W-2

GOVERNMENT OF ODISHA

ODISHA STATE ROADS PROJECT

NATIONAL COMPETITIVE BIDDING

(CIVIL WORKS)

NAME OF WORK :

Package No: OSRP-Bal-P01B

PERIOD OF SALE OF BIDDING DOCUMENT	:	FROM **April 10, 2013** TO **May 17, 2013**
TIME AND DATE OF PRE-BID CONFERENCE	:	DATE **April 24, 2013** TIME 11:00 HOURS
LAST DATE AND TIME FOR RECEIPT OF BIDS	:	DATE **May 18, 2013** TIME 11:30 HOURS
TIME AND DATE OF OPENING OF BIDS	:	DATE **May 18, 2013** TIME 11:45 HOURS
PLACE OF OPENING OF BIDS	:	Conference Hall of the Chief Engineer, World Bank Projects, Odisha, O/o E.I.C. (Civil), Odisha, Nirman Soudha, Keshari Nagar, Unit – V,Bhubaneswar- 751001, Odisha.
OFFICER INVITING BIDS	:	Chief Engineer, World Bank Projects, Odisha, Bhubaneswar

INVITATION FOR BID (IFB)

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

Date: **April 3, 2013** Loan N°: **IBRD 7577-IN**

IFB N°: PMU-WB-13/2013- **13989**

ODISHA STATE ROADS PROJECT
NATIONAL COMPETITIVE BIDDING

1. The Government of India has received a loan from the International Bank for Reconstruction & Development towards the cost of Odisha State Roads Project and intends to apply a part of the funds to cover eligible payments under the contracts for construction of works as detailed below. Bidding is open to all bidders from eligible source countries as defined in the IBRD Guidelines for Procurement. Bidders from India should, however, be registered with the Government of Odisha or other State Governments/Government of India, or State/Central Government Undertakings. ***Bidders are advised to note the minimum qualification criteria specified in Clause 4 of the Instructions to Bidders to qualify for the award of the contract.***

The Chief Engineer, World Bank Projects, Odisha, Bhubaneswar invites bids for the construction of works detailed in the table.

2. Bidding documents may be purchased from the office of the undersigned from **10.04.2013 to 17.05.2013**, for a non-refundable fee (for one set) as indicated, in the form of cash or Demand Draft on any Scheduled Bank payable at Bhubaneswar in favour of Executive Engineer, Project Management Unit, OSRP. Interested bidders may obtain further information at the same address. The complete bidding document will also be available in the website www.osrp.gov.in and www.tenders.gov.in. The intending bidders who wish to use downloaded bidding documents shall be required to deposit the cost of bidding document in shape of Demand Draft on any Scheduled bank payable at Bhubaneswar in favour of Executive Engineer, Project Management Unit, OSRP, along with their bids failing which the application shall not be considered as a bid.

In case of downloaded document, the undersigned will not be held responsible if any portion of the bid document is modified / omitted and in such cases the original document kept in the office of the undersigned shall prevail.

3. A prebid meeting will be held on **24.04.2013** at 11.00 A.M. at the office of the undersigned to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in Clause 9.2 of 'Instructions to Bidders' of the bidding document.

4. Bids must be delivered to Chief Engineer, World Bank Projects, Odisha, Bhubaneswar on or before **11:30** hours on **18.05.2013** and will be opened on the **same day** at **11:45** hours, in the presence of the bidders who wish to attend. If the office happens to be closed on the date of receipt of the bids as specified, the bids will be received and opened on the next working day at the same time and venue.

5. Other details can be seen in the bidding documents. Bids must be accompanied by security of the amount specified for the work in the table below, drawn in favour of Chief Engineer, World Bank Projects, Odisha in shape of irrevocable Demand Guarantee on any Scheduled bank payable at Bhubaneswar. Bid security shall have to be valid for 45 days beyond the validity of the bid.

6. The bidders are advised to refer the website http://www.osrp.gov.in/CivilWorks_Tenders.html for the pre-bid responses, corrigenda/ addenda and all future clarifications related to the bid.

TABLE

Package No.	Name of Work	Appx. Value of Work (Rs.)	Bid Security (Rs.)	Cost of Document (Rs.)	Period of Completion
OSRP-Bal-P01B	Construction of 4nos of High Level Bridges over River Tel between Km 27/200 to Km 30/000 with Approaches on the road from Bhawanipatna to Khariar (SH-16).	2730 Lakh	27.3 Lakh	10,500 (10,000/-+VAT 5%)	24 (Twenty-four) months

3/4/13

Chief Engineer, World Bank Projects, Odisha
O/o Engineer-in-Chief (Civil), Odisha, Nirman Soudha,
Keshari Nagar, Unit – V, Bhubaneswar – 751 001, Odisha (INDIA)
Tel: 0674 239 6783 Fax: 0674 239 0080, Email: pmuosrp@gmail.com

Contents

SECTION 1: INSTRUCTION TO BIDDERS (ITB)

A. General

1. Scope of Bid

1.1 The Chief Engineer, World Bank Projects, Odisha on behalf of Works Department, Government. of Odisha (referred to as Employer in these documents) invites bids for the construction of works (as defined in these documents and referred to as "the works") detailed in the table given in IFB. The bidders may submit bids for any or all of the works detailed in the table given in IFB.

1.2 The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data.

2. Source of Funds

2.1 The Government of India has received a loan from the International Bank for Reconstruction and Development (hereinafter interchangeably called “the Bank”) towards the cost of Odisha State Roads Project and intends to apply a part of the funds to cover eligible payments under the contract for the Works. Payments by the Bank will be made only at the request of the borrower and upon approval of the Bank in accordance with the *Loan Agreement*, and will be subject in all respects to the terms and conditions of that Agreement. Except as the Bank may specifically otherwise agree, no party other than the borrower shall derive any rights from the *Loan Agreement* or have any rights to the loan proceeds.

2.2 The loan agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by a decision of the United Nations Security Council, taken under Chapter VII of the Charter of the United Nations.

3. Eligible Bidders

3.1 This *Invitation for Bids* is open to all bidders from the eligible countries as defined under the *IBRD Guidelines for Procurement.* Any materials, equipment, and services to be used in the performance of the Contract shall have their origin in the eligible source countries.

3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is not associated, nor has been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Borrower to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

3.3 Government-owned enterprises in the Employer’s country may only participate if they are legally and financially autonomous, operate under commercial law and are not a dependent agency of the Borrower or Sub-borrower.

3.4 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Bank in accordance with sub-clause 37.1.

4. Qualification of the Bidder

4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.

4.2 In the event that Pre-qualification of potential bidders has been undertaken, only bids from prequalified bidders will be considered for award for Contract. These qualified bidders should submit with their bids any information updating their original prequalification applications or, alternatively, confirm in their bids that the originally submitted prequalification information remains essentially correct as of date of bid submission. The update or confirmation should be provided in Section 2.

4.3 All bidders shall include the following information and documents with their bids in Section 2:

(a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the Bid to commit the Bidder;

(b) total monetary value of construction work performed for each of the last five years;

(c) experience in works of a similar nature and size for each of the last five years, and details of works under way or contractually committed; and clients who may be contacted for further information on those contracts;

(d) major items of construction equipment proposed to carry out the Contract;

(e) qualifications and experience of key site management and technical personnel proposed for the Contract;

(f) reports on the financial standing of the Bidder, such as profit and loss statements and auditor's reports for the past five years;

(g) evidence of adequacy of working capital for this contract (access to line (s) of credit and availability of other financial resources);

(h) authority to seek references from the Bidder's bankers;

(i) information regarding any litigation or arbitration resulting from contracts executed by the Bidder in the last five years or currently under execution. The information shall include the names of the parties concerned, the disputed amount, cause of litigation, and matter in dispute;

(j) proposals for subcontracting components of the Works which in aggregate add to more than 20 percent of the Bid Price (*for each, the qualifications and experience of the identified sub-contractor in the relevant field should be annexed; no vertical splitting of work for sub-contracting is acceptable*); and

(k) the proposed methodology and program of construction backed with equipment, materials and manpower planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.

4.4 *Bids from Joint ventures are not acceptable.*

4.5 A. To qualify for award of the contract, each bidder in its name should have in the last five years *i.e between financial years 2007-08 to 2011-12*.

(a) achieved, in at least two financial years, a minimum annual financial turnover (in all classes of civil engineering construction works only) of Rs. 27 crore[@];

b) participated and satisfactorily completed as a prime contractor, (or as subcontractor duly certified by the employer/main contractor) at least ***one similar work like HL Bridge having PSC Girder with Pile foundation of value not less than Rs 22 crore@ or two similar works like HL Bridge having PSC Girder with Pile foundation of value not less than Rs 14 crore@ each***;

(c) executed in any one year, the following minimum quantities of work:

(i)	Earthwork in excavation, embankment & sub-grades for Road constructions	:	80,000 Cum
(ii)	Piling Work of diameter 750mm & above	:	1,000 Rmt
(iii)	RCC, PCC, DLC,PQC	:	5,000 Cum
(iv)	Prestress Concrete (PSC)	:	2,000 Cum

Note: @ 2012-13 price level : Financial turnover and cost of completed works of previous years shall be given weightage @5% per year based on rupees value to bring them to base year price level of the financial year in which bids are received.

4.5 B. To qualify for award of the contract, each bidder should further demonstrate:

(a) availability (either owned or leased or by procurement against mobilization advances) of the following key and critical equipment for this work:

Serial	Equipment Type and Characteristics		Minimum Requirement
1	Mechanical Bitumen Sensor Paver 100 TPH		01
2	Motor Grader	200 cum/hour	01
3	Hydraulic Excavator	60 cum/hour	02
4	Vibratory Roller	8 ton9100 cum/hour)	01
5	Pneumatic Tyred Roller	9 wheeled 12 ton	01
6	Concrete Batch-Mix Plant	100TPH	01
7	Transit Mixer	6cum	04
8	Front End Loader	6 cum	02
9	Dozer	150 cum/Hr	01
10	Tipper	10 cum	05
11	Earth Compactor	8-10 ton	02
12	Water Tanker	10 KL	05
13	Concrete Pump	20 cum/hour	02
14	Piling Rig for 1200mm dia DMC pile		02

15	Crane	35 tonne	02
16	Steel Formwork		6000 Sqm

Based on the studies carried out by the Engineer, the minimum suggested major equipment to attain the completion of works in accordance with the prescribed construction schedule are shown in the above list.
The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations (detailed) as stated in clause 4.3 (k) above to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.

(a) availability of the following manpower:

No.	Position	Minimum Work Experience (years)	Experience in Similar Works (years)	Minimum Qualification
1	Project Manager-cum-Bridge Engineer – 1 No	10	5	Degree in Civil Engg.
2	Material Engineer – 1 No	5	3	Degree/ Diploma in Civil Engg.
3	Quantity Surveyor – 1 No	5	3	Degree/ Diploma in Civil Engg.
4	Surveyor – 1 No	5	3	Degree/ Diploma in Civil Engg.
5	Mechanical ./Equipment. Maintenance Engineer – 1 No	5	3	Diploma in Mech. Engg.

(c) liquid assets and/or availability of credit facilities of no less than Rs. 4 Cr. in the format given in Section 2.
(Credit lines/ letter of credit/ certificates from Banks for meeting the funds requirement etc.)

4.5 **C**. To qualify for a package of contracts made up of this and other contracts for which bids are invited in the IFB, the bidder must demonstrate having experience and resources sufficient to meet the aggregate of the qualifying criteria for the individual contracts.

4.6 Sub-contractors' experience and resources shall not be taken into account in determining the bidder's compliance with the qualifying criteria except to the extent stated in 4.5 (A) (b, d and e) above.

4.7 Bidders who meet the minimum qualification criteria will be qualified only if their available bid capacity is more than the total bid value. The available bid capacity will be calculated as under:

Assessed Available Bid capacity = (A*N*1.5 - B)

where

A = Maximum value of civil engineering works executed in any one year during the last five years (updated to March 2012 price level)* taking into account the completed as well as works in progress.

N = Number of years prescribed for completion of the works for which bids are invited i.e. 2 years

B = Value, at March 2012 price level, of existing commitments and on-going works* to be completed during the next two years (period of completion of the works for which bids are invited)

Note: ** The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Engineer in charge, not below the rank of an Executive Engineer or equivalent.*
The value of civil engineering works; executed or existing commitments and ongoing, shall be given weightage @5% per year based on rupees value to bring them to base year price level of the financial year in which bids are received.

4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or

- participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

5. One Bid per Bidder

5.1 Each bidder shall submit only one bid for one contract. A bidder who submits or participates in more than one Bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Bidder's participation to be disqualified.

6. Cost of Bidding

6.1 The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

7. Site visit

7.1 The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

B. Bidding Documents

8. Content of Bidding Documents

Invitation for Bids

Section	1	Instructions to Bidders
	2	Forms of Bid and Qualification Information
	3	Conditions of Contract
	4	Contract Data
	5	Specifications
	6	Drawings
	7	Bills of Quantities
	8	Forms of Securities

8.2 Of the three sets of the bidding documents supplied, two sets should be completed and returned with the bid.

9. Clarification of Bidding Documents

9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (hereinafter "cable" includes telex, facsimile and email) at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Copies of the Employer's response will be forwarded to all purchasers of the bidding documents, including a description of the enquiry but without identifying its source.

9.2 Pre-bid meeting

9.2.1 The bidder or his official representative is invited to attend a pre-bid meeting which will take place in the conference hall of the Chief Engineer, World Bank Projects, Odisha, Nirman Soudha, Ground Floor, Bhubaneswar- 751 001, Odisha on April 24, 2013 at 11.00 Hours.

9.2.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

9.2.3 The bidder is requested to submit any questions in writing or by cable to reach the Employer not later than one week before the meeting.

9.2.4 Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be transmitted without delay to all purchasers of the bidding documents. Any modification of the bidding documents listed in Sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.

9.2.5 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

10.2 Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer.

10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer shall extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

C. Preparation of Bids

11. Language of the Bid

11.1 All documents relating to the bid shall be in the English language.

12. Documents comprising the Bid

12.1 The bid submitted by the bidder shall comprise the following:

(a) The Bid (in the format indicated in Section 2).
(b) Bid Security;
(c) Priced Bill of Quantities;
(d) Qualification Information Form and Documents;

and any other materials required to be completed and submitted by bidders in accordance with these instructions. The documents listed under Sections 2, 4 and 7 of Sub-Clause 8.1 shall be filled in without exception.

12.2 Bidders bidding for this contract together with other contracts stated in the IFB to form a package will so indicate in the bid together with any discounts offered for the award of more than one contract.

13. Bid Prices

13.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill Quantities submitted by the Bidder.

13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the **Bill of Quantities** alongwith total bid price (both in figures and words). *Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.* Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.

13.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder.

Note: *"Bidders may like to ascertain availability of excise/custom duty exemption benefits available in India to the contracts financed under World Bank loan/credits. They are solely responsible for obtaining such benefits which they have considered in their bid and in case of failure to receive such benefits for reasons whatsoever, the employer will not compensate the bidder (contractor). Where the bidder has quoted taking into account such benefits, he must give all information required for issue of certificates in terms of such notifications as per form attached to the Qualification Information in the bid. To the extent the employer determines the quantity indicated therein are reasonable keeping in view the bill of quantities, construction programme and methodology, the certificates will be issued within 60 [sixty] days of signing of contract and no subsequent changes will be permitted. No certificate will be issued for items where no quantity/capacity of equipment is indicated in the statement. The bids which do not conform to the above provisions will be treated as non responsive and rejected. Any delay in procurement of the construction equipment /machinery/goods as a result of the above shall not be a cause for granting any extension of time."*

13.4 The rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 47 of the Conditions of Contract.

14. Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees.

15. Bid Validity

15.1 Bids shall remain valid for a period not less than 120 days after the deadline date for bid submission specified in Clause 20. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid except as provided in 15.3 hereinafter, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 16 in all respects.

15.3 In the case of contracts in which the Contract Price is fixed (not subject to price adjustment), in the event that the purchaser requests and the Bidder agrees to an extension of the validity period, the contract price, if the Bidder is selected for award shall be the bid price corrected as follows :

The price shall be increased by the factor (value of factor B)[1] for each week or part of a week that has elapsed from the expiration of the initial bid validity to the date of issue of letter of acceptance to the successful Bidder.

15.4 Bid evaluation will be based on the bid prices without taking into consideration the above correction.

16. Bid Security

16.1 The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This bid security shall be in favour of Chief Engineer, World Bank Projects, Odisha, Bhubaneswar and may be in one of the following forms:

- a bank guarantee issued by a nationalized / scheduled bank located in India or a reputable bank located abroad in the form given in Section 8; or

16.2 Bank guarantees issued as surety for the bid shall be valid for 45 days beyond the validity of the bid.

16.3 Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.

16.4 The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1.

16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.

16.6 The Bid Security may be forfeited

(a) if the Bidder withdraws the Bid after Bid opening during the period of Bid validity;

(b) if the Bidder does not accept the correction of the Bid Price, pursuant to Clause 27; or
(c) in the case of a successful Bidder, if the Bidder fails within the specified time limit to

(i) sign the Agreement; or
(ii) furnish the required Performance Security.

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1. The value of B is based on the country's inflation for the period in question. The borrower inserts the value in the bid document prior to issue.

17. Alternative Proposals by Bidders

17.1 Bidders shall submit offers that comply with the requirements of the bidding documents, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered.

18. Format and Signing of Bid

18.1 The Bidder shall prepare one original and one copy of the documents comprising the bid as described in Clause 12 of these *Instructions to Bidders*, bound with the volume containing the Form of Bid, and clearly marked "**ORIGINAL**" and "**COPY"** as appropriate. In the event of discrepancy between them, the original shall prevail.

18.2 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder, pursuant to Sub-Clauses 4.3. All pages of the bid where entries or amendments have been made shall be initialled by the person or persons signing the bid.

18.3 The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialled by the person or persons signing the bid.

18.4 The Bidder shall furnish information as described in the Form of Bid on commissions or gratuities, if any, paid or to be paid to agents relating to this Bid, and to contract execution if the Bidder is awarded the contract.

D. Submission of Bids

19. Sealing and Marking of Bids

19.1 The Bidder shall seal the original and copy of the Bid in separate envelopes, duly marking the envelopes as "**ORIGINAL**" and "**COPY**". These envelopes (called as inner envelopes) shall then be put inside one outer envelope.

19.2 The **inner and outer** envelopes shall

(a) be addressed to the Employer at the following address:

Chief Engineer,
World Bank Projects, Odisha,
Nirman Soudha, Ground Floor,
Bhubaneswar- 751 001,Odisha.

and

(b) bear the following identification:

- Bid for *Construction of 4nos of High Level Bridges over River Tel between Km 27/200 to Km 30/000 with Approaches on the road from Bhawanipatna to Khariar (SH-16).*

  .Package No: OSRP-Bal-P01B

- Bid Reference No. PMU-WB-13/2013-13989 dated April 3, 2013 -

- DO NOT OPEN BEFORE 11.45 Hrs of May 18, 2013

19.3 In addition to the identification required in Sub-Clause 19.2, the inner envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared late, pursuant to Clause 21.

19.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

20. Deadline for Submission of the Bids

20.1 Bids must be received by the Employer at the address specified above no later than 11.30 Hrs of May 18, 2013. In the event of the specified date for the submission of bids declared a holiday for the Employer, the Bids will be received upto the appointed time on the next working day.

20.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

21. Late Bids

21.1 Any Bid received by the Employer after the deadline prescribed in Clause 20 will be returned unopened to the bidder.

22. Modification and Withdrawal of Bids

22.1 Bidders may modify or withdraw their bids by giving notice in writing before the deadline prescribed in Clause 20.

22.2 Each Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with Clause 18 & 19, with the outer and inner envelopes additionally marked "**MODIFICATION**" or "**WITHDRAWAL**", as appropriate.

22.3 No bid may be modified after the deadline for submission of Bids.

22.4 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

22.5 Bidders may offer discounts to, or modify the prices of their Bids only by submitting Bid modifications in accordance with this clause, or included in the original Bid submission.

E. Bid Opening and Evaluation

23. Bid Opening

23.1 The Employer will open all the Bids received (except those received late), including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at 16:30 hours on the date and the place specified in Clause 20. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

23.2 Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 22 shall not be opened. Subsequently all envelopes marked "Modification" shall be opened and the submissions therein read out in appropriate detail.

23.3 The Bidders' names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, Bid modifications and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No bid shall be rejected at bid opening except for the late bids pursuant to Clause 21. Bids [and modifications] sent pursuant to Clause 22 that are not opened and read out at bid opening will not be considered for further evaluation regardless of the circumstances. Late and withdrawn bids will be returned un-opened to bidders.

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.3.

24. Process to Be Confidential

24.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

25. Clarification of Bids

25.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of the unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause 27.

25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to its bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.

25.3 Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidders' bid.

26. Examination of Bids and Determination of Responsiveness

26.1 Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding documents.

26.2 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

26.3 If a Bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

27. Correction of Errors

27.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer **as follows**:

(a) where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and

(b) where there is a discrepancy between the unit and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

27.2 The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount the Bid will be rejected, and the Bid security may be forfeited in accordance with Sub-Clause 16.6 (b).

28. Deleted

29. Evaluation and Comparison of Bids

29.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause 26.

29.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

(a) making any correction for errors pursuant to Clause 27; or

(b) making an appropriate adjustments for any other acceptable variations, deviations; and

(c) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Sub Clause 22.5.

29.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Bid evaluation.

29.4 The estimated effect of the price adjustment conditions under Clause 47 of the *Conditions of Contract*, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.

29.5 If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

30. Deleted

F. Award of Contract

31. Award Criteria

31.1 Subject to Clause 32, the Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 3, and (b) qualified in accordance with the provisions of Clause 4.

31.2 If, pursuant to Clause 12.2 this contract is being let alongwith other contracts, the lowest evaluated Bid Price will be determined when evaluating this contract in conjunction with other contracts to be awarded concurrently, taking into account any discounts offered by the bidders for the award of more than one contract.

32. Employer's Right to Accept any Bid and to Reject any or all Bids

32.1 Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

33. Notification of Award and Signing of Agreement

33.1 The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the *Conditions of Contract* called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

33.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 34.

33.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and sent to the successful Bidder, or kept ready for signature of the successful bidder in the office of employer (***choose one alternative***) within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.

33.4 Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34. Performance Security

34.1 Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced Bids in accordance with Clause 29.5 of ITB and Clause 52 of Conditions of Contract:

- a bank guarantee in the form given in Section 8;

34.2 If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder's option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer or (c) by a foreign bank through a correspondent Bank in India [scheduled or nationalized].

34.3 Failure of the successful bidder to comply with the requirements of sub-clause 34.1 shall constitute a breach of contract, cause for annulment of the award, forfeiture of the bid security, and any such other remedy the Employer may take under the contract, and the Employer may resort to awarding the contract to the next ranked bidder.

35 Advance Payment and Security

35.1 The Employer will provide an Advance Payment on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.

36. Adjudicator

36.1 The Employer proposes that *Sri Basudev Sahoo, Chief Engineer (Retired), Works Department, Government of Odisha* shall be appointed as Adjudicator under the Contract, at a monthly retainer fee of Rs.10,000/- , daily fee of Rs.4000/- and Rs.2000/- per day for travel time plus reimbursable expenses as per actual. If the Bidder disagrees with this proposal, the Bidder should so state in the Bid. If in the Letter of Acceptance, the Employer has not agreed on the appointment of the Adjudicator, the Adjudicator shall be appointed by *Secretary General, Indian Roads Congress, New Delhi* at the request of either party.

37. Fraud and Corruption:

37.1 It is the Bank's policy to require that Borrowers (including beneficiaries of Bank loans), as well as bidders, suppliers, and contractors and their subcontractors under Bank-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. 1 In pursuance of this policy, the Bank:

(a) defines, for the purposes of this provision, the terms set forth below as follows:

---

1 In this context, any action taken by a bidder, supplier, contractor, or a sub-contractor to influence the procurement process or contract execution for undue advantage is improper.

(i) "corrupt practice"**2** 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"**3** 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"**4** is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "coercive practice"5 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 37.1(e) below.

(b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) will cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of the loan engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to the Bank to remedy the situation;

(d) will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded a Bank-financed contract if it at any time determines that they have, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a Bank-financed contract; and

(e) will have the right to require that a provision be included in bidding documents and in contracts financed by a Bank Loan, requiring bidders, suppliers, contractors and consultants to permit the Bank to inspect their accounts and records and other documents relating to the Bid submission and contract performance and to have them audited by auditors appointed by the Bank.

37.2 Furthermore, bidders shall be aware of the provision stated in Sub-Clause 23.2 and Clause 64 of the Conditions of Contract.

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[2] "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.

[3] 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.

[4] "parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

[5] a "party" refers to a participant in the procurement process or contract execution.

SECTION 2: FORMS OF BID, QUALIFICATION INFORMATION AND LETTER OF ACCEPTANCE

Table of Forms:

- **CONTRACTOR'S BID**
- **QUALIFICATION INFORMATION**
- **LETTER OF ACCEPTANCE**
- **NOTICE TO PROCEED WITH THE WORK**
- **AGREEMENT FORM**

Contractor's Bid

Description of the Works:
_____
_____
_____
_____[6]

BID

To : _____ [the Employer]

Address : _____
_____[7]

GENTLEMEN,

Having examined the bidding documents including addendum, we offer to execute the Works described above in accordance with the Conditions of Contract, Specifications, Drawings and Bill of Quantities accompanying this Bid for the Contract Price of _____ *[in figures]* (_____) *[in letters]*.[8]

The advance Payment required is: Rupees _____.

We accept the appointment of _____ as the Adjudicator.

(OR)

We do not accept the appointment of _____ as the Adjudicator and propose instead that _____ be appointed as Adjudicator whose daily fees and biographical data are attached.

This Bid and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Bid you receive.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

We also undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

---

1 To be filled in by the Employer before issue of the Bidding Documents.

2 To be filled in by the Employer before issue of the Bidding Documents.

3 To be filled in by the Bidder, together with his particulars and date of submission at the bottom of the Form of Bid.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below :

Name and address of agent	Amount	Purpose of Commission or gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state “none”)

We hereby confirm that this Bid complies with the Eligibility, Bid Validity and Bid Security required by the Bidding documents.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory: _____

Name of Bidder : _____

Address : _____

Qualification Information

The information to be filled in by the Bidder in the following pages will be used for purposes of post qualification as provided for in Clause 4 of the Instructions to Bidders. This information will not be incorporated in the Contract.

1. **For Individual Bidders**

1.1 Constitution or legal status of Bidder
[Attach copy]

Place of registration: _____

Principal place of business: _____

Power of attorney of signatory of Bid
[Attach]

1.2 Total value of Civil Engineering construction _____*β*
work executed and payments received in the last five years** 2011-2012_____
(in Rs. Million) 2010-2011_____
2009-2010_____
2008-2009_____
2007-2008_____

1.3.1 Work performed as prime contractor (in the same name) on works of a similar nature over the last five years. **

Project Name	Name of the Employer*	Descrip-tion of work	Contract No.	Value of contract (Rs. Million)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remarks explaining reasons for delay and work completed

1.3.2 Quantities of work executed as prime contractor (in the same name and style) in the last five years: **

Year	Name of the Work	Name of the Employer*	Quantity of work performed (cum) @			Remarks * (indicate contract Ref)
			Cement concrete (including RCC&PCC)	Masonry	E/works	
2011-2012						
2010-2011						
2009-2010						
2008-2009						
2007-2008						

**Attach certificate(s) from the Engineer(s)-in-Charge*
@The item of work for which data is requested should tally with that specified in ITB clause 4.5A(c).
*** immediately preceding the financial year in which bids are received.*
β Attach certificate from Chartered Accountant.

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Name and Address of Employer	Value of Contract (Rs. million)	Stipulated period of completion	Value of works* remaining to be completed (Rs. million)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(B) Works for which bids already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated value of works (Rs. million)	Stipulated period of completion	Date when decision is expected	Remarks if any
(1)	(2)	(3)	(4)	(5)	(6)	(7)

***** *Attach certificate(s) from the Engineer(s)-in-Charge.*

1.5 The following items of Contractor's Equipment are essential for carrying out the Works. The Bidder should list all the information requested below. Refer also to Sub Clause 4.3 (d) of the Instructions to Bidders.

Item of equipment	Requirement No.	Capacity	Availability proposals Owned/leased/ to be procured	Nos/ capacity	Age/ condition	Remarks (From whom to be purchased)
*	*	*	*	*	*	*
*	*	*	*	*	*	*

1.6 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data. Refer also to Sub Clause 4.3 (e) and 4.5 (B) (b) of instructions to Bidders and Sub Clause 9.1 of the Conditions of Contract.

Position	Name	Qualifications	Years of experience (general)	Years of experience in the proposed position
Project Manager	*	*	*	*
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*
etc.				

1.7 Proposed subcontracts and firms involved. [Refer ITB Clause 4.3 (j)]

Sections of the works	Value of Sub-contract	Sub-contractor (name and address)	Experience in similar work
*	*	*	*
	*	*	
*	*	*	*
	*	*	
*	*	*	*
	*	*	

1.8 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporation), etc. List them below and attach copies.

1.9 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copies of support documents *[sample format attached]*.

1.10. Name, address, email id and telephone, telex, and fax numbers of the Bidders' bankers who may provide references if contacted by the Employer.

1.11 Information on litigation history in which the Bidder is involved.

Other party(ies)	Employer	Cause of dispute	Amount involved	Remarks showing present status

1.12 Statement of compliance under the requirements of Sub Clause 3.2 of the instructions to Bidders.

_____

_____

_____

1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. [Refer ITB Clause 4.1 and 4.3 (k)].

2. Joint Ventures - Deleted

3. Additional Requirements

3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.

_____

Sample Format for Evidence of Access to or Availability of Credit Facilities –* Clause 4.5 [B] [C] of ITB

BANK CERTIFICATE

This is to certify that M/s. …… is a reputed company with a good financial standing.

If the contract for the work, namely ……. [funded by the World Bank] is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. …… to meet their working capital requirements for executing the above contract.

__ Sd. __

Name of Bank

Senior Bank Manager

Address of the Bank

*** Change the text as follows for Joint venture:**

This is to certify that M/s. …… who has formed a JV with M/s. …… and M/s. ……. for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely ……. [funded by the World Bank] is awarded to the above Joint Venture, we shall be able to provide overdraft/credit facilities to the extent of Rs. …… to M/s. ……. to meet the working capital requirements for executing the above contract.

[This should be given by the JV members in proportion to their financial participation.]

Declaration regarding customs/excise duty exemption for materials/ construction equipment bought for the work

(Bidder's Name and Address)

To: ……
(Name of the Employer)

Dear Sir:

Re: *[Name of Work]* ……
- Certificate for Import/Procurement of Goods/Construction Equipment

1. We confirm that we are solely responsible for obtaining customs/excise duty waivers which we have considered in our bid and in case of failure to receive such waivers for reasons whatsoever, the Employer will not compensate us.

2. We are furnishing below the information required by the Employer for issue of the necessary certificates in terms of the Government of India Central Excise Notification No. 108/95 and Customs Notification No. 85/99.

3. The goods/construction equipment for which certificates are required are as under:

Items	Make/ Brand Name	Capacity [where applicable]	Quantity	Value	State whether it will be procured locally or imported [if so from which country]	Remarks regarding justification for the quantity and their usage in works
Goods						
[a] Bitumen						
[b] Others						
Construction Equipment						
[a]						
[b]						
[c]						
[d]						

4. We agree that no modification to the above list is permitted after bids are opened.

5. We agree that the certificate will be issued only to the extent considered reasonable by the Employer for the work, based on the Bill of Quantities and the construction programme and methodology as furnished by us alongwith the bid.

6. We confirm that the above goods will be exclusively used for the construction of the above work and construction equipment will not be sold or otherwise disposed of in any manner for a period of five years from the date of acquisition.

Date: _____
Place: _____

(Signature) _____
(Printed Name) _____
(Designation) _____
(Common Seal) _____

This certificate will be issued within 60 days of signing of contract and no subsequent changes will be permitted.

Letter of Acceptance

(letterhead paper of the Employer)

_____[date]

To: _____[name and address of the Contractor]

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of the _____ _____ [name of the contract and identification number, as given in the Instructions to Bidders] for the Contract Price of Rupees ———————— _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Bidders[1] is hereby accepted by our Agency.

We accept/do not accept that _____ be appointed as the Adjudicator[2].

We note that as per bid, you do not intend to subcontract any component of work.

[OR]

We note that as per bid, you propose to employ M/s. ..... as sub-contractor for executing ….....

[Delete whichever is not applicable]

You are hereby requested to furnish Performance Security, plus additional security for unbalanced bids in terms of ITB clause 29.5, in the form detailed in Para 34.1 of ITB for an amount of Rs.————— within 21 days of the receipt of this letter of acceptance valid upto 28 days from the date of expiry of Defects Liability Period i.e. upto ..... and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

We have reviewed the construction methodology submitted by you alongwith the bid in response to ITB Clause 4.3[k] and our comments are given in the attachment. You are requested to submit a revised Program including environmental management plan as per Clause 27 of General Conditions of Contract within 14 days of receipt of this letter.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency

1 *Delete "corrected and" or "and modified" if only one of these actions applies. Delete "as corrected and modified in accordance with the Instructions to Bidders" if corrections or modifications have not been effected.*

2 *To be used only if the Contractor disagrees in his Bid with the Adjudicator proposed by the Employer in the "Instructions to Bidders."*

Issue of Notice to proceed with the work

(letterhead of the Employer)

———— (date)

To

——————————— (name and address of the Contractor)

———————————

———————————

Dear Sirs:

Pursuant to your furnishing the requisite security as stipulated in ITB clause 34.1 and signing of the contract agreement for the construction of ———————— @ a Bid Price of Rs.————————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

Agreement

This agreement, made the _____ day of _____20_____, between_____

_____[name and address of Employer]

(hereinafter called "the Employer)" of the one part and _____

_____

_____[name and address of contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____

_____

_____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein, at a contract price of Rs.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein 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.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:

   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Bid;
   iv) Contract Data;
   v) Conditions of contract (including Special Conditions of Contract);
   vi) Specifications;
   vii) Drawings;
   viii) Bill of Quantities; and
   ix) Any other document listed in the Contract Data as forming part of the contract.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____

was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____
_____
_____

in the presence of:

Binding Signature of Employer _____ ___

Binding Signature of Contractor _____

SECTION 3: CONDITIONS OF CONTRACT

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in Clauses 24 and 25. The name of the Adjudicator is defined in the Contract Data.

Bill of Quantities means the priced and completed **Bill of Quantities** forming part of the Bid.

Compensation Events are those defined in Clause 44 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

The **Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the execution of the works and administering the Contract.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The

Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Site Investigation Reports are those which were included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

Temporary Works are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Engineer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about the Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement

(2) Letter of Acceptance, notice to proceed with the works

(3) Contractor's Bid

(4) Contract Data

(5) Conditions of Contract including Special Conditions of Contract

(6) Specifications

(7) Drawings

(8) Bill of Quantities and

(9) any other document listed in the Contract Data as forming part of the Contract.

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Engineer's Decisions

4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 The Engineer may delegate any of his duties and responsibilities to other people except to the Adjudicator after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors. The Contractor shall as referred to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modification.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

9.2 If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's Risks

11.1 The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works in the Employer's country, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b) a cause due solely to the design of the Works, other than the Contractor's design.

12. Contractor's Risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:

(a) loss of or damage to the Works, Plant and Materials;

(b) loss of or damage to Equipment;

(c) loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and

(d) personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Investigation Reports

14.1 The Contractor, in preparing the Bid, shall rely on any site Investigation Reports referred to in the Contract Data, supplemented by any information available to the Bidder.

15. Queries about the Contract Data

15.1 The Engineer will clarify queries on the Contract Data.

16. Contractor to Construct the Works

16.1 The Contractor shall construct and install the Works in accordance with the Specification and Drawings, and as per instructions of Engineer.

17. The Works to Be Completed by the Intended Completion Date

17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

18. Approval by the Engineer

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for design of Temporary Works.

18.3 The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works where required.

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

19. Safety

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

21. Possession of the Site

21.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

22.1 The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

23. Instructions

23.1 The Contractor shall carry out all instructions of the Engineer which comply with the applicable laws where the Site is located.

23.2 Inspections and Audits 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 Clause 64 [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 23.2 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility under the Procurement Guidelines).

24. Disputes

24.1 If the Contractor believes that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Engineer's decision.

25. Procedure for Disputes

25.1 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.

25.2 The Adjudicator shall be paid daily at the rate specified in the Contract Data together with reimbursable expenses of the types specified in the Contract Data and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision will be final and binding.

25.3 The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

26. Replacement of Adjudicator

26.1 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not fulfilling his functions in accordance with the provisions of the Contract, a new Adjudicator will be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority designated in the Contract Data at the request of either party, within 14 days of receipt of such request.

B. Time Control

27. Program

27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Program including Environmental Management Plan showing the general methods, arrangements, order, and timing for all the activities in the Works along with monthly cash flow forecast.

27.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

27.3 The Contractor shall submit to the Engineer, for approval, an updated Program at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Program within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.

27.4 The Engineer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

28. Extension of the Intended Completion Date

28.1 The Engineer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

29. Deleted

30. Delays Ordered by the Engineer

30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the Works.

31. Management Meetings

31.1 Either the Engineer or the Contractor may require the other to attend a management meeting. 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.

31.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for

actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

32. Early Warning

32.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.

32.2 The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

C. Quality Control

33. Identifying Defects

33.1 The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

33.2 The contractor shall permit the Employer's Technical auditor to check the contractor's work and notify the Engineer and Contractor of any defects that are found. Such a check shall not affect the Contractor's or the Engineer's responsibility as defined in the Contract Agreement.

34. Tests

34.1 If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

35. Correction of Defects

35.1 The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

36. Uncorrected Defects

36.1 If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

Note: Where in certain cases, the technical specifications provide for acceptance of works within specified tolerance limits at reduced rates, Engineer will certify payments to Contractor accordingly.

D. Cost Control

37. Bill of Quantities

37.1 The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning work to be done by the contractor.

37.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

38. Changes in the Quantities

38.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1% of Initial Contract Price, the Engineer shall adjust the rate to allow for the change.

38.2 The Engineer shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the Prior approval of the Employer.

38.3 If requested by the Engineer, the Contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of Quantities.

39. Variations

39.1 All Variations shall be included in updated Programs produced by the Contractor.

40. Payments for Variations

40.1 The Contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the Variation is ordered.

40.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Engineer, the quantity of work above the limit stated in Sub Clause 38.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in form of new rates for the relevant items of work.

40.3 If the Contractor's quotation is unreasonable (or if the contractor fails to provide the Engineer with a quotation within a reasonable time specified by the engineer in accordance with Clause 40.1), the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer’s own forecast of the effects of the Variation on the Contractor's costs.

40.4 If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

40.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

41. Cash flow forecasts

41.1 When the Program is updated, the contractor is to provide the Engineer with an updated cash flow forecast.

42. Payment Certificates

42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously alongwith details of measurement of the quantity of works executed in a tabulated form as approved by the Engineer.

42.2 The Engineer shall check the details given in the Contractor's monthly statement and within 14 days certify the amounts to be paid to the Contractor after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause 51(3) of the Contract Data (Secured Advance).

42.3 The value of work executed shall be determined by the Engineer after due check measurement of the quantities claimed as executed by the contractor.

42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed..

42.5 The value of work executed shall include the valuation of Variations and Compensation Events.

42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

43. Payments

43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made upto the date when the late payment is made at 8% per annum.

43.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

43.3 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

44. Compensation Events

44.1 The following are Compensation Events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.

(b) The Employer modifies the schedule of other contractors in a way which affects the work of the contractor under the contract.

(c) The Engineer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.

(d) The Engineer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.

(e) The Engineer unreasonably does not approve for a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of Letter of Acceptance from the information issued to Bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(g) The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed.

(j) The effect on the Contractor of any of the Employer's Risks.

(k) The Engineer unreasonably delays issuing a Certificate of Completion.

(l) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

44.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Engineer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Engineer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Engineer shall adjust the Contract Price based on Engineer's own forecast. The Engineer will assume that the Contractor will react competently and promptly to the event.

44.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Engineer.

45. Tax

45.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

46. Currencies

46.1 All payments shall be made in Indian Rupees.

47. Price Adjustment

47.1 Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data:

(a) The price adjustment shall apply for the work done from the start date given in the contract data upto end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.

(b) The price adjustment shall be determined during each quarter from the formula given in the contract data.

(c) Following expressions and meanings are assigned to the work done during each quarter:

R = Total value of work done during the quarter. It would include the amount of secured advance for materials paid for (if any) during the quarter, less the amount of the secured advance recovered, during the quarter. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.

47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

48. Retention

48.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.

48.3 On completion of the whole works, the contractor may substitute retention money *(balance half)* with an “on demand” Bank guarantee.

49. Liquidated Damages

49.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the contract data). The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the over payment calculated from the date of payment to the date of repayment at the rates specified in Sub Clause 43.1.

50. Deleted

51. Advance Payment

51.1 The Employer shall make advance payment to the Contractor of the amounts stated in the Contract Data by the date stated in the Contract Data, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest will not be charged on the advance payment.

51.2 The Contractor is to use the advance payment only to pay for Equipment, Plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that
advance payment has been used in this way by supplying copies of invoices or other documents to the Engineer.

51.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance (mobilization and equipment only) payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, or Liquidated Damages.

51.4 **Secured Advance**:

The Engineer shall make advance payment in respect of materials intended for but not yet incorporated in the Works in accordance with conditions stipulated in the Contract Data.

52. Securities

52.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

53. Deleted

54. Cost of Repairs

54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

55. Completion

55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the Works and the Engineer will do so upon deciding that the Work is completed.

56. Taking Over

56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

57. Final Account

57.1 The Contractor shall supply to the Engineer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.

58. Operating and Maintenance Manuals

58.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

59. Termination

59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 28 days when no stoppage of work is shown on the current program and the stoppage has not been authorized by the Engineer;

(b) the Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days;

(c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate;

(e) the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;

(f) the Contractor does not maintain a security which is required;

(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Purchaser has engaged in fraud and corruption, as defined in CC Clause 64, in competing for or in executing the Contract.

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

59.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

60. Payment upon Termination

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due

to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply . If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

61. Property

61.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor’s default.

62. Release from Performance

62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

63. Suspension of World Bank Loan or Credit

63.1 In the event that the World Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the World Bank's suspension notice.

(b) If the Contractor has not received sums due to it upon the expiration of the 28 days for payment provided for in Sub-Clause 43.1, the Contractor may immediately issue a 14-day termination notice.

64. Corrupt or Fraudulent Practices:

64.1 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 59 shall apply.

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 Clause 9 [Personnel].

For the purposes of this Sub-Clause:

(i) "corrupt practice"**9** 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"**10** 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"**11** is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "coercive practice"12 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

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9 "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.

10 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.

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

12 a "party" refers to a participant in the procurement process or contract execution.

(bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under Sub-Clause 23.2 [Inspections and Audits by the Bank]."

F. Special Conditions of Contract

1. Labour :

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

2. Compliance with Labour Regulations :

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall 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 building and other construction work; the law as current on the date of bid opening will apply)

a) Workmen Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

b) 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 the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

c) Employees P.F. and Miscellaneous Provision Act 1952 *(since amended)*: The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are :

(i) Pension or family pension on retirement or death, as the case may be.

(ii) Deposit linked insurance on the death in harness of the worker.

(iii) payment of P.F. accumulation on retirement/death etc.

d) Maternity Benefit Act 1951: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

e) Contract Labour (Regulation & 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 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.

f) 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, Runways are scheduled employments.

g) 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.

h) Equal Remuneration Act 1979: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. 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.3500/-per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above upto Rs.3500/- per month shall be worked out by taking wages as Rs.2500/-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 this Act.

j) 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.

k) 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.

l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

m) Child Labour (Prohibition & 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.

n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to 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.

o) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and The Building and Other Construction workers Welfare 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 the rate of 1% of the cost of construction as notified by the Labour & Employment Department, Government of Odisha in December, 2008.

p) Factories Act 1948: The Act lays down the procedure for approval at 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.

3. Sub-Contracting (CC Clause 7)

Please add the following as Clause 7.2:

The contractor shall not be required to obtain any consent from the employer for:

a) the sub-contracting of any part of the Works for which the Sub-contractor is named in the contract;
b) the provision of labour; and
c) the purchase of materials which are in accordance with the standards specified in the Contract.

Beyond this if the contractor proposes sub-contracting any part of the work during execution of works, because of some unforeseen circumstances to enable him to complete the work as per terms of the contract, the Engineer will consider the following before according approval:

- The contractor shall not sub-contract the whole of the Works.

- The contractor shall not sub-contract any part of the Work without prior consent of the Engineer. Any such consent shall not relieve the contractor from any liability or obligations under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents or workmen as fully as if they were the acts, defaults or neglects of the contractor, his agents or workmen.

- The Engineer should satisfy whether (a) the circumstances warrant such sub-contracting; and (b) the sub-contractors so proposed for the Work possess the experience, qualifications and equipment necessary for the job proposed to be entrusted to them in proportion to the quantum of work to be sub-contracted.

- If payments are proposed to be made directly to that sub-contractor, this should be subject to specific authorization by the prime contractor so that this arrangement does not alter the contractor's liability or obligations under the contract.

(Note: 1. All bidders are expected to indicate clearly in the bid, if they proposed sub-contracting elements of the works amounting to more than 20 percent of the Bid Price. For each such proposal the qualification and the experience of the identified sub-contractor in the relevant field should be furnished alongwith the bid to enable the employer to satisfy himself about their qualifications before agreeing for such sub-contracting and include it in the contract. In view of the above, normally no additional sub-contracting should arise during execution of the contract.

2. However, [a] sub contracting for certain specialized elements of the work is not unusual and acceptable for carrying out the works more effectively; but vertical splitting of the works for subcontracting is not acceptable. [b] In any case, proposal for sub-contracting in addition to what was specified in bid and stated in contract agreement will not be acceptable if the value of such additional sub-contracting exceeds 25% of value of work which was to be executed by Contractor without sub-contracting.

3. Assignment of the contract may be acceptable only under exceptional circumstances such as insolvencies/liquidation or merger of companies etc.

4. Arbitration (CC Clause 25.3)

The procedure for arbitration will be as follows :

25.3 (a) In case of Dispute or difference arising between the Employer and a domestic contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996. The arbitral tribunal shall consist of 3 arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the Secretary, Indian Roads Congress, New Delhi, India.

(b) In the case of dispute with a Foreign contractor the dispute shall be settled in accordance with provisions of UNCITRAL Arbitration Rules. The Arbitral Tribunal shall consist of three Arbitrators one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties, and shall act a presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding arbitrator shall be appointed by the Secretary, Indian Roads Congress, New Delhi, India.

(c) If one of the parties fails to appoint its arbitrator in pursuance of sub-clause (a) and (b) above within 30 days after receipt of the notice of the appointment of its arbitrator by the other party, then the * Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Dispute Resolution (India), both in cases of the Foreign Contractor as well as Indian Contractor, shall appoint the arbitrator. A certified copy of the order of the Secretary, Indian Roads Congress, New Delhi, India, making such an appointment shall be furnished to each of the parties.

(d) Arbitration proceedings shall be held at Bhubaneswar, Odisha, India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

(e) The decision of the majority of arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as determined by the arbitral tribunal. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the arbitrator appointed by such party or on its behalf shall be borne by each party itself.

(f) Where the value of the contract is Rs.50 millions and below, the disputes or differences arising shall be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority, namely the Secretary, Indian Roads Congress, New Delhi, India.

(g) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the owners shall not be withheld, unless they are the subject matter of the arbitration proceedings.

5. Protection of Environment:

Add the following as CC Clause 16.2:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below :

The Water (Prevention and Control of Pollution) Act, 1974, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government.

[Employers should note that the Loan Agreement between IBRD and the borrowing country may establish specific measures to be taken during construction of the Works for the protection of the environment. Sub-clause 16.2 should be modified/expanded to take into account such specific measures or other measures considered appropriate by the Employer]

6. Liquidated Damages:

Sub-clause 49.1:

Please substitute the last sentence with the following:

"Time is the essence of the contract and payment or deduction of liquidated damages shall not relieve the contractor from his obligation to complete the work as per agreed construction program and milestones or from any other of the contractor's obligations and liabilities under the contract."

SECTION 4: CONTRACT DATA

Contract Data

(Items marked "N/A" do not apply in this Contract.)

Sl. No.	Conditions	Data	Clause Reference
1	The following documents are also part of the Contract:		
	a. The Schedule of Operating and Maintenance Manuals	N/A	[58]
	b. The Schedule of Other Contractors	N/A	[8]
	c. The Schedule of Key Personnel		[9]
	d. The Methodology and Program of Construction & Environmental Management Plan		[27]
	e. The Schedule of Key and Critical equipment to be deployed on the work as per agreed program of construction		[27]
	f. Site Investigation reports		[14]
2	The Borrower is	Government of Odisha through Government of India	[1.1]
3	The World Bank means	*International Bank for Reconstruction and Development (IBRD)* and loan refers to an *IBRD Loan.*	[1.1]
4	The Employer is	Name: *Chief Engineer, World Bank Projects, Odisha* on behalf of *Works Department, Government. of Odisha* Address: Office of the E.I.C.(Civil), Odisha, Nirman Soudha, Keshari Nagar, Bhubaneswar-751001 Odisha. Email:pmuosrp@gmail.com, website : www.osrp.gov.in, Tel:: 0674-2396783 Fax : 0674-2390080	[1.1]
	Name of authorized Representative:	To be notified later	[1.1]
5	The Engineer is	Name: Resident Engineer, M/s MSV International, Inc, USA in J.V with UPHAM International Corporation. Address:	[1.1]

		D-7, South City-I, Gurgaon, Haryana-122002 Facsimile: +91-124-4002605 *Local address and contact information to be notified later.*	
	Name of Authorized Representative:	To be notified later	[1.1]
6	The Adjudicator appointed jointly by the Employer and Contractor is:	Name : Sri Basudev Sahoo, Chief Engineer (Retd.), Works Department, Odisha Address : Plot No. 437, Sahid Nagar, Bhubaneswar	[1.1]
7	The name and identification number of the Contract is [insert name and number as indicated in the Invitation for Bids (or Prequalification, if any]	OSRP-Bal-P01B PMU-WB-13/ 2013-13989 Dt-03.04.2013	[1.1]

8. The Works consist of construction of 4nos of HL Bridges over river Tel between Km 27/200 to Km 30/000 on the road from Bhawanipatna to Khariar (SH-16). Two numbers of bridges shall be constructed on either side of the existing bridge over river Tel. The location of the site is on the down stream of the confluence point of two major rivers of the state i.e River Tel & Udanti. There are small bridges existing on the river which are not adequate to accommodate the flow during flood. The bridges on Khariar side shall be dismantled and replaced with new bridges, while bridges on Bhawanipatna side shall be dismantled after construction of the new bridges in the new alignment.

