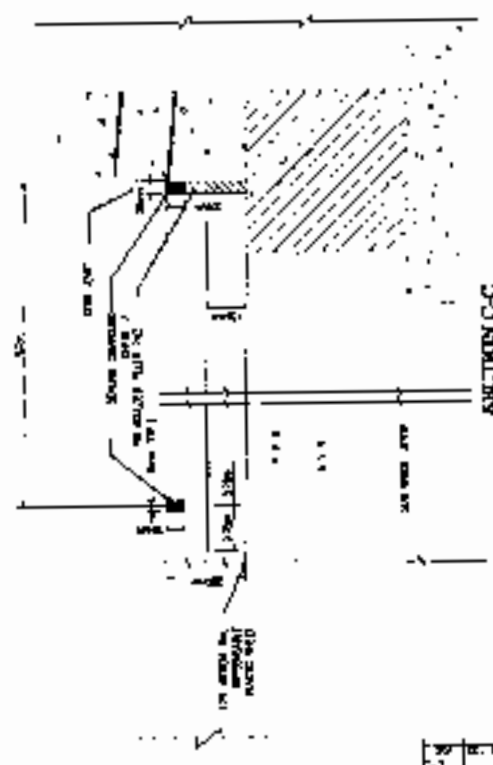


SECTION B-B



DETAIL 'A'

DETAIL 'B'



SECTION C-C

- 150mm concrete slab
- 100mm concrete slab
- Subgrade
- 150mm concrete slab
- 100mm concrete slab
- Subgrade

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES AND STRUCTURES.
6. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DRAINAGE SYSTEMS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE ENVIRONMENT.
8. THE CONTRACTOR SHALL MAINTAIN ADEQUATE SAFETY MEASURES AT ALL TIMES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT PROPERTIES.
10. THE CONTRACTOR SHALL MAINTAIN ADEQUATE RECORDS OF ALL WORK.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT PROPERTIES.
12. THE CONTRACTOR SHALL MAINTAIN ADEQUATE RECORDS OF ALL WORK.

Stamp: CONTRACTOR  
Date: 2023/08/10

Ok...  
Employer  
Date: 2023/08/10

**STANDARD DRAWINGS**

**DETAILS OF TRUCK LAYBYES (SHEET 2 OF 2)**

---

**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.**  
F-12, No. 3, Colony, (Vijaya Nagar), Jaipur-302017  
Tel: 0141-2520889, 2521889, 2520666  
Fax: 2521348, e-mail: ceg@cegin.com

Date: 2023/08/10  
Scale: 1:50  
Sheet No: 2023/08/10

AGREEMENT No.5 of 2008 - 09



**GOVERNMENT OF ORISSA**  
**WORKS DEPARTMENT**

**CIVIL WORKS CONTRACT**

[ PACKAGE No. OSRP-CW-ICB-Y1-P01 ]

**For**

*Widening & Strengthening of existing carriageway to 2-lane road from  
Bhawanipatna to Khariar  
(Km. 2/0 to 70/0 of SH – 16 )*

*under  
Orissa State Roads Project*

between

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

and

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

**[ VOLUME – V : SCHEDULES ]  
Agreement Value: Rs. 105,51,39,120.00**

*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: 3<sup>rd</sup> December, 2008**

**CONTENTS of CONTRACT**

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

**CONTENTS of VOLUME V**

<b>Sl.</b>	<b>Description</b>	<b>Page No.</b>
<b>1</b>	<b>Grand Summary of Price Schedule</b>	<b>1</b>
<b>2</b>	<b>Daywork Summary</b>	<b>2</b>
<b>3</b>	<b>Price Schedule</b>	<b>3</b>



PATEL - BSS JV  
CONTRACTOR



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



### Grand Summary of Price Schedule

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharai (2+0 km to 70+0 km of NH-16)- ICB Package OSRP-CW-ICB-V1-P01		
Contract No.: Agreement No. 5 of 2008 - 09		
<i>General Summary</i>	<i>Page</i>	<i>Amount</i>
BILL NO.1 : SITE CLEARANCE	5	11,134,874.00
BILL NO.2 : EARTH WORKS	8	146,582,735.00
BILL NO.3 : SUB-BASE AND BASE COURSES	9	217,841,825.00
BILL NO.4 : BITUMINOUS COURSES	11	296,701,832.00
BILL NO.5 : CULVERTS AND UNDERPASSES	16	131,047,021.00
BILL NO.6 : BRIDGES	26	159,856,647.00
BILL NO.7 : RETAINING WALL, DRAINAGE AND PROTECTIVE WORKS	29	88,411,936.00
BILL NO.8 : MISCELLANEOUS ITEMS	36	36,734,342.00
BILL NO.9 : MAINTENANCE, REPAIR AND REHABILITATION	38	15,199,450.00
BILL NO.10 : ENVIRONMENTAL MITIGATION MEASURES	47	26,666,087.00
BILL NO.11 : PROVISIONAL ITEMS	52	18,684,673.00
Subtotal of Bills	(A)	1,168,864,432.00
Total for Daywork (Provisional Sum)	(B)	1,032,367.50
Specified Provisional Sums included in subtotal of bills	(C)	450000.00
Total of Bills Plus Provisional Sums (A + B + C)	(D)	1,172,326,799.50
Add Provisional Sum for Contingency Allowance	(E)	0.00
Bid Price (D + E)	(F)	1,172,326,799.50
Less Discount @10% on the tendered Amount (A-B) (10% Discount shall be effected in each work bill)	(G)	127,187,679.95
Final Bid Price (F-G)	(H)	1,055,139,119.55
	Say	1,055,139,120.00

Rupees One Hundred Five Crore Fifty One Lakh Thirty Nine Thousand One Hundred Twenty Only



### Daywork Summary

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from  
 Bhawanipatna-Kharlar (2.0 km to 70.0 km of SF-16 )  
 - ICB Package OSRP-CW-ICB-YI-01

Contract No.: Agreement No. 5 of 2008 - 09

	Amount (Rs.)	% Foreign
1. Total for Daywork: Labour	168,475.00	NIL
2. Total for Daywork: Materials	2,300,575.00	NIL
3. Total for Daywork: Contractor's Equipment	532,317.50	NIL
<b>Total for Daywork (Provisional Sum)</b>	<b>3,012,367.50</b>	

(carried forward to Bid Summary, p.1 )

### Summary of Specified Provisional Sum

	Amount (Rs.)	% Foreign
Providing and maintaining wireless communication system comprising of mobile Trans-receiver suitable for mounting on four wheeler with microphone 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	
<b>Total for Specified Provisional Sum</b>	<b>450,000.00</b>	


(carried forward to Bid Summary, p.1 )



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawaniapatna-Khariar (20 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
1.01	<b>BILL NO.1 : SITE CLEARANCE</b> Cleaning and Grubbing for road land complete as per Technical Specification Clause 201 and as per the direction of Engineer-in-charge.	Hectare	124.00	28000.00 Rupees Twenty Eight Thousand Only	3,472,000.00 Rupees Thirty Four Lakh Seventy Two 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	444.00	190.00 Rupees One Hundred Ninety Only	84,360.00 Rupees Eighty Four Thousand Three Hundred Sixty 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	827.00	240.00 Rupees Two Hundred Forty Only	198,480.00 Rupees One Lakh Ninety Eight Thousand Four Hundred Eighty Only
	ii)R.C.C.	Cum	790.00	370.00 Rupees Three Hundred Seventy Only	292,300.00 Rupees Two Lakh Ninety Two Thousand Three Hundred Only
	c) Dismantling of all type of Pavement course	Cum	41714.00	160.00 Rupees One Hundred Sixty Only	6,674,240.00 Rupees Sixty Six Lakh Seventy Four Thousand Two Hundred Forty Only

  
PATEL ARSS JV  
CONTRACTOR

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 7/0/0 km of SH-16 ) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
	d) Hume pipe	Lm	768.00	50.00 Rupees Fifty Only	38,400.00 Rupees Thirty Eight Thousand Four Hundred Only
	e) Kerb	Lm	14.00	7.00 Rupees Seven Only	98.00 Rupees Ninety Eight Only
	f) Dry stone pitching	Cum	60.00	93.00 Rupees Ninety Three Only	5,580.00 Rupees Five Thousand Five Hundred Eighty Only
	g) RCC railing	Lm	253.00	29.00 Rupees Twenty Nine Only	7,337.00 Rupees Seven Thousand Three Hundred Thirty Seven Only
	h) Expansion joint	Lm	208.00	1665.00 Rupees One Thousand Six Hundred Sixty Five Only	346,320.00 Rupees Three Lakh Forty Six Thousand Three Hundred Twenty Only
	i) Wearing coat				
	a) Bituminous concrete	Sqm	265.00	44.00 Rupees Forty Four Only	11,660.00 Rupees Eleven Thousand Six Hundred Sixty Only
	b) Cement concrete	Sqm	1573.00	63.00 Rupees Sixty Three Only	99,099.00 Rupees Ninety Nine Thousand Ninety Nine Only



M. S. PATEL- ARSS JV  
CONTRACTOR

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	-100.00 Minus Rupees One Hundred Only	(10,000.00) Minus Rupees Ten Thousand Only
	<b>Sub-Total- Bill No-1</b>				<b>11,134,874.00</b>
				<b>Rupees One Crore Eleven Lakh Thirty Four Thousand Eight Hundred Seventy Four Only</b>	



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

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
2.01	<b>BILL NO.2 : EARTH WORKS</b> 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	427482.00	42.00 Rupees Forty Two Only	17,954,244.00 Rupees One Crore Seventy Nine Lakh Fifty Four Thousand Two Hundred Forty Four Only
	b) softrock (blasting not required) (LS)	Cum	1000.00	57.00 Rupees Fifty Seven Only	57,000.00 Rupees Fifty Seven Thousand Only
	c) Hard rock (blasting required) (LS)	Cum	1000.00	309.00 Rupees Three Hundred Nine Only	309,000.00 Rupees Three Lakh Nine Thousand Only
	d) Hard rock (blasting not required) (LS)	Cum	1000.00	450.00 Rupees Four Hundred Fifty Only	450,000.00 Rupees Four 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	203885.00	100.00 Rupees One Hundred Only	20,388,500.00 Rupees Two Crore Three Lakh Eighty Eight Thousand Five Hundred Only



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawaniapatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	603207.00	145.00	87,465,015.00
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	256490.00	75.00	19,236,750.00
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	5675.00	42.00	238,350.00
				Rupees Forty Two Only	Rupees Two Lakh Thirty Eight Thousand Three Hundred Fifty Only



PATEL ASSOCIATES  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharlar (20 km to 700 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
2.06	Earthwork with agriculture soil for filling of median/island complete as per Technical Specification Clause 407 and as per the direction of Engineer-in-charge.	Cum	2700.00	150.00 Rupees One Hundred Fifty Only	405,000.00 Rupees Four Lakh Five Thousand 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	26292.00	3.00 Rupees Three Only	78,876.00 Rupees Seventy Eight Thousand Eight Hundred Seventy Six Only
<b>Sub-Total- Bill No-2</b>					<b>146,582,735.00</b>
				<b>Rupees Fourteen Crore Sixty Five Lakh Eighty Two Thousand Seven Hundred Thirty Five Only</b>	





Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
3.01	<b>BILL NO.3 : SUB-BASE AND BASE COURSES</b> 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	201749.00	415.00 Rupees Four Hundred Fifteen Only	83,725,835.00 Rupees Eight Crore Thirty Seven Lakh Twenty Five Thousand Eight Hundred Thirty Five 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	134119.00	1000.00 Rupees One Thousand Only	134,119,000.00 Rupees Thirteen Crore Forty One Lakh Nineteen Thousand Only
<b>Sub-Total- Bill No-3</b>					<b>217,844,835.00</b>
<b>Rupees Twenty One Crore Seventy Eight Lakh Forty Four Thousand Eight Hundred Thirty Five Only</b>					



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawaniapatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
4.01	<b>BILL NO.4 : BITUMINOUS COURSES</b> 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	505567.00	20.00 Rupees Twenty Only	10,111,340.00 Rupees One Crore One Lakh Eleven Thousand Three Hundred Forty 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	505567.00	8.00 Rupees Eight Only	4,044,536.00 Rupees Forty Lakh Forty Four Thousand Five Hundred Thirty Six Only
	b) over normal bituminous surface	Sqm	505567.00	8.00 Rupees Eight Only	4,044,536.00 Rupees Forty Lakh Forty Four Thousand Five Hundred Thirty Six 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	31896.00	4500.00 Rupees Four Thousand Five Hundred Only	143,532,000.00 Rupees Fourteen Crore Thirty Five Lakh Thirty Two Thousand Only



Patel ARSS JV  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khanar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	20432.00	6600.00 Rupees Six Thousand Six Hundred Only	134,851,200.00 Rupees Thirteen Crore Forty Eight Lakh Fifty One Thousand Two Hundred Only
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	1028.00	115.00 Rupees One Hundred Fifteen Only	118,220.00 Rupees One Lakh Eighteen Thousand Two Hundred Twenty Only
<b>Sub-Total- Bill No-4</b>					<b>296,701,832.00</b>
				<b>Rupees Twenty Nine Crore Sixty Seven Lakh One Thousand Eight Hundred Thirty Two Only</b>	



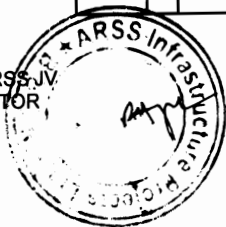
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
5.01	<b>BILL NO.5 : CULVERTS AND UNDERPASSES</b> 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	14150.00	45.00 Rupees Forty Five Only	636,750.00 Rupees Six Lakh Thirty Six Thousand Seven Hundred Fifty 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	5073.00	150.00 Rupees One Hundred Fifty Only	760,950.00 Rupees Seven Lakh Sixty Thousand Nine Hundred Fifty 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	7379.00	450.00 Rupees Four Hundred Fifty Only	3,320,550.00 Rupees Thirty Three Lakh Twenty Thousand Five 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	2880.00	1200.00 Rupees One Thousand Two Hundred Only	3,456,000.00 Rupees Thirty Four Lakh Fifty Six Thousand Only



PATEL ARS JV  
CONTRACTOR


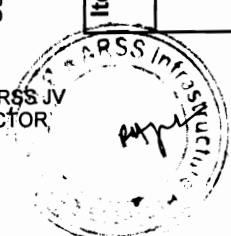


Chief Engineer  
World Bank Projects  
EMPLOYER  
O/o the E.I.C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	2898.00	3310.00 Rupees Three Thousand Three Hundred Ten Only	9,592,380.00 Rupees Ninety Five Lakh Ninety Two Thousand Three Hundred Eighty Only
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	1511.00	3390.00 Rupees Three Thousand Three Hundred Ninety Only	5,122,290.00 Rupees Fifty One Lakh Twenty Two Thousand Two Hundred Ninety 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	9567.00	4309.00 Rupees Four Thousand Three Hundred Nine Only	41,224,203.00 Rupees Four Crore Twelve Lakh Twenty Four Thousand Two Hundred Three 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	1580.00	6551.00 Rupees Six Thousand Five Hundred Fifty One Only	10,350,580.00 Rupees One Crore Three Lakh Fifty Thousand Five Hundred Eighty Only