The proposed construction package to be taken up is as follows:

Sl.	Package No.	Name of the Road	Period of Construction
1	OSRP-Bal- P01B	Construction of 4nos of High Level Bridges over River Tel between Km 27/200 to Km 30/000 with Approaches on the road from Bhawanipatna to Khariar (SH-16).	24 Months

The civil works shall broadly comprise of the following, as required, mostly along existing alignments.

a. Improvement of road geometry;
b. Raising & Widening of embankments considering drainage and road geometry
c. Sub base, base and bituminous pavement;
d. Repair and rehabilitation of bridges;
e. Construction of new Bridges;
f. Traffic safety features;
g. Road signs and road markings;
h. Environmental protection and management measures during construction stage;
i. Traffic diversion and management during the construction;
j. Routine Maintenance of Project Corridors during the construction period;
k. Construction and maintenance of Diversion roads

Sl. No.	Conditions	Data	Clause Reference

9	The Start Date	Shall be the date of issue of **notice to proceed** with the work.		[1.1]
10	The Intended Completion Date for the whole of the Works is	24 Months from the Start date		[17, 28]
11	The following documents also form part of the Contract:			[2.3]
	The Contractor shall submit a revised Program including Environmental Management Plan for the Works (in such form and detail as the engineer shall reasonably prescribe) *[This program should be in adequate detail and generally conform to the program submitted alongwith bid in response to ITB Clause 4.3 (k). Deviations if any from that should be clearly explained and should be satisfactory to the Engineer]*	within 14 days of delivery of the Letter of Acceptance.		[27]
12	The Site Possession Dates shall be:	Within 7 days after date of commencement. <u>Within two weeks of handing over of the site, contractor needs to examine and provide acceptance of receiving encumbrance free site or inform the employer otherwise with any deficiencies.</u>		[21]
13	The Site is located at	In the Kalahandi district of Odisha and is defined in Drawings provided in Section- 6		[1]
14	The Defect Liability Period is	365 days from the date of certification of completion of works. (where sectional completion certificate is issued, this will apply from those dates for those sections).		[35]
15	Insurance requirements are as under:	*<u>Minimum Cover for Insurance</u>*	*<u>Maximum deductible for Insurance</u>*	[13]
	(i) Works and Plant and Materials	Equal to Contract Amount	0.2% of Contract Amount	
	(ii) Loss or damage to Equipment	10% of Contract Amuont	0.1% of Contract Amount	
	(iii) Other Property	5% of Contract	0.1% of Contract Amount	
	(iv) Personal injury or death insurance for Contractor's Employees	Rs. 8 Lakh	0.1% of Contract Amount	
	(v) Personal injury or death insurance for other people	In accordance with the statutory requirements applicable to India		
16	The following events shall also be	N/A		[44]

	Compensation Events:		
17	The period between Program updates shall be	90 days	[27]
18	The amount to be withheld for late submission of an updated Program shall be	Rs. 2,00, 000/-	[27]
19	The language of the Contract documents is	English	[3]
20	The law which applies to the Contract is	the laws of Union of India	[3]
21	The currency of the Contract is	Indian Rupees	[46]
22	Fees and types of reimbursable expenses to be paid to the Adjudicator	(a)Monthly Retainer Fees:- Rs. 10,000/- (b) Daily Fee of Rs. 4,000/- shall be paid for each day of site visit . (c) Rs.2,000/- per day shall be paid during travel time upto a maximum of two days in each direction for journey Travelling expenses as per actual.	[25]
23	Appointing Authority for the Adjudicator	Chief Engineer, World Bank Projects, Odisha	[26]
24	The formula(e) for adjustment of prices are:	As indicated below	[47]

The formula(e) for adjustment of prices are: [47]

R = Value of work as defined in Clause 47.1 of Conditions of Contract.

Adjustment for labour component

(i) Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

$V_L = 0.85 \times P_l/100 \times R \times (L_i - L_o)/L_o$

V_L = increase or decrease in the cost of work during the quarter under consideration due to changes in rates for local labour.

L_o = The Minimum Wage for the quarter preceding the date of opening of Bids as notified by the Labour and Employment Department, Government of Odisha

L_i = The Revised Minimum Wage for the quarter under consideration as notified by the Labour and Employment Department, Government of Odisha

P_l = Percentage of labour component of the work.

Adjustment for cement component

(ii) Price adjustment for increase or decrease in the cost of cement procured by the contractor shall be paid in accordance with the following formula.

$V_c = 0.85 \times P_c/100 \times R \times (C_i - C_o)/C_o$

V_c = Increase or decrease in the cost of work during the quarter under consideration due to changes in the rates for cement

C_o = The all India average wholesale price index for cement for the quarter preceding the date of opening of Bids as published by the Office of the Economic Advisor, Ministry of Finance, Government of India

C_i = The all India average wholesale price index for cement for the quarter under consideration as published by the Office of the Economic Advisor, Ministry of Finance, Government of India

P_c = Percentage of cement component of the work

Adjustment for steel component

(iii) Price adjustment for increase or decrease in the cost of steel procured by the Contractor shall be paid in accordance with the following formula:

$V_s = 0.85 \times P_s/100 \times R \times (S_i - S_o)/S_o$

V_s = Increase or decrease in the cost of work during the quarter under consideration due to changes in the rates for steel

S_o = The all India average wholesale price index for steel (Bars and Rods) for the quarter preceding the date of opening of Bids as published by the Office of the Economic Advisor, Ministry of Finance, Government of India

S_i = The all India average wholesale price index for steel (Bars and Rods) for the quarter under consideration as published by Office of the Economic Advisor, Ministry of Finance, Government of India

P_s = Percentage of steel component of the work

Note: For the application of this clause, index of Bars and Rods has been chosen to represent steel group.

Adjustment of Bitumen component

(iv) Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

$V_b = 0.85 \times P_b/100 \times R \times (B_i - B_o)/B_o$

V_b = Increase or decrease in the cost of work during the quarter under consideration due to changes in the rate for bitumen.

B_o = The official ex-depot retail price of bulk bitumen VG 30 Grade at the IOC depot at Haldia on the day 30 days prior to date of opening of Bids.

B_i = The average ex-depot retail price of bulk bitumen VG 30 Grade at the IOC depot at Haldia for the quarter under consideration.

P_b = Percentage of bitumen component of the work.

Adjustment of POL (fuel and lubricant) component

(v) Price adjustment for increase or decrease in cost POL (fuel and lubricant) shall be paid in accordance with the following formula:

$V_f = 0.85 \times P_f/100 \times R \times (F_i - F_o)/F_o$

V_f = Increase or decrease in the cost of work during the quarter under consideration due to changes in rates for fuel and lubricants.

F_o = The average official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC at , Bhawanipatna on the day thirty days prior to the date of opening of Bids.

F_i = The average official retail price of HSD at the existing consumer pumps of IOC at Bhawanipatna for the quarter under consideration.

P_f = Percentage of fuel and lubricants component of the work.

Note: For the application of this clause, the price of High Speed Diesel oil has been chosen to represent fuel and lubricants group.

Adjustment for Plant and Machinery Spares component

(vi) Price adjustment for increase or decrease in the cost of plant and machinery spares procured by the Contractor shall be paid in accordance with the following formula:

$V_p = 0.85 \times P_p/100 \times R \times (P_i - P_o)/P_o$

V_p = Increase or decrease in the cost of work during the quarter under consideration due to changes in the rates for plant and machinery spares

P_o = The all India average wholesale price index for heavy machinery and parts for the quarter preceding the date of opening of Bids as published by the Ministry of Industrial Development, Government of India, New Delhi

P_i = The all India average wholesale price index for heavy machinery and parts for the quarter under consideration as published by Ministry of Industrial Development, New Delhi

P_p = Percentage of plant and machinery spares component of the work

Note: For the application of this clause, index of Heavy Machinery and Parts has been chosen to represent the Plant and Machinery Spares group.

Adjustment of Local materials

(vii) Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen and POL procured by the contractor shall be paid in accordance with the following formula:

$V_m = 0.85 \times P_m/100 \times R \times (M_i - M_o)/M_o$

V_m = Increase or decrease in the cost of work during the quarter under consideration due to changes in rates for local materials other than cement, steel, bitumen and POL.

M_o = The all India average wholesale price index (all commodities) for the quarter preceding the date of opening of Bids, the Office of the Economic Advisor, Ministry of Finance, Government of India

M_i = The all India average wholesale price index (all commodities) for the quarter under consideration as published by the Office of the Economic Advisor, Ministry of Finance, Government of India

P_m = Percentage of local material component (other than cement, steel, bitumen and POL) of the work.

The following percentages will govern the price adjustment for the entire contract:

1.	Labour - P_l	15 %
2.	Cement - P_c	25 %
3.	Steel - P_s	20 %
4.	Bitumen - P_b	05 %
5.	POL - P_f	15 %
6.	Plant & Machinery Spares - P_P	10 %
7.	Other materials - P_m	10 %
	Total	100%

Sl. No.	Conditions	Data	Clause Reference
25	The proportion of payments retained (retention money) shall be	10% from each bill subject to a maximum of 5% of contract price	[48]
26	The liquidated damages for the whole of the works are:	@ Rs. 1,36,000/-per day beyond the stipulated date of completion.	[49]
27	The maximum amount of liquidated damages for the whole of the works is	10% percent of contract price.	[49]
28	The amounts of the advance payment are:		[51]
	a. Mobilization	5 % of the Accepted Contract Amount payable in the currencies and proportions in which the Accepted Contract Amount is payable, in one installment after due acceptance of encumbrance free site by the contractor and on submission of un-conditional Bank Guarantee.	
	b. Equipment	90% for new and 50% of depreciated value for old equipment after equipment is brought to site as per agreed construction program (provided the Engineer is satisfied that the equipment is required for performance of the contract) and on submission of unconditional Bank Guarantee for amount of advance. Total amount will be subject to a maximum of 10% of the Contract price. This advance is not applicable for	

		equipment already owned or hired/ leased by the contractor.	
	c. Secured advance for non- perishable materials brought to site (*The advance payment will be paid to the Contractor no later than 15 days after fulfillment of the above conditions).*	On the following materials, subject to maximum of 2% of the accepted contract amount, at any point of time, as required for utilization in the works on submission of un-conditional Bank Guarantee. 1. Reinforced Steel 2. Processed Aggregates complying with the following conditions. a) The materials are in-accordance with the specification for Works; b) Such materials have been delivered to site, and are properly stored and protected against damage or deterioration to the satisfaction of the Engineer. The contractor shall store the bulk material in measurable stacks.; c) The Contractor's records of the requirements, orders, receipt and use of materials are kept in a form approved by the Engineer and such records shall be available for inspection by the Engineer; d) The contractor has submitted with his monthly statement the estimated value of the materials on site together with such documents as may be required by the Engineer for the purpose of valuation of the materials and providing evidence of ownership and payment thereof; e) Ownership of such materials shall be deemed to vest in the Employer for which the Contractor has submitted an Indemnity Bond in an acceptable format; and f) The quantity of materials are not excessive and shall be used within a reasonable time as determined by the Engineer.	
29	Repayment of advance payment for mobilization:	The advance shall be repaid with percentage deductions from the interim	[51]

		payments certified by the Engineer under the Contract. Deductions shall commence in the next Interim Payment Certificate following that in which the total of all such payments to the Contractor has reached not less than 20% of the Contract Price or 6 months from the date of payment of advance, whichever period concludes earlier, and shall be made at the rate of 10 percent of the amounts of all Interim Payment Certificates until such time as the advance has been repaid, always provided that the advance shall be completely repaid prior to 70% of the completion of the work.	
30	Repayment of secured advance:	The advance shall be repaid from each succeeding monthly payments to the extent materials [for which advance was previously paid pursuant to Clause 51.4 of C.C. and 28(c) of Contract Data on prepage] have been incorporated into the Works.	[51]
31	The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract Price:		[52]
	a. Performance Security	5 per cent of contract price plus additional security for unbalanced bids if any to be intimated in the Letter of Acceptance	[*in terms of ITB Clause 29.5*].
	b. The standard form of Performance Security	An unconditional Bank Guarantee of the types as presented in Section 8 of the Bidding Documents acceptable to the Employer	
32	The date by which operating and maintenance manuals are required	N/A	[58]
33	The manner and date by which "as-built" drawings shall be submitted	a. In the same scale in which the working drawings have been issued. b. Both in hard and soft form within 28 days of issue of certificate of completion of whole or section of the work, as the case may be.	[58]
34	The amount to be withheld for failing to supply "as built" drawings by the date specified	Rs. 5 lakh	[58]
35	The following events shall also be fundamental breach of contract:	1. The Contractor has contravened Sub-clause 7 of CC read with SCC and Clause 9.0 of CC. 2. The contractor does not adhere to	[59.2]

		the agreed construction program and agreed environmental management plan (Clause 27 of CC) and also fails to take satisfactory remedial action as per agreements reached in the management meetings (Clause 31) for a period of 30 days. The contractor fails to carry out of the instructions of Engineer within a reasonable time determined by the Engineer in accordance with CC Clause 16.1 and 23.1.	
36	The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be	20 %	[60]
37	Penalty for non performance of following items		
37(a)	Failure to Maintain the Road during construction	The contractor's obligations for maintenance of the road stretches shall be limited to the portions/ stretches/ structures handed over to him by the Employer. Other stretches not handed over to him shall be maintained by the Employer till handing over. In case of failure to execute the same, the following amount shall be deducted from the payment certificates of the contractor. 1. **Road Surface** : In case of failure to maintain the road surface pot hole free, a penalty shall be levied at the rate Rs.1500/- per km per day. 2. **Shoulders** : In case of failure to maintain the shoulders , a penalty shall be levied at the rate Rs.500/- per km per day.	
37(b)	Failure to take up Road Safety measures during construction	The Contractor has to follow all traffic safety measures as defined in the Technical Specifications. In case of failure to execute the same, the work shall be taken up by the department through other agency, and the following amount shall be deducted from the payment certificates of the contractor. 1. **Diversion**:- (a) Penalty @ Rs.5000/- per day per location shall be imposed from the date of occurrence till installation of the safety items. (b) One time deduction for non-performance @ Rs.	[18], [19]

		1,20,000/- per location towards installation of safety measures (c) Penalty @ Rs.1500/- per day per location towards maintenance of safety measures from the date of installation till removal **2. Part Road Barricading**:- (a) Penalty @ Rs.5000/- per day per location shall be imposed from the date of occurrence till installation of the safety items. (b) One time deduction for non-performance @ 75,000/- per location of 250 mtr. long road stretch or less towards installation of safety measures (c) Penalty @ Rs.1500/- per day per location towards maintenance of safety measures from the date of installation till removal	
37(c)	Failure to adhere to Environmental Mitigation Measures during construction	The Contractor has to follow all Environmental Mitigation Measures as defined in the Technical Specifications . A penalty shall be levied at the rate indicated below for non-conformity of the following items. 1. No proper sanitation & waste disposal arrangements at the labour camp site- Penalty @ Rs. 10,000/- per single violation compounded to Rs. 50,000/- at any single instance 2. No dust control measures at site- Penalty @ Rs. 5,000/- per location per single violation compounded to Rs. 50,000/- at any single instance 3. No pollution and / or noise control of crusher, hot mix plant, batch mix plant- Penalty @ Rs. 10,000/- per single violation compounded to Rs. 50,000/- at any single instance 4. Improper disposal of debris/ residues- Penalty @ Rs.	

		10,000/- per single violation compounded to Rs. 50,000/- at any single instance 5. Spillage of oil at camp site not arrested- Penalty @ Rs. 10,000/- per single violation compounded to Rs. 50,000/- at any single instance 6. Persons not using Personal Protective Equipments (PPE)- Penalty @ Rs. 200/- per single violation per person 7. Burrow area/ quarry management not done- Penalty @ Rs. 10,000/- per location per instance	

‘

SECTION 5: TECHNICAL SPECIFICATIONS

Refer Annexure-I of Bidding Document

SECTION 6: DRAWINGS

Refer Annexure-II of Bidding Document

SECTION 7: BILL OF QUANTITIES

Refer Annexure-III of Bidding Document

SECTION 8: FORMS OF SECURITIES

Forms of Securities

Acceptable forms of securities are annexed. Bidders should not complete the Performance and Advance Payment Security forms at this time. Only the successful Bidder will be required to provide Performance and Advance Payment Securities in accordance with one of the forms, or in a similar form acceptable to the Employer.

Annex A:	Bid Security (Bank Guarantee)
Annex B:	Performance Bank Guarantee
Annex B1:	Performance Bank Guarantee for Unbalanced Items
Annex C:	Deleted
Annex D:	Bank Guarantee for Advance Payment

Annex A

Bid Security (Bank Guarantee)

WHEREAS, _____ *[name of Bidder]* (hereinafter called "the Bidder") has submitted his Bid dated _____ *[date]* for the construction of _____ *[name of Contract]* (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that We _____ *[name of bank]* of _____ *[name of country]* having our registered office at _____ (hereinafter called "the Bank") are bound unto _____*[name of Employer]* (hereinafter called "the Employer") in the sum of _____[1] for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 19____.

THE CONDITIONS of this obligation are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity specified in the Form of Bid;

or

(2) If the Bidder having been notified of the acceptance of his bid by the Employer during the period of Bid validity:

(a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or

(b) fails or refuses to furnish the Performance Security, in accordance with the Instruction to Bidders; or

(c) does not accept the correction of the Bid Price pursuant to Clause 27;

we undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____[2] days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

_____

[signature, name, and address]

_____

1 The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16.1 of the Instructions to Bidders.

2 45 days after the end of the validity period of the Bid.

Annexure B

Performance Bank Guarantee

To: _____ *[name of Employer]*
_____ *[address of Employer]*

WHEREAS _____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of guarantee]* [1]_____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]*[1] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until …… (i.e.) 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

_____

1 An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.

Annexure B1

Performance Bank Guarantee (For Unbalanced Items)

To: _____ *[name of Employer]*
_____ *[address of Employer]*

WHEREAS _____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of guarantee]* [1] _____ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of guarantee]*[1] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until …….. (i.e.) 28 days from the date of issue of the certificate of completion of works.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

_____

1 An amount shall be inserted by the Guarantor, representing additional security for unbalanced Bids, if any and denominated in Indian Rupees.

Annexure D

Bank Guarantee For Advance Payment

To: _____ *[name of Employer]*
_____ *[address of Employer]*
_____*[name of Contract]*

Gentlemen:

In accordance with the provisions of the Conditions of Contract, subclause 51.1 ("Advance Payment") of the above-mentioned Contract, _____ *[name and address of Contractor]* (hereinafter called "the Contractor") shall deposit with _____ *[name of Employer]* a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of _____ *[amount of guarantee]* [1] _____ *[in words]*.

We, the _____ *[bank or financial institution]*, as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ *[name of Employer]* on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding _____ [amount of guarantee][1] _____ *[in words]*.

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed thereunder or of any of the Contract documents which may be made between _____ *[name of Employer]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ *[name of Employer]* receives full repayment of the same amount from the Contractor.

Yours truly,

Signature and seal: _____
Name of Bank/Financial Institution: _____
Address: _____
Date: _____

_____

1 An amount shall be inserted by the bank representing the amount of the Advance Payment, and denominated in Indian Rupees.

GOVERNMENT OF ODISHA
WORKS DEPARTMENT

Odisha State Road Project

BIDDING DOCUMENTS
For
NCB No: OSRP-Bal-P01B

(NATIONAL COMPETITIVE BIDDING)

Construction of 4nos of High Level Bridges over River Tel between Km 27/200 to Km 30/000 with Approaches on the road from Bhawanipatna to Khariar (SH-16)

Volume-II of Bid Document

Section-5

WORKS REQUIREMENTS
(Technical Specification)

Chief Engineer, World Bank Projects, Odisha
O/o Engineer-in-Chief (Civil), Odisha,
Nirman Soudha, Keshari Nagar, Unit – V, Bhubaneswar - 751001

GENERAL TECHNICAL REQUIREMENTS

1.0. GENERAL REQUIREMENTS

The Technical Specifications in accordance with which the entire work described hereinafter shall be constructed and completed by the Contractor, and comprise of the following:

1.1 PART – I - General Technical Specifications

The General Technical Specifications shall be the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" (FOURTH REVISION – 2001, Reprint 2006), as corrected in the original issued by the Ministry of Shipping , Road Transport & Highways(MORTH), Government of India and published by the Indian Roads Congress (IRC), with a cross reference to relevant Bureau of Indian Standards (BIS) for materials or other aspects not covered by the IRC.

1.2 PART - II - Supplementary Technical Specifications

The Supplementary Technical Specifications shall comprise various Amendments/Modifications/Additions to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS" referred to in PART - I above and also **Additional Specifications** for particular item of works not already covered in PART-I.

1.2.1 A particular Clause or a part thereof in "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FOURTH REVISION - 2001, Reprint 2006)" as corrected in the original referred in PART - I above, where Amended/Modified/Added upon, and incorporated in PART-II, referred to above, such Amendment/Modification/Addition supersedes the relevant Clause or part of the Clause.

1.2.2 When an Amended/Modified/Added Clause supersedes a Clause or part thereof in the said Specifications, then any reference to the superseded Clause shall be deemed to refer to the Amended/Modified/Added Clause or part thereof.

1.2.3 In so far as Amended/Modified/Added Clause may come in conflict or be inconsistent with any of the provisions of the said Specifications under reference, the Amended/Modified/Added Clause shall always prevail.

1.2.4 The Additional Specifications shall comprise specifications for particular item of works not already covered in PART - I.

1.2.5 The Sub-Clauses of the following Sections in the "Specifications for Road and Bridge Works (Fourth Revision – 2001, Reprint 2006) have been amended/modified/added upon 100, 200, 300, 400, 500, 600, 800, 900, 1000, 1500, 1600, 1700, 2000, 2200, 2600 & 2800.

1.2.6 Additional Specifications

The following Clauses have been added to the 'SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FOURTH REVISION – 2001, Reprint 2006)'.

A-1 Diversion and filling of existing water courses along the road alignment.

A-2 Plantation of trees.

A-3 Void Former.

A-4 Embankment Construction with Fly Ash Modified Soil

1.2.7 In the absence of any definite provisions on any particular issue in the aforesaid Specifications, reference may be made to the latest codes and specifications of IRC and IS in that order. Where even these are silent, the construction and completion of the works shall conform to sound engineering practice as approved by the Engineer and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer shall be final and binding on the Contractor.

1.2.8 The provisions of special conditions of contract, those specified elsewhere in the tender document, as well as execution drawings and notes, or other specifications issued in writing by the Engineer shall form part of the technical specifications of this project.

1.3 PART – III- Specifications for Building Works

1.4 PART – IV- Specifications and Guidelines for Environment Mitigation Plan

PART – I

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, testing acceptance or other such aspects not covered by the IRC.

PART- II
SUPPLEMENTARY TECHNICAL SPECIFICATION

(AMENDEMENTS/ ALTERATIONS/ MODIFICATIONS/ ADDITIONS/DELETIONS TO EXITING CLAUSES OF GENERAL TECHNICAL SPECIFICATIONS-PART-I)

SECTION 100 GENERAL

Clause 102 Definitions

The following abbreviations shall be added in this Clause.
"MORTH" - Ministry of Road Transport & Highways (This has been renamed as Ministry of Shipping, Road Transport and Highways)
"WBM" - Water Bound Macadam
"WMM" - Wet Mix Macadam
"MDD" - Maximum Dry Density (as per IS: 2720-Part 8)
"OMC" - Optimum Moisture Content
Wherever in the Specification, the phrase "Condition of Contract" is Mentioned, it shall mean Conditions of Contract part-I and II Contained in Section.. of Bidding Documents.

Clause 103 Add at the end of the clause

The latest edition of these standards or any other relevant standards till 30 (thirty) days before the final date of submission of the tender shall be adopted.

Clause 105 Scope of Work

Clause 105.3 Add the following below the existing clause

The contractor shall establish, adhere to monitor and maintain an adequate Quality Management Plan (QMP).

The QMP shall provide input to the overall project management plan and shall include quality control, quality assurance, and continuous process improvement approaches for the project. The QMP 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 QMP shall provide input to the overall project management plan and shall include Quality Control Checklists, Quality Assurance Plan, and continuous process improvement approaches for the project. The QMP shall be reviewed by the Engineer to ensure that decisions are based on accurate information and to assure reduction of cost and

schedule overruns caused by *rework*. The Contractor's Quality Assurance Plan describes the methods and procedures which the Contractor will apply for the execution of the Contract, including how the contractor will:

(a) identify the quality requirements specific to the contract,

(b) plan and execute the work to satisfy those requirements

(c) inspect and/or test the work to ensure compliance with the quality requirements

(d) ensure strict document control and structured filing of contract administration documents

(e) record and monitor the results as evidence of compliance

(f) monitor the material supply and delivery processes;

(g) ensure the ability to trace materials incorporated in the works;

(h) undertake testing and measurement requirements;

(i) provide evidence of testing apparatus being recently calibrated;

(j) demonstrate manufacturer's specification confirming compliance of materials;

(k) record of required testing, measurement and design sheets;

(l) document all non-conformances and ensure that prompt action is taken to correct non-compliance.

The Contractor's Quality Management Plan must clearly describe the systems, procedures and methods that will be used to deliver and monitor compliance of the Services.

The QMP shall also 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 QMP 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 QMP shall be submitted successively to the effect that it shall have been approved prior to the commencement of the activities to which the program shall apply.

.

Clause 105.4 Add the following 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 (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 are approved 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 more than 7 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 **7 days** before commencement of construction of culverts.

Clause 109 Setting Out

Clause 109.8 **Add the following Para in the end of Clause 109.8**
Surveying Equipments and Personnel

The Contractor shall provide the necessary surveying equipment, accessories, and surveyors and labours required for setting out and related measurements, including making available these to the Engineer and his representatives at different stages of the work. The surveying equipments shall meet the quality standards and shall be approved by the Engineer, in good working condition, available in 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 .
ii) Total station with 2 spare batteries, charger, tripod, data capturing prisms in sufficient numbers, electronic embedded device data recorder, data packs and all necessary software for operation.
iii) 3 meter straight edge
iv) Field Umbrellas
v) Ranging rods 50mm dia. 3m long straight with one end each metallic conical and painted alternatively black and white along the length.
vi) Sprit Levels, plumb bobs
vii) Invar/Steel tape graduated in meters, centimeter and millimeter.
    a) 5m long
    b) 30m long
viii) Reference markers and pegs

The Contractor shall maintain the surveying equipments in good condition and calibrated from authorized agencies during the works and replace the ones which get worn out otherwise become unworkable.

The surveying equipments 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 110.2 **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 **Add the following paragraph at the end of this Sub-clause.**

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 per the plan agreed prior to commencement of construction activities. .

The cost of such restoration work shall be deemed to be included in the rates, unless specifically mentioned in the contract.

Clause 111.2 **Burrow pits for Embankment Construction**

The clause shall be read as follows

Burrow pits shall not be dug within the Right-of-Way of the road. The contractor will submit a Burrow Area Management Plan before opening up any burrow area to ensure the schedules of his excavation

activites, safety arrangements during operation and rehabilitation after closure of the burrow pit. The contractor shall operate strictly adhering to the Burrow Area Management Plan.

The Contractor will ensure that proper excavation techniques are used to improve stability and safety of the burrow 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.

The cost of such safety and rehabilitation work shall be deemed to be included in the rates, unless specifically mentioned in the contract. Failure to adhere to the Environmental Mitigation Measures during construction will attract penalty as mentioned in the Contract data serial no. 37(c).

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 contractor will ensure the schedules of his activites, safety arrangements during operation and rehabilitation after closure of the quarry. The contractor shall operate strictly adhering to the Burrow Area Management Plan.

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.

The cost of such safety and rehabilitation work shall be deemed to be included in the rates, unless specifically mentioned in the contract. Failure to adhere to the Environmental Mitigation Measures during construction will attract penalty as mentioned in the Contract data serial no. 37(c).

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 that noise, vibrations and emission conforms to the regulatory norms and be fitted with dust extraction

unit. Failure to adhere to the norms will attract penalty as mentioned in the Contract data serial no. 37(c).

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 storage and 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 7 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 generally 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 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 part road is used traffic movement during construction, then contractor will maintain it at his cost only.

Most of the carriageway of the project has intermediate/ double lane carriageway. Due to poor in geometries and drainage considerations, the finished road surface 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.

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 for 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 1000m except in the case if permitted by the Engineer. The next length of 2000m or less may be planned on the opposite side with a minimum clear distance of 200m from the preceding patch.

The proposed centerline of the alignment shall be marked. The toe line of the embankment shall be marked on both sides of the alignment. After clearing & grubbing, benching the slope & compacting the original ground, earth work in embankment with approved material shall be taken up to the design sub grade level in the side on which the

traffic is proposed to be allowed. The type of earth and compaction requirement shall match the requirement of embankment or sub grade for which the section has been planned, as this section shall be retained as part of the road section. GSB (two layers) as per design requirement, conforming to the specification requirement of clause 401 of MORTH shall be provided up to the end of formation level and compacted. Over this granular base lower layer (WMM1) shall be provided up to the end of formation level and compacted. Over this primer and surface dressing shall be provided to allow the vehicles to ply on the prepared surface. During such time the existing carriageway width of minimum 3.5m and one side of treated shoulder (total of 5.0 m) shall be left for plying of vehicles. The prepared surface for traffic flow should be min of 4.0m.

The work for the other side including the carriageway portion shall be taken up, up to the sub base/sub grade/embankment level to match with the sub base of the former side and if decided, continue construction of granular base (two layers). Bituminous work as per design requirement is taken up over the prepared granular base, to allow the vehicles to ply on the prepared surface. The work for the other side from the granular base second layer (upper layer) shall be taken up and constructed till all the layers to reach the proposed formation level. The Contractor in consultation with the Engineer shall decide whether the side allowed to traffic can be taken up for construction of Granular base layer.

The work of providing earth embankment, sub-grade and granular sub-base material so carried out shall be paid under relevant items of bill of quantities. It may be ensured to provide minimum availability of width of 4.0m for plying of vehicles. At the end of diversion, a suitable link with proper gradient should be provided.

The contractor shall maintain the bypass/diversion made with the granular base material during the period of construction by way of watering, compacting, and making good loss of material after filling up of the rutting/depression etc. by additional quantity of granular materials. The cost of maintenance, making good the loss of material, watering, compacting, leveling and dressing along with additional quantity of granular base material shall be considered as incidental to the work.

The side on which the traffic was plying till then shall be made good after rolling, leveling, dressing along with any additional material required to bring the same to the required camber or super-elevation as the case may be and compacted to achieve the desired density to receive the next course of granular sub-base or base to match the other half.

The treated shoulder of the additional width if required to meet the minimum width criteria or passing of vehicles shall be either dismantled or retained. In case of dismantling the debris disposed off or reused as directed by the Engineer.

Where the excavation of the earth is required below the existing ground level, the toe line of the embankment shall be marked on both sides of the alignment. Then excavate the earth till the bottom of proposed sub grade level on one side from existing embankment toe line. Earth work in embankment with approved material shall be taken up to the design sub grade level in the side on which the traffic is proposed to be allowed. The type of earth and compaction requirement shall match the requirement of embankment or sub grade for which the section has been planned. Over this the same construction methodology should be adopted as mentioned above.

The work of providing earth embankment, sub-grade and granular sub-base material so carried out shall be paid under relevant items of bill of quantities. It may be ensured to provide minimum availability of width of 4.0m for plying of vehicles.

1. Traffic Safety Arrangements

The Contractor shall provide, fix in place & position 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 **at each part road location** as per the following table and maintain the same for the construction period. Provision of such traffic safety arrangements is mandatory and incidental to the work. No separate payment will be made on this account and no claim shall be entertained for providing the same. Non-performance of full or part of such items would lead to deductions pursuant to Clause 37(b) of Contract Data.

Sl. No	Item	Quantity
1.	Sign boards as per Technical Specifications Clause 801 including the Posts. Sheeting will be retro reflective type of high intensively grade with messages / borders/ signs etc.	
	(a) Men at Work (Triangular- 900mm side)	2 Nos
	(b) Overtaking Prohibited (Circular-600mm dia)	2 Nos
	(c) Compulsory turn (Circular-600mm dia)	2 Nos
	(d) Road Closed Take Part Road (Rectangular-1200x700mm)	2 Nos
2.	Wooden bullah delinator of 75mm dia and 2.0m height with white enamel painting with 3nos reflecting sticker in each	84 Nos
3.	Sand bag delinator containing 1 cft sand with 2nos reflecting sticker in each.	84 Nos

4.	Barricading tape	500 Rmt.

The Contractor shall be responsible for the dismantling and removal of all barricade and signages after completion of works.

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:

a) Embankments as per clause 305. The use of fly ash in temporary diversions will not be permitted.
b) Pavement 5.5m wide consisting of 150mm granular sub-base as per clause 401, 150mm 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
c) Earth shoulders 2.5m wide on both side of the pavement as per clause 407
d) Minimum horizontal radius on curves 50m
e) Maximum gradient 5 percent and minimum camber of 2.5 percent
f) Restriction of maximum speed to 30kmph
g) Cross drainage structures (if any) shall be adequate to deal with the water flow using adequate numbers of 1.0m dia NP-4 RCC Hume pipes in sufficient rows at all seasons at that location. Care should be taken of the waterway area and other relevant parameters of the existing and proposed replacement structures as given in the drawings. Causeways may only be overtopped and the road closed to traffic for short periods in extreme flood conditions.
h) Adequate erosion protection must be provided.
i) The Contractor shall be responsible for the design of temporary diversions and submit the designs and drawings to the Engineer for his approval.
j) 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.
k) Any roadside trees that have to be removed for the construction of temporary diversions shall be the responsibility of the Contractor.
l) **Traffic Safety Measures**:- The Contractor shall provide, fix in place & position 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 **at each temporary diversion location** as per the following table and maintain the same for the construction period. Provision of such traffic safety arrangements is

mandatory and incidental to the work. No separate payment will be made on this account and no claim shall be entertained for providing the same. Non-performance of full or part of such items would lead to deductions pursuant to Clause 37(b) of Contract Data.

Sl. No	Item	Quantity
1.	Sign boards as per Technical Specifications Clause 801 including the Posts. Sheeting will be retro reflective type of high intensively grade with messages / borders/ signs etc.	
	(a) Men at Work (Triangular- 900mm side)	4 Nos
	(b) Diversion Ahead (Rectangular-1200x700mm)	2 Nos
	(c) Overtaking Prohibited (Circular-600mm dia)	2 Nos
	(d) Compulsory turn (Circular-600mm dia)	2 Nos
	(e) Diversion (Rectangular-1200x700mm)	2 Nos
	(f) Road Close (Rectangular-1200x700mm)	2 Nos
	(g) One Way (Rectangular-1200x700mm)	2 Nos
2.	Type-III Barricade	2 Nos
3.	Wooden bullah delinator of 75mm dia and 2.0m height with white enamel painting with 3nos reflecting sticker in each	68 Nos
4.	Sand bag delinator containing 1 cft sand with 2nos reflecting sticker in each.	68 Nos
5.	Barricading tape	420 Rmt.

m) The Contractor shall be responsible for the dismantling, removal and disposal of all temporary diversions, barricade and signages when approved by the Engineer.

Clause 112.4 Traffic safety and Control

Add as the continuation of the first paragraph

If there is traffic jam during construction, measures shall be taken to relieve the congestion.

Add the following sub-clauses under 112.4

Clause 112.4.1 Side Roads and Property Accesses

At all times, the Contractor shall provide safe and convenient passage for vehicles pedestrians and livestock to and from side roads.

Clause 112.4.2 Plant and Equipment

"During the day, plant and equipment working in a position adjacent to traffic and having a projection beyond the normal width of the item, for example, a grader blade shall have a fluorescent red marker attached to the outer end of the projection. During poor light conditions an additional traffic controller with an illuminated red marker shall direct traffic around such plant and equipment.

At night, all plant items and similar obstructions shall be removed from the normal path of vehicles, to provide a lateral clearance of at least 6m where practicable, with a minimum clearance of 1.2m.

Plant and equipment, within 6m of the normal path of vehicles, shall be lit by not less than two yellow steady lamps suspended vertically from the point of the obstruction nearest to a traffic lane, and one yellow steady lamp at each end of the obstruction on the side farthest away from the traffic lane".

Clause 112.6 Measurements for Payments and Rate

Add below the second paragraph as follows

The contract rate also includes traffic safety and control as per clause 112.4 and maintenance of diversion of Traffic control devices as per clause 112.5. Failure to carry out the above activities, contractor shall be liable to be imposed with penalty for the first week of non-compliance report as mentioned in the contract documents. Beyond first week the same work will be carried out by third party, the cost of which is to be deducted from the contractor's IPC in the same month.

Clause 113 General Rules for the Measurement of Works for Payment:

Clause 113.2 Measurements for Lead of Materials

Delete this Clause and replace with

"The rates in the Bill of Quantities are deemed to include the costs of haulage from source of supply to the plant as well as to the construction site as the case may be for all materials required for the Works."

Clause 114 Scope of Rates for Different Items of Work

Clause 114.2 Item (ii) of clause 114.2 shall read as follows

A detailed Resource Based Construction Programme (using Microsoft Project) shall be submitted, 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 burrow area, method of construction of embankment and sub-grade, pavements, piles, concreting procedures, details of proprietary process and products (e.g. details of proprietary pilling systems, bearings, expansion joints etc.) and details of equipment to be deployed. Wherever necessary, technical literature, design calculations and drawings shall be included in the methods statement.
iv) Testing and acceptance procedures including documentation.
v) Special part of the Q.A. programme referred in clause 105.3 for the particular item of work shall be submitted along with the methods statement for the concerned activity.
vi) Engineer shall examine and approve the methods statement or direct the contractor to resubmit the statement with required modifications. The modified statement shall be submitted within **4 days** of receipt of Engineer’s comments.

The sole responsibility for the safety and adequacy of the methods adopted by the contractor shall rest on the contractor irrespective of any approval given by the Engineer.

Clause 115.1 Approval of proprietary product/ process/ system

Only proprietary products proven by International usage in comparable projects shall be permitted to be used. Fully authenticated details of licensing and collaboration arrangement shall be submitted by the manufacturer, where relevant.

Within 90 days of award of work the contractor shall submit the following information for all proprietary products for approval by the Engineer.

i) Name of manufacturer name of product/ process/ system complete details of the manufacturer of the product/ process / system shall be furnished. Details of projects where similar product/ process / system have been successfully used shall be furnished. Authenticated copies of license/ collaboration agreement shall be furnished.

ii) General features of the product/ product process/ system
Detailed write up with methods statements shall be furnished for each product/process/ system. This shall include complete working drawings & installation drawings, technical specifications covering fabrication, materials, system of corrosion protection etc.

iii) Details of product development and development testing

iv) Acceptance test and criteria
Manufacturer shall submit a quality assurance system document. Details of acceptance test and criteria of acceptance shall be furnished in this document.

v) Installation procedure& demonstration

vi) Maintenance procedure and schedule

vii) Warranty proposal

The Engineer may order any additional test for the purpose of accepting the product. The facility for such additional tests shall be made available by the manufacturer. The charges of these additional tests shall be borne by the Employer.

Clause 121 Field Laboratory

Clause 121.1 Add the following at the end of the clause

This facility including its erection, running will be provided and maintained by the Contractor, as incident to work and no separate payment shall be made for this item.

Clause 121.2 Description

Delete this Clause and replace with

"The Contractor shall construct a fully furnished and equipped field laboratory. All equipment shall conform to accepted national and international standards and shall be subject to the approval of the Engineer.

The laboratory will be located at a site approved by the Engineer and must be of adequate size to perform all the tests required under the contract including sufficient light, uninterrupted electricity and water supply etc. Office space of about 30 Sqm must be provided in the laboratory for the exclusive use of the Engineer and Employer / Employer's representative with adequate facilities such as toilets, Air conditioners, first aid box, uninturrepted power and water supply etc.

The contractor shall provide the field laboratory within one month from the date of the commencement of the work. Prior to this, the contractor must make suitable alternative arrangements for the testing of materials at his cost, which are acceptable to the Engineer.

The Contractor shall be responsible for the provision of adequately experienced and qualified laboratory staff, in sufficient numbers to be able to meet all testing requirements to the approval of the Engineer, and for the supply of all transportation of staff, testing equipment and sample necessary to allow the testing to be performed in a time scale compatible with the needs of the Site.

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

Clause 121.3 **Laboratory Equipment**

This Clause shall read as under

"The following items of laboratory equipment procured from reputed manufacturers duly approved by the Engineer shall be provided in the field laboratory."

Laboratory equipment shall be provided by the Contractor for laboratory, sufficient to carry out all the field and site quality acceptance testing required in the Specifications. It shall include the following:

A. General

i) **Balance**

a) 10 kg capacity semi-self indicating type – Accuracy 1 gm

Electronic 1 No.

		Mechanical	1 No.
	b)	500 gm capacity – Accuracy 0.01 gm	
		Electronic	1 No.
		Mechanical (semi-self indicating)	1 No.
	c)	Chemical balance (electronic) 100 gm capacity	
		Accuracy 0.001 gm	1 No.
	d)	Pan balance 5 kg capacity Accuracy 0.5 gm.	3 Nos.
	e)	Platform scale – 300 kg capacity	1 No.
	f)	Triple beam balance – 25 kg capacity Accuracy 1 gm	2 Nos.
ii)		Oven-electrically operated, thermostatically controlled (including thermometer), stainless steel interior	
	a)	Temperature range ambient to 300° C, Sensitivity 1° C, capacity 120 Litre.	1 No.
	b)	Temperature range, ambient to 150° C, sensitivity 1° C, capacity 250 Litre.	1 No.
iii)		Sieves : As per IS 460:1962	
	a)	Test sieve of G.I 450mm internal dia. as per IS complete with lid and pan of hole sizes 75mm, 63mm, 53mm, 37.5mm, 26.5mm, 13.2mm, 9.5mm, 6.7mm, and 4.75mm.	2 Sets
	b)	Test sieve set 200mm internal dia (brass frame and steel/or brass wire cloth mesh) as per IS complete with lid and pan of aperture sizes 2.36mm, 2mm, 1.18mm, 600micron, 425micron, 300micron, 150micron ,90 micron and 75micron.	2 Sets
iv)		Sieve shaker capable of taking 200mm and 450mm dia sieves-electrically operated with time switch assembly	1 No.
v)		200 tonnes compression testing machine electric cum manually operated	2 Nos.
vi)		Stop watches 1/5 sec. accuracy	2 Nos.
vii)		Glassware comprising beakers, pipettes, dishes, measuring cylinders (100 to 1000cc capacity) glass rods and funnels, glass thermometers range 0° C to 100° C and metallic thermometers range upto 300° C.	1 Doz. Each
viii)		Hot plates 200mm dia (1500 watt.)	6 Nos.
ix)		Enamel trays	
	a)	600mm x 450mm x 50mm	6 Nos.

	b)	450mm x 300mm x 40mm	6 Nos.
	c)	300mm x 250mm x 40mm	6 Nos.
	d)	Circular plates of 250mm dia	6 Nos.
x)	Water still, 3litre/hr. with fittings and accessories		1 Set
xi)	Aluminium Tins		
	a)	50mm x 30mm	36 Nos.
	b)	55mm x 35mm	36 Nos.
	c)	70mm x 45mm	36 Nos.
	d)	70mm x 50mm	36 Nos.
	e)	80mm x 50mm	36 Nos.
xii)	Riffle box of slot size 50mm		1 No.
xiii)	Spatula set of 100 and 200 long		3 Sets
xiv)	Water testing kit		1 Set
xv)	Chemicals solutions and consumable		As reqd.
xvi)	Chloride Testing kit for chemical analysis of chloride content		1 No.
xvii)	ION Exchange kit for rapid determination of sulphate content		1 No.
xviii)	First aid box		1 Set

B. For Soils and Aggregates

i)	**Liquid limit and plastic limit**		
	a)	Liquid limit device with Casagrande and grooving tools and as per IS – 2720	2 Nos.
	b)	Single point LL device	1 No.
	c)	Moisture content cans	50 Nos.
	d)	Ground glass plate with rounded edges 600mm x 600mm x 10mm	2 Nos.
ii)	Hydrometer analysis		
	a)	High speed stirrer with stainless still beaker	1 No.
	b)	Soil hydrometer set including jar	1 Set
iii)	Sampling pipettes fitted with pressure and suction inlets, 10ml. Capacity		1 Set
iv)	Laboratories compaction		
	a)	Compaction apparatus (Proctor) complete with collar, base plate & 2.5kg rammer	2 Nos.
	b)	Compaction apparatus (heavy) complete with collar, base plate and 4.5kg rammer	3 Nos.

v)	Sand pouring cylinder (150mm) with conical funnel and top and base plate (with 152mm dia of sand cone)	4 Sets
vi)	Sampling tins with lids 100mm dia x 75mm ht. 1/2kg capacity	30 Nos.
vii)	Laboratory C.B.R. testing equipment to the requirements of IS and consisting of following :	1 Set
	a) Floor mounted electro-mechanical load frame 5 tonne capacity with automatic strain control	1 No.
	b) CBR moulds complete with collar, base plate, etc.	18 Nos.
	c) Swell stands for holding dial gauge	9 Nos.
	d) CBR plunger with penetration dial gauge holder	1 No.
	e) Surcharge weight with central hole of 2 kg. weight	40 Nos.
	f) Spacer disc with handle	2 Nos.
	g) Perforated brass swell plate with adjustable cap on handle	18 Nos.
	h) Soaking tank for accommodating 9 CBR moulds	1 No.
	i) High tensile steel calibrated proving rings of 1000 kg. 2500 kg and 5000 kg capacity	1 Set
	j) Dial gauge, 25mm travel-0.01mm/division	12 Nos.
x)	Nuclear gauge for density and moisture content determination	1 Set
xii)	Speedy moisture tester complete with carrying case and supply of reagent	2 Nos.
xiii)	Sand equivalent apparatus complete along with chemicals to the requirements of IS	1 Set
xiv)	Reagent grade Sodium Sulphate for soundness test of aggregate chemical Sodium Sulphate	30 kgs.
xvii)	Core cutter apparatus 10cm dia. 10/15cum length height complete with 20kg hammer	1 Set
xix)	Standard measures of 30, 15, 3 litre capacity along with tamping rod	1 Set
xx)	Unconfined compression test apparatus	1 Set
xxi)	Flakiness index test apparatus	1 No.
xxii)	Elongation index test apparatus	1 No.
xxiii)	Aggregate crushing value / impact test apparatus	1 No.
xxiv)	Los-Angeles abrasion apparatus as per IS 2386 (Part 4) 1963	1 No
xxv)	Standard Penetration equipment	1 No

C. For Bitumen and Bituminous Mixes

i)	Constant temperature water bath for accommodating bitumen test specimen, electrically operated, and thermostatically controlled, stainless steel interior, temperature range ambient to 80° C	1 No.
ii)	Bitumen penetrometer automatic type, including adjustable weight arrangement, and needles	1 Set
iii)	Centrifugal type motorized bitumen extraction apparatus with stock of solvent & filter papers	1 Set
iv)	Bitumen laboratory mixer planetary action, 2 litre capacity, including required accessories electrically operated and fitted with heating jacket	1 No.
v)	Marshall compaction apparatus and complete with electrically operated automatic loading unit, compaction pedestal, heating unit, head breaking assembly, flow meter, load transfer bar, specimen moulds 100mm dia 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	1Set
ii)	Moulds	
	a) 150 mm x 300 mm ht. Cylinder with capping component along with the capping set and compound as per IS	48 Nos.

	b) Cube 150 mm, moulds and 100 mm (each size) as per IS	36 Nos.
	c) Beams 750 mm x 150 mm x 150 mm moulds	18 Nos.
iii)	High frequency mortar cube vibrator for cement testing	1 No.
iv)	Concrete mixer power driven, 1 cu. ft. capacity	1 No.
v)	Variable frequency and amplitude vibrating table as per the relevant IS	1 No.
vi)	Equipment for slump test /compacting factor Apparatus complete	4 Nos.
vii)	Equipment for determination of specific gravity for fine and coarse aggregate as per IS 2386 (Part 3) 1963	4 Nos.
viii)	Flexural attachment to compression testing machine.	1 Nos.
ix)	Core cutting machine with 10cm dia diamond cutting tool	1 No.
x)	Needle vibrator	1 No.
xi)	Air entrainment meter	1 No.
xii)	Le-Chatelier apparatus for Soundness testing of cement	1 Set
xiii)	Blain Air Permeability apparatus	1 No.

All equipments shall 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 CD.

Clause 125.3 **Replace the first para as :**

Supply of two copies of colour record photographs mounted in the albums and the digital form of the printed photographs recorded in a CD shall be measured in number of record photographs supplied.

Clause 125.4 **Replace the 1st line of the last para**

The photographs and materials including digital version in CD shall form a part

Clause 126.1 **Replace the last line of the 1st para**

The video data in form of DVD shall be of acceptable quality and the file shall be capable of producing colour pictures.

Clause 126.2 **Replace this para with :**

The measurement shall be by number of sets of edited master DVD each with four copies thereof.

Clause 126.3 **Replace the word Cassette with DVD**

SECTION 200 SITE CLEARANCE

Clause 201 Clearing and Grubbing

Clause 201.1 Scope

Replace with following para

This work shall consist of cutting removing and disposing of all materials such as trees of girth up to 300 mm bushes shrubs stumps, roots, grass weeds etc. and top soil 150mm minimum thickness rubbish etc. which in the opinion of Engineer is unsuitable for incorporation in the work including draining out stagnant water if any from the area of road land, drain, cross drainage structure and other area as specified in the drawing by Engineer. It shall include necessary excavation by harrow discs or any other suitable equipment back filling of the pits, by suitable soil, resulting from uprooting of trees & stumps and making the surface in proper grade by suitable equipment and compacted by power roller to required compaction as per Clause 300. The work also includes handling salvaging and disposable of cleared material. Clearing ad grubbing shall be performed less than one month in advance of earthworks operation and in accordance with requirement of these specification. Areas requiring cleaning and grubbing shall be determined by the Engineer.

Clause 201.5 Measurements for Payment

Add at the end of first para

"Cutting including removal of foundation of sign boards, hoarding boards, concrete posts, km stones etc. and back filling of pits shall be considered incidental to the clearing and grubbing operations"

Add the following paragraph:

"The removal from site and disposal of all materials obtained from clearing and grubbing operations, which in the opinion of the engineer cannot be used or auctioned shall be included in the Contract unit rate".

Clause 201.6 Rates

Clause 201.6.1 Replace the second sentence as follows

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

handling, salvaging and piling and disposing of the cleared materials with all lifts and up to all lead.

Clause 202.5 Disposal of Materials

Replace the para with the following

"All materials obtained by dismantling shall be the property of the contractor. The materials may be reused in the works in part or in full quantity if permitted by the Engineer for which no cost towards value of material, transportation etc. shall be charged to the contractor, nor the contractor shall pay any salvage value to the Employer. The materials which have to be disposed off, shall be done by the contractor at his own cost at the approved location as per direction and approval of the Engineer.

No material , on account of dismantling shall be returned back to the Employer. The dismantled materials shall be completely removed form the site."

Clause 202.7 Rates

Add the following at the end of the para

"The cost of carriage of materials to disposal sites is deemed to be included in the rates for dismantling."

SECTION 300 EARTH WORK, EROSION CONTROL AND DRAINAGE

Clause 301 Excavation for Roadway and Drains

Clause 301.3.7 This clause shall be read as under:

"In works involving widening of existing pavements or providing paved shoulders the existing shoulder/verge/ median shall be removed to its full width. The sub-grade material within 0.2m deep from the lowest part of the pavement for widened portion or paved shoulders shall be loosened and re-compacted as per Clause 305 to a density not less than 97% of maximum dry density determined according to Is: 2720 (Part 8). Any unsuitable material encountered in this portion of subgrade shall be removed and replaced with suitable material and compacted in accordance with Clause 305".

Clause 301.3.11 Disposal of excavated materials

Replace the last para

Unsuitable and Surplus material which in the opinion of the Engineer cannot be used in the works, shall be removed from site by the

Contractor and disposed of at the nearest pit or other approved disposal location **with all lead and lifts** in accordance with all statutory requirements."

Clause 301.8 **Delete item (v) of last para and replace with:**

(v) Disposal of surplus material with all lead and lifts …cum'

Clause 301.9 **Rates**

Clause 301.9.2 **This Clause shall read as under**

"The Contractor unit rate for loosening and re-compacting at sub-grade level shall include full compensation for loosening to the specified depth, removing the loosened soil outside the roadway excavation, rolling the surface below, breaking the clods, spreading the excavated soil in layers watering where necessary and compacting to the requirements."

Clause 305 **Embankment Construction**

Clause 305.2 **Materials and General Requirements**

Clause 305.2.1 **Physical requirements**

Clause 305.2.1.5 **Add the following at the end of first sentence**

The material to be used in sub-grade should satisfy the requirement of 4 day soaked design **CBR not less than 10%** ,when tested as per IS: 2720 (Part 16) at 97% of maximum laboratory dry density (IS:2720-Part 8).