  
**M. PATEL-ARSS JV**  
**CONTRACTOR**

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	574.00	45000.00 Rupees Forty Five Thousand Only	25,830,000.00 Rupees Two Crore Fifty Eight 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	634.00	3670.00 Rupees Three Thousand Six Hundred Seventy Only	2,326,780.00 Rupees Twenty Three Lakh Twenty Six Thousand Seven Hundred Eighty Only
	b) 1m dia. hume pipe in double row	Lm	1098.00	7216.00 Rupees Seven Thousand Two Hundred Sixteen Only	7,923,168.00 Rupees Seventy Nine Lakh Twenty Three Thousand One Hundred Sixty Eight Only
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	1684.00	1200.00 Rupees One Thousand Two Hundred Only	2,020,800.00 Rupees Twenty Lakh Twenty Thousand Eight Hundred Only
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	3369.00	750.00 Rupees Seven Hundred Fifty Only	2,526,750.00 Rupees Twenty Five Lakh Twenty Six Thousand Seven Hundred Fifty Only



PATEL- ARSS JV  
CONTRACTOR

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

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khairiar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	1797.00	2700.00 Rupees Two Thousand Seven Hundred Only	4,851,900.00 Rupees Forty Eight Lakh Fifty One Thousand Nine Hundred Only
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	8974.00	100.00 Rupees One Hundred Only	897,400.00 Rupees Eight Lakh Ninety Seven Thousand Four Hundred Only
5.15	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	1584.00	1250.00 Rupees One Thousand Two Hundred Fifty Only	1,980,000.00 Rupees Nineteen Lakh Eighty Thousand Only
5.16	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	1381.00	1100.00 Rupees One Thousand One Hundred Only	1,519,100.00 Rupees Fifteen Lakh Nineteen Thousand One Hundred Only



PATEL-ARSS  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharlar (20 km to 700 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
5.17	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	7874.00	850.00 Rupees Eight Hundred Fifty Only	6,692,900.00 Rupees Sixty Six Lakh Ninety Two Thousand Nine Hundred Only
5.18	Synthetic enamel painting of culvert no. and span arrangement as per IRC - 7 - 1971 and as per the direction of Engineer-in-charge.	No.	264.00	55.00 Rupees Fifty Five Only	14,520.00 Rupees Fourteen Thousand Five Hundred Twenty Only
<b>Sub-Total- Bill No-5</b>				<b>131,047,021.00</b>	<b>131,047,021.00</b>
				<b>Rupees Thirteen Crore Ten Lakh Forty Seven Thousand Twenty One Only</b>	



PATEL ARSEN & CO.  
CONTRACTORS



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



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharlar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.01	<b>BILL NO.6 : BRIDGES</b> 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	19254.00	40.00 Rupees Forty Only	770,160.00 Rupees Seven Lakh Seventy Thousand One Hundred Sixty 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	9145.00	400.00 Rupees Four Hundred Only	3,658,000.00 Rupees Thirty Six Lakh Fifty Eight Thousand Only
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	669.00	1200.00 Rupees One Thousand Two Hundred Only	802,800.00 Rupees Eight Lakh Two Thousand Eight Hundred Only



RATEL-ARSS JV  
CONTRACTOR



Chief Engineer  
World Bank Projects  
EMPLOYER  
O/o the E.I.C (Civil) Office  
Bhubaneswar:

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharlar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	730.00	3310.00 Rupees Three Thousand Three Hundred Ten Only	2,416,300.00 Rupees Twenty Four Lakh Sixteen Thousand Three 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	3326.00	3392.00 Rupees Three Thousand Three Hundred Ninety Two Only	11,281,792.00 Rupees One Crore Twelve Lakh Eighty One Thousand Seven Hundred Ninety Two Only
	b) M-20 Grade	Cum	1764.00	3923.00 Rupees Three Thousand Nine Hundred Twenty Three Only	6,920,172.00 Rupees Sixty Nine Lakh Twenty Thousand One Hundred Seventy Two Only



PATEL-  
CONTRACTOR



Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.I.C (Civil) Orissa  
Phubaneswar

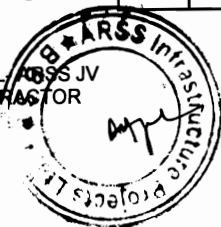
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item 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.				
	b) M-25 Grade	Cum	691.00	4530.00 Rupees Four Thousand Five Hundred Thirty Only	3,130,230.00 Rupees Thirty One Lakh Thirty Thousand Two Hundred Thirty Only
	d) M-35 Grade	Cum	1080.00	4583.00 Rupees Four Thousand Five Hundred Eighty Three Only	4,949,640.00 Rupees Forty Nine Lakh Forty Nine Thousand Six Hundred Forty 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	2242.00	4191.00 Rupees Four Thousand One Hundred Ninety One Only	9,396,222.00 Rupees Ninety Three Lakh Ninety Six Thousand Two Hundred Twenty Two Only
	b) M-25 Grade	Cum	1011.00	4910.00 Rupees Four Thousand Nine Hundred Ten Only	4,964,010.00 Rupees Forty Nine Lakh Sixty Four Thousand Ten Only
	c) M-30 Grade	Cum	310.00	4742.00 Rupees Four Thousand Seven Hundred Forty Two Only	1,470,020.00 Rupees Fourteen Lakh Seventy Thousand Twenty Only
	d) M-35 Grade	Cum	357.00	4847.00 Rupees Four Thousand Eight Hundred Forty Seven Only	1,730,379.00 Rupees Seventeen Lakh Thirty Thousand Three Hundred Seventy Nine Only



PATEL  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (20 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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-25 grade	Cum	211.00	4905.00 Rupees Four Thousand Nine Hundred Five Only	1,034,955.00 Rupees Ten Lakh Thirty Four Thousand Nine Hundred Fifty Five Only
	b) M-30 grade	Cum	891.00	5173.00 Rupees Five Thousand One Hundred Seventy Three Only	4,609,143.00 Rupees Forty Six Lakh Nine Thousand One Hundred Forty Three Only
	c) M-35 grade	Cum	350.00	4703.00 Rupees Four Thousand Seven Hundred Three Only	1,646,050.00 Rupees Sixteen Lakh Forty Six Thousand Fifty Only
6.09	Prestressed cement concrete of M-40 grade in super structure complete as per drawing and Technical specification section 1500, 1700, 1800, 2300 and as per the direction of Engineer-in-charge.				
		Cum	2184.00	5240.00 Rupees Five Thousand Two Hundred Forty Only	11,444,160.00 Rupees One Crore Fourteen Lakh Forty Four Thousand One Hundred Sixty Only
6.10	Reinforced cement concrete railing complete as per drawing and Technical specification section 2703 and as per the direction of Engineer-in-charge.	Lm	203.00	1100.00 Rupees One Thousand One Hundred Only	223,300.00 Rupees Two Lakh Twenty Three Thousand Three Hundred Only



PATEL CONTRACTORS



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharlar (20 km to 700 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.11	Bored cast-in-situ M-35 grade RCC Pile etc. complete as per drawing and technical specification clause 1100, 1700 and as per the direction of Engineer-in-charge.	Lm	698.00	8891.00 Rupees Eight Thousand Eight Hundred Ninety One Only	6,205,918.00 Rupees Sixty Two Lakh Five Thousand Nine Hundred Eighteen Only
6.12	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	278.00	45000.00 Rupees Forty Five Thousand Only	12,510,000.00 Rupees One Crore Twenty Five Lakh Ten Thousand Only
	b) in substructure	MT	291.00	45000.00 Rupees Forty Five Thousand Only	13,095,000.00 Rupees One Crore Thirty Lakh Ninety Five Thousand Only
	c) in superstructure	MT	487.00	45000.00 Rupees Forty Five Thousand Only	21,915,000.00 Rupees Two Crore Nineteen Lakh Fifteen Thousand Only
6.13	High tensile steel strand complete as per drawing and technical specifications section 1800 and as per the direction of Engineer-in-charge.	MT	60.00	90000.00 Rupees Ninety Thousand Only	5,400,000.00 Rupees Fifty Four Lakh Only



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.14	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	Cuqm	150000.00	1.60 Rupees One And Sixty Paise Only	240,000.00 Rupees Two Lakh Forty Thousand Only
	b) Tar paper bearing	Sqm	187.00	100.00 Rupees One Hundred Only	18,700.00 Rupees Eighteen Thousand Seven Hundred Only
	c) POT-PTFE Bearing				
	i) fixed ( 305 MT Capacity)	No.	32.00	100000.00 Rupees One Lakh Only	3,200,000.00 Rupees Thirty Two Lakh Only
	ii) sliding ( 305 MT Capacity)	No.	32.00	100000.00 Rupees One Lakh Only	3,200,000.00 Rupees Thirty Two Lakh Only
6.15	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	343.00	6460.00 Rupees Six Thousand Four Hundred Sixty Only	2,215,780.00 Rupees Twenty Two Lakh Fifteen Thousand Seven Hundred Eighty Only



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharlar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.16	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	5765.00	850.00 Rupees Eight Hundred Fifty Only	4,900,250.00 Rupees Forty Nine Lakh Two Hundred Fifty Only
6.17	Cement concrete wearing course 75mm thick Complete as per drawing and Technical Specification Section 2700 and as per the direction of Engineer-in-charge.	Sqm	290.00	520.00 Rupees Five Hundred Twenty Only	150,800.00 Rupees One Lakh Fifty Thousand Eight Hundred Only
6.18	Providing and fixing Drainage Spouts Complete as per drawing and Technical Specification Clause 2705 and as per the direction of Engineer-in-charge.	No	213.00	750.00 Rupees Seven Hundred Fifty Only	159,750.00 Rupees One Lakh Fifty Nine Thousand Seven Hundred Fifty Only
6.19	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	3551.00	650.00 Rupees Six Hundred Fifty Only	2,308,150.00 Rupees Twenty Three Lakh Eight Thousand One Hundred Fifty Only



Patel Arss JV  
CONTRACTOR



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

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.20	Providing as laying fitter 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	1776.00	1200.00 Rupees One Thousand Two Hundred Only	2,131,200.00 Rupees Twenty One Lakh Thirty One Thousand Two Hundred Only
6.21	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	1822.00	100.00 Rupees One Hundred Only	182,200.00 Rupees One Lakh Eighty Two Thousand Two Hundred Only
6.22	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	3644.00	700.00 Rupees Seven Hundred Only	2,550,800.00 Rupees Twenty Five Lakh Fifty Thousand Eight Hundred Only
6.23	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	494.00	1250.00 Rupees One Thousand Two Hundred Fifty Only	617,500.00 Rupees Six Lakh Seventeen Thousand Five Hundred Only
	b) Compression seal type plug	Lm	108.00	12050.00 Rupees Twelve Thousand Fifty Only	1,301,400.00 Rupees Thirteen Lakh One Thousand Four Hundred Only



PATEL CONTRACTORS





Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.24	Synthetic enamel painting of culvert no. and span arrangement as per IRC - 7 - 1971 and as per the direction of Engineer-in-charge.	No.	56.00	55.00 Rupees Fifty Five Only	3,080.00 Rupees Three Thousand Eighty Only
6.25	Carrying and Confirmatory bores up to required depth at locations of bridges as directed be 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	200.00	450.00 Rupees Four Hundred Fifty Only	90,000.00 Rupees Ninety Thousand Only
6.26	Providing and painting of flood gauge on substructure is fall height and 500mm width and as per the direction of Engineer-in-charge.	Lm	120.00	855.00 Rupees Eight Hundred Fifty Five Only	102,600.00 Rupees One Lakh Two Thousand Six Hundred Only
6.27	Providing and laying 150mm dia. HDPE Service pipe as per drawing and as per the direction of Engineer-in-charge.	Lm	3290.00	303.00 Rupees Three Hundred Three Only	996,870.00 Rupees Nine Lakh Ninety Six Thousand Eight Hundred Seventy Only



PATEL-AR  
CONTRACTOR

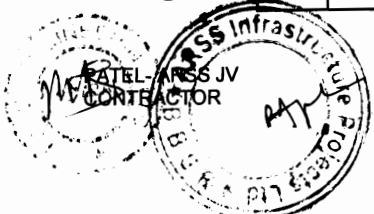


Chief Engineer  
World Bank Projects  
EMPLOYER  
to the E L C (Civil) Office  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
6.28	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	7298.00	125.00 Rupees One Hundred Twenty Five Only	912,250.00 Rupees Nine Lakh Twelve Thousand Two Hundred Fifty Only
6.29	PCC in flooring as per Drawing & Technical Specification section 1700, 2500 and as per the direction of Engineer-in-charge.				
	a) M-15	Cum	352.00	3310.00 Rupees Three Thousand Three Hundred Ten Only	1,165,120.00 Rupees Eleven Lakh Sixty Five Thousand One Hundred Twenty Only
	b) M-20	Cum	117.00	3758.00 Rupees Three Thousand Seven Hundred Fifty Eight Only	439,686.00 Rupees Four Lakh Thirty Nine Thousand Six Hundred Eighty Six Only
6.30	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	1381.00	2460.00 Rupees Two Thousand Four Hundred Sixty Only	3,397,260.00 Rupees Thirty Three Lakh Ninety Seven Thousand Two Hundred Sixty Only
<b>Sub-Total- Bill No-6</b>					<b>159,856,647.00</b>
<b>Rupees Fifteen Crore Ninety Eight Lakh Fifty Six Thousand Six Hundred Forty Seven Only</b>					



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
<b>BILL NO.7 : RETAINING WALL, DRAINAGE AND PROTECTIVE WORKS</b>					
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	4275.00	45.00 Rupees Forty Five Only	192,375.00 Rupees One Lakh Ninety Two Thousand Three Hundred Seventy Five 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	2700.00	1200.00 Rupees One Thousand Two Hundred Only	3,240,000.00 Rupees Thirty Two Lakh Forty 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	713.00	3392.00 Rupees Three Thousand Three Hundred Ninety Two Only	2,418,496.00 Rupees Twenty Four Lakh Eighteen Thousand Four Hundred Ninety Six 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	4785.00	4191.00 Rupees Four Thousand One Hundred Ninety One Only	20,053,935.00 Rupees Two Crore Fifty Three Thousand Nine Hundred Thirty Five Only



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khanjar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

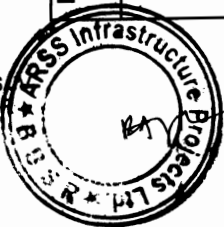
Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
(e)	Providing steel reinforcement HYSD(TMT) for retaining wall complete as per drawing and Technical Specification Clause 1600 and as per the direction of Engineer-in-charge.	MT	383.00	45000.00 Rupees Forty Five Thousand Only	17,235,000.00 Rupees One Crore Seventy Two Lakh Thirty Five Thousand Only
(f)	Providing guard post complete as per drawings and Technical specifications section 806 and as per the direction of Engineer-in-charge.	No.	1000.00	335.00 Rupees Three Hundred Thirty Five Only	335,000.00 Rupees Three Lakh Thirty Five Thousand 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.	3000.00	100.00 Rupees One Hundred Only	300,000.00 Rupees Three Lakh Only
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	1409.00	650.00 Rupees Six Hundred Fifty Only	915,850.00 Rupees Nine Lakh Fifteen Thousand Eight Hundred Fifty 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	705.00	1100.00 Rupees One Thousand One Hundred Only	775,500.00 Rupees Seven Lakh Seventy Five Thousand Five Hundred Only



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawaniipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	346620.00	19.00 Rupees Nineteen Only	6,585,780.00 Rupees Sixty Five Lakh Eighty Five Thousand Seven Hundred Eighty 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	8820.00	4000.00 Rupees Four Thousand Only	35,280,000.00 Rupees Three Crore Fifty Two Lakh Eighty Thousand 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	120.00	9000.00 Rupees Nine Thousand Only	1,080,000.00 Rupees Ten Lakh Eighty Thousand Only
<b>Sub-Total- Bill No-7</b>					<b>88,411,936.00</b>
				<b>Rupees Eight Crore Eighty Four Lakh Eleven Thousand Nine Hundred Thirty Six Only</b>	