Clause 305.2.2.2 **Burrow materials**

The first Para graph of this clause shall be read as under

"No burrow area shall be made available by the Employer for this work and Burrow 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 burrow 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 burrow area selected by the contractor shall be removed and preserved. Care shall be taken not to create any low lying

area; if any burrow 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 burrow area and watered for three days. No part of the burrow 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 b) High embankment (exceeding 6m height)	Not less than 95 Not less than 97
3.	Expansive clays (DFS <50%) a)Subgrade and 500mm portion just below the subgrade b)Remaining portion of the Embankment	 Not allowed 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 burrow 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.
3.

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
Replace the clause with the following.

The Materials to be used for the work shall be crushed stone aggregate only. The materials shall be free from organic or other deleterious constituent and confirm to Grading I of Table 400-2.

Clause 406. **WET MIX MACADAM SUB-BASE/BASE**

Clause 406.2. **MATERIALS**

Clause 406.2.1 **Aggregate**

Clause 406.2.1.1 **Physical requirements:**

Add at the end of first paragraph

The fraction of materials passing through 4.75 mm sieve shall be crusher run screening only. The river sand or quarry sand shall not be permitted either as such or mixed with crusher-run-screening in the Wet Mix Macadam.

Add the following at the end of the paragraph:

Soundness test shall be carried out in accordance with IS : 2386 (Part-5). The average loss of weight of coarse aggregate after 5 cycles shall

not exceed 12% when tested with sodium sulphate and 18% when tested with magnesium sulphate as specified in IS: 383.

Clause 406.3. CONSTRUCTION OPERATIONS

Clause 406.3.1. Preparation of base

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

Clause 406.3.3 Replace first para with :

Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced/positive mixing arrangement like pugmill. **.**

Add the following at end of 2nd para

Unless otherwise instructed by the Engineer , the moisture content at the time of compaction shall be between 80% and 120% of the optimum moisture content

Clause 406.3.4 Add after the second para with the following:

All the layers of WMM course shall be spread only by a Mechanical Paver Finisher and compacted as per clause no. 406.3.5.

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

Cationic bitumen emulsion SS-1 grade conforming to IS:8887 shall be used as primer. The quantity of bitumen emulsion for WMM types of surfaces shall be 0.7-1.0 Kg/m^2.

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 10^0C.

Clause 502.4 Construction

Clause 502.4.1 Equipment

Replace the clause as follows

All equipment required for execution of priming work shall be in good working condition at site. The primer distributor shall be a self propelled or towed bitumen pressure sprayer equipped for spraying the material uniformly at specified rates and temperature. Hand spraying of small areas using pressure hand sprayer may be permitted at specific strategic locations, where distributor is not accessible or if narrow strips of granular surface are to be primed. Pouring of Primer using perforated can should not be permitted. SS-1 grade bitumen emulsion stored at site in the tank shall have arrangement like circulation pump to ensure its proper mixing before withdrawal from tank and transfer to browser.

Clause 502.4.2 Preparation of road surface

Replace the clause as follows

The base course surface to be primed shall be swept clean and made free from dust. All loose material and other foreign material on the surface shall be removed completely. Power brooms or mechanical sweepers may be used for cleaning of surface. The surface to be primed (whether with SS-1 emulsion or cutback bitumen) should be kept dry. If Soil /Moorum binder has been used in the WBM surface, part of this should be brushed and removed up to a depth of 2mm so as to provide good bond.

The dilution of SS-1 bitumen emulsion is not permitted.

Clause 502.4.3 Application of Primer

Replace the clause as follows

After the base to be primed has been prepared as in section 502.4.2, the primer shall be uniformly applied using the appropriate equipment at application rate. The spraying should preferably be carried out using pressure sprayer or distributor. The quantity of primer shall be checked periodically using tray coating test. The method of application of primer will also depend on the type of equipment to be used, size of nozzles, pressure at spray bar and speed of the forward movement of vehicle. A trial section shall be laid to check the efficacy of equipment and penetration depth of the primer.

Temperature of Application of primer :

No heating of SS-1 Bitumen Emulsion is permitted at site.

In case of cutback bitumen, temperature of application of primer should be high enough to permit the prime to be sprayed effectively through the jets of the spray bar and to cover the base course surface effectively. The temperature of product at the time of application should be more than 10^0C.

Clause 502.4.4 Curing of Primer and opening for traffic

Replace the clause as follows

The primed surface shall be allowed to cure for at least 24 hours or such other period as is found to be necessary to allow all the volatiles to evaporate before any subsequent surface treatment or mix is laid. Excessive and unabsorbed primer if any shall be blotted with an application of sand using the minimum quantity possible. A primed surface shall not be opened for traffic other than that necessary to lay the next bituminous course.

Clause 503 Tack Coat

Clause 503.1 Scope

Replace the clause as follows

The work shall consist of a very light application of liquid bituminous material to an existing bituminous, cement concrete or primed granular surface to ensure a bond between the surface being paved and the overlaying course. The tack coat material is not expected to penetrate into pavement and for this reason; the applications should be very light to provide adequate bond strength between two layers.

Clause 503.2 Materials

Replace the clause as follows

The binder used for tack coat shall be Cationic Bitumen Emulsion RS-1 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 10^0C.

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

Clause 503.4. Construction

Clause 503.4.3. **Application of Tack Coat**

Add the following after the end of para:

Heating and dilution of RS-1 Bitumen Emulsion is not permitted.
The quantity of bitumen emulsion to be applied over primer treated WMM surfaces shall be 0.25-.35 Kg/m^2.

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^2. with 0.30 kg/m^2 in fourth line.

Clause 507.3.4 Add the following line at the end of the clause.

The mix shall be produced only in a batch type hot mix plant of required capacity. In no case materials from drum type hot mix plants shall be entertained.Clause 509.1

Add the following after 2nd line of this para.

Where modified bitumen is specified to be used as a binder shall have a softening point not less than 60^0 C & specification as prescribed in IRC SP 2002 Cl.7 for CRMB or PMB as approved by the Engineer. "Modified bitumen shall be product from the refinery".

Clause 509.2.5 In **Table 500.18**, for grading 2 ,for 13mm nominal size aggregate, the cumulative % by weight of total aggregate passing against 13.2 sieve will be 90-100 instead of 79-100 .

Clause 509.3 **Mixture Design**

Clause 509.3.1 The requirements set out in table **500-19** will be replaced by table **500-11(A) & 500-11(B).**

SECTION 600 **CONCRETE PAVEMENTS**

Clause 601 **Dry Lean Cement Concrete sub-base**

Clause 601.1 **Scope**

Clause 601.1.1 The para will be replaced as follows:

The work shall consist of construction of dry lean concrete sub base for cement concrete pavement in accordance with the requirements of these Specifications as well as of IRC:15 and in conformity with the lines, grades and cross-sections shown on the drawings or as directed by the Engineer. The work shall include furnishing of all plant and equipment, materials and labour and performing all operations, in connection with the work, as approved by the Engineer.

Clause 601.5. Construction

Clause 601.5.2 Batching and Mixing

Add as new sub-clause

Clause 601.5.2.1 Semi-Mechanised and Labour-Oriented Construction Technique

Clause 601.5.2.1.1 General

Use of very sophisticated paving machines and high capacity concrete batch mixer is not possible in small concrete road projects and also in remote hilly terrains. But with the use of such machineries and plants the end product is always of better quality. Without these advanced equipments concrete roads can be constructed using semi-mechanized and labour-intensive constructions but the resulting quality and surface may not be the same as achieved with mechanized constructions**.**

Clause 601.5.2.1.2: Forms:
The fixed-forms made of steel channels or fabricated steel sections are generally made use of.

Clause 601.5.3.1 Semi-mechanized method of construction:

Clause 601.5.3.1.1 Hauling of mix (New Clause)

Transporting of concrete mix from mixer to paving site with steel pans should be avoided. The mix tends to get segregated during such handling. It is desirable to use wheel-barrows or trolleys for carrying mix to the paving site. The workability of the mix can be controlled better with the use of wheel-barrows.

Clause 601.5.3.1.2. Plants, equipments and tools:

The plants and equipments considered essential even in semi-mechanized and labour-oriented constructions are:

A couple of tilting type drums mixers of at least 0.2 cum capacity. The number of mixers to be employed in a project shall be decided on the

basis of the size of the project. Vibratory or smooth wheeled roller of 8-10t capacilty Fixed side forms measuring at least 100-150 m length. Stop-end and start-end made of steel or wooden sections.

Clause 602. CEMENT CONCRETE PAVEMENT

Clause 602.2.4.3

Add as last paragraph

Although IS:383 permits the fines passing 75 microns up to 15 per cent, this provision should be used only when crushed stone dust is used as fine aggregate and when the mix produced in the Laboratory and the field is satisfactory in all respects and complies with the requirement of Specification.

Clause 602.2.6 Mild Steel Bars for dowels and tie bars

Add to the end of paragraph

"The steel shall be coated with epoxy paint for protection against corrosion."

Clause 602.2.8. Joint sealing Compound:

Add at the end of para as follows

and IS: 11433.(Refer Appendix –C of IRC:15 for specifications of sealing compound)

Clause 602.3.4 Workability

Clause 602.3.4.2 Add after fourth sentence of the clause

The slump of concrete mix for pavements compacted in manual construction using needle vibrators for compaction, the slump shall not be more than 40 mm.

Add as last paragraph

In case the concrete is to be carried for long distances, liquid plasticiser shall be used having slight retardation effect. The plasticisers conforming to IS: 9103- 1999 are generally desirable for road works. The quantity of admixtures shall be determined by trials.

Clause 602.4 Sub-base

Replace the 602.4 clause as follows

Clause 602.4.1 Sub-base provided under the concrete slabs shall be of two layers consisting of upper sub-base of dry Lean Concrete as specified under clause 601 and lower sub-base as specified under clause 401 constructed in accordance with the respective specification and the surface finished to the required lines, levels and cross-section. The Concrete pavement shall mostly be undertaken in urban area and if the sub-grade in the widening portion consists of heavy clay (L.L.>50 and/or DFS >50), such as, black cotton soil, the sub-base should be laid over a 22.5 cm thick blanket course consisting of local sand. The sub-base or blanket course, as the case may be, shall be laid over a properly compacted sub-grade to give uniform support. The blanket course of sand shall not be provided at the edges but should be replaced with suitable filter of graded granular material**.**

Clause 602.4.2 The sub-base shall be in a moist condition at the time the concrete is placed. There shall, however, be no pools of water or soft patches formed on the sub-base surface. In case where a sand layer is placed between the sub-base and pavement concrete, a layer of water-proof paper shall be laid over the sand layer. No moistening of the sub-base shall be done in this case**.**

Clause 602.4.3 If the sub-base is found damaged at some places or it has cracks wider than 10 mm, it shall be repaired with fine cement concrete or bituminous concrete before laying separation layer. Prior to laying of concrete it shall be ensured that the separation membrane as per Clause 602.5 is placed in position and the same is clean of dirt or other extraneous materials and free from any damage.

Clause 602.5 **Separation Membrane**

Add after the first line:

It shall be white in colour and transparent.

Clause 602.6.4. **Longitudinal Joints**

Clause 602.6.4.1 **Add to the clause no 602.6.4.1 in end of the clause**

These joints known as warping joints shall be:
Plain butt type and shall be formed by placing the concrete against the face of the slab concreted earlier. The face of the slab concreted earlier, shall be painted with bitumen before placing of fresh concrete.

Formed by a joint cutting machine when a pavement width of more than one lane is laid and to relieve warping stresses when the pavement width exceeds 4.5 m.

Add as new sub-clause

Clause 602.6.4.3. **Longitudinal joint with shoulder:**

This is one of the critical areas which are generally not given proper treatment. The joint widens after the concrete slabs have shrunk and this wide joint allows water to seep to the lower layers. Whether the shoulder is rigid or flexible type, the joint should be treated with sealant after widening.

Clause 602.6.4.4. Transition slabs:

At the interface of rigid and flexible pavement, at least 3 m long reinforced buried slab should be provided to give a long lasting joint at the interface. The details are shown in Fig. 3 of IRC 15: 2002.

Clause 602.6.5 Dowel bars:

Clause 602.6.5.1 Add after first sentence of the clause

Epoxy coating shall treat these or any approved anti-corrosion treatment**.**

Clause 602.6.5.5 The first two sentences shall read as follows

"Dowel bars shall be covered by a thin plastic sheath for at least 60 per cent of the length from one end for dowel bars in contraction. The sheath shall be tough, durable and of an average thickness not greater than 0.5 mm and shall have closed end. The sheathed bar shall comply with the following pull out test."

Clause 602.8. Side Forms, Rails and Guide wires:

Clause 602.8.1 Replace the first three sentence of the clause as follows:

All side forms shall be of mild steel of depth equal to the thickness of pavement minus the level tolerance stipulated for the lower layer. The forms can be placed on a series of steel packing plates or shims to take care of irregularity of sub-base. They shall be sufficiently robust with a minimum thickness of 6 mm and rigid to support the weight and pressure exerted by the paving equipment.

Clause 602.9. Construction

Clause 602.9.1: General

Replace the clause as follows

"A systems approach may be adopted for construction of the pavement, and the Method Statement for carrying out the work, detailing all the activities including indication of time-cycle, equipment, personnel, etc. These shall be got approved from the

Engineer before the commencement of the work. The above shall include the type, capacity and make of the batching and mixing plant/ Concrete mixer with integrated weighing mechanism/portable mixing plant besides the hauling arrangement and paving equipment. The capacity of crusher, batching plant the cement storage, silos and the paver shall be matching so that the rate of paving shall not be less than 60 metre per hour and paving can progress without any stoppage. During planning stage, it should be noted that constructing multilane pavement is better than constructing single lane at a time from the point of view of riding quality. Therefore, the capacity of plants should be planned accordingly. "

Add as new clause

Clause 602.9.1.1 Existing Pavement

When concrete pavement is to be laid over an existing bituminous pavement which is known as white-topping, it shall be ensured that the existing road extends over the required width and has a minimum thickness of 150 mm. Where the general unevenness of the surface varies within 25 &, it can be provided with an overlay of dense bituminous macadam (DBM) with the help of a paver operating with electronic sensor to achieve the desired level, grade and alignment. The thickness of DBM shall be decided on basis of undulations present on the existing road. Where the width of the existing pavement falls short of the width to be concreted and the condition of the surface is sound enough for receiving the paving concrete, the extra width may be made up by placing at least 150 rnrn depth of lean cement concrete or lime-puzzolana concrete or lime-fly ash concrete or lean cement concrete as per clause 6.2.l(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.

Clause 602.9.9. Curing of Concrete

Clause 602.9.9.1 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 1 50 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 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 with 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:

a. The width of lines and other markings shall not deviate from the specified width by more than 5%.
b. The position of lines, letters, figures, arrows and other markings shall not deviate from the true position specified by more than 20mm.
c. The alignment of any edge of a longitudinal line shall not deviate from the true alignment by more than 10 mm. in 15 m.
d. The length of segments of broken longitudinal lines shall not deviate from the specified length by more than 150 mm.
e. 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.

f. Line and curves, whether broken or unbroken, shall not consist of chords but shall follow the correct radius.

Faulty Workmanship or Materials

If any material not complying with the requirements is delivered at the site or used in the Works, or if any sub-standard work is carried out, such material or work shall be removed, replaced or repaired as required by the Engineer, at the Contractor's own cost. Rejected traffic markings and paint that has been splashed or has dripped onto the surfacing , kerbs , structures or other such surfaces shall be removed by the Contractor at his own cost , in such a way that the markings of split paint will not show up again later.

Clause 804.3 **The first sentence of this Clause shall be read as under :**

The hectometer/kilometer stones shall be made of concrete of M20 grade.

SECTION 900 **QUALITY CONTROL FOR ROAD WORKS**

Clause 903 **Quality Control Tests During Construction**

Clause 903.4 **Tests on Bituminous Constructions**

In Table 900-4, Tests mentioned at serial No.4 & 6 for Bituminous Macadam/Dense Bituminous Macadam/Semi Dense Bituminous Concrete and for Bituminous Concrete, **add the following at the end** in the frequency column:
"10% of the density tests shall be done within 300mm width from edges."

Add new sub clause as 903.4.3 as follows

Clause 903.4.3 Bituminous mix shall be spread with paver fitted with electronic sensing device and string line arrangement (supported by steel pegs @ 5 m apart) on either side of paving width for automatic levelling, surface evenness and profile control. Use of string line is compulsory to provide signal to the electronic sensing device fitted with the Paver Finisher.

Bituminous works shall be tested immediately after finishing for:

a) Thickness (compacted) measured by extracting cores shall be dealt in accordance with MORTH Specification Section 900.

b) Density (compaction) test as performed on the extracted cores

c) Workmanship test by measuring roughness of the finished layer by duly calibrated Towed Fifth Wheel Bump Integrator.

Note: Contractor shall arrange the core extraction machine at his cost and shall take cores of the executed bituminous works jointly with Engineer without any extra cost.

The result of tests shall be compared with the prescribed acceptable values. The payment of all such works executed shall be based on the test results. In case test results for parameters (b) & (c) above fall below the required values in accordance with specification, deductions as specified below here under shall apply limiting to 'Nil' payment for the executed bituminous works. Separate deductions shall be made for each attribute i.e. Density Test and Workmanship test.

b) Density (Compaction Test):

Reduction in Core Density	**Deduction in the payable rate**
-Upto 1.00% from the required percentage	@ 5%
- Between 1.01% to 2.00% from the required percentage	@15%
- Between 2.01% to 3.00% from the required percentage	@30%
-By more than 3.01% from the required percentage	@ 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

Calibration of equipments and measurement of surface unevenness shall be done in accordance with IRC:SP:16-2004.

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 BC layers.

Any completed layer (Concrete 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 5.00% more than the required ment	**Nil**

-More than 5.01% and upto 30.00% more than the requirement	@ (10%+1% for every 1% in excess of 5%)
-More than 30% more than the requirement	Work shall be rejected. Complete re-work shall be done.

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^2)

SECTION 1000 MATERIALS FOR STRUCTURES

Clause 1009 Steel For Pre-Stressing

Add (e) to the list of codes to which acceptable prestressing steel shall conform:

(e) Uncoated Stress relieved low relaxation seven ply strand for prestressed concrete - IS: 14268

Clause 1009.3 Add the following note under table 1000-3

Thermo Mechanically Treated bars (TMT bars) conforming to IS: 1786 may also be used.

Clause 1010 Water

In para (c), the permissible limit for **Chloride (Cl) shall be read as** "500 mg/lit for Prestressed Concrete / Reinforced Cement Concrete Works."

The lines indicated with * shall be read as

"* In case of structures, for concrete works not containing embedded steel, the permissible limit of chlorides may be increased upto 1000mg/lit."

Clause 1012 Concrete Admixtures

Add the following at the end of paragraph 2 of Clauses 1012.1

Admixtures shall not impair the durability of concrete; they shall not combine with the ingredients to form harmful compounds or endanger the protection of reinforcement against corrosion.

Add the following at the end of the clause.

After selecting a few acceptable brands & types of admixture based on the manufacturer's data/technical literature. Independent acceptance

tests should be carried out for the same using the approved combinations of cement / sand / aggregates intended for use in the Project. After establishing the basic acceptability using strength criteria (compression & tensile strengths) a number of trial mixes be designed using different proportion of admixures / cement / water etc. to establish the data bank on the behaviour of the admixure 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 admixure in the batching / mixing plant. No addition of admixure 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 presetress 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 the 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 Cementitous 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

The gradings of the above groups should follow the limits provided below.

Polymer Modified Cementitous (PMC) Mortar

The specifications for polymer modified cementitious material (PMC) shall be read as under

I. Mix Formulations

PMC SLURRY

COMPONENT	PARTS BY WEIGHT
Cement	100
Acrylic polymer latex	52

PMC REPAIR MORTAR

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 cuing 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 350C

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 as impermeable sheet shortly after the work has been done.

The sheet shall be kept in place until further work is carried out over the mortar or in case where the mortar is likely to be disturbed the sheet shall be kept in place for 24 hours.

No foot traffic for further work shall be allowed over mortar until 12 hours from the time of the completion of work.

Curing compound may also be used as curing membrane. Care shall be taken to ensure complete covering particularly around the interface with the host concrete.

For the first day the repaired concrete patch shall be protected from harsh environment by laying a polythene sheet over it, taping down the edges.

Mixing PMC

To mix PMC, it is necessary to have the following items

i. A suitable sized mixing container

ii. A high speed drill with mixing paddles

iii. Premark batching containers for measuring out components to be mixed

Pour all the liquid polymer latex into mixing container. After shaking the latex to disperse the solids uniformly throughout the liquid before use.

Begin mechanical mixing and while doing so, slowly add the dry components i.e. cement and sand.

Mix for about 5 minutes until solids have been well dispersed. The resulting mix should look uniform, feel creamy and be free from lumps and grits.

Precaution shall be taken not to entrap an excessive amount of air into the mix during mixing.

Since the desired consistency depends on type and brand of cement as well as weather conditions, start a trial mix with a reduced amount of cement. Once all components are mixed, add cement if necessary to achieve the desired consistency. Record the amount of cement required and uses this for subsequent mixes. Do not reduce the quantity of cement noted in the mix proportions.

In case the slurry sets before application of mortar, a fresh coat of slurry shall be applied. Under no circumstances water shall be added in PMC repair mortar mix. Unused mortar or mortar which has partially set shall not be re-mixed and used.

I.S. Sieve No.	**Percentage Passing by Weight**		
	Coarse	**Fine**	**Combined**
10 mm	100	100	100
4.75 mm	95-100	100	98-100
2.36 mm	90-100	100	80-100
1.18 mm	40-60	100	70-80
600 micron	0-10	90-100	45-55
300 micron	0-4	40-60	20-30
150 micron	0-3	0 – 10	0-5
75 micron	3max	0-3	3max

In the event of using local sand, the sand to be used must satisfy the limits of deleterious materials and the requirements of soundness as given in Cl. 3.2.1 and Cl. 3.6 respectively of IS: 383. Confirmatory tests shall be conducted by the Contractor and sample kept for comparison by the Engineer.

II Mix Formulations

COMPONENT	PARTS BY WEIGHT
Cement	100
Acrylic polymer latex	52
Fine Silica Sand	100

Curing of PMC brush topping

This specification describes the curing procedures to be followed for various PMC systems.

The curing procedures outlined apply to normal weather conditions. Under hot weather conditions take precautions to avoid drying. PMC work should be carried out at a temperature below 35°C.

Under unusual weather conditions e.g. high humidity and/or high wind velocity or imposed constraints special curing procedures shall be followed, for which approval shall be obtained from the Engineer.

Air drying shall be considered to take place only during favourable uninterrupted weather conditions existing throughout the recommended drying period. Some judgement shall be made in this respect and if conditions are deemed unfavourable for drying to occur, then drying must be prolonged for the full-recommended period after the weather clears.

In unexposed and exposed areas the initial air drying of 4 to 6 hours shall be followed by moist curing for 24 hours by spraying or another approved curing method.

Following moist curing, the coating shall be allowed to air dry for 4 to 6 hours prior to the application of finishing coat.

Mixing PMC Slurries

To mix PMC slurries, it is necessary to have the following items:

i) a suitable sized mixing container

ii) A high speed drill with mixing paddles

iii) Premark batching containers for measuring out components to be mixed.

Pour all the liquid polymer latex into the mixing container. Shake the latex to disperse the solids uniformly throughout the liquid before use.

Begin mechanical mixing and while doing so, slowly add the dry components, i.e. cement and sand for brush top coating.

Mix for about 5 minutes until all the solids have been well dispersed. The resulting mix should look uniform, feel creamy and be free from lumps and grit.

Precaution shall be taken not to entrap an excessive amount of air into the mix during mixing.

Since the desired consistency depends on type and brand of cement as well as weather conditions, start a trial mix with a reduced amount of cement. Once all components are mixed, add cement if necessary to achieve the desired consistency. Record the amount of cement required and use this for the subsequent mixes. Do not reduce the quantity of cement noted in the mix proportions.

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.

PART- IV

ENVIRONMENTAL MANAGEMENT PLAN

S. No.	Environmental Issue/Aspect	Management Measures
E.1	Tree Cutting	The Contractor shall not cut or damage trees except that are required to be felled for construction of traffic diversion works and facilities, after obtaining necessary permission for felling of the same from the authorities.
E.2	Joint Field Verification	The Engineer and the Contractor will organize and carry out joint field verification to ascertain the possibility of saving environmental and community resources. 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/management measures shall be well documented with other requisite details such as date, time, place and signature of the individuals involved. Approval will be accorded by the Engineer in consultation with the Project Authority.
E.3	Location and installation of Crushers, Hot-mix Plants and Batching Plants	All plants (hot-mix, crushers, batching plant, WMM or any other) shall be located at least 1000 mts. away from habitations, forests and wildlife movement areas, preferably in the downwind direction. The Contractor shall submit the **proposed location plan** (including survey number/s of the land parcel/s under consideration, area, land-use and surrounding features) and seek **prior approval** of the Engineer before entering into any formal agreement with land owner/s for setting-up such construction facilities. The Contractor will formalize agreement with land owner/s only after a written approval has been accorded by the Engineer. The 'installation' of the plant/s shall commence after the contractor has obtained 'consent to establish' from the Orissa State Pollution Control Board. The 'operation' of the plant/s shall be permitted by the Engineer after the 'consent to operate' has been obtained from the SPCB. A copy of the application submitted to the SPCB and the consent/s received must be submitted to the Engineer, based on which the approvals will be accorded. Action/s by the Engineer against any non-compliance on this count shall be borne by the Contractor at his own risk and cost.
E.4	Construction Camp/s – Selection, Design and Lay-out	No construction camps, including material stack yards and storage facility **will not be proposed within 500 mts**. From a. a settlement/habitation b. water source and c. reserved or protected forest limits

S. No.	Environmental Issue/Aspect	Management Measures
		to avoid conflicts and stress on the local infrastructure facilities and natural resources. In case the contractor proposes setting-up of plant/s within a construction camp, clause P.3 will apply. The Contractor shall submit the **proposed location plan** (including survey number/s of the land parcel/s under consideration, area, land-use and surrounding features) and seek **prior approval** of the Engineer before entering into any formal agreement with land owner/s for setting-up construction camps. The Contractor will formalize agreement with land owner/s only after a written approval has been accorded by the Engineer. Complete details about the pre-dominant wind direction and design of facilities, including circulation area, parking, material storage, kitchen/mess, sanitation, waste collection and disposal, drainage, electrical utility placement and water supply shall be provided by the Contractor as part of the documentation seeking approval of the Engineer on this count.
E.5	Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery to be procured for construction shall confirm to the relevant Bureau of India Standard (BIS) norms. The Contractor shall 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 by the designated/approved authorities shall be submitted to the Engineer. The Contractor shall maintain a proper record of Pollution Under Control Certificates for all vehicles and machinery used for works under the contract. Copies of such records shall be kept at the site office and shall be made available to the Engineer when sought.
E.6	Identification, Operation and Rehabilitation of Burrow Areas	The Contractor shall submit the proposed location plan (including site details, survey number/s of the land parcel/s under consideration, area and quantum of material proposed for extraction, land-use and surrounding features) and seek prior approval of the Engineer before entering into any formal agreement with land owner/s for opening burrow areas. The Contractor will formalize agreement with land owner/s only after a written approval has been accorded by the Engineer. The Engineer will be required to inspect every proposed burrow area location and evaluate (parallel with technical examination) such proposals in accordance to environmental requirements as laid down in the EMP prior to issuing the 'approval' for use of such sites. No burrow areas shall be opened within 500 mts. from wildlife movement zones and forest areas. The burrow areas shall be at least 250 mts. from schools, human habitations (residential and commercial establishments), village access roads, state highways and other roads. No burrow area will be opened/operated without the written permission of the Engineer. The location, shape and size of the designated burrow areas will be as approved by the Engineer and in accordance to the IRC recommended practice for burrow

S. No.	Environmental Issue/Aspect	Management Measures
		pits for road embankments (IRC 10: 1961). The 'format' for seeking Engineer's approval on environmental considerations will be as per the template provided in this EMP and will include a reference/location map; area, existing land use and haul road details; photograph of the site; and the proposed rehabilitation plan. The Contractor will not start burrowing earth from the approved burrow area/s until an agreement is signed between land owner/s and Contractor and a copy of this agreement is submitted to the Engineer. In burrow pits, the depth shall be regulated so that the sides of the excavation should not be steeper than 1:2, from the edge. All burrow areas whether in private, community or govt. land shall be restored as per the approved rehabilitation plan immediately after 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. 'Substantial completion' or 'completion' certificates for the civil work shall not be issued unless restoration and rehabilitation works have been completed by the Contractor and the same has been accorded a written approval by the Engineer.
E.7	Identification, Operation and Rehabilitation of Stone Quarry	The Contractor shall submit the **proposed location plan** (including site details, survey number/s of the land parcel/s under consideration, area and quantum of material proposed to be used, land-use, photograph/s of the site and surrounding features within 500 mts.) and seek **prior approval** of the Engineer before entering into any formal agreement with land owner/s in case of a new quarry site or with the owner/operator in case use of an existing quarry is proposed. No quarry and/or crusher units shall be 'selected' or 'used', which is within 1000 mts. from a human habitation, forest boundary and wildlife habitats/movement areas. The Contractor shall obtain necessary legal permission/s from Department of Mines, Govt. of Orissa and the District Administration, SPCB and local Tehsildar and submit a copy of the same to the Engineer. All quarry operations, including procurement, storage and use of blasting material/s will be undertaken within the rules and regulations in vogue.
E.8	Identification, and Operation of Sand Quarry	The Contractor shall submit the **proposed location plan** (including details of the site/s under consideration, proposed quantum of material extraction and surrounding features) and seek **prior approval** of the Engineer. No sand quarry shall be opened within 500 mts. from wildlife movement zones and forest areas. In the event of selection of a new site for sand quarrying, the Contractor shall obtain prior approval and concurrence from Competent District Authority, the local Tehsildar and the Engineer keeping in view the objections and convenience of the local population. Where the supplier of sand is another party, the authentic copy of lease agreement that has been executed between the local Tehsildar and the supplier has to be submitted to the Engineer before any procurement of material is made from such a site.

S. No.	Environmental Issue/Aspect	Management Measures
		The procurement of material shall be allowed only from those sand quarry sites that are permitted by the local Tehsildar with the concurrence of the District Collector with due regard to Orissa Miner Mineral Concession Rules, 2004.
E.9	Arrangement for Construction Water	The Contractor shall submit the **proposed location plan** (including site details; type of the source under consideration; its usage by other consumers; proposed quantum of water extraction) and seek **prior approval** of the Engineer. To avoid disruption/disturbance to other water users, the Contractor will extract water only from the approved locations and shall seek a written approval of the Engineer before finalizing and using any such water source – whether ground or at surface. 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. The Contractor shall pay the royalty for use of such water as decided under the relevant norms. A copy of the permission obtained from the Competent Authority shall be submitted to the Engineer prior to the use of any such source. The possibility/ permission for sinking of bore wells adjacent to nalas and streams may be examined, such that while the water requirement for the road construction activity is met and these structures when abandoned can help in ground water recharge after suitable modification.
E.10	Clearing and Grubbing	All works shall be carried out by the Contractor in a manner such that the damage or disruption to flora is minimal. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from Engineer.
E.11	Stripping, stacking and preservation of top soil	The top soil from all sites including road side widening and working area, cutting areas, quarry sites, burrows 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 re-use. A portion of the temporarily acquired area (along the boundaries in a construction camp, burrow areas etc.) and along the road at the Right of Way edge will be earmarked for storing top soil. The locations for stacking will be pre-identified in consultation and with approval of the Engineer. 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 water, the edges of the pile will be protected by silt fence. (c) Multiple handling kept to a minimum to ensure that no compaction occurs. (d) Such stockpiles shall be covered with empty gunny bags or will be planted with grasses to prevent loss during rains. Such stockpiled topsoil will be utilized for - ➢ Covering reclamation sites or other disturbed areas including burrow areas (other than those in barren areas)

S. No.	Environmental Issue/Aspect	Management Measures
		➢ Top dressing of road embankment and fill slopes ➢ Filling up of tree pits and ➢ In the agricultural fields of farmers, acquired temporarily that need to be restored. Residual topsoil, if there is any, will be utilized for the plantation works along the road corridor. The utilization as far as possible shall be in the same area/close to the same area from where the top soil was removed. The stripping, preservation and reuse shall be closely supervised and properly recorded by the Engineer.
E.12	**Labour Camp Management**	
12.1	Accommodation	Prior to setting-up such a labour/worker's facility, the location, lay-out and basic provision of facilities to be provided at each labour camp site shall be submitted to the Engineer for approval. The construction or hiring of such facilities shall commence only after the written approval from the Engineer has been received by the Contractor.
12.2	Potable Water	The Contractor shall ensure the fulfillment of the following conditions: a) Supply of sufficient quantity of potable water within the precincts of every workplace in a cool and shaded area. Such facilities shall be regularly maintained from health and hygiene point of view. b) 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. The Engineer is required to inspect the labour camp once in a week to ensure compliance to the health and hygienic standards prescribed in the Labour Regulations and in the EMP.
12.3	Sanitation and Sewage System	The Contractor shall ensure that - c) The provision of toilets and sewage system for the camp is to be designed, built and operated in such a fashion that no health hazard occurs and no pollution to the air, surrounding agricultural fields, ground water or adjacent water courses takes place. d) Separate toilets and bathrooms for women workers wherever required, screened from those of men, are provided with markings in vernacular language. e) All such facilities must have adequate water supply with proper drainage and disposal facility. f) All toilets in workplaces are to be maintained, cleaned and disinfected daily using proper disinfectants. g) Portable toilets may be brought to use and the night soil from such units has to be disposed through designated septic tanks so as to prevent pollution of the surrounding areas.

S. No.	Environmental Issue/Aspect	Management Measures
		h) 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. All these facilities shall be inspected on a weekly basis by the Engineer to check the hygiene standards.
E.13	Transportation of Construction Materials and Haul Road Management	The Contractor shall maintain properly (as directed by the Engineer) all roads (existing or constructed for the project), used for transporting construction materials, equipment and machineries for the works under this contract. It shall be the responsibility of the Contractor to ensure that all roads used for transportation of construction materials are clear from any dust, sand, soil, aggregates etc. that may have fallen from the transporting vehicles. The Contractor will arrange for regular water sprinkling, at least three times in a day, for dust suppression of all such roads and surfaces. All vehicles delivering goods to the site shall be covered to avoid spillage of materials and air pollution. 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.
E.14	**Worksite Safety Management**	
14.1	Traffic Diversions	This shall be done according to the provisions of Technical Specifications Cl. 112.
14.2	Traffic Safety	This shall be done according to the provisions of Technical Specifications Cl. 112
14.3	Safety of Workers	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. 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. The Contractor shall provide and ensure enforcement with zero tolerance on the following: a) Protective footwear and protective goggles to all workers employed handling asphalt materials, cement, mortar, concrete, blasting and crusher operations. b) Welder's protective eye-shields and protective footwear to workers engaged in welding works. c) Earplugs to workers exposed to high noise levels.

S. No.	Environmental Issue/Aspect	Management Measures
		d) Hard hat or helmets to all workers, supervising staff and inspecting officials entering a construction site, plant area, quarry and enagaged in loading/unloading operations. e) Protective goggles and clothing to workers engaged in stone breaking activities. f) Nettings below and on the sides of overhead construction and excavation work to prevent mishaps due to accidental fall of workmen and debris. g) 'No smoking' and other 'high risk' areas are to be provided with warning signage besides strict enforcement of PPE with zero tolerance limits.
14.4	Risk from Electrical Equipment(s)	All power transmission lines whether claded or sufficiently covered are potential hazards at construction sites. The Contractor shall take all required precautions to prevent danger from electrical cables, wires and equipment and ensure that – a) 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. b) All such electrical installations and wirings shall be barricaded in manner that ensures safety of the road users, workers, operating vehicles/equipment (such as cranes, excavators, loaders, fabricating units) and wildlife. c) Necessary fencing, illumination and proper insulation of the electrical lines shall be ensured by the contractor for safety and security of the general public, road users, workers and the wildlife. d) The contractor shall ensure proper maintenance of electrical supply lines/points. e) All such electrical operating units shall be switched off before operations are closed every day or night as the case may be. f) All electrical equipment/cables/wires to be used in the construction shall have to conform to the relevant BIS specifications/codes. g) The contractor will ensure that such equipment/cables/wires are free from patent defect, 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.
14.5	First Aid	The Contractor shall arrange for - ▪ A readily available life saving first aid kits including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone. ▪ Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital. ▪ Equipment and trained nursing /paramedical staff at construction camps. ▪ Periodic health checks for workers.

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14.6	Risk Force Majeure	The Contractor shall 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, burrow areas, quarries, haul roads and in any other place associated with the project activity. 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 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. A Construction Safety Plan to be prepared by the Contractor during the Mobilization phase 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 prepared in accordance with the standard practice adopted under labour welfare activities and Factories Act and will be approved by the Engineer.
E.15	Accessibility	Construction activities that affect the use of side roads and existing accesses to individual properties, whether public or private, shall not be undertaken without providing adequate provision/s approved by the Engineer. The Contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from road sides and property accesses connecting the project road by providing safe temporary arrangements, including a connecting road, as necessary.
E.16	Disruption to Other Users of Water	While working across or close to any perennial water bodies, the Contractor shall not obstruct/prevent the flow of water. 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 a community. Such water body may be ponds, water harvesting structures (WHS), feeder channels to pond, irrigation sources etc. 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.
E.17	Labour Requirements	The Contractor preferably will use labour drawn from local areas to provide maximum benefit to the local community especially to the vulnerable individuals/groups living in the project area.

S. No.	Environmental Issue/Aspect	Management Measures
E.18	**Pollution Management**	
18.1	Dust Pollution	The Contractor will take every precaution to reduce the level of dust (SPM and RSPM) and make arrangements to minimize dust pollution through provision of wind screens/barriers, water sprinkling/mist spray units, and encapsulation of dust source shall be made at the plant sites. Specifications of crushers, hot mix plants and batching plants shall comply with the requirements of the relevant legislations and as laid out in the 'Consents' issued by the OSPCB. The Contractor will provide necessary certificates to confirm that all crushers used for the works under the Contract conform to relevant dust emission control legislation. Even if the Contractor chooses to use an existing crusher (already operating in the area), basic minimum standards stipulated under the Pollution Control Legislation will have to be met and dust control devices need to be installed and operated. Copies of the required certificates and 'consents' of such a plant shall be procured by the Contractor and submitted to Engineer prior to the procurement of material from a unit of this nature.
18.2	Siltation of Water Bodies and Degradation of Water Quality	Release of wastes (non-toxic and toxic) by the Contractor into water bodies and drainage systems that may adversely impact the aquatic life both locally and in the downstream stretches shall be viewed as serious non-compliance of EMP since these may affect the eco-flow, aquatic life and livelihoods of people dependent on such resources. The Contractor will ensure that construction and excavated materials containing fine particles are stored in an enclosure, particularly during the rainy season, such that sediment-laden water does not drain into nearby water bodies.. The Contractor shall take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system by providing proper septic tanks and soak pits. Spills, dust fines, waste oil, wastes and debris shall be cleared and disposed off as per the guidelines provided in the EMP under the supervision of the Engineer. 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 proper collection pits.
18.3	Water Pollution from Fuel, Lubricants and	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. The Contractor shall ensure that all vehicles, machinery and equipment are operated (including re-fuelling) and maintained in such

S. No.	Environmental Issue/Aspect	Management Measures
	Chemicals	a fashion that any spillage (while working or accidental) of fuel and lubricants does not contaminate the land and water resources. There shall be lined drains and service ramps with oil and grease traps/oil interceptors in such areas to prevent liquid wastes from entering into soil, any aquifer, local water source, bore well, pond and other water bodies. Storage of drums (both filled and empty) and refueling shall be done on concrete platforms (impervious surface). Additionally, roofing (of any type other than asbestos) 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. The contractor will arrange for collection, storage, reuse/disposal of spent oil, lubricants, grease, sludge, slurry, bitumen, chemicals and paints or other such material. Covered bins/drums (marked specifically regarding the contents) shall be kept separately at maintenance and refueling areas. Disposal shall be at pre-identified sites (as listed in the Waste Management Plan) as approved by the Engineer. All spills and collected petroleum products will be disposed off in accordance with the prevailing MoEF and SPCB guidelines issued for such purpose. The Engineer will certify that all arrangements comply with the guidelines of SPCB/ MoEF.
18.4	Noise Pollution	The Contractor shall ensure the following: a) All plants and equipment used in construction (including those of sub-Contractors and/or suppliers such as aggregate crushing plants) shall strictly conform to the MoEF/CPCB noise standards and shall have latest noise suppression mountings. b) All vehicles and equipment used in construction will be fitted with exhaust silencers. c) 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. d) Maintenance of equipment, machinery and vehicles (including proper lubrication, tuning, checks for muffler effectiveness) shall be regular and up to the satisfaction of the Engineer to keep noise levels under control. e) Construction activity at sites within 100m habitations and hospitals shall not be carried out during night (10:00 pm to 06:00 am). f) 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. g) Blasting operations, if any shall be carried out with full safety precautions and in compliance with measures as specified in the legal provisions. Monitoring shall be carried out by the Contractor in presence of the Engineer at the construction sites as per the Noise Monitoring Plan provided in this EMP and results shall be shared with the Engineer.
E.19	Drainage and Flood Control	The contractor will also ensure that no material (such as earth, stone, or other construction material or wastes) blocks the natural flow of water in any water course or cross drainage channel. All cross drainage and structure construction sites shall be

S. No.	Environmental Issue/Aspect	Management Measures
		cleared/cleaned-up prior to the rainy season. Also, prior to the monsoon season, the Contractor will provide either permanent or temporary drains to prevent water accumulation in residential, commercial and agricultural areas adjoining the under-construction zones of the road. Besides this, drainage shall be cleared to avoid accumulation of water within the construction sites, camp and plant sites and storage yard well in advance of the rainy season.
E.20	Slope Protection and Control of Soil Erosion	The Contractor will provide slope protection works as per design, or as directed by the Engineer to control soil erosion and sedimentation through use of dykes, sedimentation chambers, basins, fiber mats, mulches, grasses, slope drains and other devices as required under specific local conditions. 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. The Contractor shall ensure the following: a) 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. b) Turfing works will be taken up as soon as possible provided the season is favorable for the establishment of grass sods. c) Other measures of slope stabilization may include mulching/netting with sowing of grass seeds and sprinkling of water on such slopes after the completion of the earth work. d) Along sections abutting water bodies, stone pitching, as laid out in the design, will be provided to protect slopes.
E.21	**Waste Management**	
21.1	Waste Management – Planning and Identification of Disposal Sites	The Contractor will ensure that any spoils/materials unsuitable for embankment fill are not be disposed off near any water course; water body; agricultural land; natural habitats like grass lands, wet lands, flood plains, forests and pastures. All proposed disposal sites for waste material 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 to the Engineer for approval.
21.2	Re-use and Disposal of Debris Generated from Dismantling of	Debris generated due to the dismantling of the existing road will be suitably re-used in the proposed construction as follows: ▪ The dismantled scraps of bitumen will be disposed off through utilization 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 Engineer.

S. No.	Environmental Issue/Aspect	Management Measures
	Structures and Road Surface	▪ At locations identified for disposal of residual bituminous wastes, the disposal will be carried out over a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. ▪ The Contractor will suitably dispose off unutilized non-toxic debris either through filling up of burrows areas located in wasteland or at pre-designated disposal sites, subject to the approval of the Engineer. ▪ 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 water body. ▪ Non-bituminous wastes may be dumped in burrow pits (preferably located in barren lands) where such burrow pits are not suitable to develop as a economic source like pisci-culture or a source of irrigation. Such burrow 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 can be taken-up. 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.
21.3	Waste Disposal from Construction Camp/s and Plant Site/s	The Contractor will provide garbage bins in the construction camp/s and ensure that these are regularly emptied and disposed off in a hygienic manner. 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. 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, tyres, belts, filters, waste oil, drums and other such materials shall be either reused or will be sold/given out for recycling.
E.22	Chance Found Archaeological Property	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.
E.23	Demobilization and Decommissioning	The Contractor shall clear all temporary structures and dispose all garbage, night soils and POL waste as per the approved Waste Management Plan. 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 rehabilitated as per the approved plans. The 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 certificate' is issued/recommended to the Client. All clean-up and restoration operations, including road-side and structure construction site clean-up; burrow area rehabilitation;

S. No.	Environmental Issue/Aspect	Management Measures
		provision of drainage and slope protection measures and; restoration of top-soil shall be completed. 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. The Engineer shall ensure through site inspection that the Contractor and Engineer have complied with all these provisions prior to 'taking-over' the milestone stretch in question.

Form P1

IDENTIFICATION OF DISPOSAL SITE LOCATIONS

[*One Time Format, to be filled by the Contractor before dumping in each location***]**

Link : _____

[Give chainages and nearest settlements from both ends]

Sl. No.	Criteria on which information for each site is to be collected	Site 1	Site 2	Site 3
1	Existing Land Use			
2	Area covered (m^2)			
3	Total Material that can be dumped within the site (m^2)			
4	Depth to which dumping is feasible (m)			
5	Distance of nearest watercourse (m)			
6	Nearest Settlement (m)			
7	Date/s of Community Consultation/s			
8	Whether the community is agreeable to sitting of dumping site (Y/N)			
9	Date of Permission from Villager/local community			
10	Proposed future use of the Site			
11	Selected Site (tick any one column only)			

Enclosures: [*Tick as appropriate*]

1. Map of each location (Total ……no.s) : Attached / Not Attached
2. Photographs of
    a. Each disposal location : Attached/ Not Attached
    b. Each community consultation : Attached/ Not Attached
3. Photo copy of Agreement with individual owners
    a. Mr. : Attached/ Not Attached
    b. Mr. : Attached/ Not Attached

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form **P2**

SETTING-UP CONSTRUCTION CAMP AND STORAGE AREA

[*One Time Format, to be to be filled by the Contractor & submitted before target date of establishing camps or each time before change of layout*]

Location of Camp :_____ Date_____

Sl. No.	Item	Unit	Details
1.	**Detail of item camp**		
a.	Size of Camp	m x m	
b.	Area of Camp	Sq.m	
c.	Distance from Nearest Settlement		
d.	Distance from Nearest Water Source [Type/Size/Capacity/present Use/Ownership]		
e.	Date of camp being operational dd/mm/yy		
f.	Present land use		
g.	No of trees with girth > 0.3m.		
h.	Details of Storage area (Availability of impervious surface)	Mxm	
i.	Availability of separate waste disposal from storage area	Cum	
2.	**Details of topsoil stacking**		
a.	Quantity of top soil removed	Sq.m	
b.	Details of storage of topsoil [Describe stacking arrangement]		
3.	**Details of workforce**		
a.	Total No of Laborers	Nos	
b.	Total no of Male Workers	Nos	
c.	No of Male Workers below 18 years	Nos	
d.	Total No of Female Workers	Nos	
e.	No of Female workers below 18 years	Nos	
f.	No of children	Nos	
4.	**Details of dwelling units**		
a.	No of dwellings/huts		
b.	Minimum Size of Dwelling	m x m	
c.	No. of openings per dwelling	Nos	
d.	Minimum size of opening	m x m	
e.	Walls	Specifications	
f.	Roofing	Specifications	
g.	Flooring	Specifications	
h.	Drinking Water Tank	Specifications	

i.	Capacity of Drinking Water Tank	Cum	
j.	Size of Drinking Water Tank	Mxm	
k.	Total no of WC	Nos	
l.	No of Wcs for female workers	Nos	
m.	Minimum Size of WC	Mxm	
n.	Total No of Bathrooms for female workers	Nos	
o.	Size of septic tank for WC/Baths	Mxm	
p.	Capacity of Water Tank for WCs /Bathrooms and general purpose	cum	
q.	Fencing around camp	Y/N	
5.	**Details of facilities**		
a.	Availability of security 24 hrs a day	Yes/No	
b.	Details of First Aid Facility	Yes/No	
c.	Availability of Dav Care Centre	Yes/No	
d.	Availability of dust bins (capacity 60 Itr)	Nos	

Encl:

- Site Layout of Construction camp Attached/ Not Attached
- Drawings of dwelling units with allied facilities Attached/ Not Attached

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form P3

ESTABLISHMENT OF BURROW AREAS PRIOR TO OPENING

[One time Format, to be submitted by the Contractor for taking consent for opening of EACH Burrow area]

Link No._____ *[Give chainages and nearest settlements from both ends]*

Material _____

Sl. No.	Location				Area m x m	Quantity of Available Material (cum)	Distance from nearest Water Course (m)	Distance from nearest Settlement(m)	Land Use		No. of Trees Affected	Rehabilitation Measures Proposed
	Name of Village	Chainage of Project Road (km)	Side (LHS /RHS)	Haul road length (km)					Before	After		

- Photograph of Proposed Site Attached/ Not Attached
- Location Map Attached/ Not Attached
- Agreement with Land Owner Attached/ Not Attached

Submitted	**Checked**	**Approved**
Signature…….	Signature……	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form P4

ESTABLISHMENT OF HOT MIX PLANT /BATCH MIX PLANT

[To be submitted by Contractor for taking permission from PMU]

Link _____

Sl. No.	Location				Area (m^2)	Distance from nearest Water Course (m)	Distance from nearest Settlement	Existing Land Use	Prevalent Wind Direction	Weather in Down Wind Direction (Y/N)	Approved by EO (Y/N)	Remark
	Name of Village	Chainage (km)	Side (LHS /RHS)	Haul road length (m)								

1. Photograph of Proposed Site Attached/ Not attached
2. Site Plan Attached/ Not attached
3. Permission from OSPCB Attached/ Not attached (Valid upto _____)

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form P5

ROAD SAFETY REPORTING FORMATS

[Reporting by Contractor to PMU before commencement of construction in the *Working Zone*]

Link _____

DIVERSION at location : km_____ Report-Date……

Sl. No.	Item	Unit	Remarks
	Details of Construction Zone		
1.	Length of Working Zone	m	
2.	Distance between this and adjacent construction zone	m	
3.	Length of approach transition zone (should be min 50 for a speed of 50 km/ hr)	m	
4.	Length of terminal transition zone	m	
5.	Length of Longitudinal Buffer Zones	m	
6.	Length of Lateral Buffer Zone	m	
	Signage's in advance warning zone		
1.	Sign 'Men at Work' before 200m	Y/N	
2.	Sign 'Men at Work' before working zone	Y/N	
3.	Signage saying 'Compulsory Keep Right /Left' provided	Y/N	
4.	Signage saying 'Narrow Road on left/ right' provided	Y/N	
	Signage in Approach Transition Zone		
1.	Signage saying 'Compulsory Keep Right /Left' provided	Y/N	
2.	Delineators placed along length of transition	Y/N	
	Signage in work zone		
1.	Hazard Marker placed where railing for CD structure on diversion starts	Y/N	
2.	Barricade on either side of work sub zone	Y/N	
	Signage in Terminal transition zone		
1.	Sign for Restriction Ends	Y/N	
	Road Delineator		
1.	Delineator posts provided	Y/N	
2.	Sand bag delineators with Retroreflective stickers provided	Y/N	
3.	Object Makers Provided	Y/N	

1. Sketch of construction zone showing all sub zones and location of signs Attached/ Not Attached

2. Format on Acquisition of Temporary diversions Attached/ Not Attached

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form P6

ARRANGEMENT FOR TEMPORARY LAND

[Quarterly Reporting by Contractor to PMU, Site Layout of all locations to be attached with this format]

Link _____ Report – Date:_____

Sl. No.	Item	Target date for Establishment	Date of Establishment	Location					Present Land use	Size (m x m)	Existing Trees >30 cm girth	Dist. From nearest settlement	Dist. From nearest water source	Site approved or not (Y/N)	Remarks by CMU (PRBDB) if any
				Name of Village	Chainage (km)	Side (LHS /RHS)	Area (m^2)	Haul road length (m)							
1	Burrow Areas														
	BA 1														
2	Workers Camps														
	WC 1														
3	Site for Batching Plant														
	BP 1														
4	Site for Hot Mix Plant														
	HMP 1														
5	Stock Yard														
	SY 1														

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature……
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form P7

IDENTIFICATION OF SOURCE OF WATER FOR CONSTRUCTION

[Monthly Reporting by the Contractor]

Link _____ Report – Date:_____

Sl. No.	Source (Name)	Location /Ch.	Distance from Road	Permission Required	Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C1

DETAILS OF EARTHWORK

[Monthly Report to be filled by the Contractor for Each Burrow Area under use]

Link _____ Month……

Date of Submission……..

Location of Burrow Area under use

	Name of Village	Chainage (km)	Side (LHS / RHS)	Haul road length (m)
I				
II				

2. Details of Burrow Areas

2.1	Capacity of the Burrow Area	
2.2	Percentage of the capacity exhausted	
2.3	Total quality of the Earth Excavated (in cum)	
2.4	Quantity of Top Soil removed from the Burrow Areas	
2.5	Location of Top Soil stored removed	
2.6	Quantity of Top Soil stored at the beginning of the month	
2.7	Quantity of Top Soil utilized at the end of the month	
2.8	Location (s) where Top Soil has been utilized (Specify on a location plan)	
2.9	Quantity of earthwork excavation from existing road	
2.10	Total quantity of earthwork reused in cum. (5%)	
2.11	Location disposal (if other than sites) (Specify clearly on a location plan)	
2.12	Quantity of earthwork re-used in fill operation	
2.13	Location of burrow areas in disuse / exhausted	
2.14	Outline a rehabilitation plan for each of the exhausted burrow areas with special reference to Erosion Protection Measures. Also, submit at separate detailed rehabilitation plan for exhausted burrow areas for approval supported adequately with layouts, plans and drawings.	

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C2

DETAILS OF HOT MIX PLANT

[Monthly Report for Each Hot Mix Plant , to be filled by the Contractor]

Reporting Month……

Date of Submission……

1. Environment Features of the surrounding area

1.1	Name and location of Hot Mix Plant (w.r.t. PWD km ch.)	
1.2	Wind direction	
1.3	Name (s), distance population and type of settlements in a 1.5 km radius of site.	

2. Draw/ Attach Sketch Plan of HMP clearly indicating distance and approach roads.

3. Details of HMP and Mitigation Measures taken

3.1	Installed Capacity	
3.2	Average Utilization	
3.3	Make	
3.4	Model	
3.5	Last Serviced	

4. Explain Air Pollution Control Measures taken at the HMP site

5. Explain Noise Pollution Control Measures taken at the HMP site

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C3

DETAILS OF LAND FILL OPERATIONS

[Monthly Report for Each Land Fill site, to be filled by the Contractor]

Reporting Month……

Reporting Date ……

1. Environment Features of the surrounding area

1.1	Location of each land fill site (Provide sketch Map below)	Name of Village	Chainage (km)	Side (LHS/RHS)	Haul road length (m)
	I				
	II				
1.2	Capacity of each land fill site				
1.3	Safety measure taken at land fill site (s)	1. 2. 3.			

1. Sketch maps Attached/ Not attached

2.

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C4

DETAILS OF MACHINERY IN OPERATION

[Monthly Report , to be filled by the Contractor]

Link _____ Reporting Month……

Date of Submission……

1. Details of Machinery Operation

Sr. no.	Machinery in operation	Registration No./ Mark	Make	Validity date of Pollution Control Certificate
1	Pavers	1.		
		2.		
2	Rollers	1.		
		2.		
3	Number of excavators	1.		
		2.		
4	Number of graders	1.		
		2.		
5	Number of dumpers	1.		
		2.		
		3.		
6	Others (Give details)			

1. Copy of OSPCB emission control certificates (To be attached Quarterly) Attached/ Not Attached

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C5

DETAILS OF WORKSHOPS IN OPERATION

[Quarterly Report , to be filled by the Contractor]

Reporting Month……
Date of Reporting……

Sr. No.	Details	Location 1	Location 2	Location 3
1	No. of workshops with repairs facility (furnish location and type of facility provided)			
2	Number of vehicles in repair at each location			
3	Number of oil interceptor provided in each repair / fuelling site			
4	Total quantity of oil and wastes recovered in each interceptor during last month. (kg / lit)			
5	Details of waste disposal. (Whether Sold/ Disposed)			

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C6

REDVELOPMENT OF BURROW AREAS

[Monthly Reporting Format to be filled by the Contractor]

Link _____ Report-Date_____

Sl. No.	Burrow Area No.	Rehabilitation Measures	Date of approval of Rehabilitation	Date of Handing Over back to the Owner	Remarks

1. Drawing for Redevelopment for each Burrow Area — Attached/ Not Attached
2. Photographs of sites before use — Attached/ Not Attached
3. Photographs of sites after rehabilitation — Attached/ Not Attached

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C7

SAFETY CHECK LIST

[Monthly Reporting Format to be filled by the Contractor for each location]

Name of Safety Officer _____

Date of Inspection _____

Location .....

Description	Category		
	A	B	C
General			
House Keeping			
Stacking of Material			
Passageway			
Lighting			
Ventilation			
Others			
Electrical			
Switches			
Wirings			
Fixed Installation			
Portable Lighting			
Portable Tool			
Welding Machine			
Others			
Fire Prevention			
Fire Fighting Appliance			
Dangerous Goods Store			
Gas Welding Cylinders			
Others			
Others			
Dust Control			
Noise Control			
First Aid Equipment			
Washing Facility			
Latrine			
Canteen			
Provision of Personal Protective			
Helmet			
Eye Protector			
Ear Protector			
Respirator			
Safety Shoes			
Safety Belts			
Others			

A: Adequate at time of Inspection ; B: Needs Improvement ; C: Needs Immediate Attention

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form **C8**

ACCIDENT REPORT

[To be completed **ON OCCURRENCE** of injury by the Safety Officer]

Location :_____

Time :_____ Day/ Night Weather :_____

Part I

Type of Accident

D01 ( )	Fall of person from a height		D11 ( )	Explosion
D02 ( )	Slip, trip or fall on same level		D12( )	Fire
D03 ( )	Struck against fixed objects		D13 ( )	Contact with hot or corrosive substance
D04 ( )	Struck by flying or falling objects		D14 ( )	Contact with poisonous gas or toxic substances.
D05 ( )	Struck by moving objects		D15 ( )	Contact with poisonous gas or toxic substances
D06 ( )	Struck / caught by cable		D16 ( )	Hand tool accident
D07 ( )	Stepping on hail etc.		D17 ( )	Vehicle / Mobile plant accident
D08 ( )	Handling without machinery		D18 ( )	Machinery operation accident
D09 ( )	Crushing / burying		D19 ( )	Other (please specify)
D10 ( )	Drowning or asphyxiation			

Agent Involved in Accident

E01 ( )	Machinery		E11 ( )	Excavation / underground working
E02 ( )	Portable power appliance		E12 ( )	
E03 ( )	Vehicle or associated equipment / machinery		E13 ( )	Ladder
E04 ( )	Material being handled, used or stored		E14 ( )	Scaffolding /gondola
E05 ( )	Gas, vapor, dust, fume or oxygen		E15 ( )	Construction formwork, shuttering and false work.
E06 ( )	Hand tools		E16 ( )	Electricity supply cable, wiring switchboard and associated equipment
E07 ( )	Floor edge		E17 ( )	Nail, sllnter or chipping
E08 ( )	Floor opening		E18 ( )	Other (Please specify)
E09 ( )	Left shaft		E19 ( )	
E10 ( )	Stair edge			

Unsafe Action Relevant to the Accident

F01 ( )	Operating without authority		F11 ( )	Failure to use eye protector
F02 ( )	Failure to secure objects		F12 ( )	Failure to use respirator
F03 ( )	Making safety devices inoperative		F13 ( )	Failure to use proper clothing
F04 ( )	Working on moving or dangerous equipment		F14 ( )	Failure to use warn others or given proper signals
F05 ( )	Using un-safety equipment		F15 ( )	Horseplay
F06 ( )	Adopting unsafe position or posture		F16 ( )	No unsafe action
F07 ( )	Operating or working at unsafe speed		F17 ( )	Others (please specify)
F08 ( )	Unsafe loading, Placing, mixing etc.		F18 ( )	
F09 ( )	Failure to use helmet		F19 ( )	
F10 ( )	Failure to use proper footwear			

G01 ( )	No protective gear		G08 ( )	Unsafe layout of job, traffic etc.
G02 ( )	Defective protective gear		G09 ( )	Unsafe process of job methods
G03 ( )	Improper dress / footwear		G10 ( )	Poor housekeeping
G04 ( )	Improper guarding		G11 ( )	Lack of warning system
G05 ( )	Improper ventilation		G12 ( )	Defective tool, machinery or materials
G06 ( )	Improper illumination		G13 ( )	No unsafe condition

G07 ( )	Improper procedure		G14 ( )	Others (please specify)

Human Factors Relevant to the Accident

H01 ( )	Incorrect attitude /motive		H06 ( )	Disobeyance of Rules
H02 ( )	Alcohol/ Drug Usage		H07 ( )	More Risk taking issue
H03 ( )	Poor perception issue		H08 ( )	Lack of Comprehension
H04 ( )	Unsafe act by other persons		H09 ( )	No unsafe personal factor
H05 ( )	Fatigue Related Issues		H10 ( )	Other (please specify)

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Part-II

[To be completed Upon Finalization of Employee's compensation Claim**]**

101 ( ) No permanent incapacity

102 ( ) Less than 5% incapacity

103 ( ) More than 5% incapacity

104 ( ) Final

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C9

POLLUTION MONITORING

(Periodically To be submitted by Contractor for locations at which monitoring to be conducted as per EMP)

Report – Date:_____

Compliance to Mitigation measures suggested in last report ……..

If not reasons thereof……..

Sl. No.	Chainage (km)	Details of locations	Duration of monitoring	Instruments used	Completion	Standards	Results	Reasons for exceeding standards	Mitigation Measures suggested	Type of area (Residential /Industrial /Commercial)	Remarks
1. Air Monitoring											
						SPM RSPM HC Sox NOx	SPM RSPM HC Sox NOx				
2.Water Monitoring											
						pH TSS TDS Turbidity Hardness Coliform BOD COD Oil & Grease	pH TSS TDS Turbidity Hardness Coliform BOD COD Oil & Grease				

Sl. No.	Chainage (km)	Details of locations	Duration of monitoring	Instruments used	Completion	Standards	Results	Reasons for exceeding standards	Mitigation Measures suggested	Type of area (Residential /Industrial /Commercial)	Remarks
3. Soil Monitoring											
						pH Organic Matter Alkalinity Conductivity Water holding Capacity Pb	pH Organic Matter Alkalinity Conductivity Water holding Capacity Pb				
4.Noise Monitoring											
						$L_{\text{day equivalent}}$ $L_{\text{night equivalent}}$ $L_{\text{equivalent}}$	$L_{\text{day equivalent}}$ $L_{\text{night equivalent}}$ $L_{\text{equivalent}}$				

Remark

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form C10

RESTORATION OF CONSTRUCTION SITES

(Monthly To be submitted by Contractor for locations at which monitoring to be conducted as per EMP)

Link _____

Report-Date……

Sl. No.	Contract Package	Labour Camp		Construction Camp		Plant Site		Burrow areas		Disposal Locations		Top Soil	
		O	R	O	R	O	R	O	R	O	R	Preserved	Restored

Remarks

Submitted	**Checked**	**Approved**
Signature…….	Signature…….	Signature…….
Name……...	Name……...	Name……...
Designation…….. Contractor	Environmental Engineer. Construction Supervision Consultant	Resident Engineer

Form P**MU 1**

FORMAT FOR KEEPING RECORDS OF CONSENT OBTAINED BY CONTRACTOR
[Monthly Format]

Report-Date: _____

Sl. No.	Clearance	Applicable Acts	Agencies	Obtained on	Valid upto	Remarks
1						
2						
3						
4						
5						
6						

Remarks

Verified

Signature…….

Name……...

Resident Engineer
Construction Supervision Consultant

Countersigned

Signature…….

Name……...

Executive Engineer (PMU)

Form PMU 2

CHECK LIST FOR ENVIRONMENT INSPECTION

[Monthly Format]

Date of Inspection_____

Sl. No.	ESMP Measures	Remarks
1	Provision of a personnel accountable for implementation of ESMP /Safety Measures with Contractor	
2	Consent of PCB to Establish HMP	
3	Consent of PCB to operate HMP	
4	Compliance of PCB Conditions for HMP installation and operation	
5	Whether compliance reported through monthly Progress report to Divisional Office of Executive Engineer	
6	PUC taken for all Construction vehicles	
7	Concrete platform with trap under bitumen boiler, Fuel Tank for HMP and generator set provided or not	
8	Precautions to prevent contamination of soil by emulsion, Bitumen, oil and lubricant taken while storing	
9	Providing cover to fine construction material & bituminous mix during transportation	
10	Burrow areas:	
	a) Burrow areas approved by Department	
	b) Existing land was used	
	c) Nos Opened	
	d) Available Quantity	
	e) Utilized Quality	
	f) Balance Quantity	
	g) Nos of Burrow areas Rehabilitated	
11	Spoil and debris disposal:	
	a) Present status of land	
	b) Closure and completion plan	
12	Site specific traffic Safety management Plan:	
	a) Contractor installed the warning /regulatory Traffic signs at the construction site	
	c) The arrangement adequate	
13	Safety equipment i.e. helmet, gloves, gumboot, mask, earplugs etc. provided to workers	

14	Health Facility at camp and work site i.e. First Aid kit & suitable vehicle for conveyance in case of emergency / accident	
15	Permit for Procuring River sand	
16	License from Department of mines for quarrying	
17	Consent to establish / operation of crusher	
18	Provision of labour camp with sanitation & potable water	
19	Fire precautions at Hot Mix Plant and site Office	
20	Air and noise monitoring done in camp site	
21	Whether any cultural property is being impacted	
22	Status of drainage provision in camp area	
23	General House Keeping	

Remarks

Verified

Signature…….

Name……...

Resident Engineer
Construction Supervision Consultant

Countersigned

Signature…….

Name……...

Executive Engineer (PMU)

Form PMU 3

SUMMARY SHEET

[To be filled MONTHLY by PMU]

Month _____Date_____

Sl. No.	Description	Remarks
1	**No Objection Certificate**	
A	Hot mix Plant	
	Location 1	
	Location 2	
	Location 3	
B	Cement batching Plant	
	Location 1	
	Location 2	
	Location 3	
2	**Pollution Under Certificate**	
	Vehicles	
	Machineries	
3	**No objection Certificate for Diesel Gen set**	
	Location 1	
	Location 2	
4	**Labour Camps**	
	No. of sites Identified	
	Approved	
	Opened	
	Conforms to conditions imposed at the time of opening of sites	
	Closed	
5	**Workers**	
	No of workers employed	
	No of male workers	
	No of female workers	
	No of day workers	
6	**Burrow Area**	
	No. of sites identified	
	Approved	
	Opened	
	Quantity of available material	
	Quantity of material Utilized	
	Quantity of Topsoil preserved	
	Quantity to top soil used	
	No of sites closed	
	No. of sites Rehabilitated	
7.	Quarry	
	No. of sites identified	
	Approved	
	Opened	
	Material available	
	Material obtained	
	No. of sites Rehabilitated	
8	Disposal Locations	
	No. of sites identified	
	Approved	
	Opened	

Sl. No.	Description	Remarks
	Amount of Waste disposed	
	Type of waste disposed	
	No. of sites Rehabilitated	
9	Road Safety	
	Road Safety norms followed as per guidelines, SP-55 and approved Traffic plan	
10	Cleaning of Culvert/ drains	
	No. of culverts/ drains	
	Nos. Cleaned	
11	Trees	
	No of trees marked for cutting in field	
	No of trees cut	
	No of trees to be Planted	
	Trees Planted	
12	Haul Roads	
	Adequacy of maintenance of Haul Road Network	

Remarks

Verified

Signature…….

Name……...

Resident Engineer
Construction Supervision Consultant

Countersigned

Signature…….

Name……...

Executive Engineer (PMU)

GOVERNMENT OF ODISHA

WORKS DEPARTMENT

ODISHA STATE ROAD PROJECT

(UNDER WORLD BANK ASSISTANCE)

OSRP/Y1/P01-B

TEL BRIDGE (KM.27/200 TO KM.30/000)

VOLUME - IV

DRAWINGS

INDEX

SL.	DESCRIPTION		DRAWING NO.
1	**Cover Sheet**		
2	Index		OSRP/CEG/SH-16/INDEX
	HORIZONTAL CURVE DETAILS		
3	Horizontal Curve Details		OSRP/CEG/SH-16/HC
	VERTICAL CURVE DETAILS		
4	Vertical Curve Details		OSRP/CEG/SH-16/VC
	PLAN & PROFILE		
5	Plan & Profile km 27.000 to km 28.000		OSRP/CEG/SH-16/P &P/01
6	Plan & Profile km 28.000 to km 29.000		OSRP/CEG/SH-16/P &P/02
7	Plan & Profile km 29.000 to km 30.000		OSRP/CEG/SH-16/P &P/03
	SCHEDULES		
8	Suhedule of Road Sign Post,Extra Widening,Guard Pos		OSRP/CEG/SH-16/SCH/01
9	Suhedule for Pavement Composition		OSRP/CEG/SH-16/SCH/PAV
	Typical X-sections		
10	Typical Cross Sections		OSRP/CE/TCS/ 2 & 3
11	Details of Application of Super Elevation		OSRP/CEG/SE
	ROAD SIGNS, MARKINS & Misc. ROADWAY FURNITURES		
12	Standard Drawings Metal Beam Crash Barrier Details		OSRP/CEG/CB
13	Standard Drawings Typical KM Stone & 5th KM Stone		OSRP/CEG/KM/01
14	Standards Drawings Typical Details of 200m Stone & Guard		OSRP/CEG/KM & GP
15	Standards Drawings Details of Road Delinators		OSRP/CEG/RD
16	Standards Drawings Details of RPMs & Chevron Markers		OSRP/CEG/RPM
17	Standards Drawings Typical Road Marking Details(1of2)		OSRP/CEG/RM/01
18	Standards Drawings Typical Road Marking Details(2of2)		OSRP/CEG/RM/02
19	Standards Drawings Typical Road Signs (Sheet 1 of 4)		OSRP/CEG/RS/01
20	Standards Drawings Typical Road Signs (Sheet 2 of 4)		OSRP/CEG/RS/02
21	Standards Drawings Typical Road Signs (Sheet 3 of 4)		OSRP/CEG/RS/03
22	Standards Drawings Typical Road Signs (Sheet 4 of 4)		OSRP/CEG/RS/04
	ENVIRONMENT DRAWINGS		
23	Standard Drawing for Slope Pitching		OSRP/CEG/PW
24	Oil & Grease Trap for Plant Site		OSRP/CEG/O&GT

Sl. No.	DECRIPTION		DRAWING NO.
	GENERAL DRAWINGS		
25	General Notes (For PSC Girder)		OSRP/CEG/SH-16/BR/NOTES
26	Key Plan of Tel Bridge		OSRP/SH-16/TEL BR/GEN
	BRIDGE AT PROPOSED CH. 27+600		
27	General Arranement Drawing		OSRP/SH-16/TEL/BR/27+600
28	Site plan		OSRP/CEG/SH-16/BR/27+600
	BRIDGE AT PROPOSED CH. 27+800		
29	General Arrangement Drawing		OSRP/SH-16/TEL/BR/27+800
30	Site plan		OSRP/CEG/SH-16/BR/27+800
	BRIDGE AT PROPOSED CH. 28+900		
31	General Arrangement Drawing		OSRP/SH-16/TEL/BR/28+900
32	Site plan		OSRP/CEG/SH-16/BR/28+900
	BRIDGE AT PROPOSED CH. 29+400		
33	General Arrangement Drawing		OSRP/SH-16/TEL/BR/29+400
34	Site Plan		OSRP/CEG/SH-16/BR/29+400
35	Dimension Details of Abutment, Abutment Cap		OSRP/CEG/SH-16/BR/SUB/02
36	Reinforcement Details of Abutment &Pile Cap		OSRP/CEG/SH-16/BR/SUB/03
37	Reinforcement Details of Abutment Cap & Pile		OSRP/CEG/SH-16/BR/SUB/04
38	Dimension & Reinforcement Detail for Pile & Pile Cap		OSRP/CEG/SH-16/BR/SUB/05
39	Dimension & Reinforcement Detail for Pier&Pier Cap		OSRP/CEG/SH-16/BR/SUB/06
40	Details of Crash Barrier, expansion Joint, approach slab, drainage Spout		OSRP/CEG//BR/MISC/01

PROJECT			INDEX SHEET				
ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	DRG NO.	OSRP/CEG/SH-16/HC	REV :	R1	DESIGNED BY CEG	REV R1 PREPARED BY EE/PMU	APPROVED CE, World Bank Projects.
	SH.NO.		DATE :	28/12/2(			
	SCALE						

HORIZONTAL CURVE DETAILS

Curve No.	Curve Direction	Transition Start Chainage	Curve Start Chainage	HIP Details			Total Deflection Angle	Design Speed	Curve Radius	Transition Length	Circular Curve Length	Tangent Distance	Apex Distance	Shift	Super Elevation
		TS	CS	Chainage	Easting	Northing	D	V (Km/hr)	R (m)	Ls (m)	Lc (m)	Ts (m)	Es (m)	S	e (%)
1	Left		26914.774	26933.166	49837.082	2189619.574	0d 12' 38.8"	100	10000	0	36.79	18.39	0.02	0	-2.50
2	Right		27065.494	27080.112	49757.820	2189743.311	0d 20' 6.1"	100	5000	0	29.24	14.62	0.02	0	-2.50
3	Left	27403.946	27493.946	27510.963	49520.453	2190102.250	29d 35' 51.2"	80	240	90	33.98	108.72	9.69	1.5	7.00
4	Left		27744.498	27875.808	49203.227	2190281.555	12d 29' 22.2"	80	1200	0	261.58	131.31	7.16	0	-2.50
5	Left		28767.216	28776.449	48334.786	2190524.122	0d 31' 44.4"	100	2000	0	18.47	9.23	0.02	0	-2.50
6	Right		28819.742	28835.561	48277.708	2190539.498	0d 54' 22.9"	100	2000	0	31.64	15.82	0.06	0	-2.50
7	Right	28948.285	28988.285	29059.538	48064.110	2190606.540	34d 21' 39.7"	65	300	40	139.91	112.82	14.24	0.2	6.26
8	Left	29352.085	29427.085	29445.378	47808.002	2190898.211	21d 18' 8.9"	80	300	75	36.54	94.05	6.05	0.8	7.00

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PROJECT:-

ODISHA STATE ROAD PROJECT

UNDER WORLD BANK ASSISTANCE.

HORIZONTAL CURVE DETAILS
BHAWANIPATNA-KHARIAR (SH-16 KM 27/0 TO KM 30/0)

DRG NO.	OSRP/CEG/SH-16/HC/01					DESIGNED BY	DRAWN BY	REVISION-1	APPROVED
SH. NO.	G	DATE	DEC,12	REV	R1	CEG	CEG	EE,PMU	CE,WBP
SCALE	NTS								

VERTICAL CURVE DETAILS

Curve No.	Curve Type	VIP Details		Curve Length	K	Curve Start		Curve End		Start Gradient	End Gradient	Grade Difference
		Chainage	Level	m		Chainage	Level	Chainage	Level	%	%	%
01	Sag	27508.401	216.189	60	150.328	27478.401	216.309	27538.401	216.189	-0.399	0.000	0.399
02	Sag	27716.176	216.189	60	21.022	27686.176	216.189	27746.176	217.045	0.000	2.860	2.860
03	Hog	27784.498	218.139	60	21.022	27754.498	217.283	27814.498	218.139	2.860	0.000	-2.860
04	Sag	28086.404	218.139	60	43.748	28056.404	218.139	28116.404	218.550	0.000	1.377	1.377
05	Hog	28162.525	219.183	60	43.748	28132.525	218.772	28192.525	219.183	1.377	0.000	-1.377
06	Hog	28732.614	219.183	95	34.878	28685.114	219.183	28780.114	217.889	0.000	-2.723	-2.723
07	Sag	28842.535	216.189	115	42.221	28785.035	217.755	28900.035	216.189	-2.723	0.000	2.723
08	Sag	29305.753	216.189	60	126.105	29275.753	216.189	29335.753	216.332	0.000	0.476	0.476
09	Sag	29754.931	218.326	60	124.401	29724.931	218.183	29784.931	218.614	0.476	0.958	0.482

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PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE.

HORIZONTAL CURVE DETAILS
BHAWANIPATNA-KHARIAR(SH-16 KM 27/0 TO KM 30/0)

DRG NO.	OSRP/CEG/SH-16/VC/01					DESIGNED BY	DRAWN BY	REVISION-1	APPROVED
SH. NO.	F	DATE	DEC,12	REV	R1	CEG	CEG	EE,PMU	CE,WBP
SCALE	NTS								

CURVE NO.51	
HIP	27+080.1
V	100 kmph
R	5000m
$	0° 20' 6.1"
Dir	Right
Ls	NA
Ts	0.0m
Lc	29.24m
Es	0.0m
e	N.C.
W	NA

CURVE NO.52	
HIP	27+487.592
V	50kmph
R	−400.0m
$	19° 27' 1.5"
Dir	Left
Ls	20.0m
Ts	78.6m
Lc	115.79m
Es	5.9m
e	3%
W	NA

BRIDGE	
CHAINAGE:	27+619
TYPE:	
LENGHT:	
NO OF SPAN:	
PROPOSED LEVEL:	220.485

BRIDGE	
CHAINAGE:	27+800
TYPE:	
LENGHT:	
NO OF SPAN:	
PROPOSED LEVEL:	220.485

DATUM = 202.00

CH:	27000.000	27025.000	27050.000	27075.000	27100.000	27125.000	27150.000	27175.000	27200.000	27225.000	27250.000	27275.000	27300.000	27325.000
PROPOSED ROAD LEVEL (m)	218.144	218.000	217.812	217.590	217.367	217.144	216.921	216.697	216.474	216.329	216.183	216.045	216.023	216.155
EXISTING LEVEL (m)	217.753	217.735	217.570	217.203	216.925	216.666	216.415	216.295	216.010	215.827	215.592	215.106	214.726	214.409

CH:	27350.000	27375.000	27400.000	27425.000	27450.000	27475.000	27500.000	27525.000	27550.000	27575.000	27600.000	27625.000	27650.000	27675.000
PROPOSED ROAD LEVEL (m)	216.441	216.882	217.439	218.003	218.567	219.131	219.637	220.024	220.295	220.447	220.485	220.485	220.485	220.485
EXISTING LEVEL (m)	214.220	214.206	214.064	213.779	213.717	213.812	213.979	213.809	214.600	214.910	212.509	209.281	208.764	211.931

CH:	27700.000	27725.000	27750.000	27775.000	27800.000	27825.000	27850.000	27875.000	27900.000	27925.000	27950.000	27975.000	28000.000
PROPOSED ROAD LEVEL (m)	220.485	220.485	220.485	220.485	220.485	220.485	220.485	220.485	220.485	220.485	220.485	220.485	220.485
EXISTING LEVEL (m)	211.761	211.423	210.930	211.084	211.500	210.856	210.537	210.208	210.179	210.374	209.795	208.019	206.974

HORIZONTAL ALIGNMENT
113.936m
R
L
L=3014.47m
L
L=50.000m
R=−400.000m
L=115.734m
L=50.000m
L=55.083m
L=65.000m
L=420.775m
R=800.000m

VERTICAL PROFILE
m
04m
L=210.989m
G=−0.893
R=4052.449m
L=115.000m
L=92.5m
G=2.26
R=−5318.7
L=120.000m
L=1668m
G=0

SUPERELEVATION /CROSSFALL
Q=3.000
Q=3.000

LEGEND

EXISTING CENTRELINE
PROPOSE CENTER LINE
EXISTING CARRIAGE WAY
PRO. CARRIAGE WAY EDGES
PRO. SHOULDER EDGES
EXISTING RoW BOUNDARY
PRO. RoW BOUNDARY
PIPE LINE
PROPOSED EARTH WORK
BRIDGE/CULVERT
RIVER/NALLA
H.T. LINE, TOWER
WELL,TAP & HAND PUMP
ELECTRIC LINE & POLE
TELEPHONE LINE & POLE
HOUSE/BUILDING/STRUCTURE
PIPE CULVERT
BOX/SLAB CULVERT
POND

BEGINING OF SPIRAL CURVE	TS
BEGINING OF CIRCULAR CURVE	SC
APEX OF CURVE	AC
END OF CIRCULAR CURVE	CS
END OF SPIRAL CURVE	ST
HORIZONTAL INTERSECTION POINT	HIP
DEVIATION ANGLE	$
LENGTH OF SPIRAL CURVE	Ls
TANGENT LENGTH	Ts
LENGTH OF CIRCULAR CURVE	Lc
APEX DISTANCE	Es
SUPERELEVATION	e%
DESIGN SPEED	V kmph
RADIUS OF CURVE	R

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PROJECT:-

ODISHA STATE ROAD PROJECT

UNDER WORLD BANK ASSISTANCE

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
(SH−16) KM 27/000 TO KM 28/000

DRG NO.	OSRP/CEG/SH−16/P&P26				DESIGNED BY	DRAWN BY	REVISION−1	APPROVED
SH. NO.	26	DATE	DEC,12	REV R1	CEG	CEG	EE,PMU	CE,WBP
SCALE	HORIZONTAL: 1 : 2000 VERTICAL: 1 : 200							

TO BHAWANIPATNA

TO KHARIAR

CURVE NO.54	
HIP	28+143.085
V	65 kmph
R	600.0m
$	8° 51' 48.6"
Dir	Left
Ls	25.0m
Ts	59.0m
Lc	67.82m
Es	1.8m
e	3%
W	NA

CURVE NO.55	
HIP	28+777.0
V	100 kmph
R	2000m
$	0° 31' 44.4"
Dir	Left
Ls	NA
Ts	0.0m
Lc	18.47m
Es	0.0m
e	N.C.
W	NA

CURVE NO.56	
HIP	28+836.1
V	100 kmph
R	2000m
$	0° 54' 22.9"
Dir	Right
Ls	NA
Ts	0.0m
Lc	31.64m
Es	0.1m
e	N.C.
W	NA

BRIDGE	
CHAINAGE:	28+193
TYPE:	
LENGHT:	
NO OF SPAN:	
PROPOSED LEVEL:	219.183

BRIDGE	
CHAINAGE:	28+911
TYPE:	
LENGHT:	
NO OF SPAN:	
PROPOSED LEVEL:	220.485

DRAIN, AGRICULTURE LAND, RIVER, CS 28+176.96, BACK CH:28+207.940, ST 28+201.96, FORWARD CH:28+200, 28+200, CS 28+060.91, ST 28+080.91, TS 28+084.14, 28+100, SC 28+109.14, MATCH LINE 28+000, MATCH LINE, KM29/0

EXISTING GROUND, PROPOSED PROFILE

DATUM = 200.00

PROPOSED ROAD LEVEL (m)	220.485
EXISTING LEVEL (m)	206.974, 209.484, 212.034, 214.063, 215.936, 216.824, 217.658, 218.572, 219.058, 219.067, 219.077, 219.085, 219.091, 219.097, 219.103, 219.109, 219.137, 219.167, 219.183, 219.183, 219.182, 219.167, 219.159, 219.176, 219.190, 219.188, 219.190, 219.220, 219.204, 218.925, 218.474, 217.703, 216.909, 216.176, 215.430, 214.799, 214.247, 214.172, 214.161, 214.162, 214.238
HORIZONTAL ALIGNMENT	L=83.000m, L=65.000m, R=600.000m, L=88.394m, L=65.000m, L=1.940m, L=684.557m, R, L, L, R, L, L=96.905m, L=40.000m
VERTICAL PROFILE	
SUPERELEVATION /CROSSFALL	Q=2.500, Q=2.500, Q=3.000, Q=3.000, Q=2.500
CH:	28000.000, 28025.000, 28050.000, 28075.000, 28100.000, 28125.000, 28150.000, 28175.000, 28200.000, 28225.000, 28250.000, 28275.000, 28300.000, 28325.000, 28350.000, 28375.000, 28400.000, 28425.000, 28450.000, 28475.000, 28500.000, 28525.000, 28550.000, 28575.000, 28600.000, 28625.000, 28650.000, 28675.000, 28700.000, 28725.000, 28750.000, 28775.000, 28800.000, 28825.000, 28850.000, 28875.000, 28900.000, 28925.000, 28950.000, 28975.000, 29000.000

LEGEND

EXISTING CENTRELINE	RIVER/NALLA	BEGINNING OF SPIRAL CURVE	TS	TANGENT LENGTH	Tm
PROPOSE CENTER LINE	H.T. LINE, TOWER	BEGINNING OF CIRCULAR CURVE	SC	LENGTH OF CIRCULAR CURVE	Lc
EXISTING CARRIAGE WAY	WELL,TAP & HAND PUMP	APEX OF CURVE	AC	APEX DISTANCE	Es
PRO. CARRIAGE WAY EDGES	ELECTRIC LINE & POLE	END OF CIRCULAR CURVE	CS	SUPERELEVATION	e%
PRO. SHOULDER EDGES	TELEPHONE LINE & POLE	END OF SPIRAL CURVE	ST	DESIGN SPEED	V kmph
EXISTING RoW BOUNDARY	HOUSE/BUILDING/STRUCTURE	HORIZONTAL INTERSECTION POINT	HIP	RADIUS OF CURVE	R
PRO. RoW BOUNDARY	PIPE CULVERT	DEVIATION ANGLE	$		
PIPE LINE	BOX/SLAB CULVERT	LENGTH OF SPIRAL CURVE	Ls		
PROPOSED EARTH WORK	POND				
BRIDGE/CULVERT					

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PROJECT:-

ODISHA STATE ROAD PROJECT

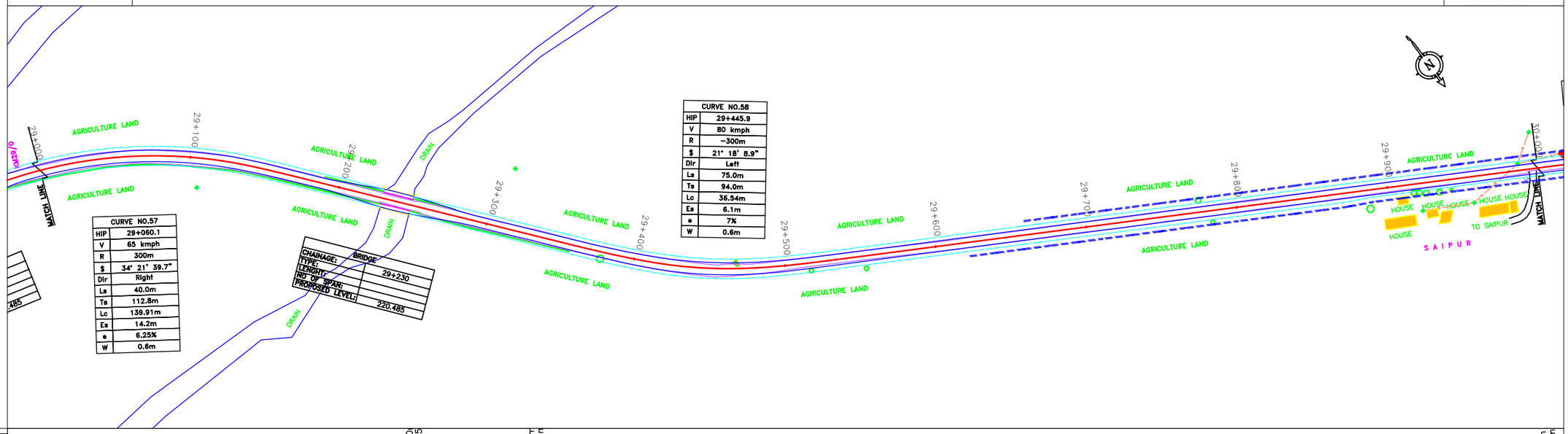
UNDER WORLD BANK ASSISTANCE

WIDENING AND STRENGTHENING TO TWO LANE

PLAN AND LONGITUDINAL SECTION

(SH-16) KM 28/000 TO KM 29/000

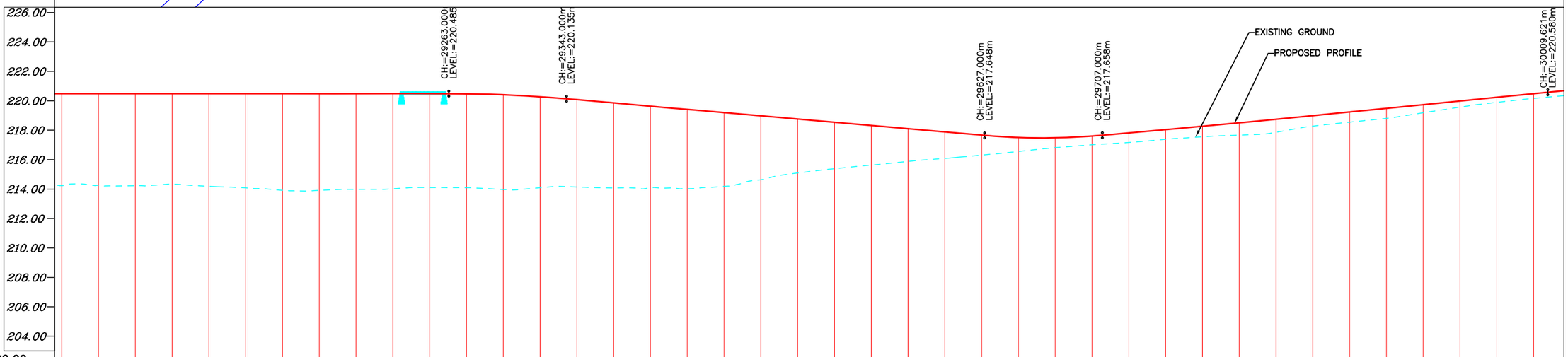
DRG NO.	OSRP/CEG/SH-16/P&P27					DESIGNED BY	DRAWN BY	REVISION-1	APPROVED
SH. NO.	27	DATE	DEC,12	REV	R1	CEG	CEG	EE,PMU	CE,WBP
SCALE	HORIZONTAL: 1 : 2000 VERTICAL: 1 : 200								



CURVE NO.57	
HIP	29+060.1
V	65 kmph
R	300m
$	34° 21' 39.7"
Dir	Right
Ls	40.0m
Ts	112.8m
Lc	139.91m
Es	14.2m
e	6.25%
W	0.6m

BRIDGE	
CHAINAGE:	29+230
TYPE:	
LENGHT:	
NO OF SPAN:	
PROPOSED LEVEL:	220.485

CURVE NO.58	
HIP	29+445.9
V	80 kmph
R	-300m
$	21° 18' 8.9"
Dir	Left
Ls	75.0m
Ts	94.0m
Lc	36.54m
Es	6.1m
e	7%
W	0.6m



DATUM = 202.00

CH:	PROPOSED ROAD LEVEL (m)	EXISTING LEVEL (m)
29000.000	220.485	214.238
29025.000	220.485	214.255
29050.000	220.485	214.230
29075.000	220.485	214.338
29100.000	220.485	214.188
29125.000	220.485	214.085
29150.000	220.485	213.919
29175.000	220.485	213.913
29200.000	220.485	213.984
29225.000	220.485	214.023
29250.000	220.485	214.107
29275.000	220.477	214.093
29300.000	220.410	213.974
29325.000	220.275	214.093
29350.000	220.073	214.143
29375.000	219.855	214.079
29400.000	219.636	214.086
29425.000	219.417	214.025
29450.000	219.198	214.188
29475.000	218.979	214.632
29500.000	218.760	215.093
29525.000	218.541	215.387
29550.000	218.322	215.628
29575.000	218.104	215.882
29600.000	217.885	216.088
29625.000	217.666	216.309
29650.000	217.506	216.558
29675.000	217.484	216.814
29700.000	217.600	217.011
29725.000	217.820	217.168
29750.000	218.044	217.379
29775.000	218.269	217.550
29800.000	218.494	217.666
29825.000	218.743	217.862
29850.000	218.991	218.279
29875.000	219.240	218.548
29900.000	219.489	218.805
29925.000	219.738	219.186
29950.000	219.987	219.572
29975.000	220.236	219.894
30000.000	220.484	220.162

HORIZONTAL ALIGNMENT

R=300.000m L=181.814m L=139.914m
L=40.000m
L=183.887m
L=75.000m
R L=36.538 L=133.772m
L=75.000m
L=628.287m

VERTICAL PROFILE

L=80.000m R=-9137.12
L=284m G=-0.876
R=4507.556 L=80.000m
G=0.899 L=189.646m
G=0.995 L=309.903m

SUPERELEVATION /CROSSFALL

Q=2.500

LEGEND

EXISTING CENTRELINE	RIVER/NALLA	BEGINING OF SPIRAL CURVE — TS	TANGENT LENGTH — Ts
PROPOSE CENTER LINE	H.T. LINE, TOWER	BEGINING OF CIRCULAR CURVE — SC	LENGTH OF CIRCULAR CURVE — Lc
EXISTING CARRIAGE WAY	WELL,TAP & HAND PUMP	APEX OF CURVE — AC	APEX DISTANCE — Es
PRO. CARRIAGE WAY EDGES	ELECTRIC LINE & POLE	END OF CIRCULAR CURVE — CS	SUPERELEVATION — e%
PRO. SHOULDER EDGES	TELEPHONE LINE & POLE	END OF SPIRAL CURVE — ST	DESIGN SPEED — V kmph
EXISTING RoW BOUNDARY	HOUSE/BUILDING/STRUCTURE	HORIZONTAL INTERSECTION POINT — HIP	RADIUS OF CURVE — R
PRO. RoW BOUNDARY	PIPE CULVERT	DEVIATION ANGLE — $	
PIPE LINE	BOX/SLAB CULVERT	LENGTH OF SPIRAL CURVE — Ls	
PROPOSED EARTH WORK	POND		
BRIDGE/CULVERT			

CEG

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PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

WIDENING AND STRENGTHENING TO TWO LANE
PLAN AND LONGITUDINAL SECTION
(SH-16) KM 29/000 TO KM 30/000

						DESIGNED BY	DRAWN BY	REVISION-1	APPROVED
DRG NO.	OSRP/CEG/SH-16/P&P28					CEG	CEG	EE,PMU	CE,WBP
SH. NO.	28	DATE	DEC,12	REV	R1				
SCALE	HORIZONTAL: 1 : 2000 VERTICAL: 1 : 200								

SCHEDULE OF SIGN POSTS

Sign Post ID	Description of the sign Board	chainage	location					Remarks
			LL	RL	CR(L)	CR®	Median	
SP-1	Stop	27139.060				√		Minor road intersection
SP-4(C)	Speed Limit-65 KMPH	27570.000		√				Village Limits
SP-9(A)	Right Side Road	27259		√				
SP-1o(a)	left hand curve	27314.000	√					
		27711.000	√					
		29263.000	√					
SP-10(b)	Right Hand Curve	27708.000		√				
		28032.000		√				
		29629.000		√				
		28859.000	√					
SP-10(a)	Left Hand Curve	29259		√				
SP-10(a)	Left Reverse Bend Curve	28677.777	√					
SP-10(f)	Right Reverse bend curve	27184.73		√				
		28941.941		√				

SCHEDULE OF EXTRA-WIDENING

LEFT C/W				
Sl. No.	START	END	ADDL. WIDTH	Length
1	27493.946	27527.924	0.300	33.978
2	28988.846	29128.760	0.300	139.914
3	29427.647	29464.186	0.300	36.539
RIGHT C/W				
4	27493.946	27527.924	0.300	33.978
5	28988.846	29128.760	0.300	139.914
6	29427.647	29464.186	0.3	36.539

SCHEDULE OF LOCATIONS FOR GUARD POSTS

	GUARD POSTS		
Sl. No.	START	END	LENGTH
1	29800	30000	200
2	28000	28150	150
3	28650	28900	250

PROJECT	SCHEDULE FOR SIGN POSTS, EXTRA WIDENING & GUARD POSTS						
ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	DRG NO.	OSRP/CEG/SH-16/SCH/01	REV :	R1	DESIGNED BY	REV R1	APPROVED
	SH.NO.		DATE :	28/12/2012	CEG	PREPARED BY EE/PMU	CE, WBP
	SCALE	NTS					

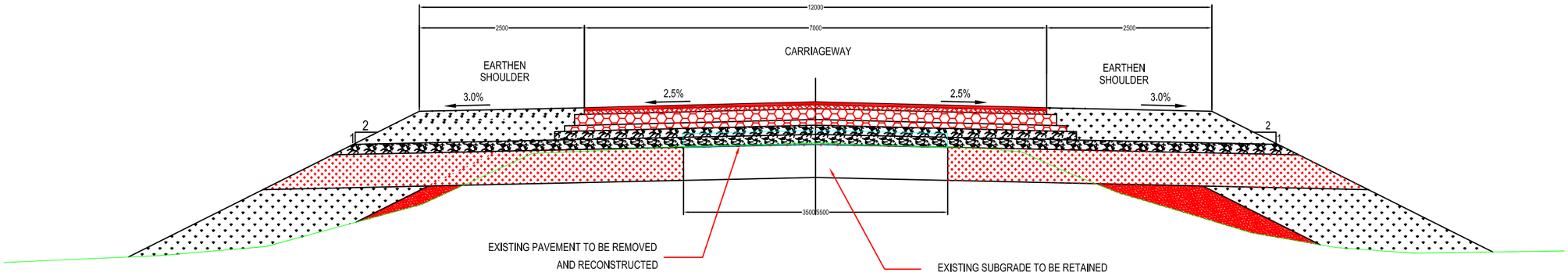
SCHEDULE FOR PAVEMENT COMPOSITION AND TYPE OF CONSTRUCTION FOR BHAWANIPATNA-KHARIAR(SH-16)

SL. No	Prop Chainage		length in km	Thickness Design(IRC-37) Crust Details over Existing Pavement									Thickness Design(IRC-37) Crust Details for Widening								Type of Construction	TCS	Open/Builtup
				Surface		Base		Sub Base		Sub Grade	Embankment	Total Thickness	Surface		Base		Sub base		Sub Grade	Total Thickness			
	From	To		BC	DBM	WMM1	WMM2	GSB 1	GSB2				BC	DBM	WMM1	WMM2	GSB 1	GSB2					
1	27.200	28.150	0.950	40	75	100	150	110	150	500	500	1625									New Construction(DFS)	TCS-18	OPEN
2	28.150	31.000	2.850	40	75	100	150	110	150	500		1125									New Construction	TCS-03	OPEN

SCHEDULE O F ROAD DELINEATIORS AT CURVES UPTO 100M						
ARC						
Sl. No	START	END	RADIUS	C LENG	SPACING	TOTAL
1	27494	27528	240	33.978	20	9
2	27856	27887	400	30.637	30	8
3	28989	29129	300	139.91	25	14
4	29428	29464	300	36.539	25	8

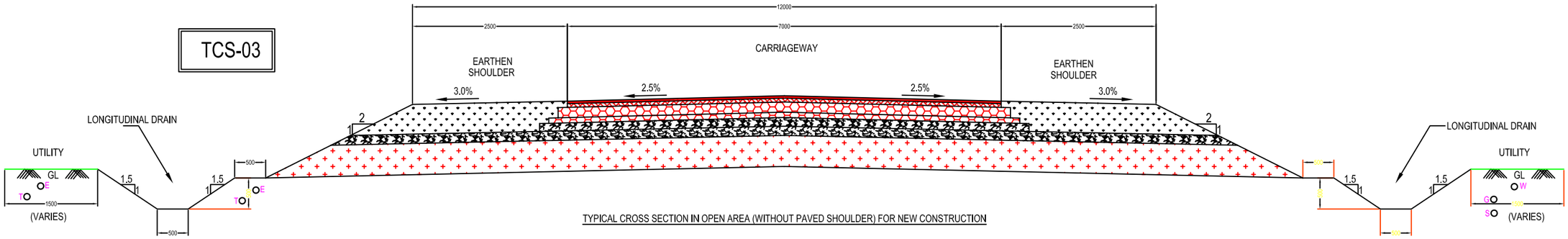
PROJECT	SCHEDULE FOR EXTRA WIDENING & GUARD POSTS					
ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	DRG NO.	OSRP/CEG/SH-16/SCH/PAV	REV :	R1	DESIGNED BY CEG	REV R1 PREPARED BY EE/PMU	APPROVED CE, World Bank Projects.
	SH.NO.		DATE :	28/12/2012			
	SCALE	NTS					

TCS-02



TYPICAL CROSS SECTION IN OPEN AREA (WITHOUT PAVED SHOULDER) FOR RECONSTRUCTION / WIDENING

TCS-03



TYPICAL CROSS SECTION IN OPEN AREA (WITHOUT PAVED SHOULDER) FOR NEW CONSTRUCTION

NOTES:

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

LEGENDS

1) BC
2) DBM
3) WMM
4) GSB
5) SUBGRADE
6) DLC
7) PCC
8) EARTH FILL
9) SAND FILL
10) E - Electricity Cable
11) T - Telecom Cable
12) W - Water Supply Line
13) G - Gas Line
14) S - Sewer

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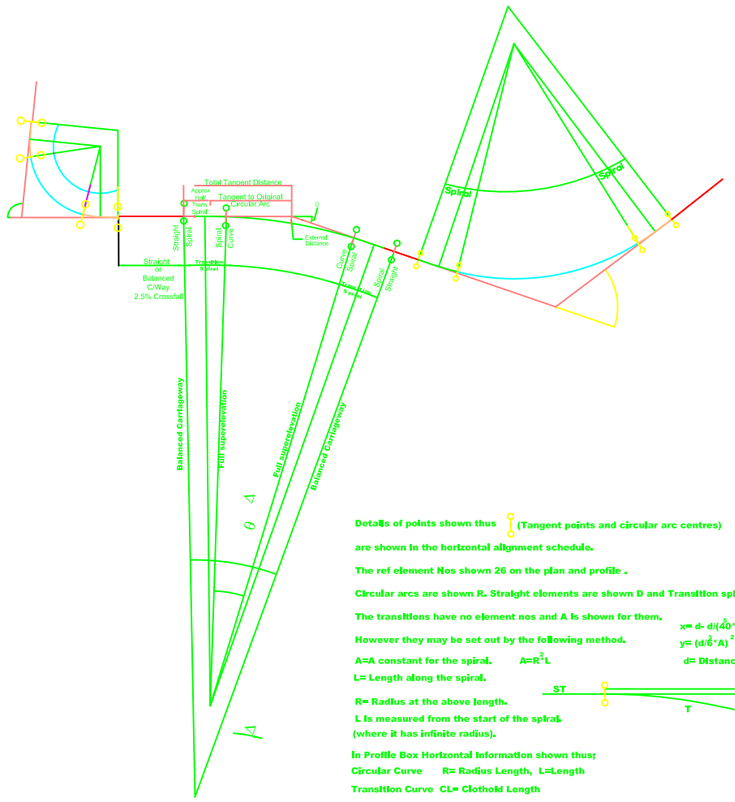
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

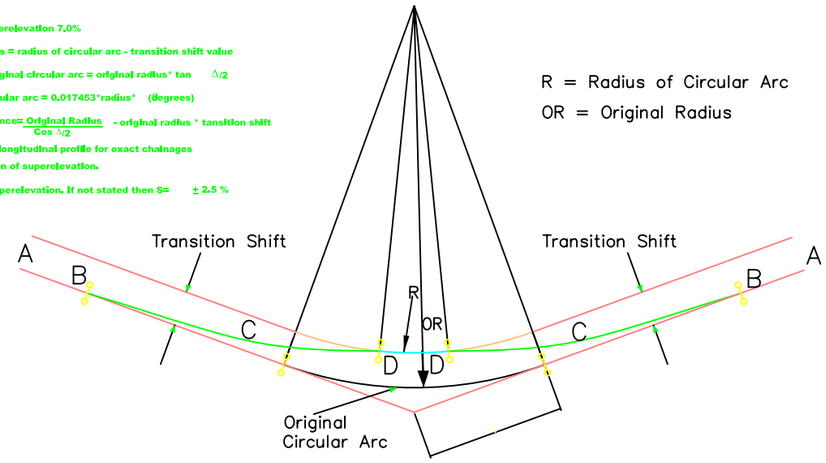
TYPICAL CROSS-SECTION
TCS - 02 & TCS - 03
(BHAWANIPATNA - KHARIAR)

DRG NO.	OSRP/CEG/TCS/02&03					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	01	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



NOTES:

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



APPLICATION OF SUPERELEVATION

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

are shown in the horizontal alignment schedule.