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 )- ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.01	<b>BILL NO-8 : MISCELLANEOUS ITEMS.</b> 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	480.00	210.00 Rupees Two Hundred Ten Only	100,800.00 Rupees One Lakh Eight Hundred Only
8.02	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	743.00	260.00 Rupees Two Hundred Sixty Only	193,180.00 Rupees One Lakh Ninety Three Thousand One Hundred Eighty Only
8.03	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	271.00	300.00 Rupees Three Hundred Only	81,300.00 Rupees Eighty One Thousand Three Hundred Only
	b) No of Kilometer stone	No	54.00	1200.00 Rupees One Thousand Two Hundred Only	64,800.00 Rupees Sixty Four Thousand Eight Hundred Only
	c) No. of 5th Kilometer Stone	No	14.00	1900.00 Rupees One Thousand Nine Hundred Only	26,600.00 Rupees Twenty Six Thousand Six Hundred Only

*[Handwritten Signature]*  
PATEL-ANAND  
CONTRACTOR



Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E.L.C. (Civil) Orissa,  
Bhubaneswar:

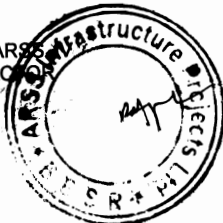
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.04	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	863.00	2500.00 Rupees Two Thousand Five Hundred Only	2,157,500.00 Rupees Twenty One Lakh Fifty Seven Thousand Five Hundred Only
8.05	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	34.00	125000.00 Rupees One Lakh Twenty Five Thousand Only	4,250,000.00 Rupees Forty Two Lakh Fifty Thousand Only
8.06	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	7875.00	1650.00 Rupees One Thousand Six Hundred Fifty Only	12,993,750.00 Rupees One Crore Twenty Nine Lakh Ninety Three Thousand Seven Hundred Fifty Only



PATEL-ARJUN  
CONTRACT



Chief Engineer  
World Bank Project, Orissa  
EMPLOYER  
to the E.I.C (Civil) Orissa.  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawaniapatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.07	Pavement marking with hot applies thermoplastic paints conforming 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	17394.00	560.00 Rupees Five Hundred Sixty Only	9,740,640.00 Rupees Ninety Seven Lakh Forty Thousand Six Hundred Forty Only
	b) Directional arrows and lettering etc.	No	192.00	51.00 Rupees Fifty One Only	9,792.00 Rupees Nine Thousand Seven Hundred Ninety Two Only
8.08	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	2.00	2900.00 Rupees Two Thousand Nine Hundred Only	5,800.00 Rupees Five Thousand Eight Hundred Only
	(ii) Direction Signs (1200 x 700 mm)	No	4.00	8700.00 Rupees Eight Thousand Seven Hundred Only	34,800.00 Rupees Thirty Four Thousand Eight Hundred Only
	(iii) Advance Direction (size 1800 x 1200mm) ,	No	1.00	8880.00 Rupees Eight Thousand Eight Hundred Eighty Only	8,880.00 Rupees Eight Thousand Eight Hundred Eighty Only
	(iv) Re-Assurance Sign (1800 X 1200 mm) ,	No	1.00	9100.00 Rupees Nine Thousand One Hundred Only	9,100.00 Rupees Nine Thousand One Hundred Only



PATEL ASSOCIATES  
CONTRACTORS





Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawaniapatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
	(v) Destination Sign (1500 X 900 mm) ,	No	2.00	6900.00 Rupees Six Thousand Nine Hundred Only	13,800.00 Rupees Thirteen Thousand Eight Hundred Only
	(vi) Place Identification (1500 X 900 mm) ,	No	1.00	8000.00 Rupees Eight Thousand Only	8,000.00 Rupees Eight Thousand Only
	(vii) Route Marker Sign (450mm x 600mm)	No	4.00	3300.00 Rupees Three Thousand Three Hundred Only	13,200.00 Rupees Thirteen Thousand Two Hundred Only
	(viii) Other Informatory Signs (2100mm x 1500mm)	No	4.00	9000.00 Rupees Nine Thousand Only	36,000.00 Rupees Thirty Six Thousand Only
(b)	CAUTIONARY SIGNS triangular 900mm side	No	130.00	3650.00 Rupees Three Thousand Six Hundred Fifty Only	474,500.00 Rupees Four Lakh Seventy Four Thousand Five Hundred Only
(c)	Mandatory signs				
	(i) Circular 600mm dia	No	30.00	3200.00 Rupees Three Thousand Two Hundred Only	96,000.00 Rupees Ninety Six Thousand Only
	(ii) Octagon 900 mm height	No	20.00	6000.00 Rupees Six Thousand Only	120,000.00 Rupees One Lakh Twenty Thousand Only
	(iii) Triangular 900 mm side	No	30.00	6000.00 Rupees Six Thousand Only	180,000.00 Rupees One Lakh Eighty Thousand Only



TEL-ARS  
CONTRACT



Chief Engineer  
World Bank Project  
EMPLOYER  
World Bank Projects  
to the E.I.C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.09	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	452.00	800.00 Rupees Eight Hundred Only	361,600.00 Rupees Three Lakh Sixty One Thousand Six Hundred Only
	(ii) Hazard Marker	No	168.00	800.00 Rupees Eight Hundred Only	134,400.00 Rupees One Lakh Thirty Four Thousand Four Hundred Only
	(iii) Object Marker	No	52.00	800.00 Rupees Eight Hundred Only	41,600.00 Rupees Forty One Thousand Six Hundred Only
8.10	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.	3357.00	350.00	1,174,950.00
8.11	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	700.00	6.00	4,200.00
				Rupees Six Only	Rupees Four Thousand Two Hundred Only



PATEL ASSOCIATES  
CONTRACTOR



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

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.12	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	1400.00	6.00 Rupees Six Only	8,400.00 Rupees Eight Thousand Four Hundred Only
8.13	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	3.00	250.00 Rupees Two Hundred Fifty Only	750.00 Rupees Seven Hundred Fifty Only
8.14	Providing rumble strips for complete carriageway width at required places as per drawing and as per the direction of Engineer-in-charge.	No.	26.00	5500.00 Rupees Five Thousand Five Hundred Only	143,000.00 Rupees One Lakh Forty Three Thousand Only
8.15	Providing road hump complete at required places as per drawing and as per the direction of Engineer-in-charge.	No.	42.00	13500.00 Rupees Thirteen Thousand Five Hundred Only	567,000.00 Rupees Five Lakh Sixty Seven Thousand Only



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

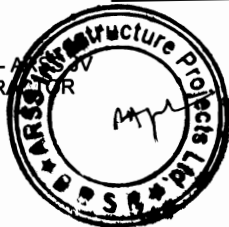
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
8.16	Providing toll plaza as per drawing and technical specification and as per the direction of Engineer-in-charge.	No.	1.00	1250000.00 Rupees Twelve Lakh Fifty Thousand Only	1,250,000.00 Rupees Twelve Lakh Fifty Thousand Only
8.17	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.	18.00	135000.00 Rupees One Lakh Thirty Five Thousand Only	2,430,000.00 Rupees Twenty Four Lakh Thirty Thousand Only
<b>Sub-Total- Bill No-8</b>					<b>36,734,342.00</b>
<b>Rupees Three Crore Sixty Seven Lakh Thirty Four Thousand Three Hundred Forty Two Only</b>					



PATEL-  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 )- ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
9.01	<b>BILL NO.9 MAINTENANCE, REPAIR AND REHABILITATION</b> 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	955.00	1550.00 Rupees One Thousand Five Hundred Fifty Only	1,480,250.00 Rupees Fourteen Lakh Eighty Thousand Two Hundred Fifty 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	85000.00	55.00 Rupees Fifty Five Only	4,675,000.00 Rupees Forty Six Lakh Seventy Five Thousand Only
9.03	Guniting by 25mm thick complete as per Technical specification clause 2807 and as per direction of the Engineer-in-charge.	Sqm	134.00	600.00 Rupees Six Hundred Only	80,400.00 Rupees Eighty Thousand Four Hundred 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	495.00	9400.00 Rupees Nine Thousand Four Hundred Only	4,653,000.00 Rupees Forty Six Lakh Fifty Three Thousand Only



RATEL-AN  
CONTRACTOR



Chief Engineer  
World Bank Projects, Orissa  
EMPLOYERS  
World Bank Projects  
to the E.I.C (Civil) Orissa,  
Bhubaneswar.