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

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

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

However they may be set out by the following method.

$x = d - d/(40*A)^4 + d/(3456*A)^8 - d/(3999040*A)^{12}$

$y = (d/6*A)^2 - d/(336*A)^6 - d/(42240*A)^{10}$

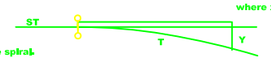
A=A constant for the spiral. $A=R^2L$

L= Length along the spiral.

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

R= Radius at the above length.

L is measured from the start of the spiral. (where it has infinite radius).

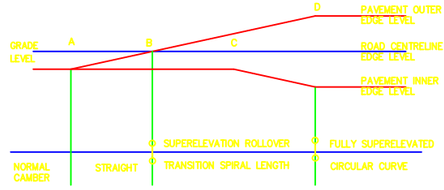


In Profile Box Horizontal Information shown thus;

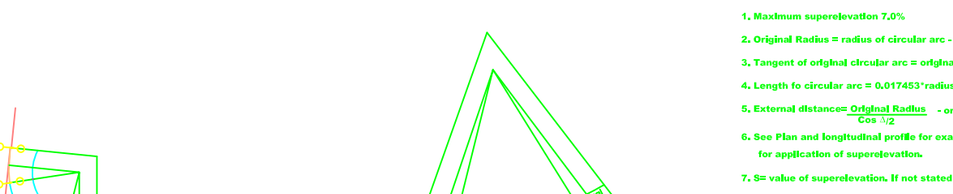
Circular Curve R= Radius Length, L=Length

Transition Curve CL= Clothoid Length

Straight D= Length



LONGITUDINAL SECTION THROUGH HORIZONTAL CURVE



Grade(1 in %) = dy/dx*100

IP's are shown on the PLAN and PROFILE as

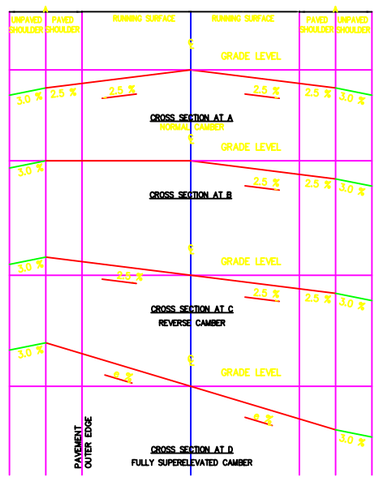
PLAN and PROFILE as ⊕

IP NO 2

Level 212.314

Km 1024.123

ROTATION ABOUT PAVEMENT CENTRELINE



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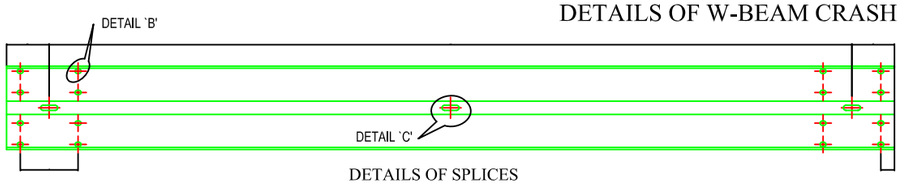
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

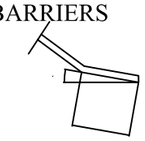
DETAILS OF APPLICATION OF SUPERELEVATION TEL BRIDGE AND APPROACH_P01B-BLANCE

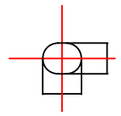
DRG NO.	OSRP/CEG/SE					DESIGNED BY	DRAWN BY	REV.R1 / APPROVED
SH. NO.	17	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY: EE(PMU) / CE,WBP
SCALE	NTS							

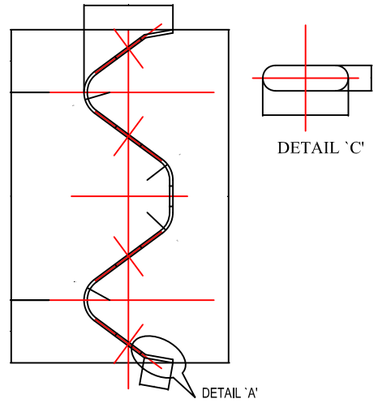
DETAILS OF W-BEAM CRASH BARRIERS



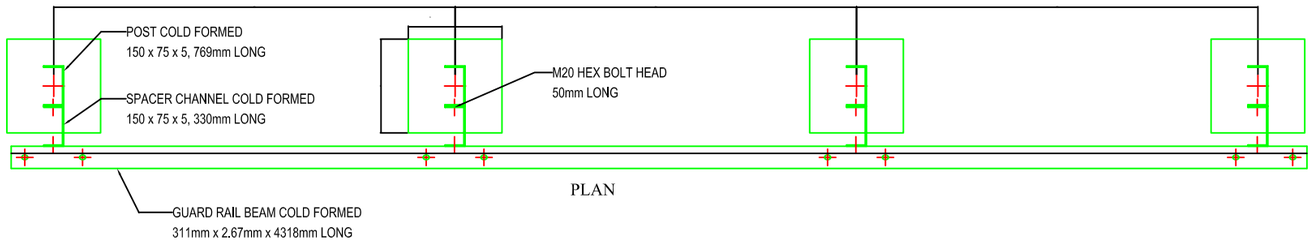
DETAILS OF SPLICES



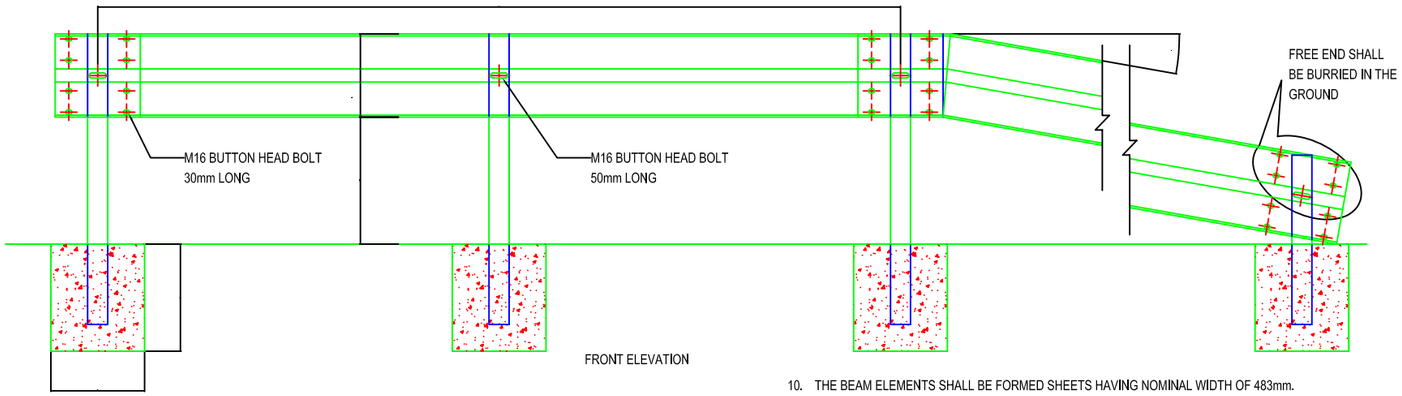




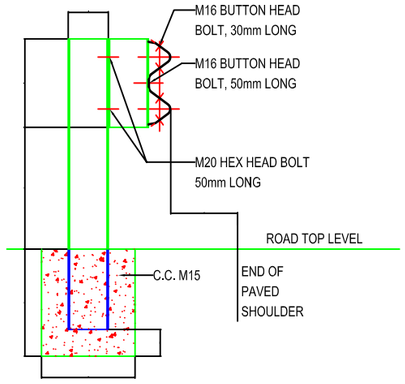
BEAM SECTION



PLAN



FRONT ELEVATION



SIDE ELEVATION

NOTE:

1. HEIGHT OF POSTS SHOULD BE 785mm LONG ABOVE THE FINISHED ROAD LEVEL.
2. SPACING OF POSTS SHOULD BE 2.0m C/C.
3. 1 No. SPACER CHANNEL SHOULD BE PLACED AT EACH POST.
4. W-PROFILE FORMED CORRUGATED BEAMS (EFFECTIVE LENGTH OF 4318mm), 311mm x 83mm.
5. POST CONSISTS OF FORMED CHANNEL OF SIZE 150 x 75 x 5, 785mm LONG ABOVE GROUND LVL.
6. SPACER CONSISTS OF FORMED CHANNEL OF SIZE 150 x 75 x 5, 330mm LONG.
7. BUTTON HEAD BOLTS M16 x 30mm LONG, 8 Nos FOR THE SPLICING OF THE W PROFILE AT EACH LOCATION.
8. BUTTON HEAD BOLTS M16 x 50mm LONG, 1 Nos AT THE CONNECTION OF THE W BEAM TO SPACER.
9. HEX HEAD BOLTS M20 x 50mm LONG , 2 Nos AT THE CONNECTION OF THE SPACER TO POST.
10. THE BEAM ELEMENTS SHALL BE FORMED SHEETS HAVING NOMINAL WIDTH OF 483mm.
11. THE BASE MATERIAL OF THE CORRUGATED BEAM SHALL COMPLY TO FOLLOWING MECHANICAL PROPERTIES:-
    I. TENSILE STRENGTH, MIN=483 MPA. II. ELONGATION, in 2 inches, MIN = 12%
    III. YIELD, MIN=345 MPA.
12. ALL MEMBERS OF THE SYSTEM SHOULD BE HOT DIPPED GALVANIZED AND TO HAVE A MINIMUM COATING OF 550g/Sq m, EACH FACE IN CONFORMANCE TO M.O.R.T & H. SPECIFICATIONS (CLAUSE 810).
13. BEAMS TO BE ERECTED ON A RADIUS OF 46m (150') OR LESS SHALL BE SHAPE CURVED TO APPROPRIATE CURVATURE.
14. CRASH BARRIERS ARE POSTED ON ALL SECTION OF EMBANKMENT WHOSE HEIGHT IS >= TO 3m, HORIZONTAL CURVES OF RADIUS < 170m AND ALSO AT ALL BRIDGE APPROACHES FOR LENGTH OF 20m ON BOTH SIDES.
15. BEAM SURFACE FACING THE TRAFFIC IS PAINTED WITH ALTERNATE BANDS (500mm WIDE) OF BLACK & YELLOW COLOR REFLECTORIRED PAINT CONFORMING CL.803.5 OF M.O.R.T & H SPEC.

SCHEDULE

Sl. No.	Chainage		Length	Sides
	From	To		
1	27200	27500	300	BOTH
2	27700	27800	100	BOTH
3	28700	28900	200	BOTH
4	29400	29800	400	BOTH

CEG
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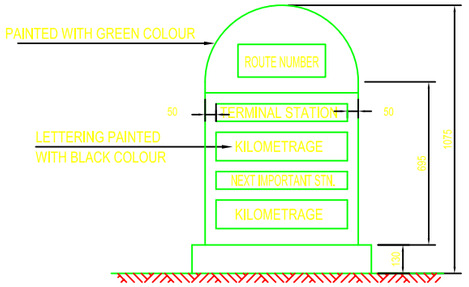
PROJECT:-

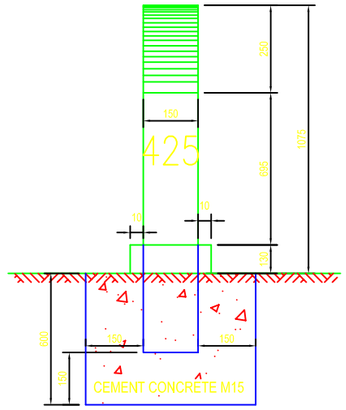
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
METAL BEAM CRASH BARRIER DETAILS
TEL BRIDGE-APPROACH

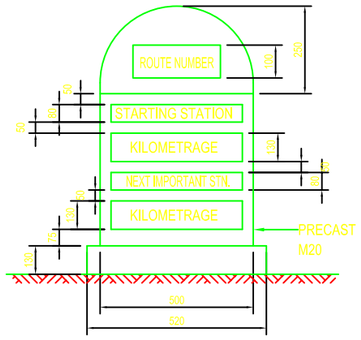
DRG NO.	OSRP/CEG/CB					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	24	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



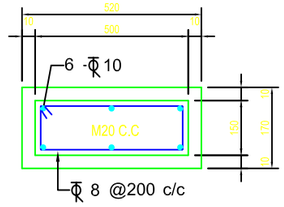
FACE 1



SIDE ELEVATION



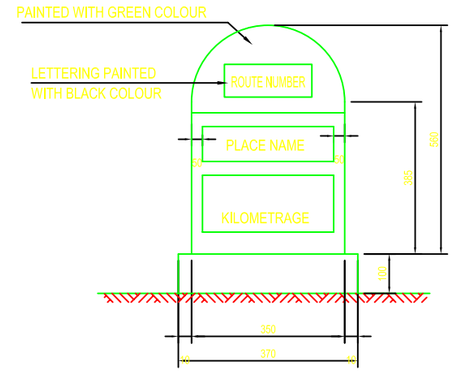
FACE 2



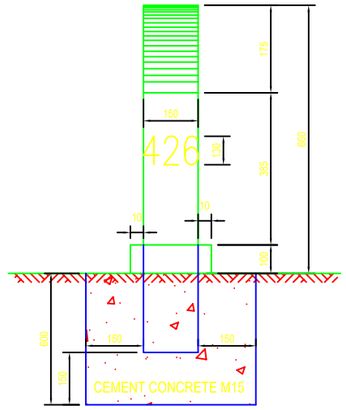
SECTIONAL PLAN

TYPICAL DESIGN FOR THE 5TH KILOMETRE STONE

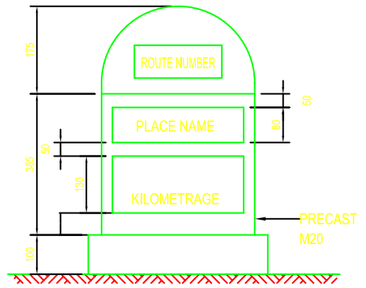
INDEX FOR KILOMETRE STONES		
Km No.	SCRIPT FOR PLACE NAMES	PLACE TO BE SHOWN
0	ROMAN	TERMINAL/STARTING STATION AND NEXT IMPORTANT TOWN
1	HINDI (DEVANAGARI SCRIPT)	NEXT IMPORTANT TOWN
2	LOCAL LANGUAGE (ORIYA)	NEXT IMPORTANT TOWN
3	HINDI (DEVANAGARI SCRIPT)	TERMINAL / STARTING STATION
4	LOCAL LANGUAGE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



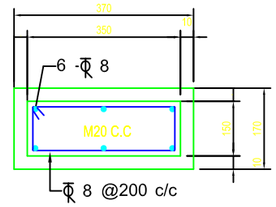
FACE 1



SIDE ELEVATION



FACE 2



SECTIONAL PLAN

TYPICAL DESIGN FOR ORDINARY KILOMETRE STONE

NOTES:

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

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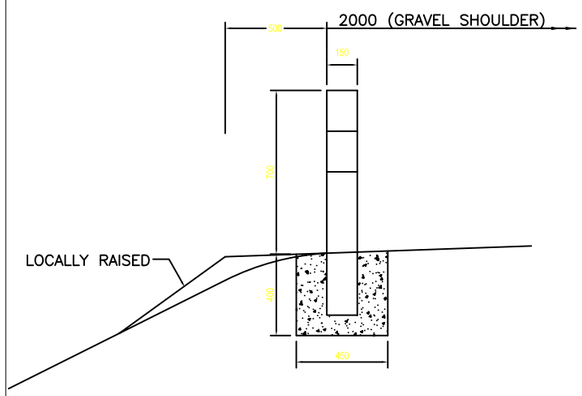
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

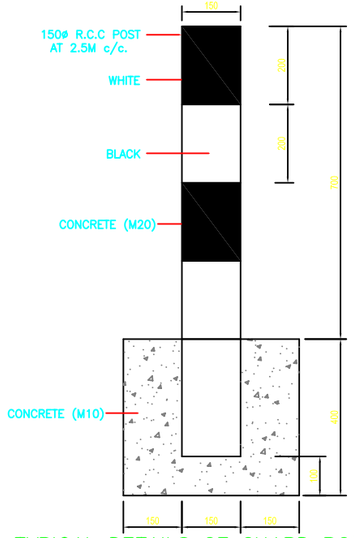
STANDARD DRAWINGS
TYPICAL KM STONE & 5TH KM STONE

TEL BRIDGE

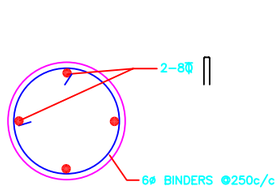
DRG NO.	OSRP/CEG/KM/01					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	25	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE9PMU)	CE,WBP
SCALE	NTS								



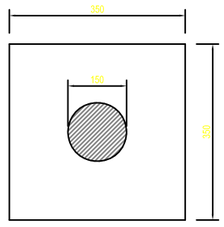
FIXING DETAILS OF GUARD POST



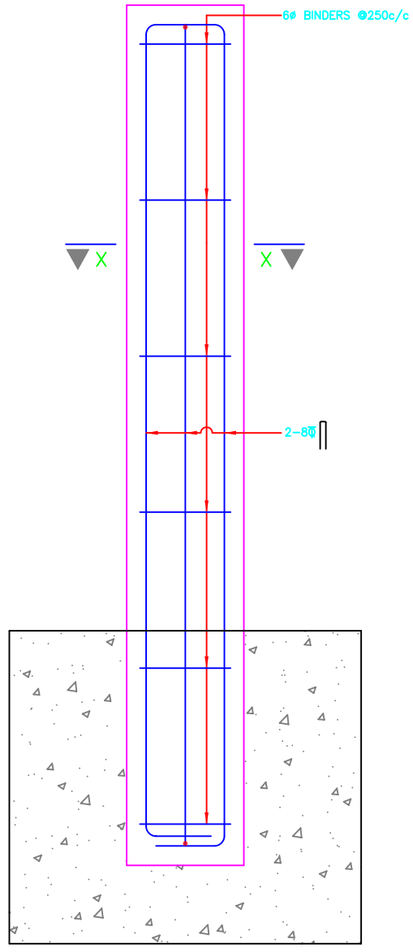
TYPICAL DETAILS OF GUARD POST



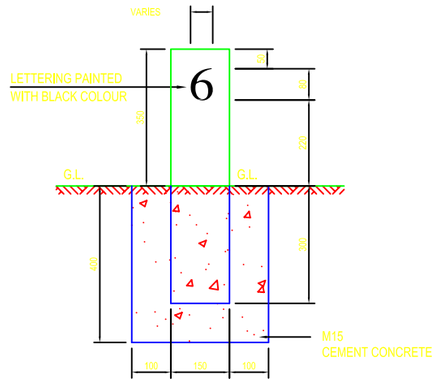
SECTION X–X



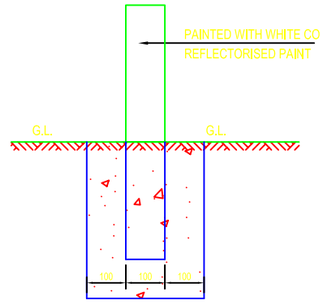
PLAN OF GUARD POST



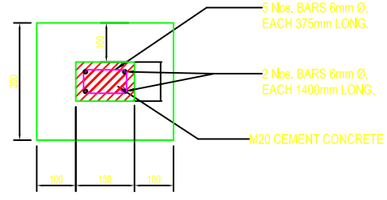
REINFORCEMENT DETAIL OF GUARD POST



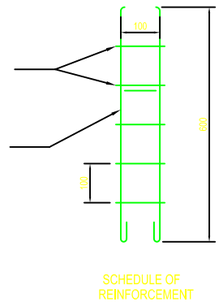
FRONT ELEVATION



SIDE VIEW



PLAN



SCHEDULE OF
REINFORCEMENT

TYPICAL DESIGN FOR 200m STONES

NOTES:

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

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE MENTIONED.
2. R.C.C. GUARD POSTS IS INSTALLED WHERE EMBANKMENT HEIGHT IS GREATER THAN 3 M AT OTHER HAZARD LOCATIONS.

3. FOR SCHEDULE REFER DRAWING NO. OSRP/CEG/SH9A&SH-9/SCH-GP

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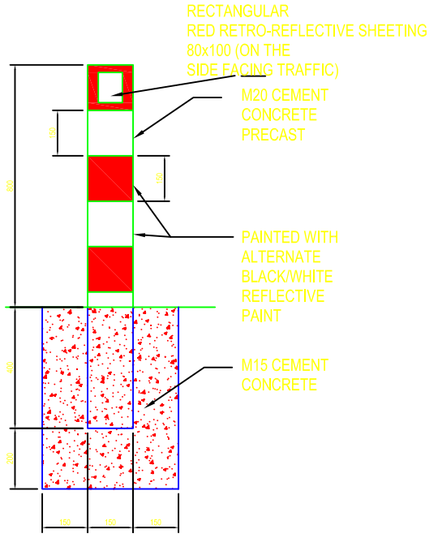
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

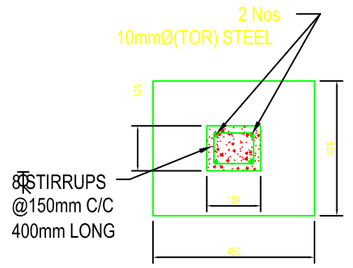
STANDARD DRAWINGS
TYPICAL DETAILS OF 200M STONE & GUARD POST

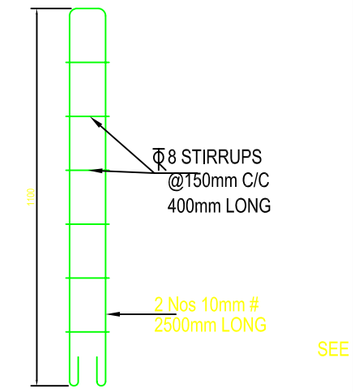
TEL BRIDGE

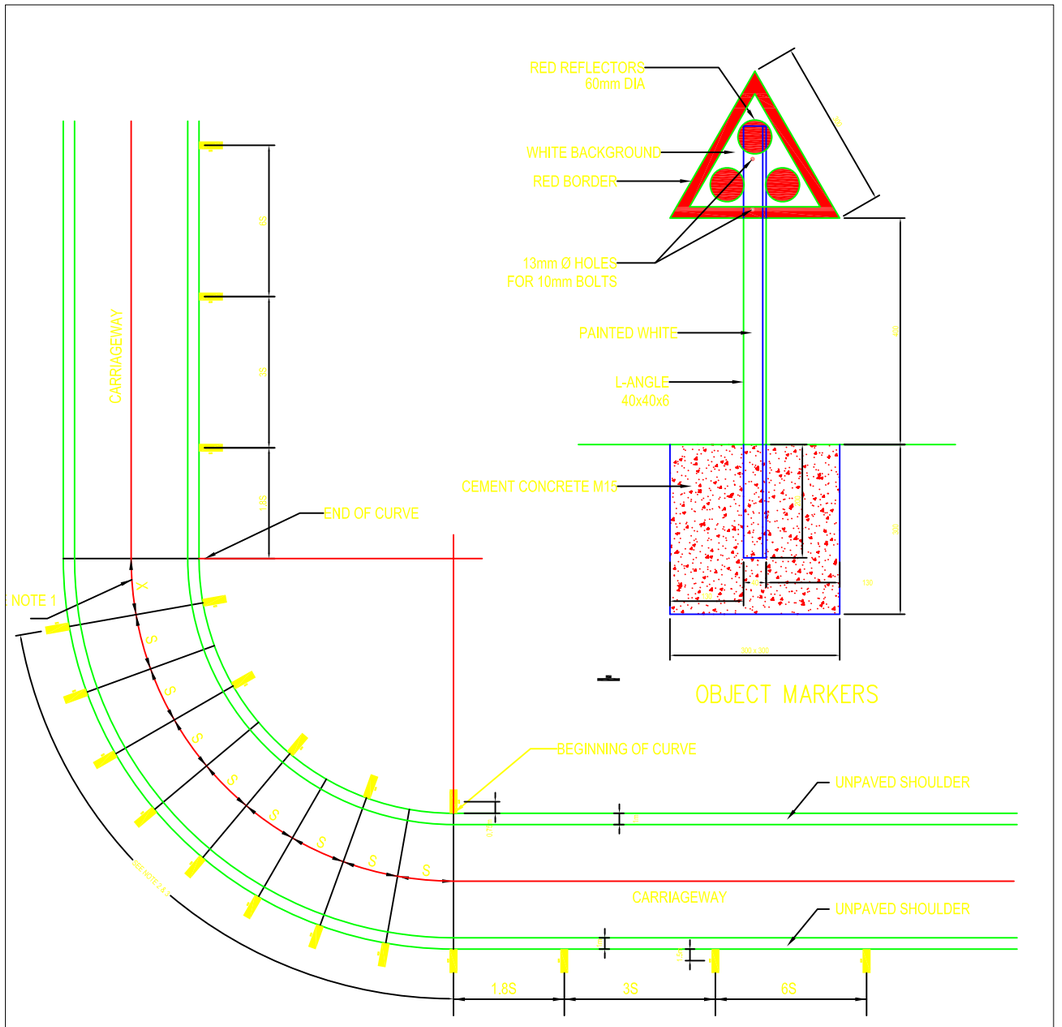
DRG NO.	OSRP/CEG/KM & GP					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	26	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



ROAD DELINEATORS







SPACING OF DELINEATORS ON CURVES

OBJECT MARKERS

SCHEDULE O F ROAD DELINEATIORS AT CURVES						
ARC						
Sl. No	START	END	RADIUS	ARC LENGTH	SPACING	TOTAL
1	27494	27527.9	240	33.978	20	9
2	27856.4	27886.7	400	30.637	30	8
3	28988.9	29128.8	300	139.914	25	14
4	29427.7	29464.2	300	36.539	25	8

NOTE:-
1. ROAD DELINEATORS SHALL BE PROVIDED AS PER THE GUIDLINES IN IRC:79-1981

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

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

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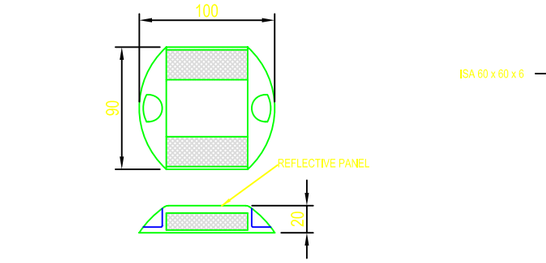
PROJECT:-

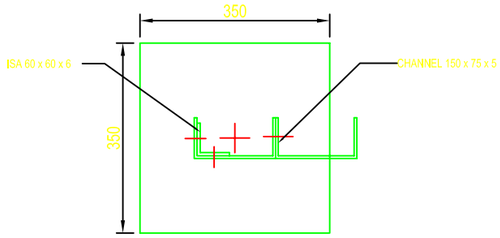
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
DETAILS OF ROAD DELINEATORS
TEL BRIDGE

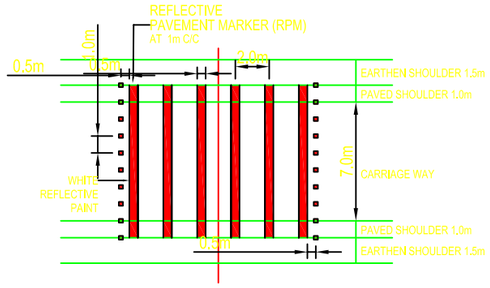
DRG NO.	OSRP/CEG/RD					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	27	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



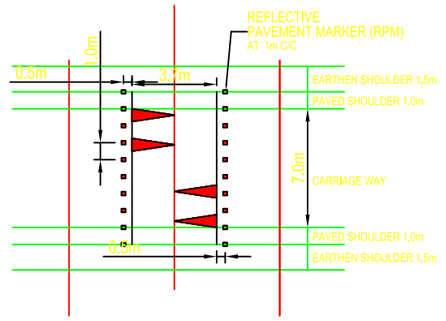
REFLECTIVE PAVEMENT MARKERS (RPM)



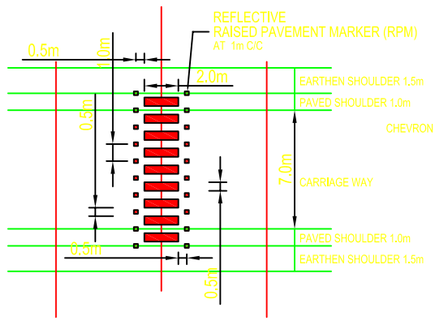
SECTION `A-A'



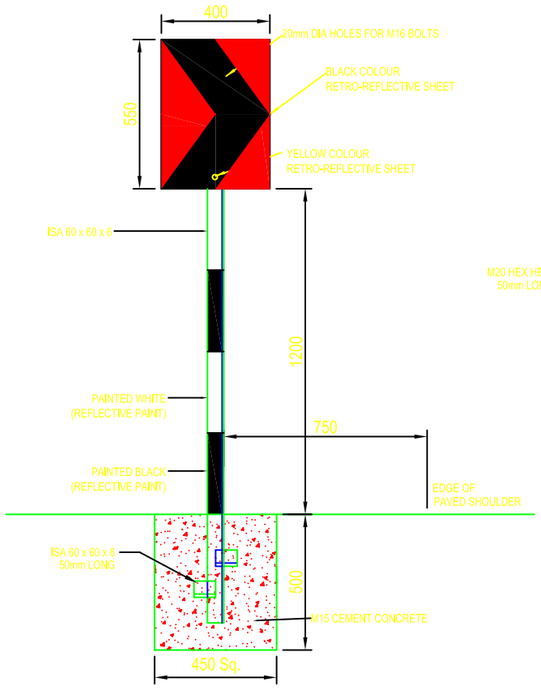
LOCATION OF RPM BEFORE RUMBLE STRIPS



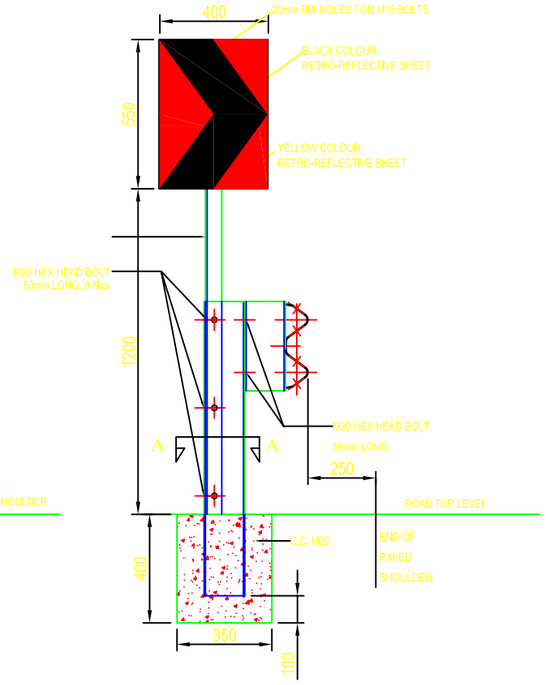
LOCATION OF RPM BEFORE ROAD HUMP



LOCATION OF RPM BEFORE PEDESTRIAN CROSSING



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



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

REFLECTIVE PAVEMENT MARKERS

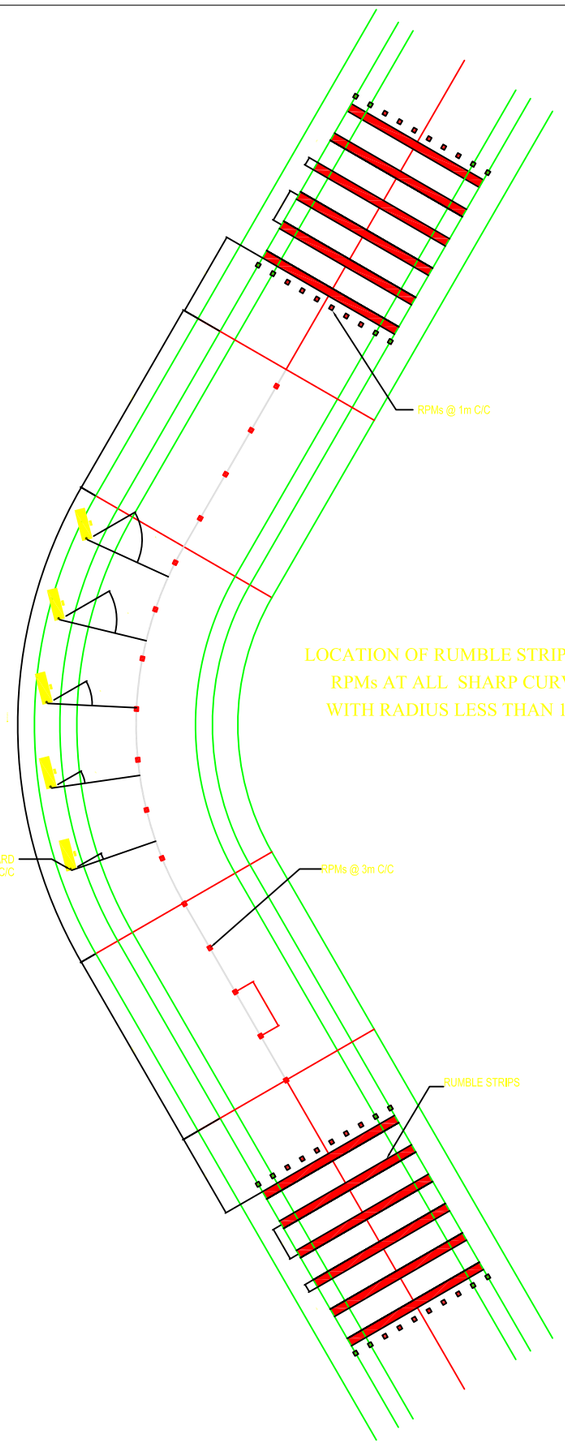
1. SPECIFICATION OF MATERIAL, DESIGN, OPTICAL PERFORMANCE, TESTS AND FIXING OF RPM SHALL BE IN ACCORDANCE WITH TECH.SPEC. CL.812.
2. LOCATIONS OF RPM

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

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

CHEVRON SIGN BOARD

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



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

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PROJECT:-

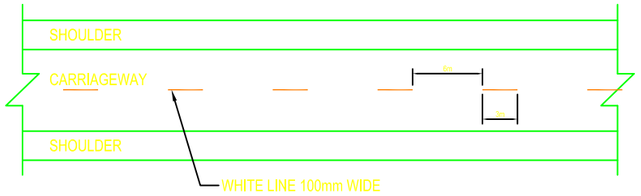
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
DETAILS OF RRPMs & CHEVRON MARKERS
TEL BRIDGE

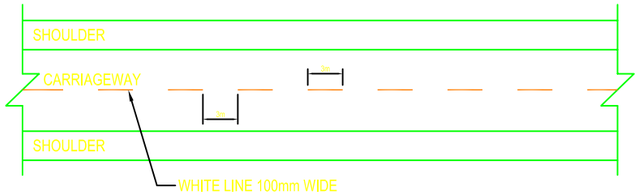
DRG NO.	OSRP/CEG/RPM					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	28	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								

LONGITUDINAL MARKING

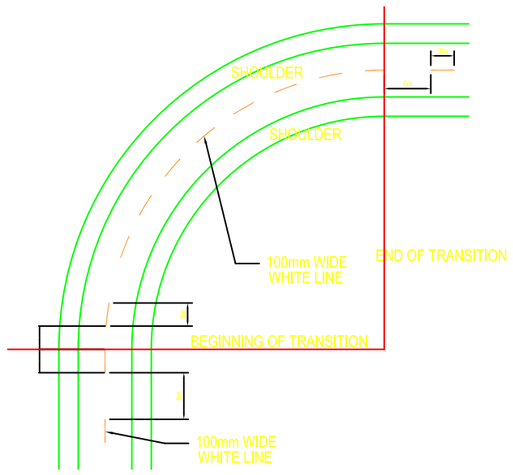
DETAILS OF CENTRE LINE



BEYOND INTERSECTIONS

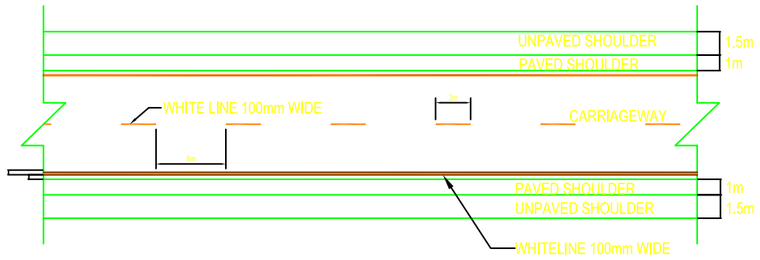


AT INTERSECTIONS

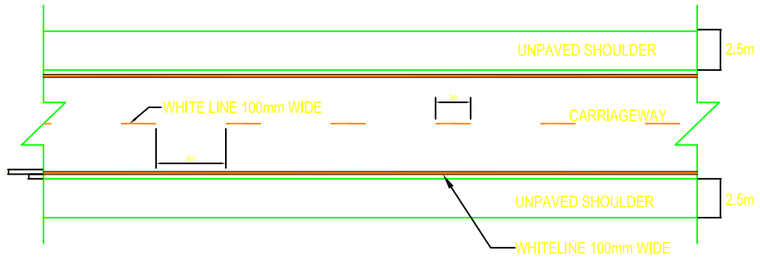


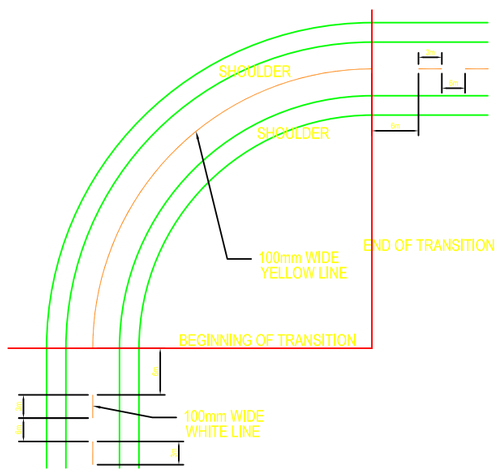
DETAILS AT CURVES

DETAILS OF EDGE LINE MARKING



DETAILS OF EDGE LINE MARKING





DETAILS AT SHARP CURVES
(NO-OVERTAKING ZONE)

NOTE:

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

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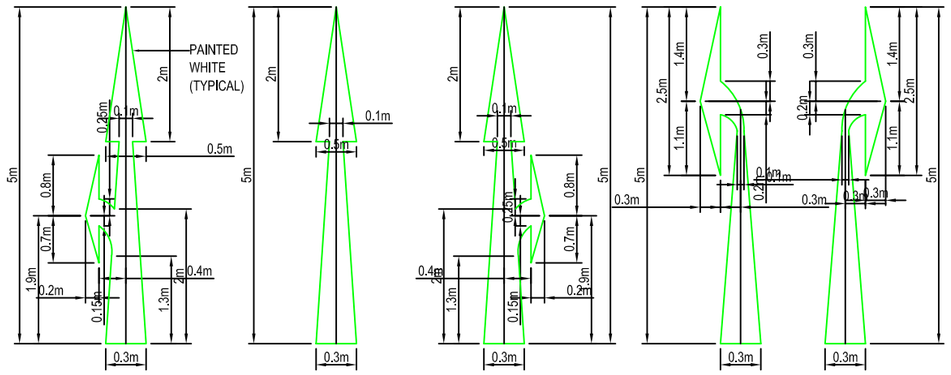
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

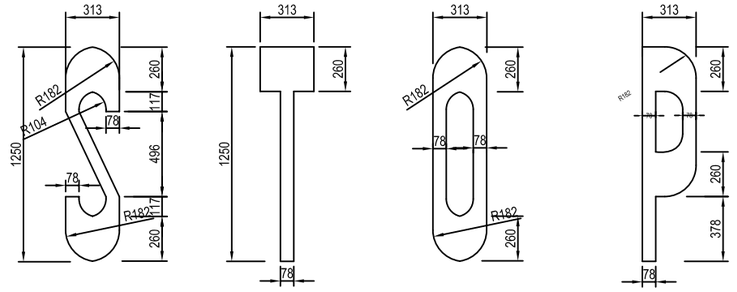
STANDARD DRAWINGS
TYPICAL ROAD MARKING DETAILS
(SHEET 1 OF 2)

DRG NO.	OSRP/CEG/RM/01					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	29	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								

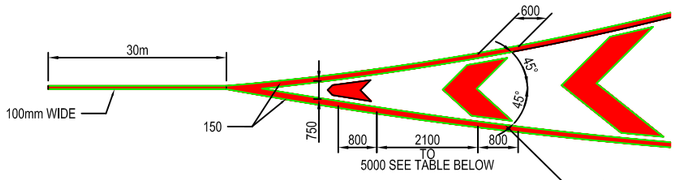
DIRECTIONAL ARROWS



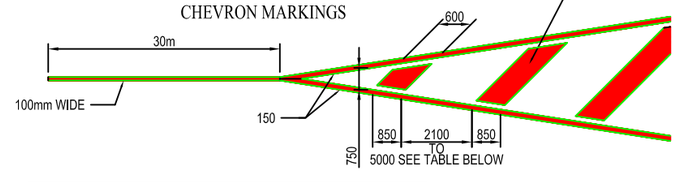
SIZE OF LETTERS



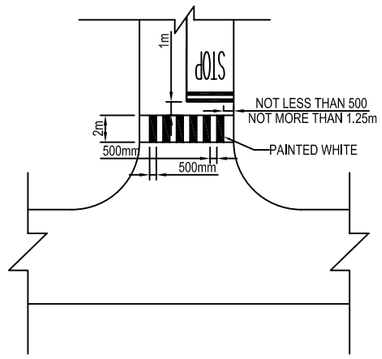
DIAGONAL MARKINGS



CHEVRON MARKINGS



PEDESTRIAN CRossing



STOP LINE

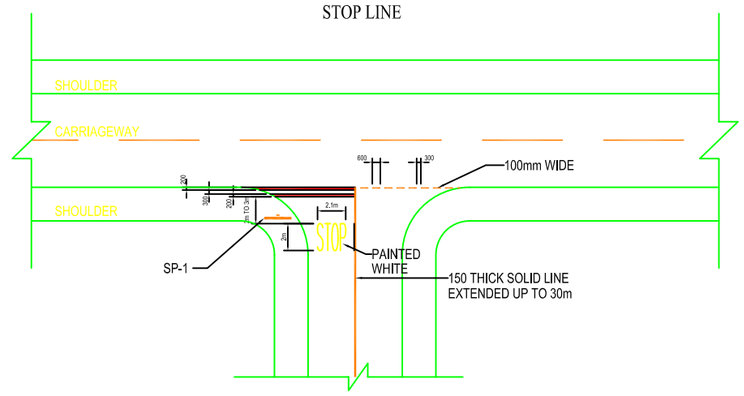
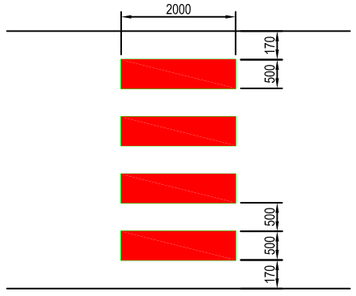
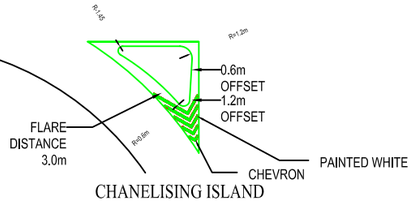


TABLE : SPACING BETWEEN DIAGONALS/CHEVRONS		
TOTAL LENGTH OF MARKING (m)	CLEAR SPACING BETWEEN DIAGONALS OR CHEVRONS (mm)	
	SPEED (<75 km/h)	SPEED (>75 km/h)
<6	2100	-
6 TO 22	3500	-
>22	5000	-
<10	-	4000
>10	-	6000



PEDESTRIAN CROSSING



CHANELISING ISLAND

NOTE:

1. ALL LENGTHS AND SPACINGS IN THE TABLE ARE MEASURED PARALLEL TO ROAD CENTRE LANE.
2. FIRST DIAGONAL OR CHEVRON IS TO BE SO LOCATED THAT ITS LENGTH IS ATLEAST EQUAL TO ITS WIDTH
3. WIDTH OF ALL DIAGONALS/CHEVRONS MEASURED AT RIGHT ANGLES TO THE DIAGONALS OR CHEVRONS IS 600mm.
4. FOR CENTERLINE AND EDGELINE MARKING AT BUS BAY LOCATION REFER DRAWING NO. OSRP/CEG/BB/01
5. ROAD MARKING SHOULD BE DONE WITH THERMOPLASTIC PAINT CONFORMING TO CL. 803.4 OF M.O.R.T & H SPECIFICATIONS
6. DETAILS OF MARKING AT INTERSECTIONS ARE AS PER M.O.R.T & H TYPE DESIGNS FOR INTERSECTIONS ON NATIONAL HIGHWAYS

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PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
TYPICAL ROAD MARKING DETAILS
(SHEET 2 OF 2)

DRG NO.	OSRP/CEG/RM/02					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	29	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								

SP-1

STOP

SP-2

COMPULSORY
KEEP LEFT

SP-2(a)

RESTRICTION ENDS

SP-3

GIVE WAY

SP-4(a)

SPEED LIMIT

SP-4(b)

SPEED LIMIT

SP-4(c)

SPEED LIMIT

SP-4(d)

SPEED LIMIT

SP-4(e)

SPEED LIMIT

SP-5(a)

OVERTAKING
PROHIBITED

SP-5(b)

ONE WAY

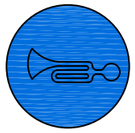
SP-5(c)

ONE WAY

SP-6

SCHOOL ZONE

SP-7



COMPULSORY
SOUND HORN

SP-8

CROSS ROAD

SP-9(a)

RIGHT SIDE ROAD

SP-9(b)

LEFT SIDE ROAD

SP-10(a)

RIGHT HAND
CURVE

SP-10(b)

LEFT HAND
CURVE

SP-10(c)

RIGHT HAIR PIN
BEND

SP-10(d)

LEFT HAIR PIN
BEND

SP-10(e)

RIGHT REVERSE
BEND

SP-10(f)

LEFT REVERSE
BEND

SP-11

T-INTERSECTION

SP-12

PEDESTRIAN
CROSSING

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PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 1 OF 4)

DRG NO.	OSRP/CEG/RS/01					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	31	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								

SP-13(a)

STAGGERED INTERSECTION

SP-13(b)

STAGGERED INTERSECTION

SP-13(C)

MAJOR ROAD AHEAD

SP-13(d)

MAJOR ROAD AHEAD

SP-14(a)

Y-INTERSECTION

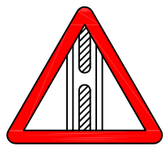
SP-14(b)

Y-INTERSECTION

SP-14(c)

Y-INTERSECTION

SP-14(d)



GAP IN MEDIAN

SP-14(e)

OVERHEAD CABLE

SP-15(a)

NARROW BRIDGE

SP-15(b)

DUAL C' WAY STARTS

SP-15(c)

DUAL C' WAY ENDS

SP-15(d)

SERIES OF BENDS

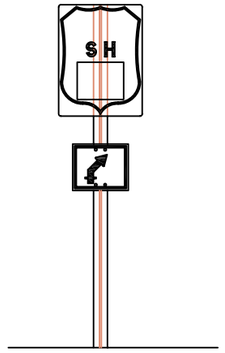
SP-16(a)

HUMP OR ROUGH ROAD

SP-16(b)

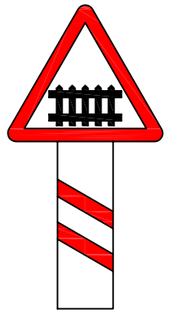
BARRIER AHEAD

SP-17



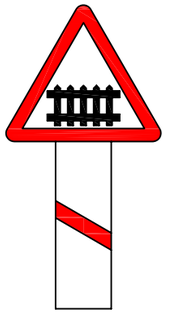
STATE ROUTE MARKER SIGN

SP-18 (a)



GUARDED RAILWAY CROSSING AT 200m

SP-18 (b)



GUARDED RAILWAY CROSSING AT 50-100m

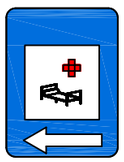
SP-24

PUBLIC TELEPHONE

SP-22

PETROL BUNK

SP-23



HOSPITAL

SP-25

DISPENSARY

SP-26

EATING PLACE

NOTE:

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

LEGEND

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

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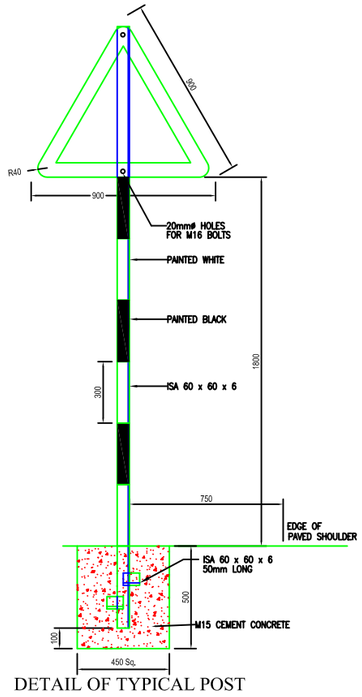
PROJECT:-

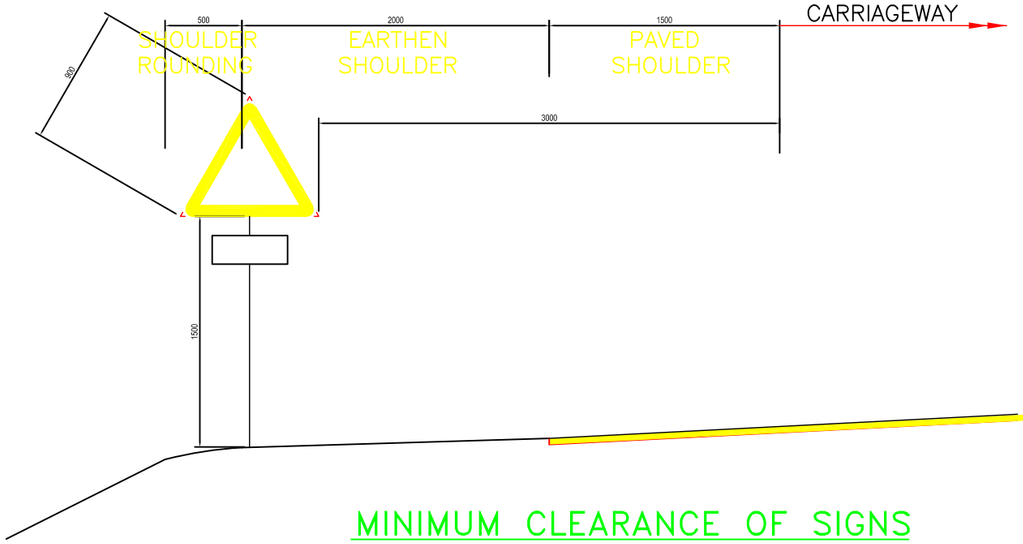
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 2 OF 4)

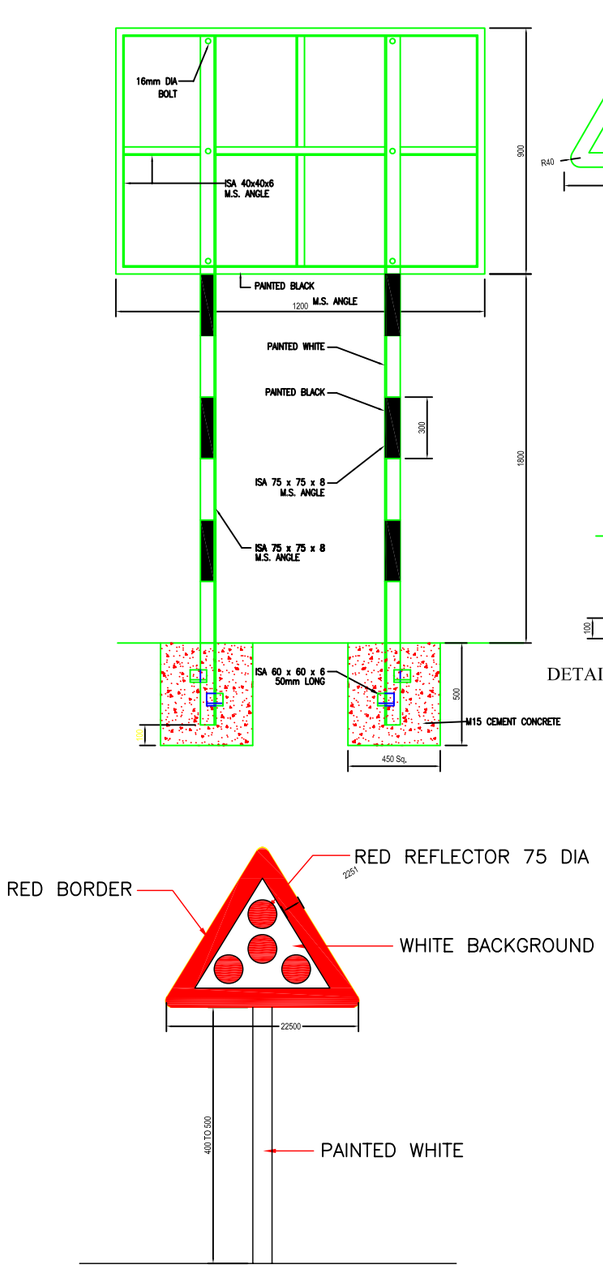
DRG NO.	OSRP/CEG/RS/02					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	32	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



DETAIL OF TYPICAL POST

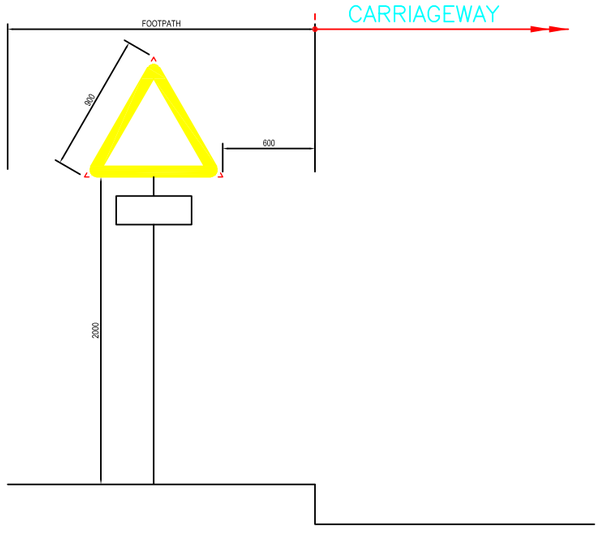


MINIMUM CLEARANCE OF SIGNS IN UNKERBED SECTIONS

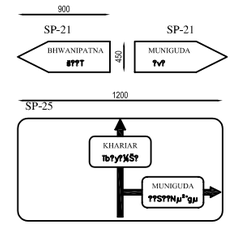


CLUSTER OF RED REFLECTORS

TA 1



MINIMUM CLEARANCE OF SIGNS IN KERBED SECTIONS



SP-19

SP-20

SP-27

SP-28

NOTES

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

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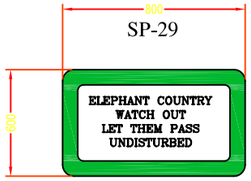
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 3 OF 4)

DRG NO.	OSRP/CEG/RS/03					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	33	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								

SP-29



SP-30

SP-31

SP-32

SP-33

SP-34

SP-35

SP-36

SP-37

SP-38

SP-39

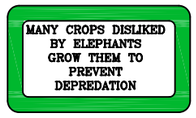
SP-40

SP-41

SP-42

SP-43

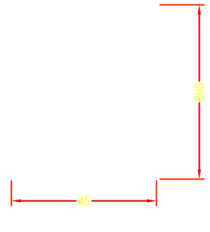
SP-44



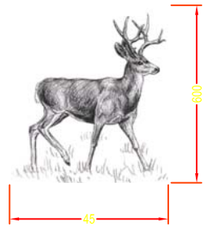
SP-45

SP-46

SP-47



SP-48



SP-49

SP-50

SP-51

NOTE:

1. DETAILS OF ROAD SIGNS ARE AS PER IRC: 67-2001 & IRC 30-1968
2. DETAIL OF STATEROUTE MARKER SIGN IS AS PER IRC: 31-1969.
3. ALL MANDATORY AND CAUTIONARY SIGNS SHOULD BE HIGH INTENSITY WIDE ANGLE MICRO PRISMATIC SHEETING CONFORMING TO CL-801 OF TECH. SPECIFICATION
4. ALL INFORMATORY SIGNS SHOULD CONFIRM TO STANDARDS OF HIGH INTENSITY ENCAPSULATED TYPE RETRO REFLECTIVE SHEETING AS PER CL. 801.OF TECH. SPECIFICATION

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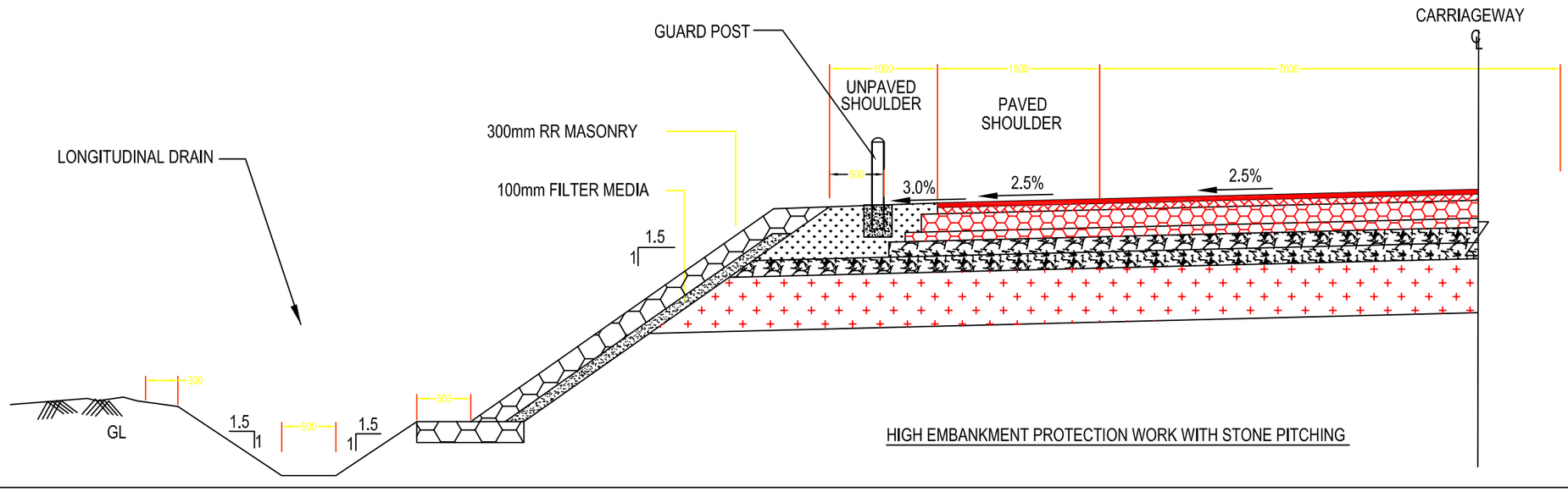
PROJECT:-

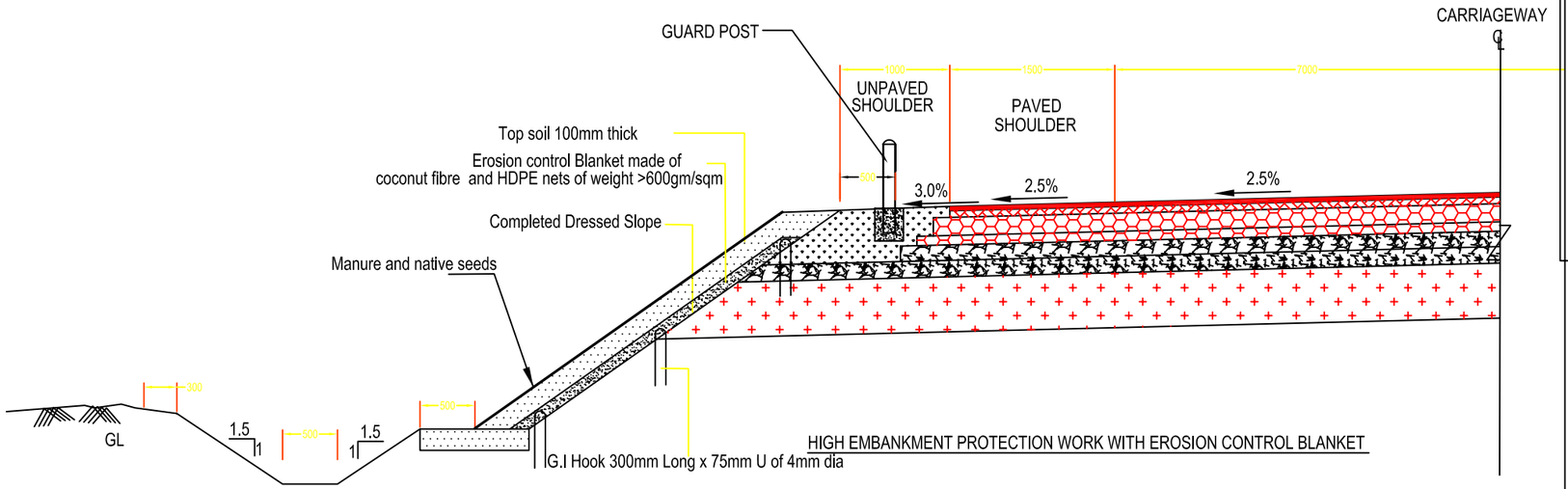
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
TYPICAL ROAD SIGNS (SHEET 4 OF 4)

DRG NO.	OSRP/CEG/RS/04					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	34	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



HIGH EMBANKMENT PROTECTION WORK WITH STONE PITCHING



HIGH EMBANKMENT PROTECTION WORK WITH EROSION CONTROL BLANKET

SCHEDULE

Sl. No.	Chainage		Length	Sides
	From	To		
1	27200	27400	200	BOTH
2	29500	29800	300	BOTH

CONSULTING ENGINEERS GROUP LTD.
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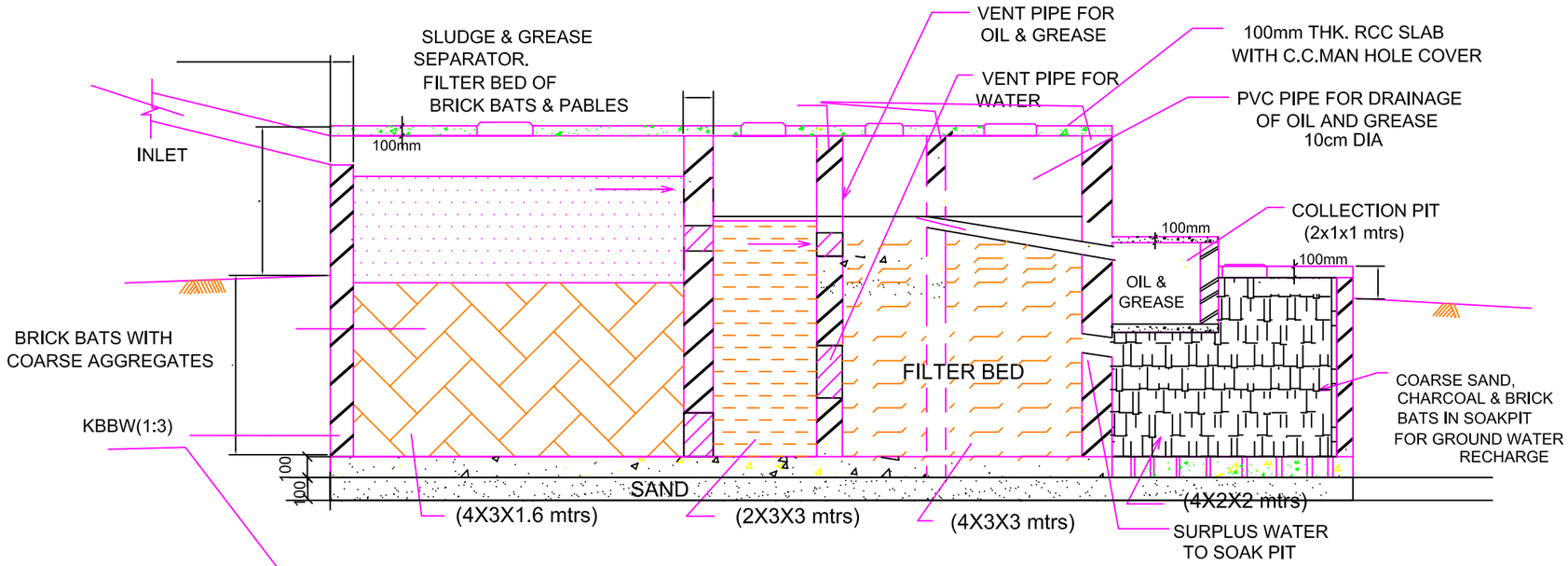
PROJECT:-

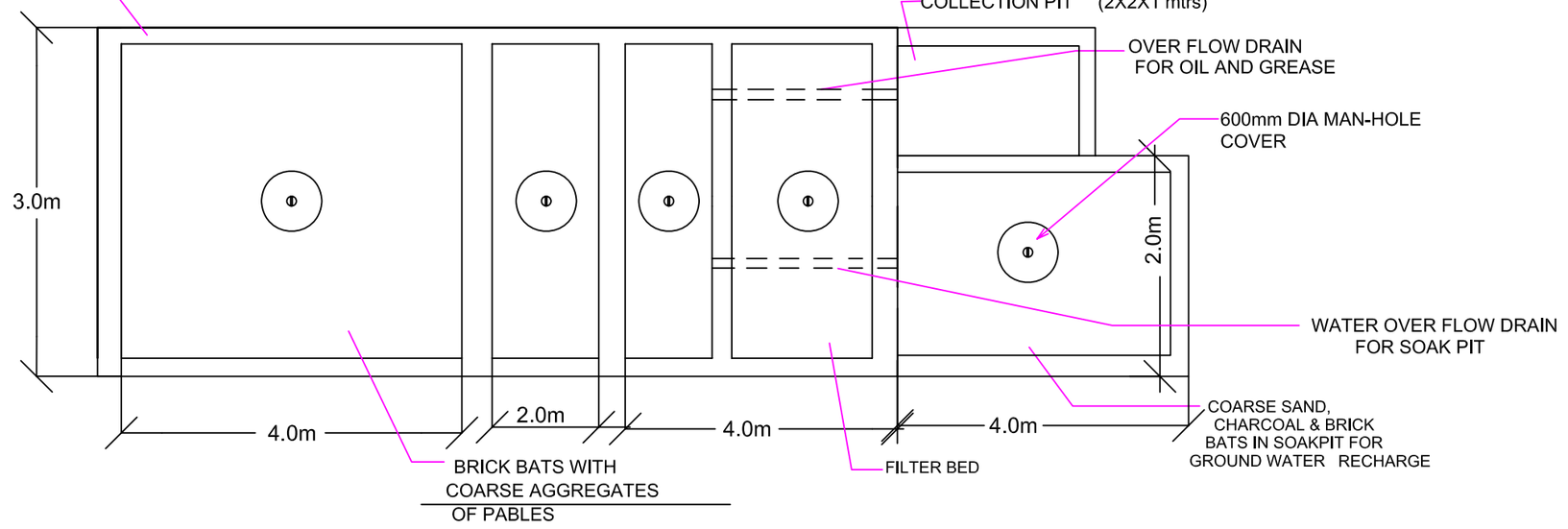
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS PROTECTION WORK & WITH EROSION BLANKET TEL BRIDGE

DRG NO.	OSRP/CEG/PW					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	11	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								



SECTION OF SOAK PIT



PLAN OF SOAK PIT

NOTE: PROVIDE AT CONTRACTOR'S PLANT SITE.

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PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK

STANDARD DRAWINGS
TYPICAL OIL & GREASE TRAP
AT CONTRACTORS CAMP SITE

DRG NO.	OSRP/CEG/O&GT					DESIGNED BY	DRAWN BY	REV.R1	APPROVED
SH. NO.	34	DATE	31/12/12	REV	R-1	CEG	CEG	PREPARED BY EE(PMU)	CE,WBP
SCALE	NTS								

NOTES :-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE MENTIONED.
2. TYPE OF ANCHORAGE -12T13 CONFORMING TO IS:6006
   UTS OF ONE CABLE - 224.8 T
   MODULUS OF ELASTICITY OF HIGH TENSILE STEEL STRANDS = $2.0X10^{6}$ Kg/Cm^{2}
   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. ABSCISSA OF ALL SALIENT POINTS ON CABLE PROFILE ARE GIVEN WITH REFERENCE TO MID SPAN. ORDINATES OF ALL SALIENT 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 A1 AND /OR MODULUS OF ELASTICITY E1 ARE DIFFERENT FROM ASSUMED VALUES (A=1184.4 mm^{2} AND E=$2X10^{6}$ Kg/Cm^{2}). THEORETICAL ELONGATION SHALL BE MODIFIED AS UNDER REVISED $\triangle = \triangle_0$ (IN DRG.) X AE/A1 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. ANCHORANGE RECESSES TO BE SEALED WITH PREPACKED NON SHRINK MORTAR. END FACES OF GIRDERS TO BE COATED WITH 2 COATS OF EPOXY.
12. CONCRETE MIX SHALL BE M - 40.
13. REINFORCEMENT H.Y.S.D. CONFORMING TO IS:1786.Fe = $500N/mm^{2}$.
14. LAP LENGTH 65xDIA 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 CONTROLED CONCRETE WITH DESIGN MIX AS PER IS:10262.
19. FOR DIMENSION AND ANCHORAGE DETAILS REFER MOST STANDARD DRAWINGS(1991) FOR PSC GIRDER & RC SLAB OF DRAWING NOS OF 35M SPAN FROM SI. SD/331, 332,333,334,335,336 & SH. NOS 1,2 & 3 OF SD/337

IMPORTANT NOTES :-

1. IF THE CALCULATED ELONGATION $\triangle_0$ IS REACHED BEFORE THE GIVEN GAUGE READING σ_0 FOR THE CABLE, CONTINUE STRESSING TILL σ_0 IS ACHIEVED PROVIDED THE ELONGATION DOES NOT EXCEED 1.05 $\triangle_0$ IN CASE THE ELONGATION 1.05 $\triangle_0$ IS REACHED BEFORE σ_0 STOP STRESSING AND INFORM ENGINEER -IN-CHARGE.
2. IF AT THE GAUGE READING σ_0 FOR A CABLE THE ELONGATION $\triangle_0$ HAS NOT BEEN REACHED CONTINUE STRESSING BY INTERVELS OF 5 Kg/Cm^{2} UNTIL THE ELONGATION $\triangle_0$ HAS BEEN REACHED OR A PRESSURE NOT GREATER THAN 1.05 σ_0 IS ACHIEVED.

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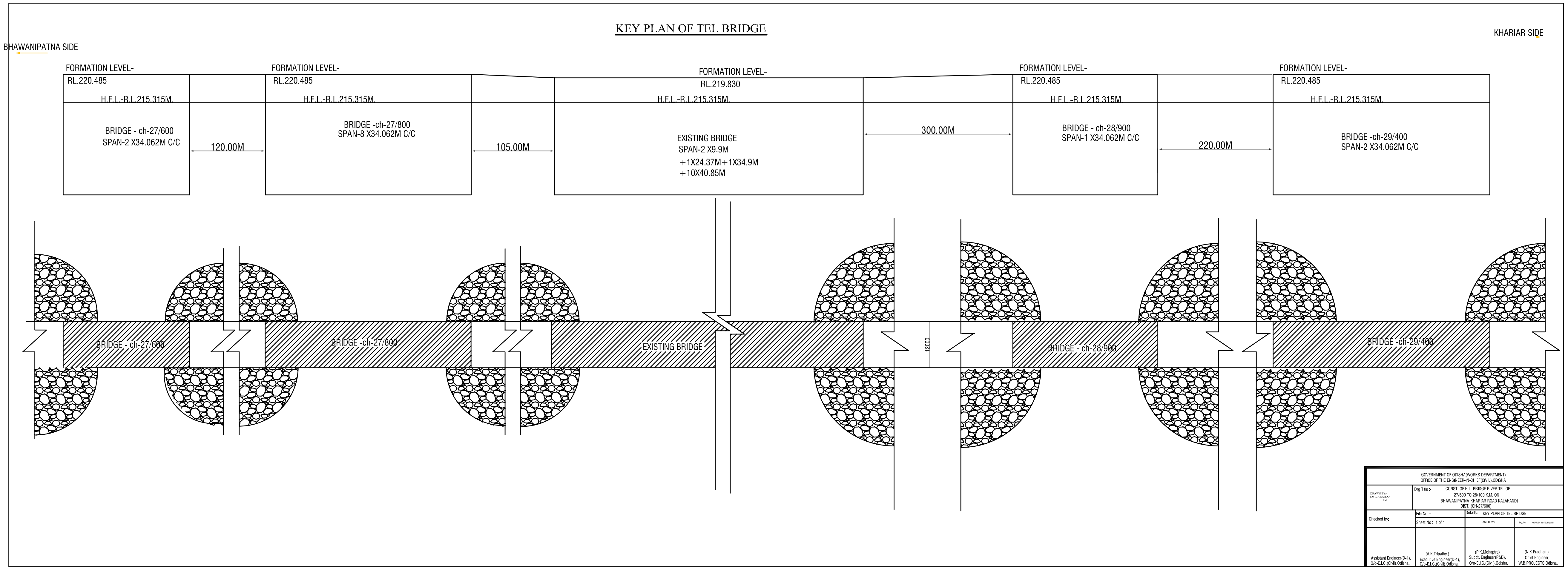
PROJECT:- CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

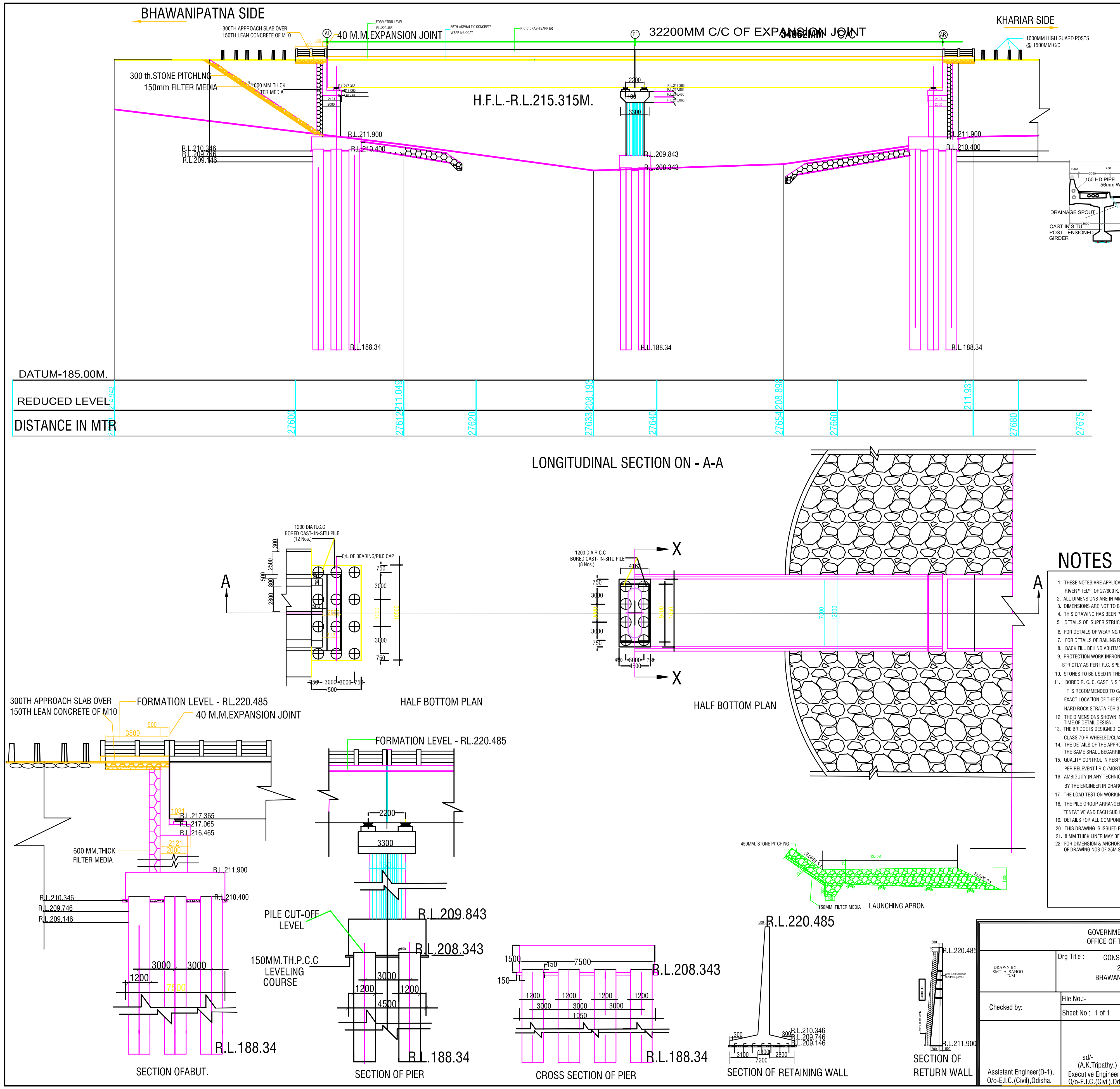
GENERAL NOTES
FOR PSC GIRDERS

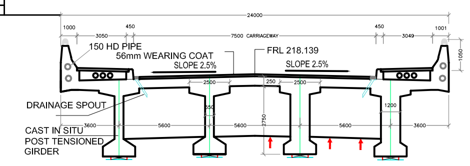
DRAWING NO. : OSRP/CEG/SH-16/BR/NOTES
DATE : DEC, 2012

DRAWN	DESIGNED	REV.R3	APPROVED
CEG	CEG	EE,PMU	CE,WBP



KEY PLAN OF TEL BRIDGE
BHAWANIPATNA SIDE
KHARIAR SIDE
FORMATION LEVEL-
RL.220.485
H.F.L.-R.L.215.315M.
BRIDGE - ch-27/600
SPAN-2 X34.062M C/C
120.00M
FORMATION LEVEL-
RL.220.485
H.F.L.-R.L.215.315M.
BRIDGE -ch-27/800
SPAN-8 X34.062M C/C
105.00M
FORMATION LEVEL-
RL.219.830
H.F.L.-R.L.215.315M.
EXISTING BRIDGE
SPAN-2 X9.9M
+1X24.37M+1X34.9M
+10X40.85M
300.00M
FORMATION LEVEL-
RL.220.485
H.F.L.-R.L.215.315M.
BRIDGE - ch-28/900
SPAN-1 X34.062M C/C
220.00M
FORMATION LEVEL-
RL.220.485
H.F.L.-R.L.215.315M.
BRIDGE -ch-29/400
SPAN-2 X34.062M C/C
BRIDGE - ch-27/600
BRIDGE -ch-27/800
EXISTING BRIDGE
12000
BRIDGE - ch-28/900
BRIDGE -ch-29/400
GOVERNMENT OF ODISHA(WORKS DEPARTMENT)
OFFICE OF THE ENGINEER-IN-CHIEF(CIVIL),ODISHA
DRAWN BY:-
SMT. A SAHOO.
D/M.
Drg Title :- CONST. OF H.L. BRIDGE RIVER TEL OF
27/600 TO 28/100 K.M. ON
BHAWANIPATNA-KHARIAR ROAD KALAHANDI
DIST. (CH-27/600)
Checked by:
File No.:-
Details: KEY PLAN OF TEL BRIDGE
Sheet No : 1 of 1
AS SHOWN
Drg. No: OSRP/SH-16/TEL BR/GEN
Assistant Engineer(D-1),
O/o-E.I.C.(Civil),Odisha.
(A.K.Tripathy.)
Executive Engineer(D-1),
O/o-E.I.C.(Civil),Odisha.
(P.K.Mohaptra)
Supdt. Engineer(P&D),
O/o-E.I.C.(Civil),Odisha.
(N.K.Pradhan.)
Chief Engineer,
W.B.PROJECTS,Odisha.





HYDRAULIC DATA
1.DESIGN DISCHARGE. - - - - -15500 CUMEC
2.VELOCITY - - - -2.47M/ SEC.
3.FORMATION LEVEL - - - -R.L. 220.485M
4. H.F.L. R.L. 215.315M.
5. FOUNDING LEVEL OF ABUTMENTS- - - R.L.188.34M
PIERS---R.L.188.34M
4. D.S.M. --------------------------------8.96M

SPECIFICATION:-
1.SUPPER STRUCTURE (R.C.C.)............M.30
2.WEARING COAT M.30
3.PIER SHAFT,PIER CAP M.30
4.ABUTMENT & ABUTMENT CAP M.30
5.PILE & PILE CAP M.35
6.DIRT WALL & WING WALL M.25

NOTES

1. THESE NOTES ARE APPLICABLE FOR THE GENERAL ARRANGEMENT DRAWING (G.A.D.)FOR THE HIGH LEVEL BRIDGE RIVER " TEL" OF 27/600 K.M. TO 28/100 K.M. ON BHAWANIPATANA-KHARIAR ROAD AT KALAHANDI DIST.ch-27/600
2. ALL DIMENSIONS ARE IN MM. AND R.Ls. ARE IN METERS.
3. DIMENSIONS ARE NOT TO BE SCALED ONLY WRITTENDIMENSIONS ARE TO BE FOLLOWED.
4. THIS DRAWING HAS BEEN PREPARED BASING ON THE H.P FURNISHED BY THE CWPRS.
5. DETAILS OF SUPER STRUCTURE AND POT / POTFE BEARING SHALL BE SUPPLIED SEPARATELY.
6. FOR DETAILS OF WEARING COAT, EXPANSION JOINT AND DRAINAGE SPOUT REFER M.O.S.T. DRG.No.SD/303.
7. FOR DETAILS OF RAILING REFER M.O.S.T. DRG.No. SD/304.
8. BACK FILL BEHIND ABUTMENTS SHOULD BE DONE IN SUCH MATERIALS WHOSE C=0 & Ø > 30°.
9. PROTECTION WORK INFRONT & AROUND THE ABUTMENT AND RETAINING WALL SHALL BE DONE STRICTLY AS PER I.R.C. SPECIFICATIONS & MORTH GUIDE LINES .
10. STONES TO BE USED IN THE PROTECTION WORK SHALL NOT BE LESS THAN 70 K.G EACH.
11. BORED R. C. C. CAST IN SITU PILE SUCKATED INSIDE HARD ROCK. IT IS RECOMMENDED TO CARRY OUT CONFIRMATORY BORING AT EXACT LOCATION OF THE FOUNDATION & CONTINUITY OF THE HARD ROCK STRATA FOR 3.00M BELOW THE FOUNDING LEVEL .
12. THE DIMENSIONS SHOWN IN THIS DRG. ARE TENATIVE & MODIFICATIONS IF REQUIRED SHALL BE MADE AT THE TIME OF DETAIL DESIGN.
13. THE BRIDGE IS DESIGNED CONSIDERING CRITICAL CLASS 70-R WHEELED/CLASS 70 R TRACKED LOADINGEFFECTS OF EITHER CLASS-A TWO LANE OR ONE LANE OF
14. THE DETAILS OF THE APPROACH EMBANKMENT HAS NOT BEEN SHOWN IN THIS DRG. THE DESIGN OF THE SAME SHALL BECARRIED OUT BY THE FIELD DIVISION.
15. QUALITY CONTROL IN RESPECT OF EACH ITEMS OF WORK AS PER RELEVENT I.R.C./MORTH GUIDE LINES SHALL BE STRICTLY FOLLOWED
16. AMBIGUITY IN ANY TECHNICAL PARAMETER SHALL BE SORTED OUT BY THE ENGINEER IN CHARGE WITH FULL RESPONSIBILITY.
17. THE LOAD TEST ON WORKING PILES SHALL BE AS PER CL. 711.8.3 OF I.R.C. 78.
18. THE PILE GROUP ARRANGEMENT SHOWN IN THIS DRAWING IS TENTATIVE AND EACH SUBJECT TO THE RESULT OF PILE LOAD TEST.
19. DETAILS FOR ALL COMPONENT SHALL BE SUPPLIED BEFORE EXECUTION.
20. THIS DRAWING IS ISSUED FOR THE PURPOSE OF TENDER AND ESTIMATE ONLY.
21. 8 MM THICK LINER MAY BE PROVIDED FOR THE FULL LENGTH OF PILE UP TO HARD ROCK LEVEL .
22. FOR DIMENSION & ANCHORAGE DETAILS REFER MOST STANDARD DRAWINGS(1991) FOR PSC GIRDER & RC SLAB. OF DRAWING NOS OF 35M SPAN FROM SI. SD/331,332,333,334,335,336 & SHEET NOS 1,2 & 3 OF SD/337

GOVERNMENT OF ODISHA(WORKS DEPARTMENT)
OFFICE OF THE ENGINEER-IN-CHIEF(CIVIL),ODISHA

DRAWN BY : - SMT. A. SAHOO D/M	Drg Title : CONST. OF H.L. BRIDGE RIVER TEL OF 27/600 TO 28/100 K.M. ON BHAWANIPATNA-KHARIAR ROAD KALAHANDI DIST. (CH-27/600) SPAN 2 X 32200MM. C/C		
Checked by:	File No.:-	Details: GENERAL ARRANGEMENT DRAWING	
	Sheet No : 1 of 1	AS SHOWN	Drg.No.:- OSRP/SH-16/TEL BR/GAD/27600
Assistant Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	sd/- (A.K.Tripathy.) Executive Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	(P.K.Mohaptra) Supdt. Engineer(P&D), O/o-E.I.C.(Civil),Odisha.	sd/- (N.K.Pradhan.) Chief Engineer, W.B.PROJECTS,Odisha.

TO BHAWANIPATNA

TO KHARIAR

DRAIN

BRIDGE	
CHAINAGE:	27+650
TYPE:	SLAB
LENGHT:	64.4
NO OF SPAN:	7 X 9.2
PROPOSED LEVEL:	216.189

AGRICULTURE LAND

AGRICULTURE LAND

AGRICULTURE LAND

AGRICULTURE LAND

EXISTING TWO LANE BRIDGE
AT CH. 27+650 SPAN
7X9.2M SKEW ANGLE 0°

DRAIN

DRAIN

CURVE NO.52	
HIP	27+511.0
V	80 kmph
R	-240m
$	29° 35' 51.2"
Dir	left
Ls	90.0m
Ts	108.7m
Lc	33.98m
Es	9.7m
e	7%
W	0.6m

CURV	
HIP	2
V	8
R	
$	12°
Dir	
Ls	
Ts	
Lc	3
Es	
e	
W	

SITE PLAN

NOTES:

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PROJECT:-

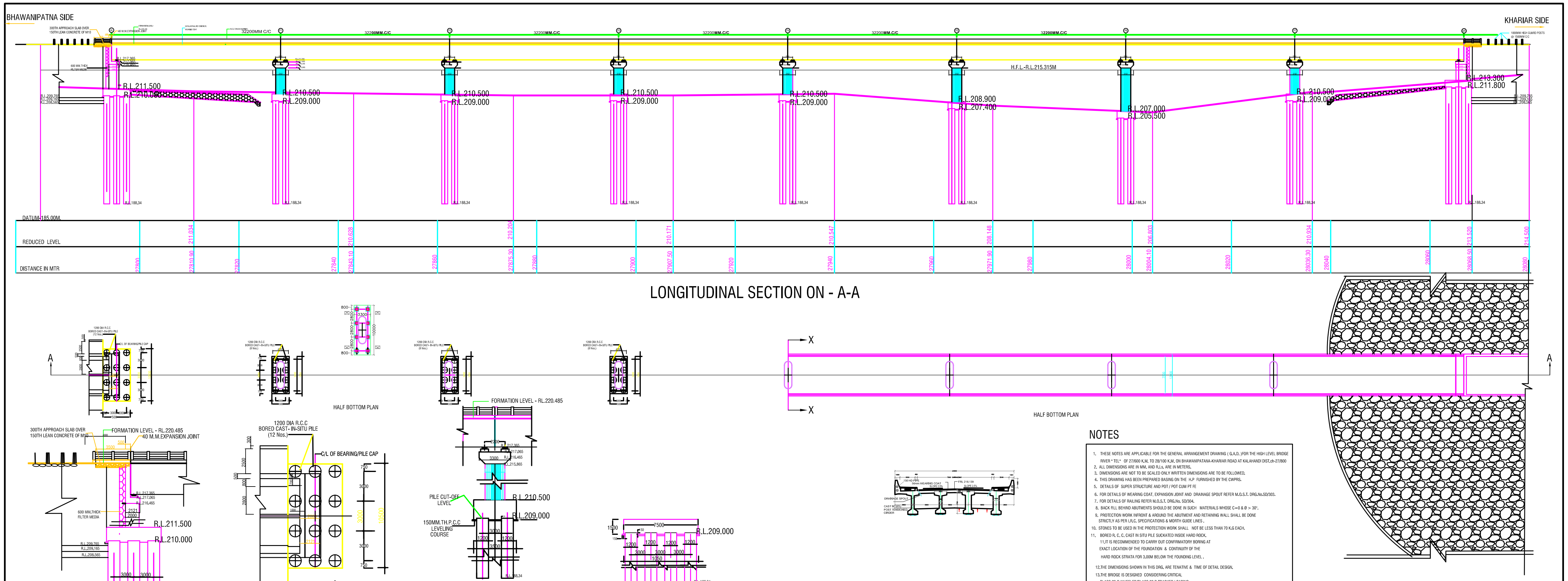
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

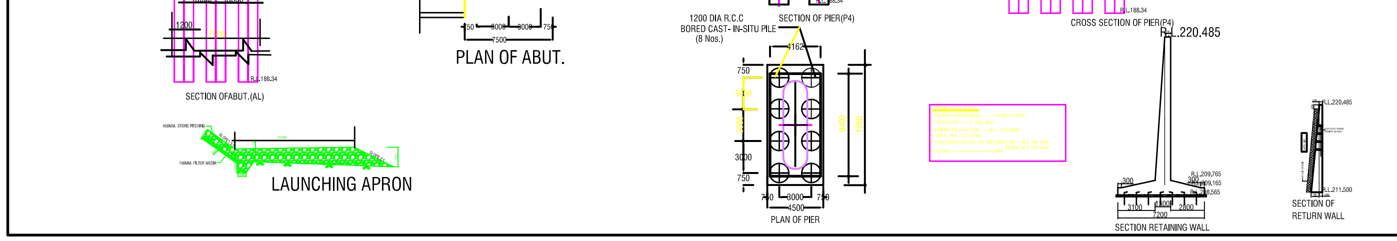
SITE PLAN

BRIDGE AT PROPOSED CH. 27+650
SANA DUBURA NALLAH (MINOR BRIDGE NO - 1)

DRAWING NO. : OSRP/CEG/SH-16/BR/27+600
DATE : DEC, 2012

DRAWN BY	DESIGNED BY	REV.R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP





SPECIFICATION:-

1.SUPPER STRUCTURE (R.C.C.)............M.30

2.WEARING COAT M.30

3.PIER SHAFT,PIER CAP M.30

4.ABUTMENT & ABUTMENT CAP M.30

5.PILE & PILE CAP M.35

6.DIRT WALL & WING WALL M.25

NOTES

1. THESE NOTES ARE APPLICABLE FOR THE GENERAL ARRANGEMENT DRAWING (G.A.D.)FOR THE HIGH LEVEL BRIDGE RIVER " TEL' OF 27/600 K.M. TO 28/100 K.M. ON BHAWANIPATANA-KHARIAR ROAD AT KALAHANDI DIST.ch-27/800
2. ALL DIMENSIONS ARE IN MM. AND R.Ls. ARE IN METERS.
3. DIMENSIONS ARE NOT TO BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
4. THIS DRAWING HAS BEEN PREPARED BASING ON THE H.P FURNISHED BY THE CWPRS.
5. DETAILS OF SUPER STRUCTURE AND POT / POT CUM PT FE
6. FOR DETAILS OF WEARING COAT, EXPANSION JOINT AND DRAINAGE SPOUT REFER M.O.S.T. DRG.No.SD/303.
7. FOR DETAILS OF RAILING REFER M.O.S.T. DRG.No. SD/304.
8. BACK FILL BEHIND ABUTMENTS SHOULD BE DONE IN SUCH MATERIALS WHOSE C=0 & Ø > 30°.
9. PROTECTION WORK INFRONT & AROUND THE ABUTMENT AND RETAINING WALL SHALL BE DONE STRICTLY AS PER I.R.C. SPECIFICATIONS & MORTH GUIDE LINES .
10. STONES TO BE USED IN THE PROTECTION WORK SHALL NOT BE LESS THAN 70 K.G EACH.
11. BORED R. C. C. CAST IN SITU PILE SUCKATED INSIDE HARD ROCK.
11.IT IS RECOMMENDED TO CARRY OUT CONFIRMATORY BORING AT EXACT LOCATION OF THE FOUNDATION & CONTINUITY OF THE HARD ROCK STRATA FOR 3.00M BELOW THE FOUNDING LEVEL .
12.THE DIMENSIONS SHOWN IN THIS DRG. ARE TENATIVE & TIME OF DETAIL DESIGN.
13.THE BRIDGE IS DESIGNED CONSIDERING CRITICAL CLASS 70-R WHEELED/CLASS 70 R TRACKED LOADING.
14.THE DETAILS OF THE APPROACH EMBANKMENT HAS NOT BEEN SHOWN IN THIS DRG. THE DESIGN OF THE SAME SHALL BECARRIED OUT BY THE FIELD DIVISION.
15.QUALITY CONTROL IN RESPECT OF EACH ITEMS OF WORK AS PER RELEVENT I.R.C./MORTH GUIDE LINES SHALL BE STRICTLY FOLLOWED
16.AMBIGUITY IN ANY TECHNICAL PARAMETER SHALL BE SORTED OUT BY THE ENGINEER IN CHARGE WITH FULL RESPONSIBILITY.
17.THE LOAD TEST ON WORKING PILES SHALL BE AS PER CL. 711.8.3 OF I.R.C. 78.
18.THE PILE GROUP ARRANGEMENT SHOWN IN THIS DRAWING IS TENTATIVE AND EACH SUBJECT TO THE RESULT OF PILE LOAD TEST.
19.DETAILS FOR ALL COMPONENT SHALL BE SUPPLIED BEFORE EXECUTION.
20.THIS DRAWING IS ISSUED FOR THE PURPOSE OF TENDER AND ESTIMATE ONLY.
21. 8 MM THICK LINER MAY BE PROVIDED FOR THE FULL LENGTH OF PILE UP TO HARD ROCK LEVEL .
22. FOR DIMENSION & ANCHORAGE DETAILS REFER MOST STANDARD DRAWINGS(1991) FOR PSC GIRDER & RC SLAB. OF DRAWING NOS OF 35M SPAN FROM SI. SD/331,332,333,334,335,336 & SHEET NOS 1,2 & 3 OF SD/337

GOVERNMENT OF ODISHA(WORKS DEPARTMENT)
OFFICE OF THE ENGINEER-IN-CHIEF(CIVIL),ODISHA

DRAWN BY:- SMT. A SAHOO. D/M.	Drg Title : CONST. OF H.L. BRIDGE RIVER TEL OF 27/600 TO 28/100 K.M. ON BHAWANIPATNA-KHARIAR ROAD KALAHANDI DIST. (CH-27/800) SPAN 8 X 32200MM. C/C		
Checked by:	File No.:-	Details: GENERAL ARRANGEMENT DRAWING	
	Sheet No : 1 of 1	AS SHOWN	Drg.No.:-
Assistant Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	(A.K.Tripathy.) Executive Engineer(D-1),	(P.K.Mohaptra) Supdt. Engineer(P&D), O/o-E.I.C.(Civil),Odisha.	(N.K.Pradhan.) Chief Engineer, W.B.PROJECTS,Odisha.

	C O N S U L T I N G ENGINEERS GROUP LTD. E-12,Mo|i Colony,Malviya Nagar ,Jaipur-17 Tel: +91-141- 2520899, 2521899, 2520556 Fax: 252148, E-Mail: cegg@cegindia.com	PROJECT: CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	SITE PLAN BRIDGE AT PROPOSED CH. 27+949 MINOR BRIDGE NO - 2 (TEL APPROACH)

DRAWN BY	DESIGNED BY	REV.R1	APPROVED
CEG	CEO	EE,PWU	CE,MBP

DRAWING NO. : OSRP/CEG/SH-16/BR/27+800
DATE : DEC. 2012

SITE PLAN

CURVE NO.53	
HIP	27+871.5
V	80 kmph
R	-400m
$	12° 13' 40.7"
Dir	Left
Ls	55.0m
Ts	70.4m
Lc	30.37m
Es	2.6m
e	7%
W	NA

CURVE NO.54	
HIP	28+065.0
V	100 kmph
R	-8000m
$	0° 15' 41.5"
Dir	Left
Ls	NA
Ts	0.0m
Lc	36.52m
Es	0.0m
e	N.C.
W	NA

PROPOSED NEW TWO LANE BRIDGE AT CH. 27+949 SPAN 8X32.2M SKEW ANGLE 0°

KM28/0

DRAIN

AGRICULTURE LAND

AGRICULTURE LAND

AGRICULTURE LAND

DRAIN

DRAIN

BRIDGE	
CHAINAGE:	27+949
TYPE:	PSC GIRDER
LENGHT:	257.600
NO OF SPAN:	8 X 32.2
PROPOSED LEVEL:	218.139

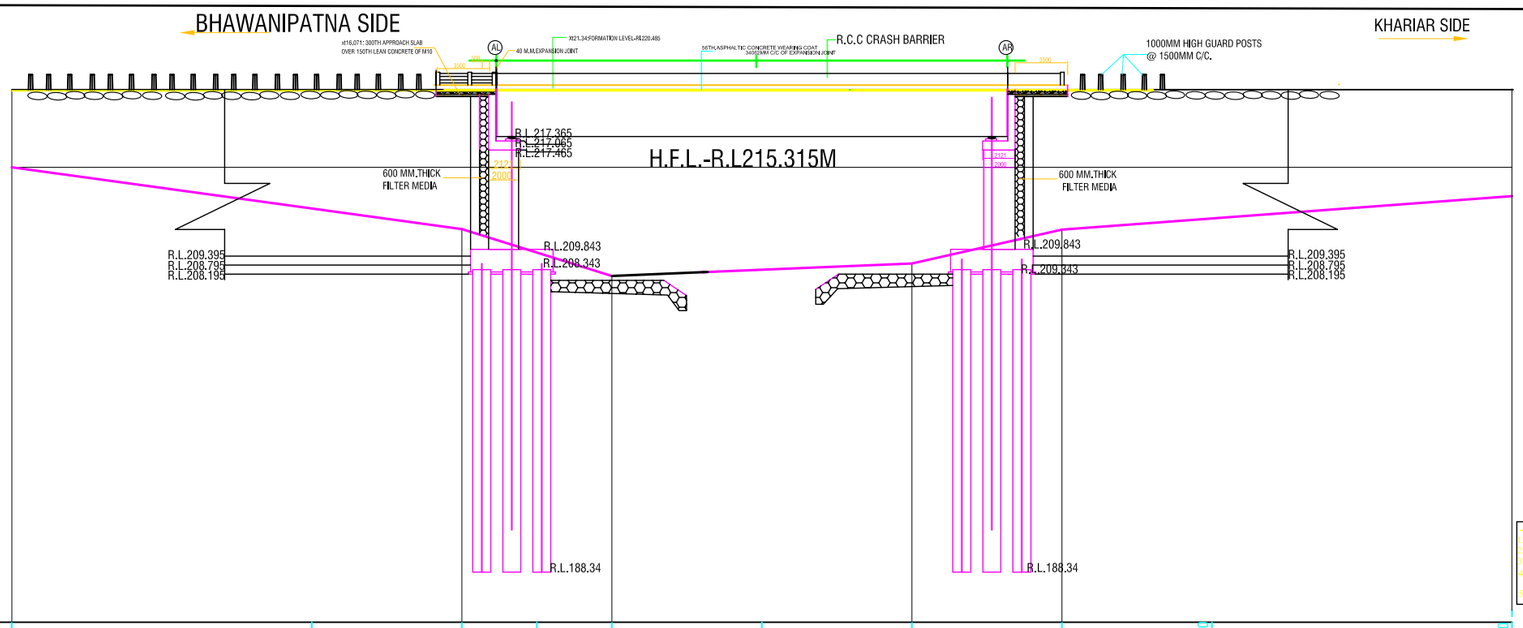
TO KHARIAR

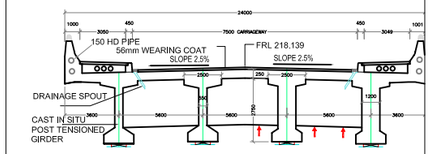
TO BHAWANIPATNA

NOTES:

BHAWANIPATNA SIDE

KHARIAR SIDE





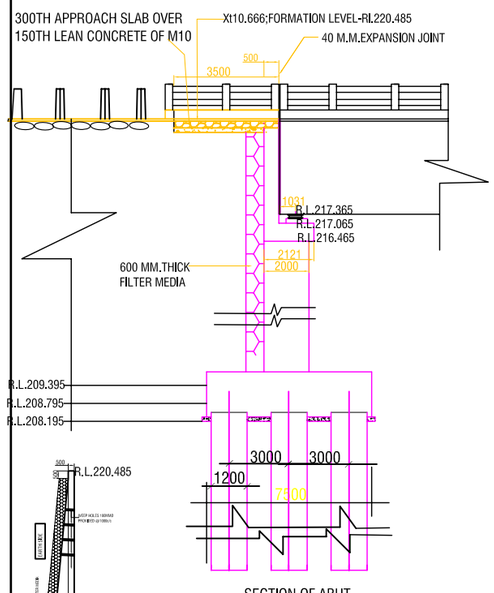
HYDRAULIC DATA

1. VELOCITY - - - -2.58M/SEC.
2. FORMATION LEVEL - - - -R.L. 220.485M
3. H.F.L. - R.L.215.315M
4. FOUNDING LEVEL OF ABUTMENTS- - - R.L.188.34M
PIERS---R.L.188.34M
5. D.S.M. ----------7.47M

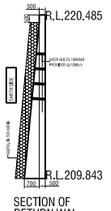
SPECIFICATION:-

1.SUPPER STRUCTURE (R.C.C.)..... M.30
2.WEARING COAT M.30
3.PIER SHAFT,PIER CAP M.30
4.ABUTMENT & ABUTMENT CAP M.30
5.PILE & PILE CAP M.35
6.DIRT WALL & WING WALL M.25

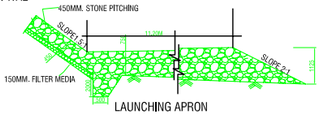
300TH APPROACH SLAB OVER
150TH LEAN CONCRETE OF M10



SECTION OF ABUT.