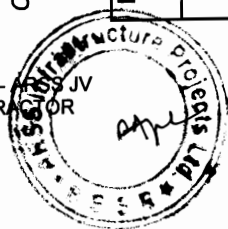
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
9.05	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.	Sqm	290.00	520.00 Rupees Five Hundred Twenty Only	150,800.00 Rupees One Lakh Fifty Thousand Eight Hundred Only
9.06	Lifting of deck slab by jacking, shifting the entire deck slab to the side of the existing bridge and holding the same till the completion of the raising of the substructure and replacing the decks slab complete as per direction of the Engineer-in-charge.	No.	13.00	320000.00 Rupees Three Lakh Twenty Thousand Only	4,160,000.00 Rupees Forty One Lakh Sixty Thousand Only
<b>Sub-Total- Bill No-9</b>				<b>15,199,450.00</b>	
				<b>Rupees One Crore Fifty One Lakh Ninety Nine Thousand Four Hundred Fifty Only</b>	



PATEL JV  
CONTRACTOR

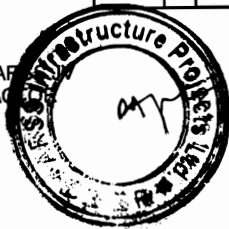


Chief Engineer  
World Bank Projects, Orissa  
to the E.I.C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Kharar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.01	<b>BILL NO.10 ENVIRONMENTAL MITIGATION MEASURES</b> 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,07,09,10,12and technical specifications clause 304 including all leads and lifts and as per the direction of Engineer-in-charge.	Cum	2045.00	40.00 Rupees Forty Only	81,800.00 Rupees Eighty One Thousand Eight Hundred 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	388.00	130.00 Rupees One Hundred Thirty Only	50,440.00 Rupees Fifty Thousand Four Hundred Forty 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	461.00	2515.00 Rupees Two Thousand Five Hundred Fifteen Only	1,159,415.00 Rupees Eleven Lakh Fifty Nine Thousand Four Hundred Fifteen Only



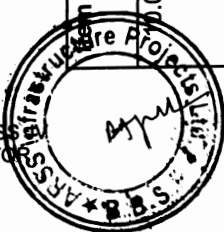
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.04	Providing & laying in position <b>Cement Concrete M-15 grade</b> 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	326.00	3300.00 Rupees Three Thousand Three Hundred Only	1,075,800.00 Rupees Ten Lakh Seventy Five Thousand Eight Hundred Only
10.05	Providing & laying in position <b>plain cement concrete M 20 grade (in kerbs)</b> 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	2880.00	165.00 Rupees One Hundred Sixty Five Only	475,200.00 Rupees Four Lakh Seventy Five Thousand Two Hundred Only
10.06	Providing & laying in position <b>Cement Concrete M-20 grade</b> 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	1379.00	3760.00 Rupees Three Thousand Seven Hundred Sixty Only	5,185,040.00 Rupees Fifty One Lakh Eighty Five Thousand Forty Only
10.07	Providing <b>weep holes</b> 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	1235.00	100.00 Rupees One Hundred Only	123,500.00 Rupees One Lakh Twenty Three Thousand Five Hundred Only



PATEL- ARSS CONTRACTOR





Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	428.00	4190.00 Rupees Four Thousand One Hundred Ninety Only	1,793,320.00 Rupees Seventeen Lakh Ninety Three Thousand Three Hundred Twenty Only
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	106.00	3900.00 Rupees Three Thousand Nine Hundred Only	413,400.00 Rupees Four Lakh Thirteen Thousand Four Hundred Only
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	22.00	45000.00 Rupees Forty Five Thousand Only	990,000.00 Rupees Nine Lakh Ninety Thousand Only
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	576.00	55.00 Rupees Fifty Five Only	31,680.00 Rupees Thirty One Thousand Six Hundred Eighty Only



PATEL-ASSOCIATES  
CONTRACTORS



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	11088.00	46.00 Rupees Forty Six Only	510,048.00 Rupees Five Lakh Ten Thousand Forty Eight 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	3875.00	46.00 Rupees Forty Six Only	178,250.00 Rupees One Lakh Seventy Eight Thousand Two Hundred Fifty 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	1828.00	46.00 Rupees Forty Six Only	84,088.00 Rupees Eighty Four Thousand Eighty Eight 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	110.00	3030.00 Rupees Three Thousand Thirty Only	333,300.00 Rupees Three Lakh Thirty Three Thousand Three Hundred Only

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	3600.00	60.00 Rupees Sixty Only	216,000.00 Rupees Two Lakh Sixteen Thousand Only
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	8811.00	1000.00 Rupees One Thousand Only	8,811,000.00 Rupees Eighty Eight Lakh Eleven Thousand Only
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	8681.00	115.00 Rupees One Hundred Fifteen Only	998,315.00 Rupees Nine Lakh Ninety Eight Thousand Three Hundred Fifteen Only
10.19	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	650.00	120.00 Rupees One Hundred Twenty Only	78,000.00 Rupees Seventy Eight Thousand Only



PATEL-  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khairar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.20	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	60.00	1560.00 Rupees One Thousand Five Hundred Sixty Only	93,600.00 Rupees Ninety Three Thousand Six Hundred Only
10.21	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	38.00	3300.00 Rupees Three Thousand Three Hundred Only	125,400.00 Rupees One Lakh Twenty Five Thousand Four Hundred Only
10.22	Providing and laying of boulder apron with HG Boulders at spilling locations as per technical specification Cl.2506 and as per Drawing no. OSRP/CEG/SH/ENV/10 and as per the direction of Engineer-in-charge.	Cum	103.00	750.00 Rupees Seven Hundred Fifty Only	77,250.00 Rupees Seventy Seven Thousand Two Hundred Fifty Only
10.23	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	218.00	2950.00 Rupees Two Thousand Nine Hundred Fifty Only	643,100.00 Rupees Six Lakh Forty Three Thousand One Hundred Only



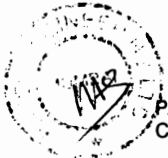
PATEL  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.24	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	500.00	1100.00 Rupees One Thousand One Hundred Only	550,000.00 Rupees Five Lakh Fifty Thousand Only
10.25	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	1000.00	650.00 Rupees Six Hundred Fifty Only	650,000.00 Rupees Six Lakh Fifty Thousand Only
10.26	Providing Cement plastering 12mm with punning 1:3 for platform as per technical specification cl.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	2490.00	65.00 Rupees Sixty Five Only	161,850.00 Rupees One Lakh Sixty One Thousand Eight Hundred Fifty Only
10.27	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	130.00	100.00 Rupees One Hundred Only	13,000.00 Rupees Thirteen Thousand Only



PATEL ASSOCIATES JV  
CONTRACTOR



Chief Engineer  
World Bank Projects  
EMPLOYER  
World Bank Projects  
the E.I.C (Civil) Office  
Phulabani