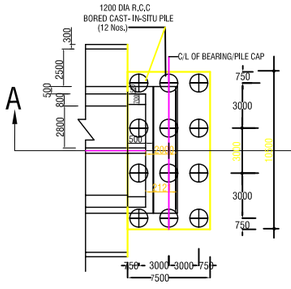


SECTION OF
RETURN WAL

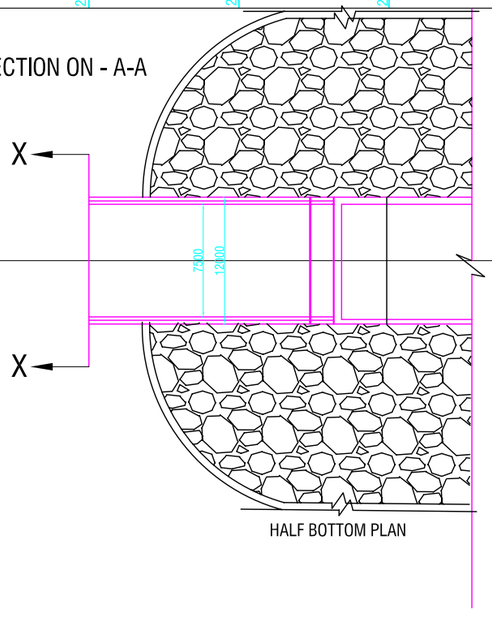


LAUNCHING APRON

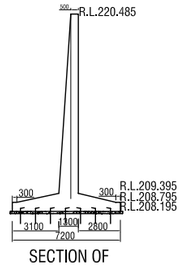
LONGITUDINAL SECTION ON - A-A



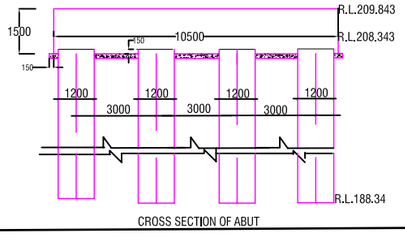
HALF BOTTOM PLAN



HALF BOTTOM PLAN



SECTION OF
RETAINING WALL



CROSS SECTION OF ABUT

NOTES

1. THESE NOTES ARE APPLICABLE FOR THE GENERAL ARRANGEMENT DRAWING (G.A.D.)FOR THE HIGH LEVEL BRIDGE RIVER " TEL" OF 27/600 K.M. TO 28/100 K.M. ON BHAWANIPATANA-KHARIAR ROAD AT KALAHANDI DIST.ch-28/900
2. ALL DIMENSIONS ARE IN MM. AND R.L's. ARE IN METERS.
3. DIMENSIONS ARE NOT TO BE SCALED ONLY WRITTENDIMENSIONS ARE TO BE FOLLOWED.
4. THIS DRAWING HAS BEEN PREPARED BASING ON THE H.P FURNISHED BY THE CWPRS.
5. DETAILS OF SUPER STRUCTURE AND POT / POTFE BEARING SHALL BE SUPPLIED SEPARATELY.
6. FOR DETAILS OF WEARING COAT, EXPANSION JOINT AND DRAINAGE SPOUT REFER M./O.S.T. DRG.No.SD/303.
7. FOR DETAILS OF RAILING REFER M./O.S.T. DRG.No. SD/304.
8. BACK FILL BEHIND ABUTMENTS SHOULD BE DONE IN SUCH MATERIALS WHOSE C= 0 & ϕ > 30°.
9. PROTECTION WORK INFRONT & AROUND THE ABUTMENT AND RETAINING WALL SHALL BE DONE STRICTLY AS PER I.R.C. SPECIFICATIONS & MORTH GUIDE LINES .
10. STONES TO BE USED IN THE PROTECTION WORK SHALL NOT BE LESS THAN 70 K.G EACH.
11. BORED R. C. C. CAST IN SITU PILE SUCKATED INSIDE HARD ROCK. IT IS RECOMMENDED TO CARRY OUT CONFIRMATORY BORING AT EXACT LOCATION OF THE FOUNDATION & CONTINUITY OF THE HARD ROCK STRATA FOR 3.00M BELOW THE FOUNDING LEVEL .
12. THE DIMENSIONS SHOWN IN THIS DRG. ARE TENATIVE & MODIFICATIONS IF REQUIRED SHALL BE MADE AT THE TIME OF DETAIL DESIGN.
13. THE BRIDGE IS DESIGNED CONSIDERING CRITICAL CLASS 70-R WHEELED/CLASS 70 R TRACKED LOADING EFFECTS OF EITHER CLASS-A TWO LANE OR ONE LANE OF
14. THE DETAILS OF THE APPROACH EMBANKMENT HAS NOT BEEN SHOWN IN THIS DRG, THE DESIGN OF THE SAME SHALL BECARRIED OUT BY THE FIELD DIVISION.
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16. AMBIGUITY IN ANY TECHNICAL PARAMETER SHALL BE SORTED OUT BY THE ENGINEER IN CHARGE WITH FULL RESPONSIBILITY.
17. THE LOAD TEST ON WORKING PILES SHALL BE AS PER CL. 711,8.3 OF I.R.C. 78.
18. THE PILE GROUP ARRANGEMENT SHOWN IN THIS DRAWING IS TENTATIVE AND EACH SUBJECT TO THE RESULT OF PILE LOAD TEST.
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21. 8 MM THICK LINER MAY BE PROVIDED FOR THE FULL LENGTH OF PILE UP TO HARD ROCK LEVEL .
22. FOR DIMENSION & ANCHORAGE DETAILS REFER MOST STANDARD DRAWINGS(1991) FOR PSC GIRDER & RC SLAB. OF DRAWING NOS OF 35M SPAN FROM SL SD/331,332,333,334,335,336 & SHEET NOS 1,2 & 3 OF SD/337

GOVERNMENT OF ODISHA(WORKS DEPARTMENT)
OFFICE OF THE ENGINEER-IN-CHIEF(CIVIL),ODISHA

DRAWN BY
SMT. A. SAHOO
D/M

Drg Title :- X|1.6089,t1.6089;CONST. OF H.L. BRIDGE RIVER TEL OF 27/600 TO 28/100 K.M. ON BHAWANIPATNA-KHARIAR ROAD KALAHANDI DIST. (CH-28/900) SPAN 1 X 32200 MM. C/C

Checked by:

File No.:-

Details: GENERAL ARRANGEMENT DRAWING

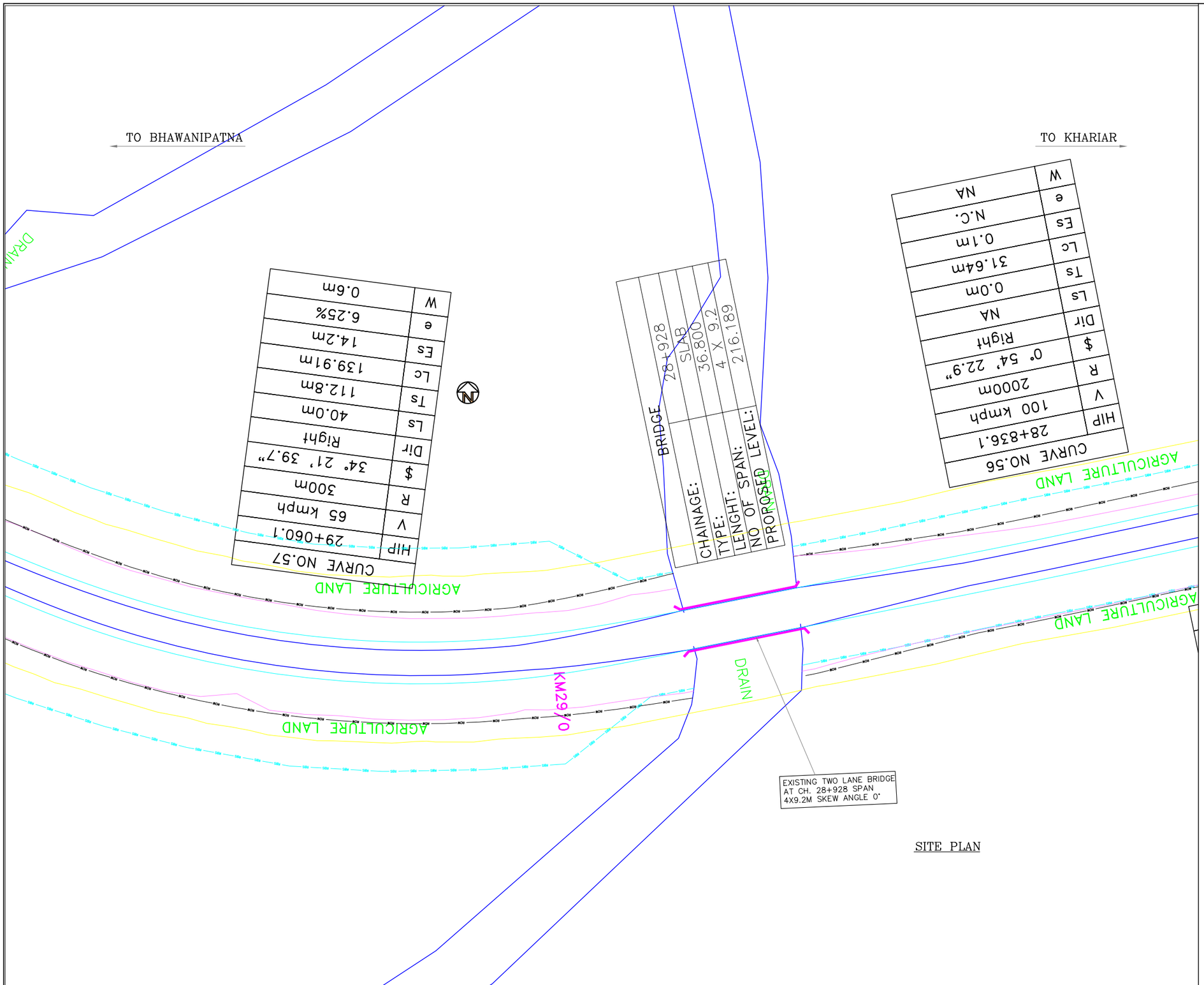
Sheet No : 1 of 1

As SHOWN

Drg.No.:- OSRP/SH-16/TEL BR/GAD/28900

Assistant Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	sd/- (A.K.Tripathy.) Executive Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	(P.K.Mohaptra) Supdt. Engineer(P&D), O/o-E.I.C.(Civil),Odisha.	sd/- (N.K.Pradhan.) Chief Engineer, W.B.PROJECTS,Odisha.

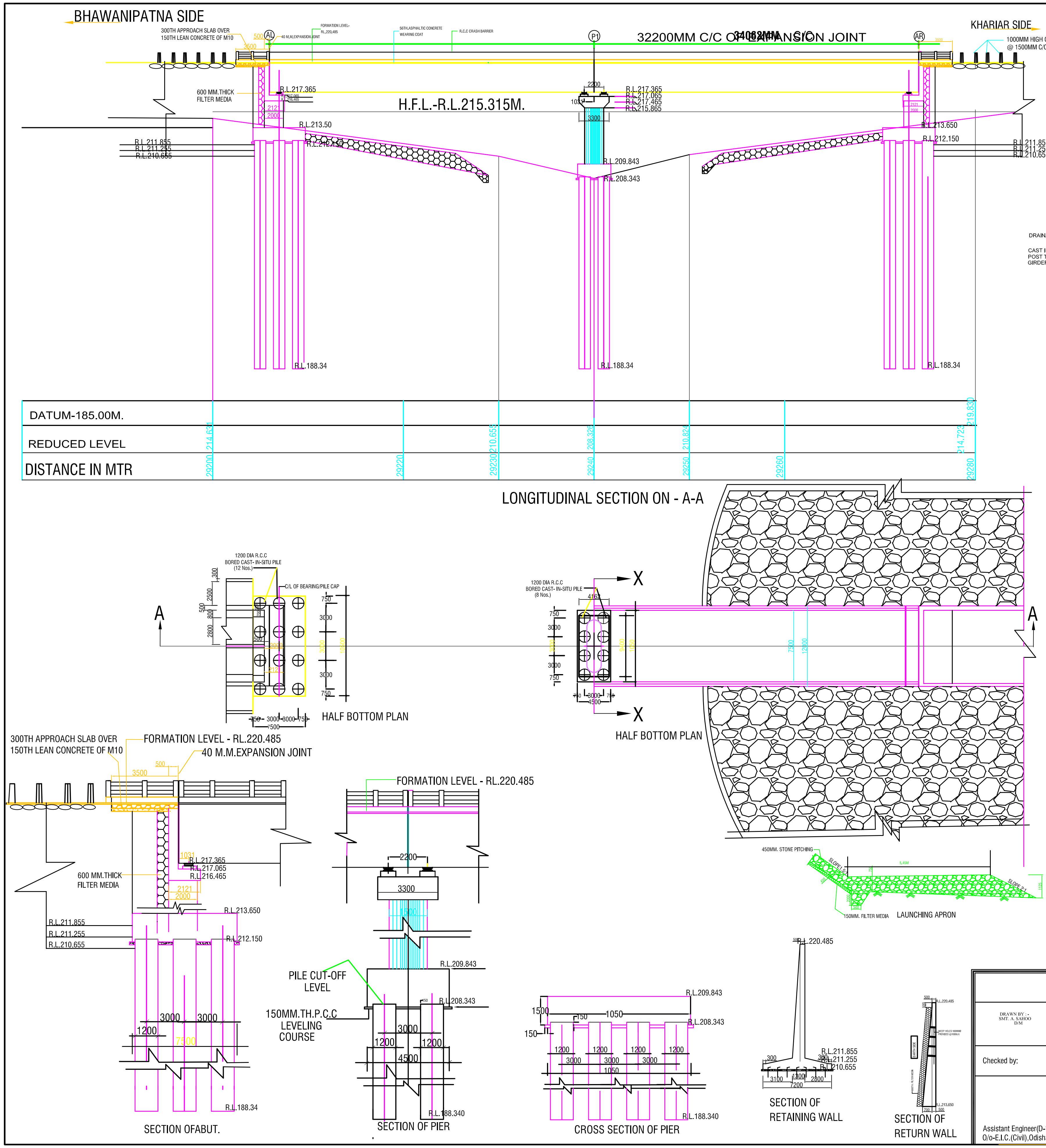
NOTES:

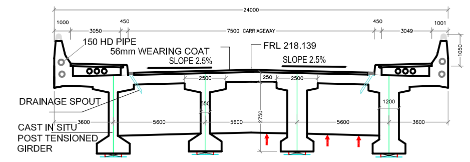


SITE PLAN

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	PROJECT:- CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE	SITE PLAN BRIDGE AT PROPOSED CH. 28+928 MINOR BRIDGE NO - 3 (BRANCH OF UDANTI)	DRAWING NO. : OSRP/CEG/SH-16/BR/28+900 DATE : DEC, 2012

DRAWN BY	DESIGNED BY	REV.R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP





HYDRAULIC DATA

1.VELOCITY - - - -1.33M/ SEC.
2.FORMATION LEVEL - - - -R.L. 220.485M
3. H.F.L. R.L. 215.315M.
4. FOUNDING LEVEL OF ABUTMENTS- - - R.L.188.34M
PIERS---R.L.188.34M
5. D.S.M. --------------------------------3.63M

SPECIFICATION:-

1.SUPPER STRUCTURE (R.C.C.)...........M.30
2.WEARING COAT M.30
3.PIER SHAFT,PIER CAP M.30
4.ABUTMENT & ABUTMENT CAP M.30
5.PILE & PILE CAP M.35
6.DIRT WALL & WING WALL M.25

NOTES

1. THESE NOTES ARE APPLICABLE FOR THE GENERAL ARRANGEMENT DRAWING (G.A.D.)FOR THE HIGH LEVEL BRIDGE RIVER " TEL" OF 27/600 K.M. TO 28/100 K.M. ON BHAWANIPATANA-KHARIAR ROAD AT KALAHANDI DIST.ch-29/400
2. ALL DIMENSIONS ARE IN MM. AND R.Ls. ARE IN METERS.
3. DIMENSIONS ARE NOT TO BE SCALED ONLY WRITTENDIMENSIONS ARE TO BE FOLLOWED.
4. THIS DRAWING HAS BEEN PREPARED BASING ON THE H.P FURNISHED BY THE CWPRS.
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6. FOR DETAILS OF WEARING COAT, EXPANSION JOINT AND DRAINAGE SPOUT REFER M.O.S.T. DRG.No.SD/303.
7. FOR DETAILS OF RAILING REFER M.O.S.T. DRG.No. SD/304.
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9. PROTECTION WORK INFRONT & AROUND THE ABUTMENT AND RETAINING WALL SHALL BE DONE STRICTLY AS PER I.R.C. SPECIFICATIONS & MORTH GUIDE LINES .
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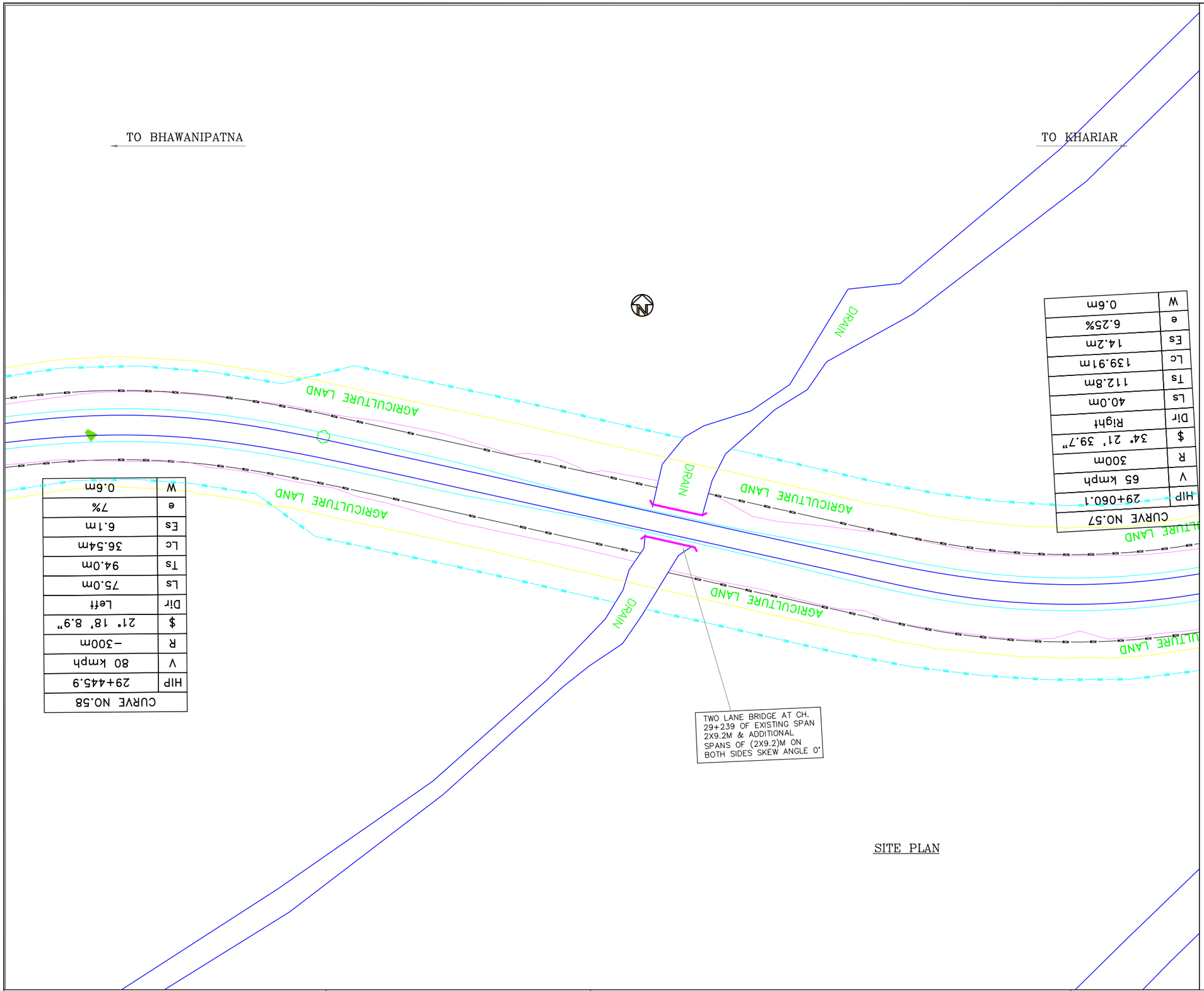
GOVERNMENT OF ODISHA(WORKS DEPARTMENT)
OFFICE OF THE ENGINEER-IN-CHIEF(CIVIL),ODISHA

DRAWN BY : - SMT. A. SAHOO D/M	Drg Title :- CONST. OF H.L. BRIDGE RIVER TEL OF 27/600 TO 28/100 K.M. ON BHAWANIPATNA-KHARIAR ROAD KALAHANDI DIST. (CH-29/400) SPAN 2 X 32200MM. C/C		
Checked by:	File No.:-	Details: GENERAL ARRANGEMENT DRAWING	
	Sheet No : 1 of 1	AS SHOWN	Drg.No.:- OSRP/SH-16/TEL BR/GAD/29400
Assistant Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	sd/- (A.K.Tripathy.) Executive Engineer(D-1), O/o-E.I.C.(Civil),Odisha.	(P.K.Mohaptra) Supdt. Engineer(P&D), O/o-E.I.C.(Civil),Odisha.	sd/- (N.K.Pradhan.) Chief Engineer, W.B.PROJECTS,Odisha.

NOTES:



CURVE NO.57	
HIP	29+060.1
V	65 kmph
R	300m
$	34° 21' 39.7"
Dir	Right
Ls	40.0m
Ts	112.8m
Lc	139.91m
Es	14.2m
e	6.25%
W	0.6m

CURVE NO.58	
HIP	29+445.9
V	80 kmph
R	-300m
$	21° 18' 8.9"
Dir	Left
Ls	75.0m
Ts	94.0m
Lc	36.54m
Es	6.1m
e	7%
W	0.6m

SITE PLAN

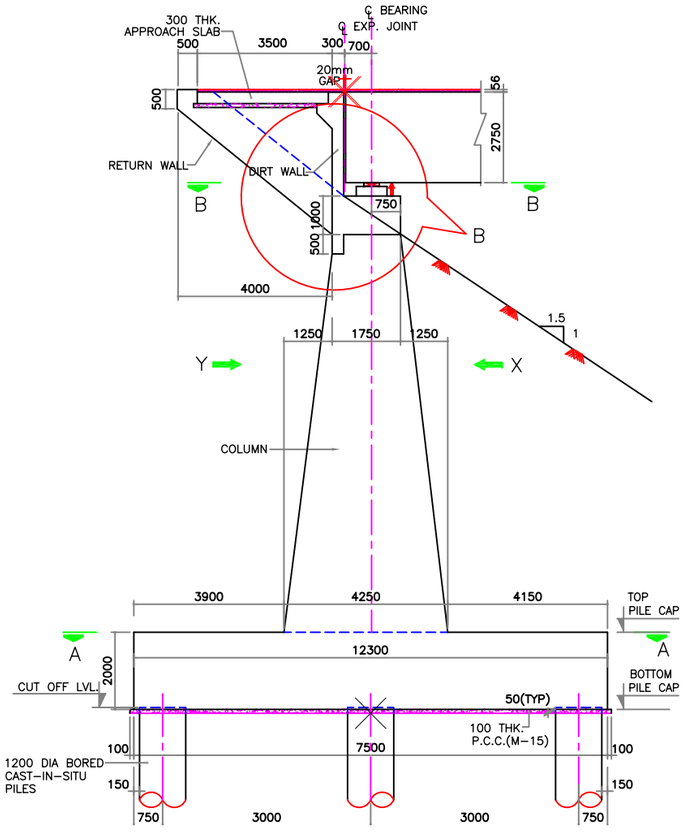
CONSULTING
ENGINEERS GROUP LTD.
E-12,Moji Colony,Malviya Nagar Jaipur-17
Tel: +91-141- 2520899, 2521899, 2520556
Fax: 2521348, E-Mail: ceg@cegindia.com

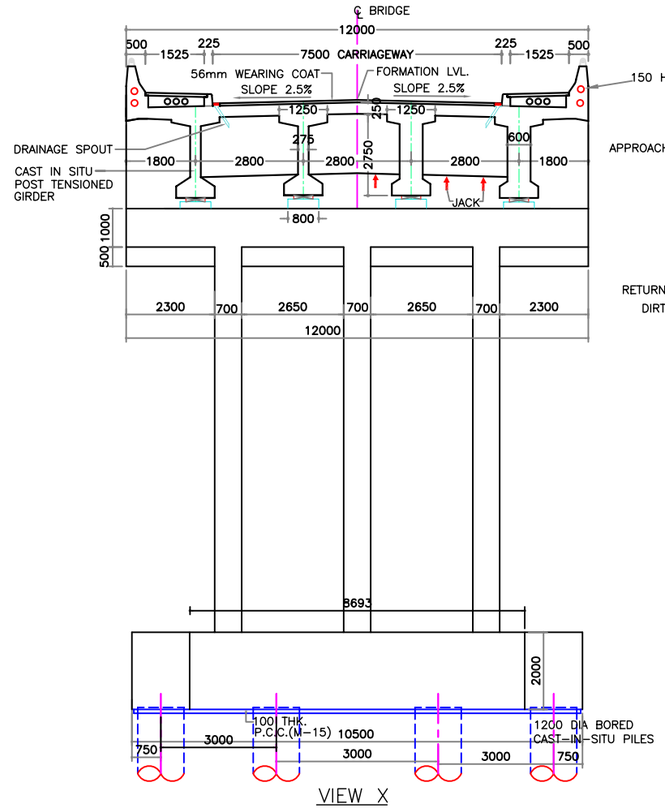
PROJECT:-
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

SITE PLAN
BRIDGE AT PROPOSED CH. 29+239
MINOR BRIDGE NO - 4 (BRANCH OF UDANTI)

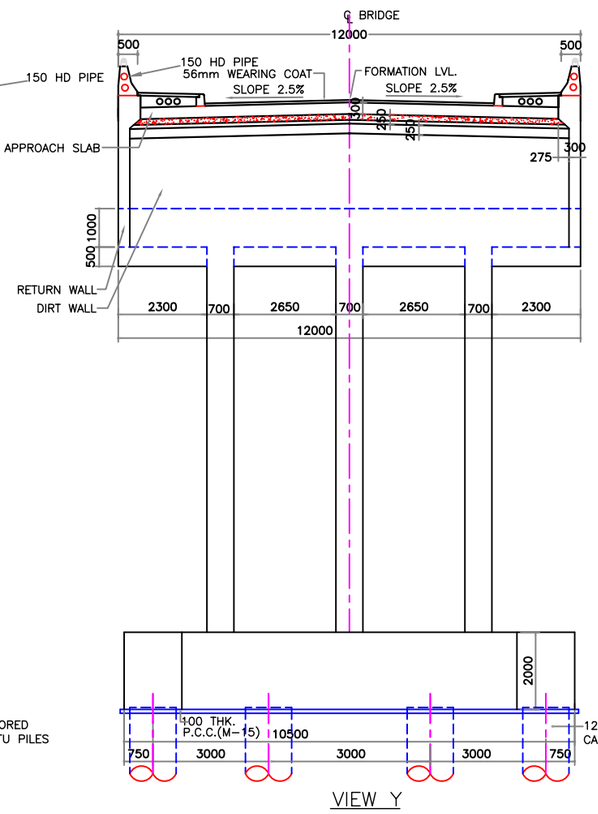
DRAWING NO. : OSRP/CEG/SH-16/BR/29+400
DATE : DEC, 2012

DRAWN BY	DESIGNED BY	REV.R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP





VIEW X



VIEW Y

NOTES:

1. ALL DIMENSIONS ARE IN mm AND LEVELS IN METER.
2. DO NOT SCALE THE DIMENSIONS .ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE AS FOLLOWS
   - PILE & PILE CAP M-35
   - ABUTMENT & ABUTMENT CAP.....M-35
   - DIRT WALL M-30
   - PEDESTAL M-35
   - LEVELLING COURSE.....M-15
4. ⊗ SHOWS JACK LOCATION IN PLAN & ↑ SHOWS JACK LOCATION IN ELEVATION. LOCATION OF JACKS IS CLEARLY MARKED ON THE TOP OF ABUTMENT CAP.
5. ALL PILES IS SOCKETED IN THE ROCK BY 2000 mm BELOW THE ROCK LEVEL.
6. 5mm THICK MS LINER TO PILES IS BE PROVIDED FROM BOTTOM OF PILE CAP TO ROCK LEVEL.
7. FOR DETAILS OF EXPANSIONS JOINT, APPROACH SLAB, CRASH BARRIER, ETC. REFER DRAWING NO. OSRP/CEG/BR/MISC-01
8. MAXIMUM AXIL LOAD ON PILE = 290 t

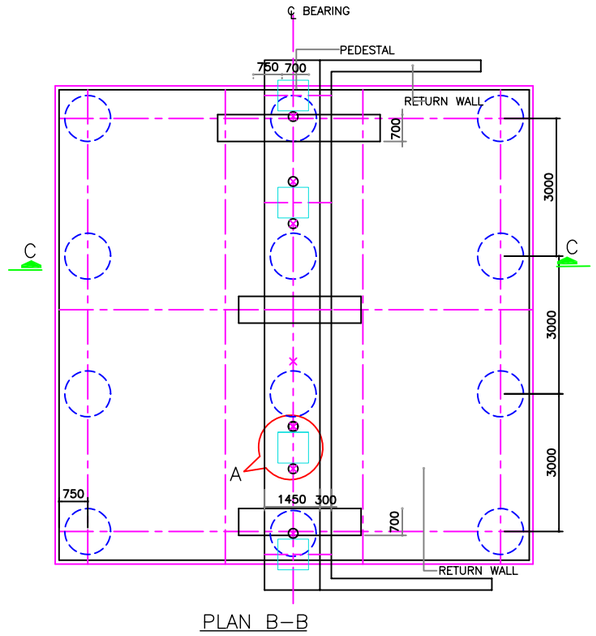
REFERENCE DRAWINGS:

1 OSRP/CEG/SH-16/BR/SUB/01
2 OSRP/CEG/SH-16/BR/SUB/03
(SHEET 1 OF 2) & (SHEET 2 OF 2)

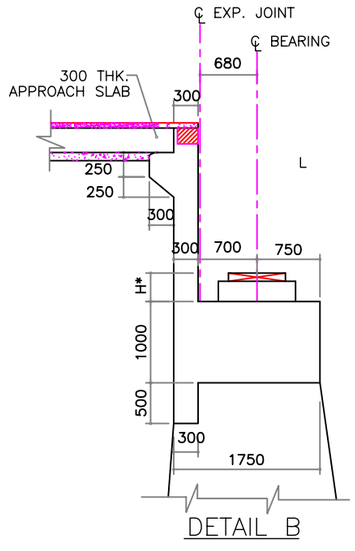
LEVELS CHART FOR PILE CAP LAYOUT

AT BRIDGE NO. 27+800

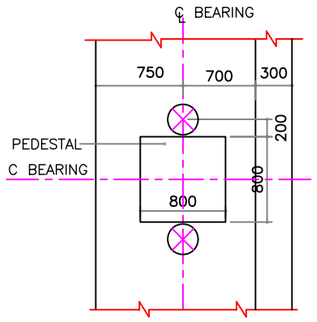
ABUTMENT DESIGNATION	BED LEVELS	TOP OF PILE CAP	CUT OFF LEVELS	FOUNDING LEVELS
A1	211.049	211.900	210.400	188.340
A2	211.931	211.900	210.400	188.340



PLAN B-B



DETAIL B



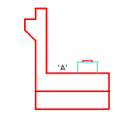
DETAIL A
(SHOWING PEDESTAL)

HEIGHT OF PEDESTAL H*=350-HEIGHT OF BEARING

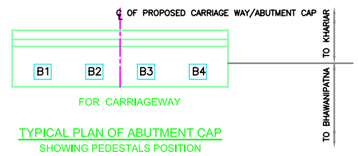
LEVELS CHART FOR ABUTMENTS

AT BRIDGE NO. 27+800

ABUTMENT DESIGNATION	FORMATION LEVELS	HFL	BED LEVELS	ABUTMENT CAP TOP LEVELS 'A'	HEIGHT OF PEDESTAL+ BEARING			
					B1	B2	B3	B4
A1	220.485	215.315	211.049	217.365	0.350	0.420	0.420	0.350
A2	220.485	215.315	211.931	217.365	0.350	0.420	0.420	0.350



SECTION OF ABUTMENT CAP



FOR CARRIAGEWAY

TYPICAL PLAN OF ABUTMENT CAP
SHOWING PEDESTALS POSITION

C O N S U L T I N G
ENGINEERS GROUP LTD.
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Tel: +91-141- 2520899, 2521899, 2520556
Fax: 2521348, E-Mail: ceg@cegindia.com

PROJECT:-

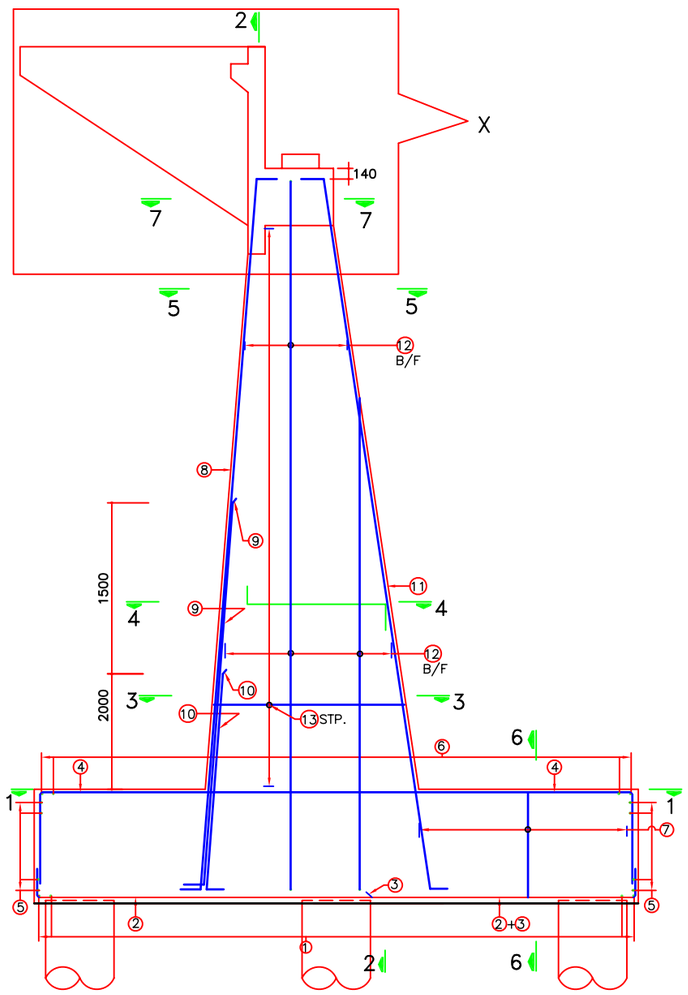
CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ORISSA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DIMENSION DETAILS OF ABUTMENT,ABUTMENT CAP, PILE & PILE CAP

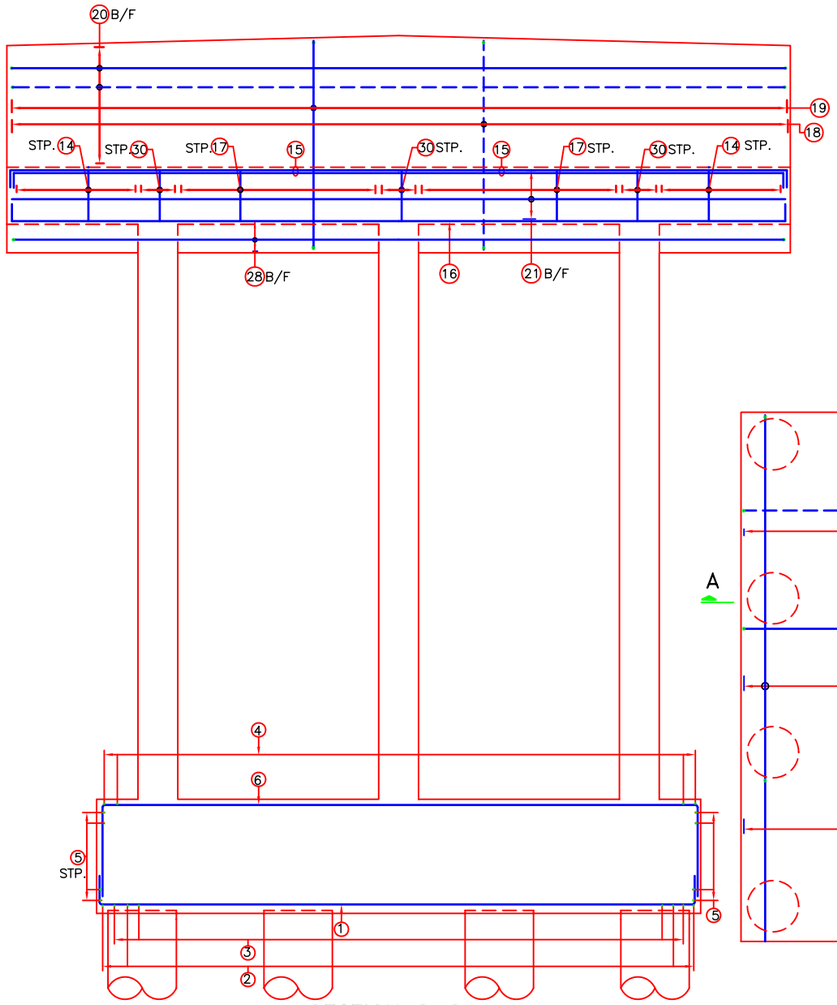
BRIDGE AT PROPOSED CH. 27+949
MINOR BRIDGE NO - 2 (TEL APPROACH)

DRAWING NO. : OSRP/CEG/SH-16/BR/SUB/02
DATE : JAN, 2013

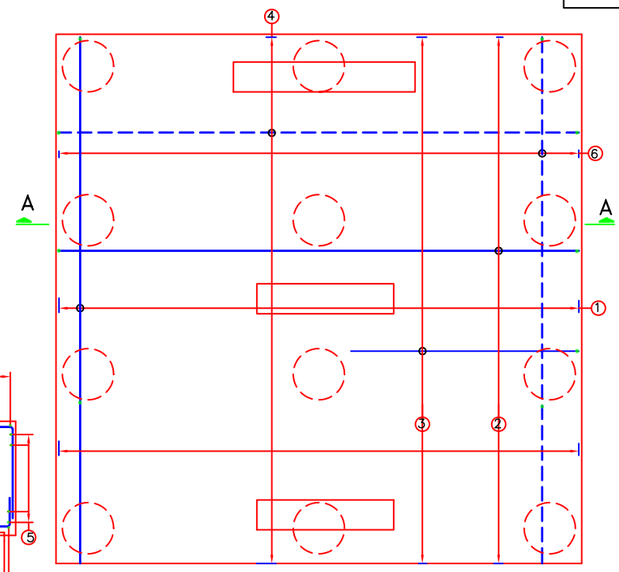
DRAWN BY	DESIGNED BY	CHECKED	APPROVED
CEG	CEG	EE,PMU	CE,WBP



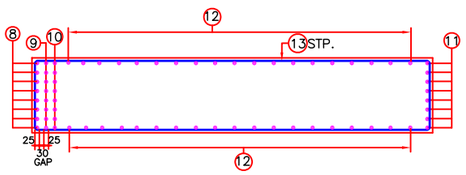
SECTION A–A



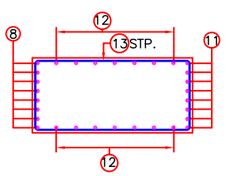
SECTION 2–2
(SHOWING REINF. IN PILE CAP
DIRT WALL & ABUTMENT CAP)



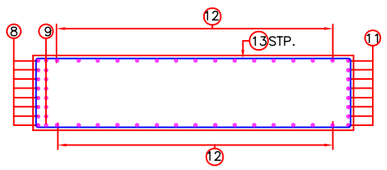
SECTION 1–1
(PLAN SHOWING REINF. IN PILE CAP)



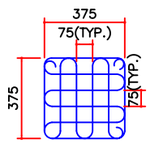
SECTION 3–3



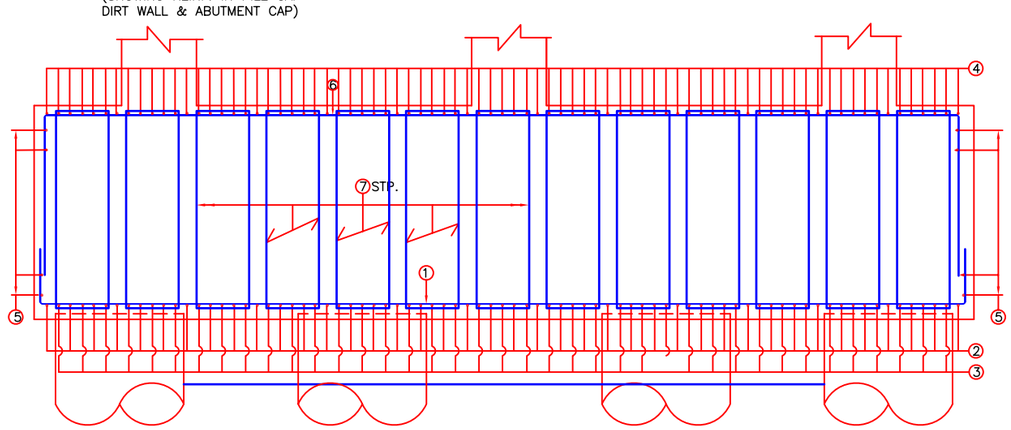
SECTION 5–5



SECTION 4–4



8 ⌀ MESH (m1)



SECTION 6–6

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 CONJUCTION WITH SHEET NO. 2 OF 2 OF THIS DRAWING.
4. REINFORCEMENTS SHALL CONFIRM TO IS–1786 AND GRADE Fe 500

REFERENCE DRAWINGS:

1 OSRP/CEG/SH–16/BR/SUB/01
2 OSRP/CEG/SH–16/BR/SUB/02
3 OSRP/CEG/SH–16/BR/SUB/03 (SHEET 2 OF 2)

REINFORCEMENT DETAILS:

BAR MKD.	DIA	SPACING/Nos.	SHAPE
1	20	125 c/c	500
2	32	42 Nos.	500
3	16	41 Nos.	500
4	16	54 Nos.	1600
5	10	200 c/c	ALL AROUND
6	20	125 c/c	1600
7	12	250 c/c	26 LEGGED
8	25	3x6 Nos.	250/250
9	25	3x6 Nos.	250/
10	25	3x6 Nos.	/250
11	16	3x6 Nos.	200\200
12	12	18 Nos.	200
13	10	150 c/c	STP.
14	12	175 c/c	6L. STP.
15	25	2x11 Nos.	300
16	16	11 Nos.	700
17	10	200 c/c	6L. STP.
18	16	160 c/c	150
19	10	200 c/c	400 / 150
20	10	200 c/c	150
21	12	2x4 Nos.	200
22	20	175 c/c	150 800 150
23	10	200 c/c	150 200
24	10	200 c/c	150
25	10	200 c/c	150
26	16	30 Nos.	400
27	10	190 c/c	STP.
28	10	200 c/c	150
29	12	175 c/c	150
30	12	3x5 Nos.	2L. STP.

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PROJECT:-

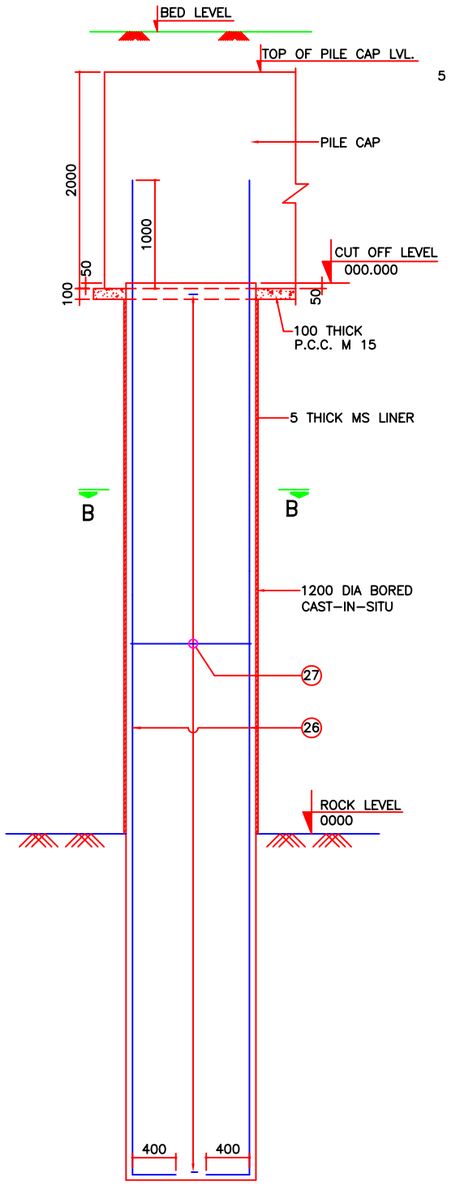
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

REINFORCEMENT DETAILS OF ABUTMENT & PILE CAP

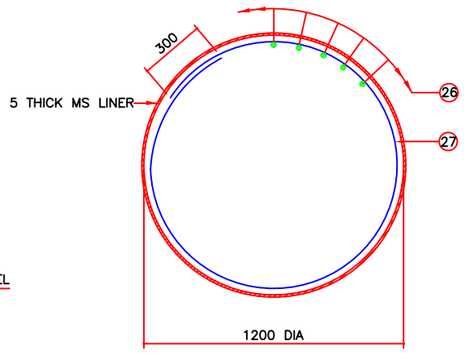
PROPOSED TEL BRIDGE

DRAWING NO. : OSRP/CEG/SH-16/BR/SUB/03
DATE : DEC, 2012 (SHEET NO. 1 OF 2)

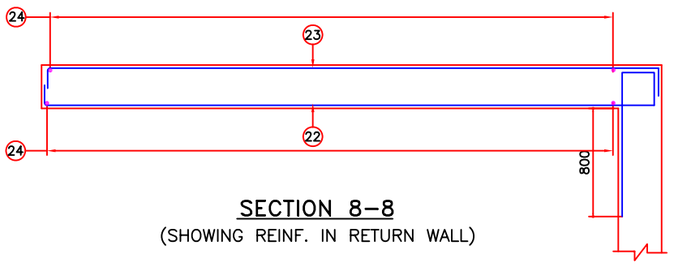
DRAWN BY	DESIGNED BY	REV. R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP



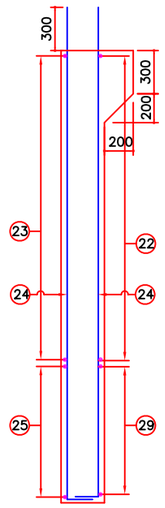
DETAILS OF REINFORCEMENT IN PILE



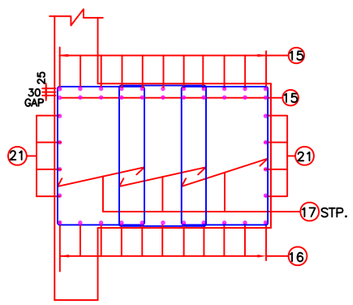
SECTION B–B



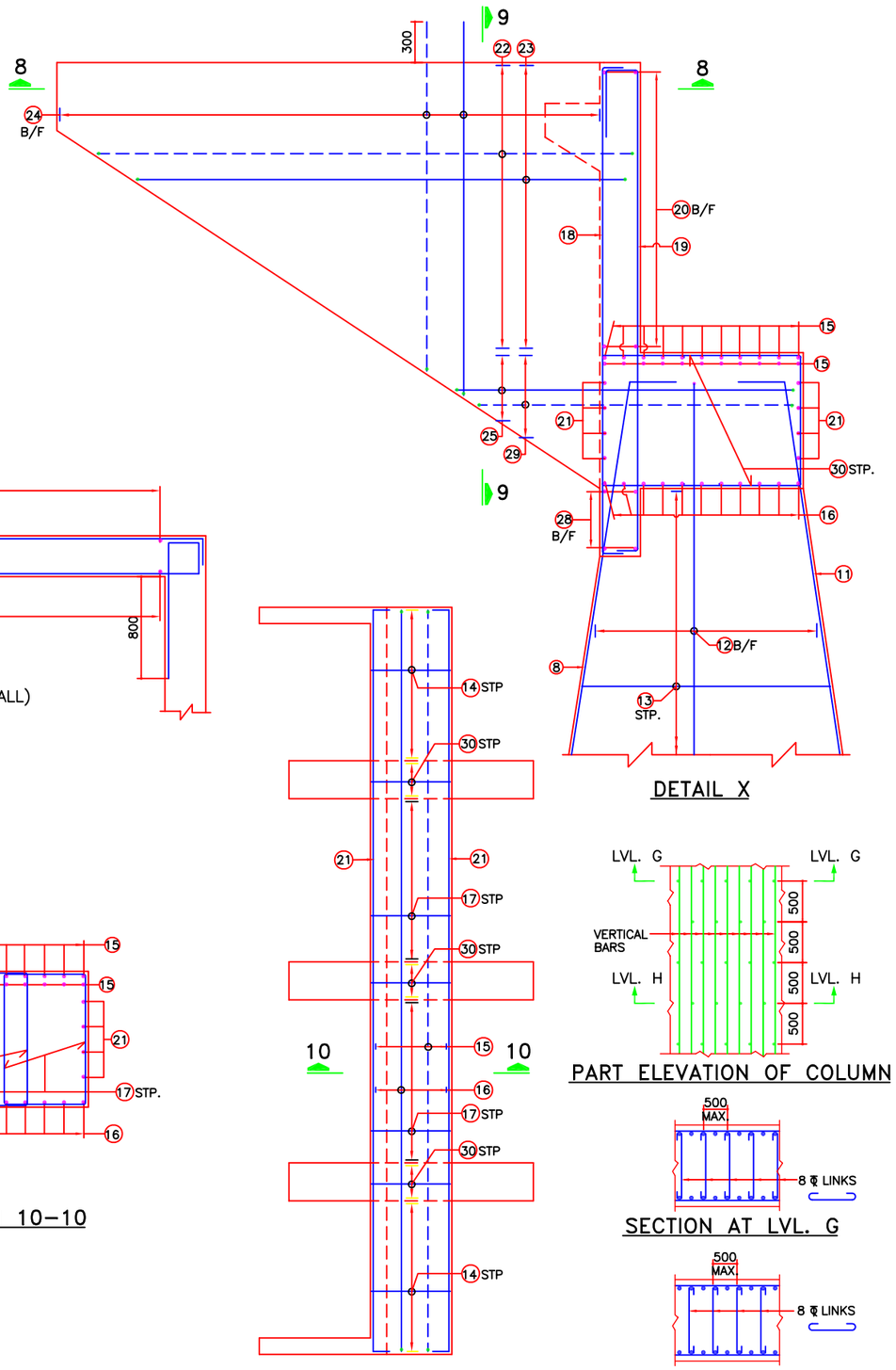
SECTION 8–8
(SHOWING REINF. IN RETURN WALL)



SECTION 9–9



SECTION 10–10



DETAIL X

SECTION 7–7

PART ELEVATION OF COLUMN

SECTION AT LVL. G

SECTION AT LVL. H

LEGENDS:

- - - - - - - -	BAR ON TOP/ EARTH RETAINING FACE
———	BAR ON BOTTOM/ OTHER FACE
B/F	BAR ON BOTH FACES
STP	STIRRUPS

NOTES:

1. ALL DIMENSIONS ARE IN mm LEVELS IN METER.
2. ALL H.Y.S.D. BARS IS CONFORM TO IS:1786 GRADE Fe 500.
3. CLEAR COVER TO ANY REINF.
   PILE CAP ---------- 75mm.
   ALL OTHER CONPONENTS ---- 40 mm.
4. LAPS IS STAGGERED AND NOT MORE THAN 50% OF BARS IS LAPPED AT ANY LOCATION. LAP LENGTH IS 30 TIMES DIA OF BAR FOR BAR MARKED (4), (5), (7), (11), (12), (13), (16), (19), (20), (21), (23), (24), (25), (27) & (28) AND 72 TIMES DIA OF BAR FOR ALL OTHER BARS.
5. 5 THICK MS LINER TO PILES IS PROVIDED FROM BOTTOM OF PILE CAP TO ROCK LEVEL.
6. MESH (m1) IS PROVIDED IN THE ABUTMENT CAP AT JACK LOCATIONS.
7. FOR DETAILS OF REINFORCEMENT FOR CRASH BARRIER IS EMBEDED INTO RETURN WALL REFER DRG NO. 200/MISC/E–01
8. THIS DRAWING IS TO BE READ IN CONJUCTION WITH SHEET NO.1 OF 2 OF THIS DRAWING.

REFERENCE DRAWINGS:

1 OSRP/CEG/SH–16/BR/SUB/01
2 OSRP/CEG/SH–16/BR/SUB/02
3 OSRP/CEG/SH–16/BR/SUB/03
(SHEET 1 OF 2)

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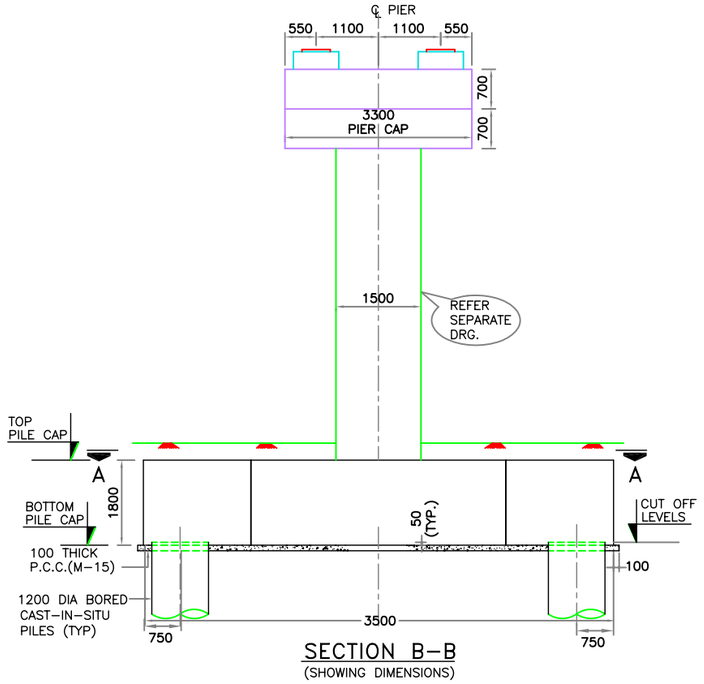
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

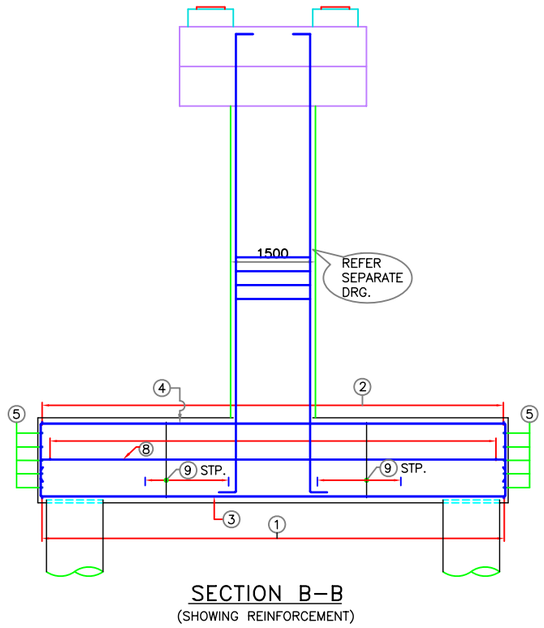
REINFORCEMENT DETAILS OF ABUTMENT CAP & PILE

PROPOSED TEL BRIDGE

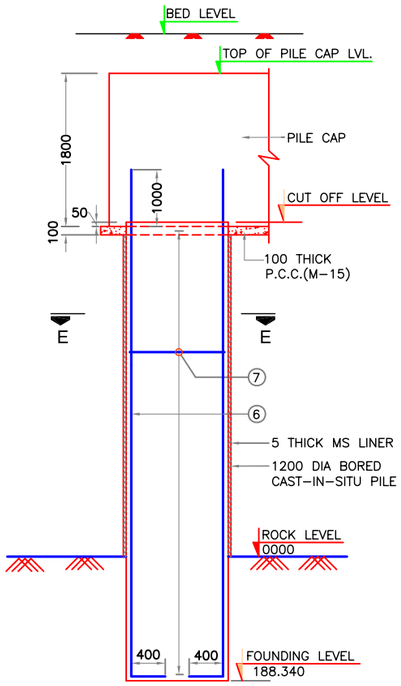
DRAWING NO. : OSRP/CEG/SH-16/BR/SUB/04			
DATE : DEC, 2012		(SHEET NO. 2 OF 2)	
DRAWN BY	DESIGNED BY	REV. R1	APPROVED
CEG	CEG	EE, PMU	CE, WBP



SECTION B–B
(SHOWING DIMENSIONS)



SECTION B–B
(SHOWING REINFORCEMENT)



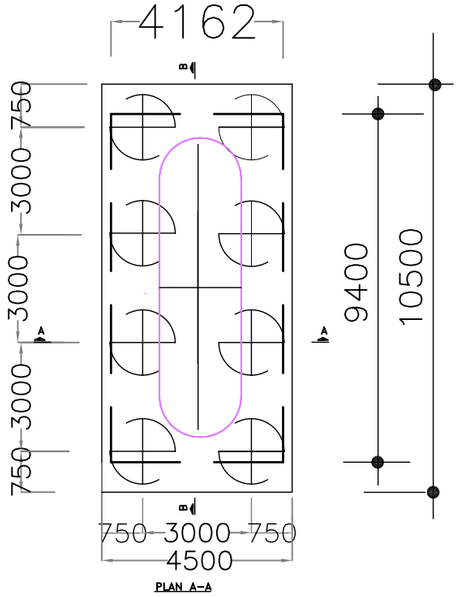
DETAILS OF REINFORCEMENT IN PILE

NOTES:

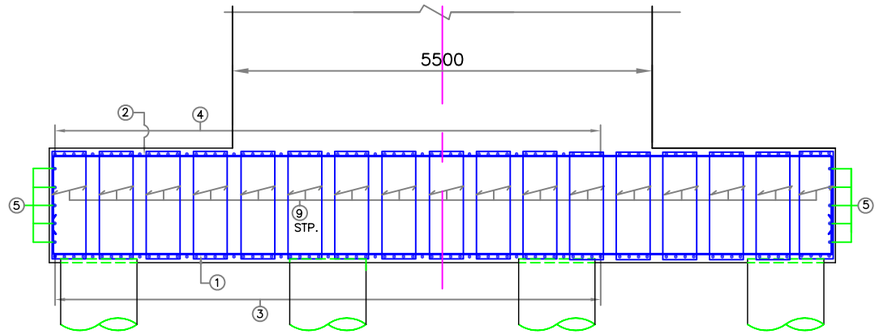
1. ALL DIMENSIONS ARE IN mm AND LEVELS IN METRE.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONCRETE SHALL BE AS FOLLOWS
   PILE & PILE CAP M–35
   PIER & PIER CAP.....M–35
   LEVELLING COURSE.....M–15
4. ALL H.Y.S.D. BARS SHALL CONFORM TO IS:1786 GRADE Fe500.
5. LAPS SHALL BE STAGGERED AND NOT MORE THAN 50% OF BARS SHALL BE LAPPED AT A SECTION. LAP LENGTH SHALL BE 63 TIMES THE DIA OF BAR.
6. CLEAR COVER TO ANY REINFORCEMENT
   PILE CAP.....75mm
   PIER.....40mm
7. FOR PIER HEAD DETAIL REFER SEPERATE DRAWING.
8. AS PER CLAUSE 5.07(g) OF NIT, LAYER OF 12ϕ @ 250 C/C (B.M. ⑧) BOTH WAYS SHOULD BE PROVIDED AT MID HEIGHT OF PILE CAP.

REFERENCE DRAWINGS:

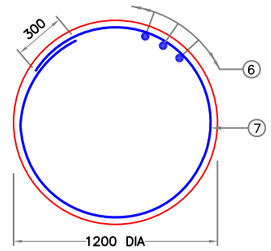
1 OSRP/CEG/SH–16/BR/SUB/01
2 OSRP/CEG/SH–16/BR/SUB/05



PLAN A–A



SECTION B–B
(SHOWING SHEAR REINFORCEMENT ONLY)



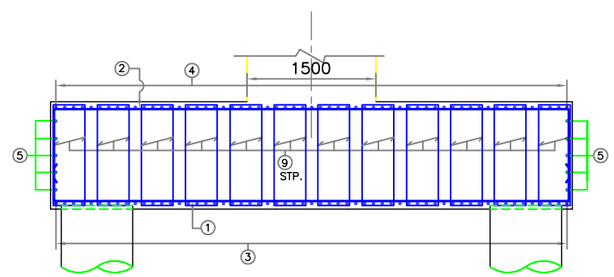
SECTION E-E

LEGENDS:

BAR ON TOP FACE	
BAR ON BOTTOM FACE	
BAR ON BOTH FACES	B/F
STRIRRUPS	STP.

REINFORCEMENT DETAILS

BAR MKD.	DIA (mm)	SPACING/NOS. (mm)	SHAPE
①	20	130 C/C	500
②	16	130 C/C	1300
③	32	130 C/C	300
④	16	130 C/C	1300
⑤	10	5 NOS.	ALL AROUND
⑥	16	23 NOS.	400, 3300
⑦	8	180 C/C	
⑧	12	250 C/C	
⑨	10	190 C/C 24 LEGGED	AS SHOWN IN PLAN A–A & SEC E–E



SECTION A–A
(SHOWING SHEAR REINFORCEMENT ONLY)

CONSULTING
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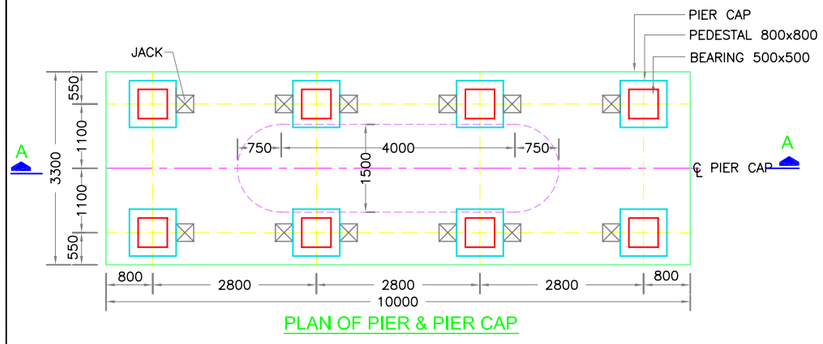
PROJECT:-

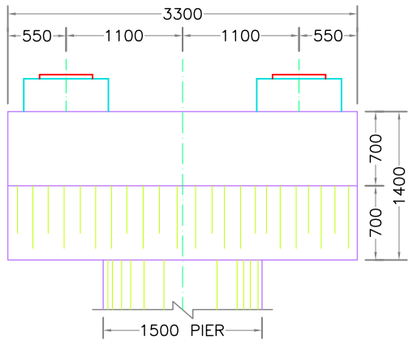
ODISHA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

DIMENSION & REINFORCEMENT DETAIL FOR PILE & PILE CAP
PROPOSED TEL BRIDGE

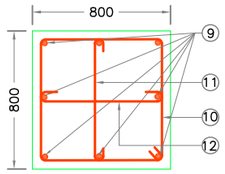
DRAWING NO. : OSRP/CEG/SH-16/BR/SUB/05			
DATE : DEC, 2013			
DRAWN BY	DESIGNED BY	REV. R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP



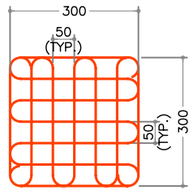
PLAN OF PIER & PIER CAP



SECTION AT B-B



TOP PLAN OF PEDESTAL



8 Ø MESH REINF.
UNDER JACK TYPE (M2)

REINFORCEMENT DETAILS

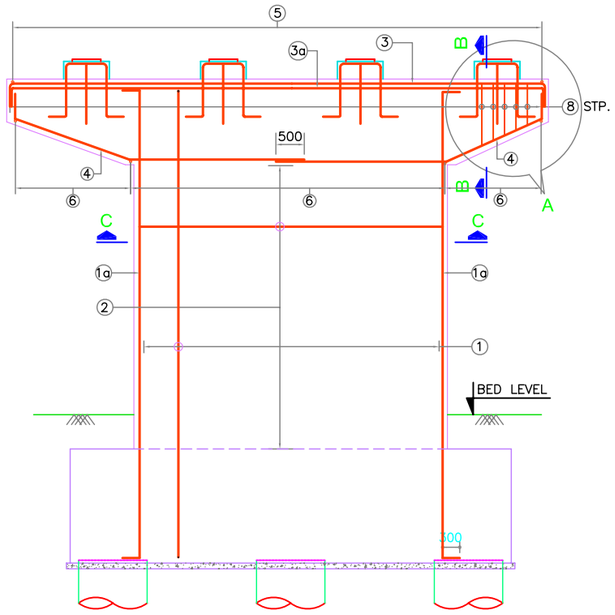
BAR NO.	BAR DIA.	SPACING	SHAPE
1	25	30+30 NOS	300 / 300
1a	16	8+8 NOS	300 / 300
2	16	100 C/C	300
3	32	14 NOS	500
3a	32	14 NOS	500
4	20	14 NOS	
5	32	61 NOS	1000
6	16	61 NOS	700
7	16	40 LEGGED (EACH LAYER)	
8	12	200 C/C	14 LEGGED
9	16	8 NOS.	750
10	10	150 C/C	750
11	10	150 C/C	
12	10	150 C/C	

NOTES :-

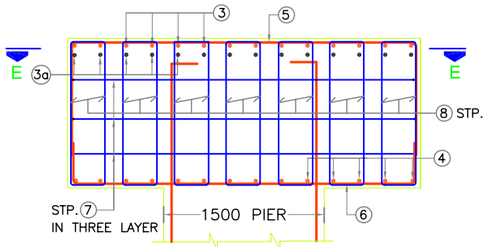
1. ALL DIMENSION ARE IN MM & LEVELS ARE IN METERS.
2. DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONC. FOR PIER. ----M-35
   GRADE OF CONC. FOR PIER CAP ----M-35
   GRADE OF CONC. FOR PEDESTAL ----M-35
4. ALL T.M.T. BARS IS CONFORMED TO IS:1786 GRADE Fe 500.
5. MINIMUM CLEAR COVER TO ANY REINFORCEMENT FOR PIER – 40mm
6. LAPS IS STAGGERED AND NOT MORE THAN 50% OF BARS IS LAPPED AT ANY LOCATION.
7. THE LEVELS SHALL BE IDENTIFIED AT SITE AND SHALL BE CALCULATED FROM FRL AND IN CASE OF ANY DISCREPANCY, IT SHALL BE BROUGHT INTO THE NOTICE OF CONSULTANT.

REFERENCE DRAWINGS:

1 OSRP/CEG/SH-16/BR/SUB/01
2 OSRP/CEG/SH-16/BR/SUB/04



REINFORCEMENT DETAIL OF PIER CAP & PIER
(SECTION A-A)

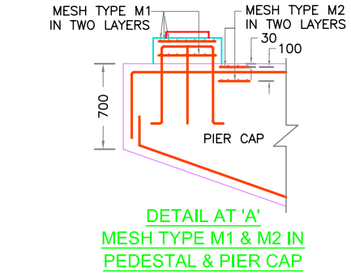


SECTION AT B-B

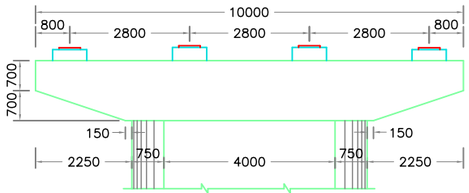
LEVELS CHART FOR PIERS

AT BRIDGE NO. 27+800

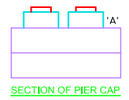
PIER DESIGNATION	FORMATION LEVELS	HFL	BED LEVELS	PIER CAP TOP LEVELS 'A'	HEIGHT OF PEDESTAL+ BEARING			
					B1	B2	B3	B4
P1	220.485	215.315	210.628	217.365	0.350	0.420	0.420	0.350
P2	220.485	215.315	210.204	217.365	0.350	0.420	0.420	0.350
P3	220.485	215.315	210.171	217.365	0.350	0.420	0.420	0.350
P4	220.485	215.315	210.547	217.365	0.350	0.420	0.420	0.350
P5	220.485	215.315	208.148	217.365	0.350	0.420	0.420	0.350
P6	220.485	215.315	208.803	217.365	0.350	0.420	0.420	0.350
P7	220.485	215.315	210.934	217.365	0.350	0.420	0.420	0.350



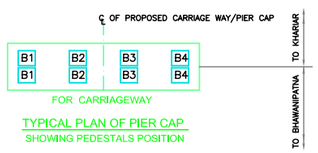
DETAIL AT 'A'
MESH TYPE M1 & M2 IN
PEDESTAL & PIER CAP



SECTIONAL ELEVATION OF PIER CAP

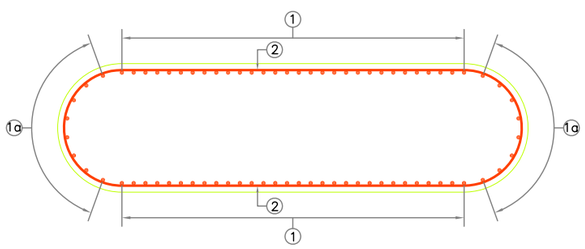


SECTION OF PIER CAP

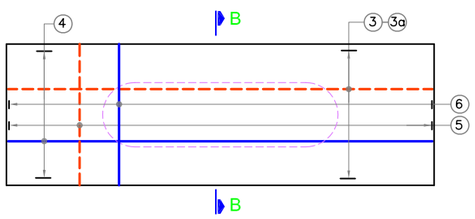


FOR CARRIAGEWAY

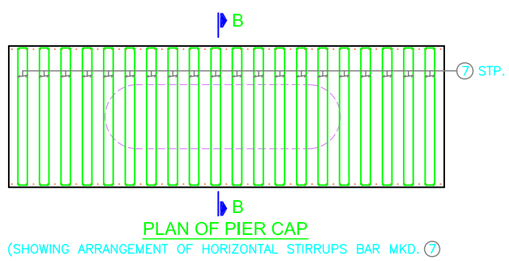
TYPICAL PLAN OF PIER CAP
SHOWING PEDESTALS POSITION



SECTION OF PIER AT C-C

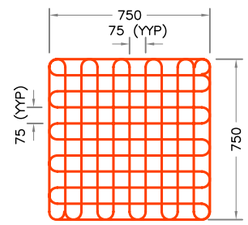


SECTION E-E



PLAN OF PIER CAP
(SHOWING ARRANGEMENT OF HORIZONTAL STIRRUPS BAR MKD. 7)

LEGENDS:
BAR ON TOP FACE
BAR ON BOTTOM FACE



8Ø MESH REINFORCEMENT
UNDER BEARING (M2)

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

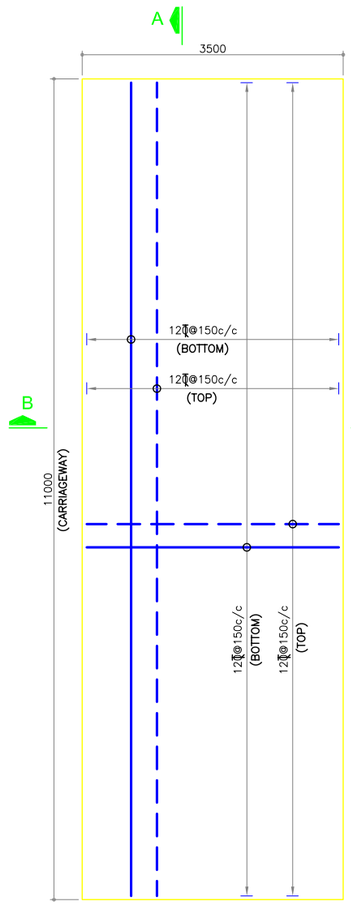
PROJECT:-

ODISHA STATE ROAD PROJECT
UNDER WORLD BANK ASSISTANCE

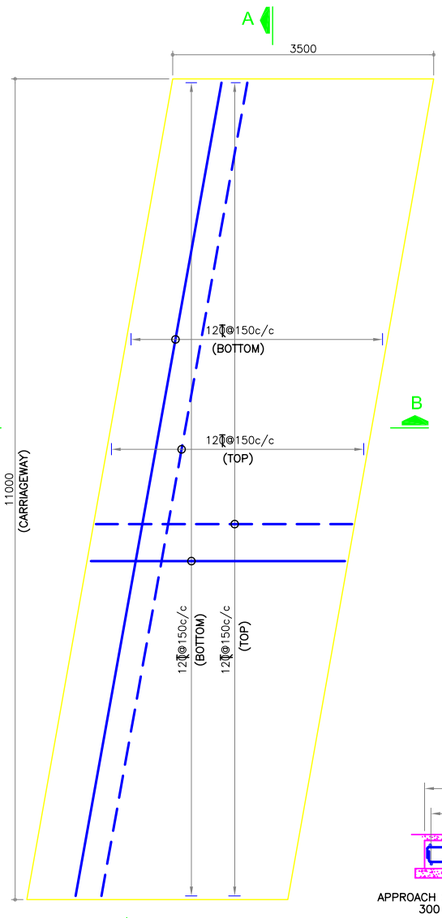
DIMENSION & REINFORCEMENT DETAIL FOR PIER & PIER CAP
PROPOSED TEL BRIDGE

DRAWING NO. : OSRP/CEG/SH-16/BR/SUB/06
DATE : DEC, 2012

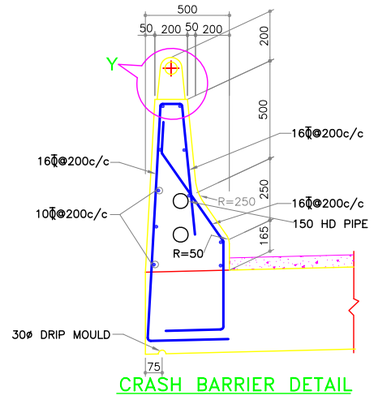
DRAWN BY	DESIGNED BY	REV. R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP



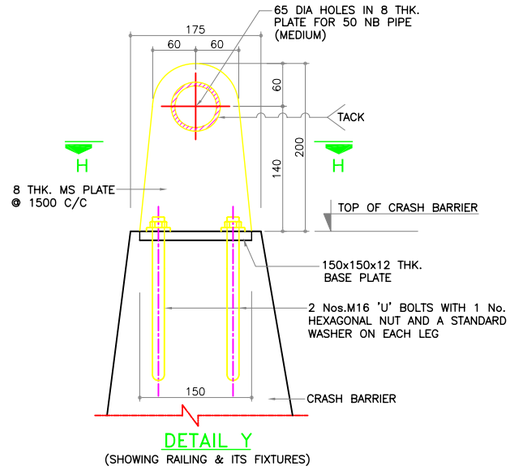
PLAN OF APPROACH SLAB (RIGHT)
SHOWING REINFORCEMENT



PLAN OF APPROACH SLAB (SKEW)
SHOWING REINFORCEMENT



CRASH BARRIER DETAIL



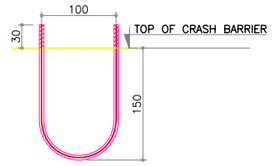
DETAIL Y
(SHOWING RAILING & ITS FIXTURES)

NOTES:

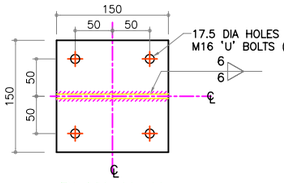
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. DO NOT SCALE THE DIMENSIONS, ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. JOINT FILLER IS CONFORMED TO IS:1838. PRODUCTS WITH I.S.I. CERTIFICATION MARK IS ONLY BE USED.
4. DRAINAGE SPOUT AND COLLECTION PIT ASSEMBLY IS FABRICATED FROM MILD STEEL AND AFTER FABRICATION THE COMPLETE ASSEMBLY EXCEPT GRATING IS GIVEN A HOT DIP GALVANISED COATING.
5. THE REINFORCEMENT OF THE DECK SLAB IS SUITABLY MODIFIED TO ACCOMODATE THE DRAINAGE SPOUT.
6. GRADE OF CONCRETE :

PCC LEVELING COURSE	= M-15
APPROACH SLAB	= M-30
KERB	= M-30
CRASH BARRIER	= M-40
DIRT WALL	= M-30

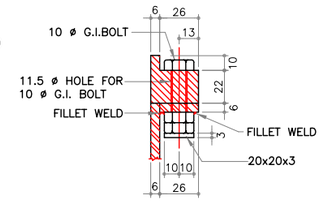
7. CLEAR COVER TO REINFORCEMENT = 40mm
8. H.Y.S.D. REINFORCEMENT IS CONFORMED TO IS:1786 GRADE Fe 500.



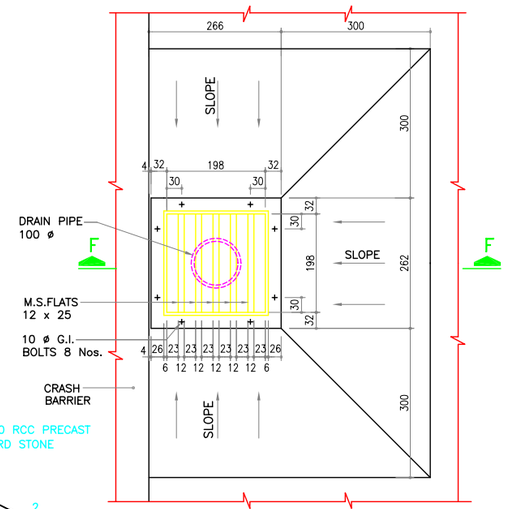
DETAIL 'U' BOLT M16



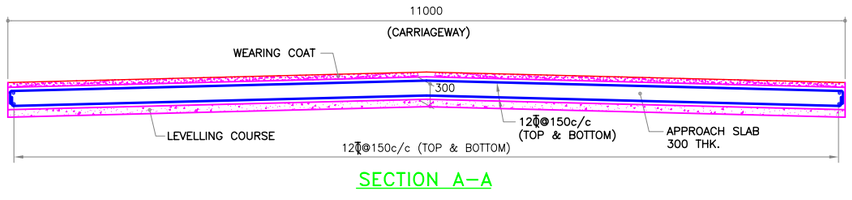
PLAN H-H
(SHOWING PLAN OF BASE PLATE)



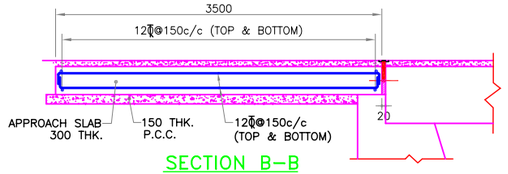
DETAIL AT X



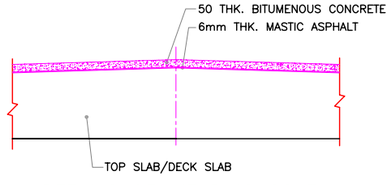
PLAN OF DRAINAGE SPOUT
(DETAILS OF DRAINAGE SPOUT & COLLECTION PIT)



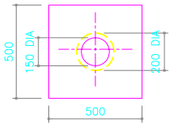
SECTION A-A



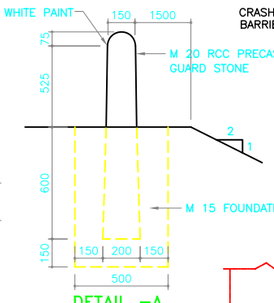
SECTION B-B



DETAILS OF WEARING COAT

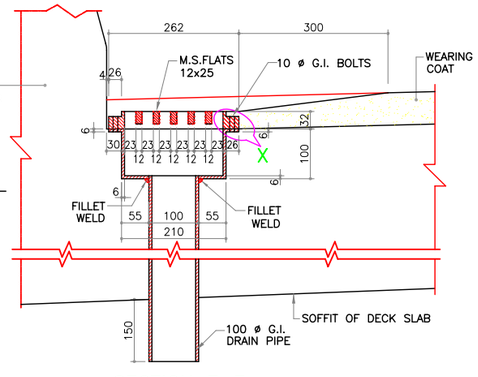


PLAN

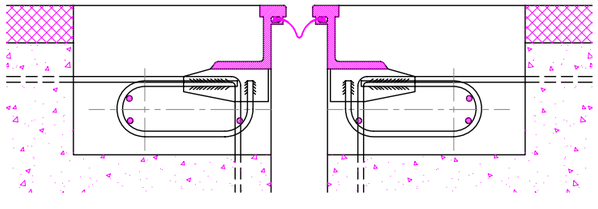


DETAIL -A

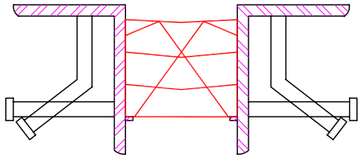
DETAIL OF PRECAST GUARD STONE



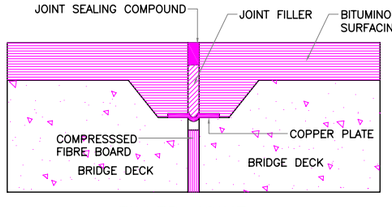
SECTION F-F



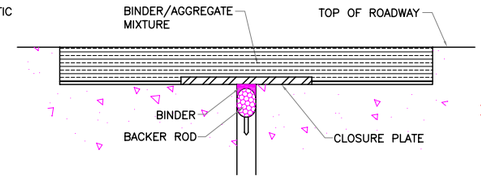
SINGLE STRIP SEALS EXPANSION JOINT



COMPRESSION SEAL JOINT



FILLER JOINT



ASPHALTIC PLUG JOINT

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

PROJECT:-

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED PROJECT PREPARATION OF PHASE - (I) ROADS FOR ODISHA STATE ROAD PROJECT UNDER WORLD BANK ASSISTANCE

DETAILS OF CRASH BARRIER, EXPANSION JOINT, APPROACH SLAB & DRAINAGE SPOUT

DRAWING NO. : OSRP/CEG/BR/MISC-01
DATE : MAY, 2007

DRAWN BY	DESIGNED BY	REV. R1	APPROVED
CEG	CEG	EE,PMU	CE,WBP

NCB No: OSRP-Bal-P01B

(NATIONAL COMPETITIVE BIDDING)

Construction of 4nos of High Level Bridges over River Tel between Km 27/200 to Km 30/000 with Approaches on the road from Bhawanipatna to Khariar (SH-16).

Project: ***Odisha State Road Project***

Section-7

BILL OF QUANTITY

A. Preamble

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Special Conditions of Contract, Technical Specifications, and Drawing.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the the Engineer and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.

3. The rates and prices bid in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional Plant, labour, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

5. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

6. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.

7. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer.

8. The method of measurement of completed work for payment shall be in accordance with Specifications for Road and Bridge Works (Fourth Revision), Ministry of Shipping, Road Transport & Highways read along with the technical specifications and other clauses of the Vol II of this document.

9. Any arithmetic errors in computation or summation will be corrected by the Employer as follows:

   (a) where there is a discrepancy between amounts in figures and in words, the amount in words will govern; and

   (b) where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer, there is an obviously gross misplacement of the decimal point in the unit price, in which event the total amount as quoted will govern and the unit rate will be corrected.

10. Rock is defined as all materials that, in the opinion of the the Engineer, require blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for their removal, and that cannot be extracted by ripping with a tractor of at least 150 brake hp with a single, rear-mounted, heavy-duty ripper.

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount

B. Work Items

Item No.	Description	Unit	Quantity	Rate	Amount
	BILL NO.1 : SITE CLEARANCE				
1.01	Clearing and Grubbing for road land complete as per Technical Specification Clause 201 and as per the direction of the Engineer.	Hectare	10.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
1.02	Dismantling Concrete/Reinforced concrete/ Pre-stressed concrete structures as per Technical Specification Clause 202, 2809 and as per the direction of the Engineer.				
	a) R.C.C.	Cum	790.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	b) RCC Railing	Lm	239.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	(c) Cement Concrete Wearing Course	Sqm	1671.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 04) **Total for Bill No. 1** **(Carried forward to Summary, p. 42)**				Rs.

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	BILL NO.2 : EARTH WORKS				
2.01	Construction of embankment with approved material from approved borrow areas with all leads and lifts complete as per Drawing and Technical Specification Clause 305 and as per the direction of the Engineer.	Cum	148784.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
2.02	Construction of sub grade and earthen shoulder with approved material as per Drawing complete and Technical Specification Clause 305 and as per the direction of the Engineer.	Cum	14819.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
2.03	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 the Engineer.	Sqm	9279.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 03) **Total for Bill No. 2** **(Carried forward to Summary, p. 42)**				Rs.

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	BILL NO.3 : SUB-BASE AND BASE COURSES				
3.01	Construction of Granular Sub-base course using crushed stone aggregates conforming to Gr-I of Table 400-2 complete as per Technical Specification Clause 401 and as per the direction of the Engineer.	Cum	5520.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
3.02	Construction of Wet Mix Macadam Grading-I complete as per Technical Specification Clause 406 and as per the direction of the Engineer.	Cum	4081.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 02) **Total for Bill No. 3** **(Carried forward to Summary, p. 42)**				Rs.

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	BILL NO.4 : BITUMINOUS COURSES				
4.01	Providing bituminous primer coat over granular surface complete all as per Technical Specification Clause 502 and as per the direction of the Engineer.	Sqm	15385.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
4.02	Providing Tack coat complete as per Technical Specification Clause 503 and as per the direction of the Engineer.				
	a) Granular surface treated with primer	Sqm	15385.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	b) Over normal bituminous surface	Sqm	15385.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
4.03	Providing Dense Bituminous Macadam course using Bitumen Grade-60/70 (VG-30) complete as per Technical Specification Clause 507 and as per the direction of Engineer.	Cum	1163.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
4.04	Providing Bituminous Concrete wearing course with modified bitumen confirming of grade CRMB 55 complete as per Technical Specification Clause 509 & 521 and as per the direction of the Engineer.	Cum	615.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 05) **Total for Bill No. 4** **(Carried forward to Summary, p. 42)**				**Rs.**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	BILL NO.5 : BRIDGES				
5.01	Earthwork in excavation of foundation for structures in all types of soils complete as per Drawing and Technical Specification Clause 304 including all leads & lift and as per the direction of the Engineer.	Cum	1791.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.02	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 the Engineer.	Cum	8428.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.03	Cement concrete M-15 grade in levelling course etc including centering and shuttering all complete as per Drawing and Technical Specification Section 1500, 1700 and 2100 and as per the direction of the Engineer.	Cum	144.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.04	Reinforced Cement Concrete M35 grade in foundation complete as per Drawing & Technical Specification sections 1500, 1700, 2100, 2200 and as per the direction of the Engineer.	Cum	1473.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
5.05	Reinforced Cement Concrete M35 grade in substructure complete as per Drawing & Technical Specification sections 1500, 1700, 2200 and as per the direction of the Engineer.	Cum	3201.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.06	Reinforced Cement Concrete of following grades in super structure complete as per Drawing and Technical Specification section 1500, 1700, 2300 and as per the direction of the Engineer.				
	(a) M-30 Grade	Cum	64.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(b) M-35 Grade	Cum	498.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
5.07	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.	Cum	3549.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.08	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.	Lm	3444.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.09	Providing HYSD (TMT) bar reinforcement complete as per Drawing and Technical Specifications Clause 1600 and as per the direction of the Engineer.				
	a) in Foundation	MT	279.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	b) in Substructure	MT	300.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	c) in Superstructure	MT	587.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.10	High tensile steel strand for prestressed concrete structures complete as per drawing and technical specifications section 1800 and as per the direction of Engineer.	MT	98.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.11	Providing and fixing POT PTFE bearings complete as per Drawing and Technical Specification 2000 and as per the direction of the Engineer.				
	(a) Fixed Type (305 MT Capacity)	No	52	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(b) Sliding Type (305 MT Capacity)	No	52	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
5.12	Providing 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 the Engineer.	Cum	96.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.13	Providing Bituminous wearing course 56mm thick comprising 50mm thick asphaltic Concrete with modified bitumen confirming of grade CRMB 55 in a single layer over Bituminous mastic course 6 mm thick with a prime Coat Complete as per Drawing and Technical Specification Section 503, 509, 515 & 2700 and as per the direction of the Engineer.	Sqm	3225.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.14	Providing and fixing Drainage Spouts Complete as per Drawing and Technical Specification Clause 2705 and as per the direction of the Engineer.	No	156	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.15	Providing and laying Stone pitching in slopes complete as per Drawing and Technical Specification Section 2504 and as per the direction of the Engineer.	Cum	14692.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
5.16	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 the Engineer.	Cum	7346.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.17	Providing Weep Holes in abutments, wing walls and return walls etc. as per Drawing and Technical Specification Clause 2706 and as per the direction of the Engineer.	No	14694	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.18	Supplying and fixing compression seal type expansion joints Complete as per Drawing and as per IRC: SP : 69-2005 and as per the direction of Engineer.	Lm	204.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.19	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 Hard Rock)				

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	i) depth from 0m to 10m	Lm	170.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(b) In Hard Rock				
	i) depth from 0m to 5m	Lm	85.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	ii) depth from 5m to 10m	Lm	85.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.20	Synthetic enamel painting of Bridge No. and span arrangement as per IRC - 7 - 1971 and as per the direction of the Engineer.	No	8	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
5.21	Providing and painting of flood gauge on substructure is fall height and 500mm width and as per the direction of the Engineer.	Lm	60.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.22	Providing and laying 150mm dia. HDPE Service pipe as per Drawing and as per the direction of the Engineer.	Lm	2580.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.23	Providing and filling 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 the Engineer.	Cum	8607.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
5.24	Providing Reinforced cement concrete crash barrier constructed with M-40 grade concrete with HYSD reinforcement conforming to IRC:21, with MS vertical plate & base plate, 50mm dia pipe and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design and as per dimensions in the approved drawing and at locations directed by the Engineer and Technical Specification Clause 809, and section 1500, 1600, 1700. The item includes the cost of reinforcement and its fabrication.	Lm	859.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
5.25	Providing and applying 2 coats of water based cement paint to unplastered concrete surface after cleaning the surface of dirt, dust, oil, grease, efflorescence and applying paint @ of 1 litre for 2 Sq.m.)	Sqm	4819.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 31) **Total for Bill No. 5** **(Carried forward to Summary, p. 42)**				Rs.

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	BILL NO-6: ROAD SAFETY AND AMENITIES.				
6.01	Construction of temporary diversion including temporary cross drainage works for plying of traffic in both directions, wherever necessary and maintenance thereof including traffic control and safety complete till the operation of the original road/ structure as per Technical Specification Clause 112.3 and as per the direction of the Engineer.	Lm	2000.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
6.02	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes, as per Technical Specification section 800 and as per direction of Engineer. Lane line / Edge marking and other markings along the strips	Sqm	749.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
6.03	Supplying and fixing sign boards complete as per Technical Specifications Clause 801. Including the cost of Posts, Fitting & fixing. Sheeting will be retro reflective type of high intensively grade and messages / boarders as per drawing and as per the direction of the Engineer.				

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	Cautionary Signs (triangular 900mm side)	No	16	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
6.04	Providing & fixing retro - reflectorised Roadway delineator complete as per Drawing, Technical Specifications Clause 805 and as per the direction of the Engineer.	No	100	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
6.05	Supply of colour video coverage in digital format during construction as per Technical Specifications Clause 126 As per requirement and as per the direction of the Engineer.	Set	3	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
6.06	Providing and fixing of metal beam crash barrier made out of cold rolled steel strip W profile of 3 mm thick having a minimum yield strength of 2400 kg/sqcm, width of 313 mm and depth of corrugation as 83 mm hot dip galvanized of zinc coating @ 550 gm/sq.m.The post and spacer channel is made out of cold rolled channel 150x75x5 mm having minimum yield strength of 2400 kg/sqcm and hot dip galvanized of zinc coating @ 550 gm/sq.m. The total length of post shall be 1900 mm and minimum height of post above concrete foundation shall be 800 mm. The length of spacer channel shall be 330 mm. Job includes neatly fixing new post in cement concrete of M-20 grade complete (cost included) as directed by the Engineer including fasteners and fixing etc. complete. The spacing of the Steel posts shall be about 2 m.The guard rail reflectors of 100 mm dia circular made out of 2 mm thick GI sheet duly fixed with micro-prismatic type sheeting with Type 9 ASTM D 4956-01 standards @ every 5 meters. The rate also includes the cost for supplying & fixing of terminal anchorages at both ends of barrier. The work is to be executed as per drawing, Specifications and as directed by the Engineer.	Lm	2000.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
6.07	Providing and fixing of bi-directional retro reflective raised pavement markers of approved colour, quality & make conforming to ASTM D-4280 as per approved drawing and locations provided in the schedule made from injection moulded high impact polymer including cleaning, preparation of surface and fixing at position with approved quality adhesives including cost of all materials, labour, transportation, taxes, duties, sundries, T&P etc. complete as per the technical specifications and direction of Engineer.	No	1000	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 07) **Total for Bill No. 6** **(Carried forward to Summary, p. 42)**				Rs.

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	BILL NO.7- MAINTENANCE, REPAIR AND REHABILITATION				
7.01	Restoration of Rain Cuts (Restoration of rain cuts with soil, moorum, gravel or a mixture of these, clearing the loose soil, benching for 300 mm width, laying fresh material in layers not exceeding 250 mm and compacting with plate compactor or power rammers to restore the original alignment, levels and slopes) as per the direction of Engineer.	Cum	16.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
7.02	Maintenance of Earthen Shoulder (filling with fresh soil) (Making up loss of material/ irregularities on shoulder to the design level by adding fresh approved soil and compacting it with appropriate equipment.) as per direction of the the Engineer.	Sqm	2160.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
7.03	Maintenance of Earth Shoulder (stripping excess soil) (Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor) as per direction of the Engineer.	Sqm	5400.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
7.04	Filling Pot- holes and Patch Repairs with open - graded Premix surfacing, 20mm. (Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 511, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2) and as directed by the Engineer.	Sqm	2228.00	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	(Total no of items to be quoted: 04) **Total for Bill No. 7** **(Carried forward to Summary, p. 42)**				Rs.

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

C. Daywork Schedule

General

1. Reference should be made to Sub-Clause 13.6 of the General Conditions. Work shall not be executed on a daywork basis except by written order of the the Engineer. Bidders shall enter basic rates for daywork items in the Schedules, which rates shall apply to any quantity of daywork ordered by the the Engineer. Nominal quantities have been indicated against each item of daywork, and the extended total for Daywork shall be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for daywork shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

Daywork Labour

2. In calculating payments due to the Contractor for the execution of daywork, the hours for labour will be reckoned from the time of arrival of the labour at the job site to execute the particular item of daywork to the time of return to the original place of departure, but excluding meal breaks and rest periods. Only the time of classes of labour directly doing work ordered by the the Engineer and for which they are competent to perform will be measured. The time of gangers (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.

3. The Contractor shall be entitled to payment in respect of the total time that labour is employed on daywork, calculated at the basic rates entered by him in the **Schedule of Daywork Rates: 1. Labour,** together with an additional percentage payment on basic rates representing the Contractor's profit, overheads, etc., as described below:

(a) The basic rates for labour shall cover all direct costs to the Contractor, including (but not limited to) the amount of wages paid to such labour, transportation time, overtime, subsistence allowances, and any sums paid to or on behalf of such labour for social benefits in accordance with *[country of Borrower]* law. The basic rates will be payable in local currency only.

(b) The additional percentage payment to be quoted by the bidder and applied to costs incurred under (a) above shall be deemed to cover the Contractor's profit, overheads, superintendence, liabilities, and insurances and allowances to labour, timekeeping, and clerical and office work, the use of consumable stores, water, lighting, and power; the use and repair of staging, scaffolding, workshops, and stores, portable power tools, manual plant, and tools; supervision by the Contractor's staff, foremen, and other supervisory personnel; and charges incidental to the foregoing. Payments under this item shall be made in the following currency proportions:

(i) foreign: _____ percent (to be stated by bidder).

(ii) local: _____ percent (to be stated by bidder).

Daywork Materials

4. The Contractor shall be entitled to payment in respect of materials used for daywork (except for materials for which the cost is included in the percentage addition to labour costs as detailed heretofore), at the basic rates entered by him in the **Schedule of Daywork Rates: 2. Materials,** together with an additional percentage payment on the basic rates to cover overhead charges and profit, as follows:

(a) the basic rates for materials shall be calculated on the basis of the invoiced price, freight, insurance, handling expenses, damage, losses, etc., and shall provide for delivery to store for stockpiling at the Site. The basic rates shall be stated in local currency, but payment will be made in the currency or currencies expended upon presentation of supporting doCumentation.

(b) the additional percentage payment shall be quoted by the bidder and applied to the equivalent local currency payments made under (a) above. Payments under this item will be made in the following currency proportions:

(i) foreign: _____ percent (to be stated by the bidder);[1]
(ii) local: _____ percent (to be stated by the bidder);

(c) the cost of hauling materials for use on work ordered to be carried out as daywork from the store or stockpile on the Site to the place where it is to be used will be paid in accordance with the terms for Labour and Construction in this schedule.

Daywork Contractor's Equipment

5. The Contractor shall be entitled to payments in respect of Contractor's Equipment already on Site and employed on daywork at the basic rental rates entered by him in the **Schedule of Daywork Rates: 3. Contractor's Equipment.** Said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity, and insurance, repairs, maintenance, supplies, fuel, lubricants, and other consumables, and all overhead, profit, and administrative costs related to the use of such equipment.[2] The cost of drivers, operators, and assistants will be paid for separately as described under the section on Daywork Labour.[3]

6. In calculating the payment due to the Contractor for Contractor's Equipment employed on daywork, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the the Engineer, the travelling time from the part of the Site where the Contractor's Equipment was located when ordered by the the Engineer to be employed on daywork and the time for return journey thereto shall be included for payment.

7. The basic rental rates for Contractor's Equipment employed on daywork shall be stated in local currency, but payments to the Contractor will be made in currency proportions, as follows:
(a) foreign: _____ percent (to be stated by the bidder).[4]
(b) local: _____ percent (to be stated by the bidder).

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1 The bidder shall state the percentage in a single foreign currency equivalent and the exchange rates and official sources used.

2 This is an example of wording to include overhead and profit, etc., in the daywork rates. A separate percentage addition could be used as for labour and materials.

3 An alternative, sometimes adopted for administrative convenience, is to include the cost of drivers, operators, and assistants in the basic rates for Contractor's Equipment. The last sentence of paragraph 5 should then be modified accordingly.

4 The bidder shall state the percentage in a single foreign currency equivalent and the exchange rates and official sources used.

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount

Schedule of Daywork Rates: 1. Labour

D101	Labour (Un-skilled)	Day	30	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D I02	Mason (Special Class)	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D103	Carpenter (Special Class)	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D104	Mason (Second Class)	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D105	Carpenter (Second Class)	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D106	Steelworker Erector	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D107	Driver for vehicle up to 10 tons	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D108	Operator for excavator, dragline, shovel or crane	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D109	Operator for tractor with dozer blade or ripper	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D110	Operator grader	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D111	Operator in other construction equipment	Day	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D112	Chowkidar for watch & ward	Day	25	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
Subtotal					
D113	Allow _____percent of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above				
Total for Daywork : Labour (Carried forward to Daywork Summary, p. ____41____)					

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount

Schedule of Daywork Rates: 2. Materials

D201	Cement, ordinary Portland or equivalent in bags conforming to IS:269:1989 and IS 455:1989	MT	2	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D202	HYSD reinforcing bars upto 25 mm dia conforming to IS:1786:1989	MT	1	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D203	Bricks of class designation 75 as per IS:1077:1992	1000 Nos	10000	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D204	Anti Corrosive Bituminous paint	Ltr.	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D205	Enamel Paint of any shade & colour (IS:2932-1964 & IS 137-1975)	Ltr.	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D206	Coarse Sand as per IS 1542	Cum	10	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D207	R.R. Stone for masonry	Cum	10	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D208	Crusher broken stone aggregates up to 25 mm nominal size	Cum	25	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D209	Crusher broken stone aggregates Above 25 mm nominal size	Cum	25	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D210	Portable water at site	KL	1000	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D211	Gravel/ Moorum for Road work	Cum	25	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D212	Bitumen-VG-30	MT	3	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
Subtotal					
D213	Allow _____percent of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 4 (b) above				
Total for Daywork : Materials **(Carried forward to Daywork Summary, p. ____41____)**					

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount

Schedule of Daywork Rates: 2. Contractor's Equipment

D301	Excavator, face shovel, or draggling including the cost of operator::				
D301.1	Up to and including 1 m^3	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D301.2	Over 1 m^3 to 2 m^3	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D301.3	Over 2 m^3	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D302	Tractor, including bull or angle dozer including the cost of operator::				
D302.1	Up to and including 150 kW	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D302.2	Over 150 kW to 200 kW	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D302.3	Over 200 kW to 250 kW	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D303	Tractor with ripper including the cost of operator::			**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D303.1	Up to and including 200 kW	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D303.2	Over 200 kW to 250 kW	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D304	Motor grader including the cost of operator:	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D305	Crane- 5 tonne including the cost of operator:	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D306	Diesel Road Roller, or Vibratory Compactor upto 10 t including the cost of operator:	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D307	Trucks, or Truck tipper, or Truck with mounted water tank or truck with crane for removal of accidental vehicles including the cost of operator:.	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D308	Tractor with trolley, or tractor with water tanker trailer, tractor with ripper Tractor with hydraulic scraper including the cost of operator:				

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
	(a) upto 25 HP	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
	(b) For 25-40 HP	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
D309	Bitumen mixture (10-14 Cft.) C.C including the cost of operator:	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D310	Water pumping sets mounted on trolley (diesel driven)with inlet & outlet pipes including the cost of operator:.				
	a) Sets up to 10 HP	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**
	b) Sets 11 to 20 HP	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	
	c) Sets above 20 HP	Hour	5	**in figure : Rs.**	**in figure : Rs.**
				in Word : Rupees	**in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D311	Generator sets mounted on trolley including the cost of operator:				
	a) Sets upto 5 Kva	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
	b) Sets 5-15 Kva	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D312	Mobile Crane / Power winch including the cost of operator:	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D313	Bull Dozer 100/110 Hp including the cost of operator:	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D314	Plate compactors including the cost of operator:	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D315	Jack hammers for dismantling including the cost of operator:	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
D316	Utility Vehicles including the cost of driver:	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Item No.	Description	Unit	Nominal Quantity	Rate	Extended Amount
D317	Mini Hot Mix Plant (5TPH) including the cost of operator:	Hour	5	**in figure : Rs.** **in Word : Rupees**	**in figure : Rs.** **in Word : Rupees**
				Subtotal	
D318	Allow _____percent of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 5 above				
Total for Daywork : Contractor's Equipment (Carried forward to Daywork Summary, p. ____41___)					

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Daywork Summary

	Amount (Rs.)	*% Foreign*
1. Total for Daywork: Labour		
2. Total for Daywork: Materials		
3. Total for Daywork: Contractor's Equipment		
Total for Daywork (Provisional Sum) (Carried forward to Summary, p. 42)		

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-

Grand Summary

General Summary	*Page*	*Amount*
BILL NO.1 : SITE CLEARANCE		
BILL NO.2 : EARTH WORKS		
BILL NO.3 : SUB-BASE AND BASE COURSES		
BILL NO.4 : BITUMINOUS COURSES		
BILL NO.5 : BRIDGES		
BILL NO.6 : ROAD SAFETY AND AMENITIES		
BILL NO.7 : MAINTENANCE, REPAIR AND REHABILITATION		
Subtotal of Bills	(A)	
Total for Daywork (Provisional Sum)	(B)	
Bid Price (C=A+B) (Carried forward to Form of Bid)	(C)	

(1) No. of corrections :-
(2) No. of overwriting :-
(3) No. of interpolations:-
(4) No. of omissions :-