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 )- ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.28	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	25200.00	20.00 Rupees Twenty Only	504,000.00 Rupees Five Lakh Four Thousand Only
10.29	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	105.00	150.00 Rupees One Hundred Fifty Only	15,750.00 Rupees Fifteen Thousand Seven Hundred Fifty Only
10.30	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	1520.00	52.00 Rupees Fifty Two Only	79,040.00 Rupees Seventy Nine Thousand Forty Only
10.31	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	2660.00	25.00 Rupees Twenty Five Only	66,500.00 Rupees Sixty Six Thousand Five Hundred Only
10.32	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	1330.00	25.00 Rupees Twenty Five Only	33,250.00 Rupees Thirty Three Thousand Two Hundred Fifty Only



PATEL-ARSS  
CONTRACTOR



Chief Engineer  
World Bank Projects, OHS&D  
World Bank Projects  
the E.I.C (Civil) Office  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
10.33	Construction of approach road with GSB and murrom 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	365.00	435.00 Rupees Four Hundred Thirty Five Only	158,775.00 Rupees One Lakh Fifty Eight Thousand Seven Hundred Seventy Five Only
10.34	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	998.00	12.00 Rupees Twelve Only	11,976.00 Rupees Eleven Thousand Nine Hundred Seventy Six Only
10.35	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	11440.00	75.00 Rupees Seventy Five Only	858,000.00 Rupees Eight Lakh Fifty Eight Thousand Only
10.36	Providing and making site enhancement Plantation including maintenance with specified enclosed in schedule and as per the direction of Engineer-in-charge.	No	2400.00	15.00 Rupees Fifteen Only	36,000.00 Rupees Thirty Six Thousand Only
<b>Sub-Total- Bill No-10</b>					<b>26,666,087.00</b>
				<b>Rupees Two Crore Sixty Six Lakh Sixty Six Thousand Eighty Seven Only</b>	



PATEL ARSS JV  
CONTRACTOR

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khartar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
11.01	<b>BILL NO. - 11 : PROVISIONAL ITEMS</b> 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	82.00	84.00 Rupees Eighty Four Only	6,888.00 Rupees Six Thousand Eight Hundred Eighty Eight Only
	b) Girth From 600mm to 900mm	No	175.00	171.00 Rupees One Hundred Seventy One Only	29,925.00 Rupees Twenty Nine Thousand Nine Hundred Twenty Five Only
	c) Girth From 900mm to 1800mm	No	1935.00	302.00 Rupees Three Hundred Two Only	584,370.00 Rupees Five Lakh Eighty Four Thousand Three Hundred Seventy Only
	d) Girth From 1800mm to Above	No	98.00	546.00 Rupees Five Hundred Forty Six Only	53,508.00 Rupees Fifty Three Thousand Five Hundred Eight Only
11.02	A) Plantation of trees	No	9150.00	11.00 Rupees Eleven Only	100,650.00 Rupees One Lakh Six Hundred Fifty Only
	B) Planting of plants & shrubs in median/ verges	Lm	25000.00	21.00 Rupees Twenty One Only	525,000.00 Rupees Five Lakh Twenty Five Thousand 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	300.00	420.00 Rupees Four Hundred Twenty Only	126,000.00 Rupees One Lakh Twenty Six Thousand Only



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 )- ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
11.04	Co-ordination for Shifting of Utilities as per Technical Specification Clause 110.	Km	68.00	2500.00 Rupees Two Thousand Five Hundred Only	170,000.00 Rupees One Lakh Seventy Thousand Only
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	2.00	75000.00 Rupees Seventy Five Thousand Only	150,000.00 Rupees One Lakh Fifty Thousand 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	10000.00	3300.00 Rupees Three Thousand Three Hundred Only	33,000,000.00 Rupees Three Crore Thirty Lakh Only



PATEL-ARSS  
CONTRACTOR



Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-F01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	1860.00	425.00 Rupees Four Hundred Twenty Five Only	790,500.00 Rupees Seven Lakh Ninety Thousand Five Hundred Only
	31Mtr to 60mtr.	Mtr	1860.00	450.00 Rupees Four Hundred Fifty Only	837,000.00 Rupees Eight Lakh Thirty Seven Thousand Only
	60mtr. To 75mtr	Mtr	930.00	475.00 Rupees Four Hundred Seventy Five Only	441,750.00 Rupees Four Lakh Forty One Thousand Seven Hundred Fifty Only



PATEL ARSS,  
CONTRACTOR

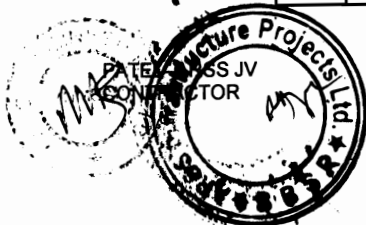


Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
to the E.L.C (Civil) Orissa,  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item 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/ENVV/07and labour as per direction of Eng-in-Charge.	Mtr	1860.00	45.00	83,700.00
11.09	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	62.00	1000.00	Rupees Eighty Three Thousand Seven Hundred Only
	Providing labour for fixing of 1m II hand pump	Each	62.00	103.00	Rupees Six Thousand Three Hundred Eighty Six Only
	Supplying 125mm PVC pipe	RM	1860.00	600.00	Rupees Eleven Lakh Sixteen Thousand Only
	Supplying 1m II hand pump	Each	62.00	6000.00	Rupees Three Lakh Seventy Two Thousand Only

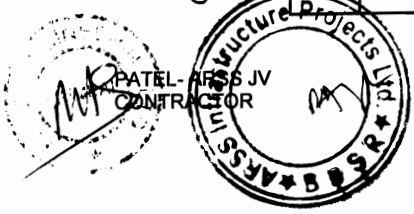


Chief Engineer  
World Bank Projects, Orissa  
EMPLOYER  
World Bank Projects  
to the E.L.C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khairar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
	Supplying 32mm GI riser pipe	Each	496.00	450.00 Rupees Four Hundred Fifty Only	223,200.00 Rupees Two Lakh Twenty Three Thousand Two Hundred 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	69.00	84.00 Rupees Eighty Four Only	5,796.00 Rupees Five Thousand Seven Hundred Ninety Six Only
<b>Sub-Total- Bill No-11</b>					<b>38,684,673.00</b>
<b>Rupees Three Crore Eighty Six Lakh Eighty Four Thousand Six Hundred Seventy Three Only</b>					



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

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khairiar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
<b>Schedule of Daywork Rates: 1. Labour</b>					
D101	Labour	Day	400.00	70.00 Rupees Seventy Only	28,000.00 Rupees Twenty Eight 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	150.00 Rupees One Hundred Fifty Only	7,500.00 Rupees Seven Thousand Five Hundred Only
D106	Operator for excavator, dragline, shovel or crane	Day	50.00	200.00 Rupees Two Hundred Only	10,000.00 Rupees Ten Thousand Only
D107	Operator for tractor with dozer blade or ripper	Day	50.00	200.00 Rupees Two Hundred Only	10,000.00 Rupees Ten Thousand Only
D108	Operator grader	Day	50.00	200.00 Rupees Two Hundred Only	10,000.00 Rupees Ten Thousand Only

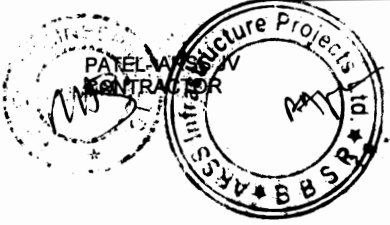


Chief Engineer  
World Bank Projects, Orissa  
World Bank Projects  
to the E I C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khairiar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
D109	Operator in other construction equipment	Day	50.00	200.00 Rupees Two Hundred Only	10,000.00 Rupees Ten Thousand Only
D110	Chowkidars for watch & ward	Day	500.00	100.00 Rupees One Hundred Only	50,000.00 Rupees Fifty Thousand Only
					<b>146500.00</b>
					Rupees One Lakh Forty Six Thousand Five Hundred Only
D111	Allow 15% (Fifteen percent) of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				21975.00
					Rupees Twenty One Thousand Nine Hundred Seventy Five Only
					<b>168475.00</b>
					Rupees One Lakh Sixty Eight Thousand Four Hundred Seventy Five Only



Chief Engineer  
World Bank for Business  
EMPLOYER  
World Bank Projects  
Olo the E I C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 )- ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
<b>Schedule of Daywork Rates: 2. Materials</b>					
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 No	500.00	2000.00 Rupees Two Thousand Only	1,000,000.00 Rupees Ten 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	150.00 Rupees One Hundred Fifty Only	1,500.00 Rupees One Thousand Five Hundred Only
D206	Coarse Sand as per IS 1542	Per Cum	50.00	200.00 Rupees Two Hundred Only	10,000.00 Rupees Ten Thousand Only
D207	R.R. Stone for masonry	Per Cum	50.00	2000.00 Rupees Two Thousand Only	100,000.00 Rupees One Lakh Only
D208	Crusher broken stone aggregates up to 25 mm nominal size	Per Cum	50.00	900.00 Rupees Nine Hundred Only	45,000.00 Rupees Forty Five Thousand Only

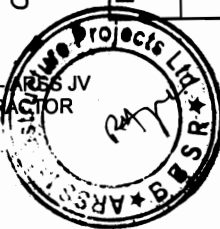


Chief Engineer  
World Bank Projects, Orissa  
World EMPLOYER  
to the E.I.C (Civil) Orissa  
Bhubaneswar

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16 ) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item 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	850.00 Rupees Eight Hundred Fifty Only	42,500.00 Rupees Forty Two Thousand Five Hundred Only
D210	Portable water at site	Per 1000 ltr	5000.00	100.00 Rupees One Hundred Only	500,000.00 Rupees Five Lakh Only
					<b>2000500.00</b> Rupees Twenty Lakh Five Hundred Only
D211	Allow 15%(Fifteen percent) of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				300,075.00 Rupees Three Lakh Seventy Five Only
					<b>2300575.00</b> Rupees Twenty Three Lakh Five Hundred Seventy Five Only





Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (20 km to 70/0 km of SH-16) - ICB Package OSRP-CW-  
ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
<b>Schedule of Daywork Rates: 2. Contractor's Equipment</b>					
D301	Excavator, face shovel, or dragging:				
D301.1	Up to and including 1 m <sup>3</sup>	Hour	50.00	1200.00 Rupees One Thousand Two Hundred Only	60,000.00 Rupees Sixty Thousand Only
D301.2	Over 1 m <sup>3</sup> to 2 m <sup>3</sup>	Hour	30.00	1500.00 Rupees One Thousand Five Hundred Only	45,000.00 Rupees Forty Five Thousand Only
D301.3	Over 2 m <sup>3</sup>	Hour	10.00	2000.00 Rupees Two Thousand Only	20,000.00 Rupees Twenty Thousand Only
D302	Tractor, including bull or angle dozer:				
D302.1	Up to and including 150 kW	Hour	50.00	250.00 Rupees Two Hundred Fifty Only	12,500.00 Rupees Twelve Thousand Five Hundred Only
D302.2	Over 150 kW to 200 kW	Hour	30.00	300.00 Rupees Three Hundred Only	9,000.00 Rupees Nine Thousand Only
D302.3	Over 200 kW to 250 kW	Hour	10.00	300.00 Rupees Three Hundred Only	3,000.00 Rupees Three Thousand Only
D303	Tractor with ripper:				
D303.1	Up to and including 200 kW	Hour	30.00	300.00 Rupees Three Hundred Only	9,000.00 Rupees Nine Thousand Only
D303.2	Over 200 kW to 250 kW	Hour	10.00	300.00 Rupees Three Hundred Only	3,000.00 Rupees Three Thousand Only



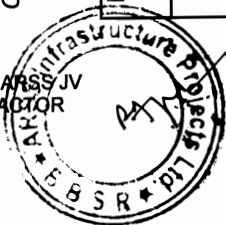
Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 7/0 km of SH-16 )- ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
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	500.00 Rupees Five Hundred Only	20,000.00 Rupees Twenty Thousand Only
D306	Diesel Road Roller, or Vibratory Compactor upto 10 t	Hour	40.00	800.00 Rupees Eight Hundred Only	32,000.00 Rupees Thirty Two 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	750.00 Rupees Seven Hundred Fifty Only	75,000.00 Rupees Seventy Five 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	500.00 Rupees Five Hundred Only	20,000.00 Rupees Twenty Thousand Only
	(b) For 25-40 HP	Hour	30.00	600.00 Rupees Six Hundred Only	18,000.00 Rupees Eighteen Thousand Only
D309	Bitumen mixture (10-14 Cft.) C.C	Hour	20.00	800.00 Rupees Eight Hundred Only	16,000.00 Rupees Sixteen Thousand Only
	Mix tyre (10-14 Cft.)				
D310	Water pumping sets mounted on trolley (diesel driven)with inlet & outlet pipes.				
	a) Sets up to 10 HP	Hour	10.00	75.00 Rupees Seventy Five Only	750.00 Rupees Seven Hundred Fifty Only



PATEL-ANAND JV  
CONTRACTOR



Chief Engineer  
World Bank Project  
World Bank Projects  
to the E.I.C (Civil) Office  
Bhubaneswar.

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
	b) Sets 11 to 20 HP	Hour	10.00	120.00 Rupees One Hundred Twenty Only	1,200.00 Rupees One Thousand Two Hundred Only
	c) Sets above 20 HP	Hour	10.00	200.00 Rupees Two Hundred Only	2,000.00 Rupees Two Thousand Only
D311	Generator sets mounted on trolley				
	a) Sets upto 5 Kva	Hour	10.00	125.00 Rupees One Hundred Twenty Five Only	1,250.00 Rupees One Thousand Two Hundred Fifty Only
	b) Sets 5-15 Kva	Hour	10.00	250.00 Rupees Two Hundred Fifty Only	2,500.00 Rupees Two Thousand Five Hundred Only
D312	Mobile Crane / Power winch	Hour	10.00	500.00 Rupees Five Hundred Only	5,000.00 Rupees Five Thousand Only
D313	Bull Dozer 100/110 Hp	Hour	10.00	2000.00 Rupees Two Thousand Only	20,000.00 Rupees Twenty Thousand Only
D314	Plate compactors	Hour	10.00	150.00 Rupees One Hundred Fifty Only	1,500.00 Rupees One Thousand Five Hundred Only
D315	Jack hammers for dismantling	Hour	10.00	25.00 Rupees Twenty Five Only	250.00 Rupees Two Hundred Fifty Only
D316	Utility Vehicles	Hour	10.00	450.00 Rupees Four Hundred Fifty Only	4,500.00 Rupees Four Thousand Five Hundred Only

Contract Name: Widening and Strengthening of Existing Carriageway to 2 lane from Bhawanipatna-Khariar (2/0 km to 70/0 km of SH-16) - ICB Package OSRP-CW-ICB-Y1-P01

**PRICE SCHEDULE (Works Items & Dayworks)**

Item No	Description	Unit	Quantity	Rate in Figure and Words	Amount in Figure and Words
D317	Mini Hot Mix Plant (5TPH)	Hour	10.00	1100.00 Rupees One Thousand One Hundred Only	11,000.00 Rupees Eleven Thousand Only
					<b>472450.00</b>
					Rupees Four Lakh Seventy Two Thousand Four Hundred Fifty Only
D318	Allow 15% (Fifteen percent) of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				70,867.50 Rupees Seventy Thousand Eight Hundred Sixty Seven And Fifty Paise Only
					<b>543317.50</b>

**Rupees Five Lakh Forty Three Thousand Three Hundred Seventeen And Fifty Paise Only**



Chief Engineer  
World Bank Projects Office  
EMPLOYER  
World Bank Projects  
the ELC (Civil) Office  
Bhubaneswar