ORIGINAL

DEVELOPMENT AND OPERATION OF MASS RAPID TRANSIT SYSTEM

FOR

VERSOVA – ANDHERI – GHATKOPAR CORRIDOR

TECHNICAL PROPOSAL

VOLUME - I

Reliance Energy
A Dhirubhai Ambani Enterprise

Reliance Energy Ltd
India

connex

Connex S A
France

MUMBAI METROPOLITAN REGION DEVELOPMENT AUTHORITY

MAY 2005

ORIGINAL

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A Dhirubhai Ambani Enterprise

Reliance Energy Limited
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FORMAT 1-A
LETTER OF TRANSMITTAL

Date: 16 May 2005
Place: Mumbai

To

Chief, Transport & Communications Division
Mumbai Metropolitan Region Development Authority
Bandra-Kurla Complex
Bandra (E)
Mumbai-400 051.

1/5 VS 16/5/05 16/5/05 16/5/05

Dear Sir,

Sub: **Development and Operation of Mass Rapid Transit System for Versova-Andheri – Ghatkopar Corridor on BOOT Basis through PPP – Submission of Technical Proposal**

Please find enclosed the Technical Proposal in original and a copy in respect of "Development and Operation of Mass Rapid Transit System for Versova-Andheri-Ghatkopar Corridor in response to the *Invitation for Bids (IFB) Document* issued by the Mumbai Metropolitan Region Development Authority (MMRDA).

We hereby confirm that:

1. The Proposal is being submitted by Reliance Energy Limited who is the Lead Consortium Member of the Bidding Consortium comprising (Reliance Energy Limited and CONNEX, SA), in accordance with the conditions stipulated in the RFP. Our Bid includes the Letter of Consent and Authorization in the format specified in the RFP, and the MOU (as per the principles stated in the RFP) between, Reliance Energy Limited and CONNEX SA, who are the Member Company as per the conditions stipulated in the RFP.

2. We have examined in detail and have understood the terms and conditions stipulated in the RFP issued by MMRDA and in any subsequent communication sent by MMRDA as regards Technical Proposal. We agree and undertake to abide by all these terms and conditions. Our Proposal is consistent with all the requirements of submission as stated in the RFP or in any of the subsequent communications from MMRDA.

3. The Bidding Consortium of which we are Consortium Member satisfies the legal requirements and

meets all the eligibility criteria laid down in the RFP.

4. A Power of Attorney in Format 2 from the Lead Consortium Member authorizing the undersigned as the Authorised Representative, Signatory and Contact Person who is authorized to perform all tasks including, but not limited to providing information, responding to enquiries, entering into contractual commitments on behalf of the Bidder, etc., in respect of the Project is included as a part of the Proposal.

5. The information submitted in our Proposal is complete, is strictly as per the requirements as stipulated in the RFP, and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Proposal.

6. Our Proposal is firm and an irrevocable offer and shall not be revoked during the Bidding Process, shall remain valid until two years from the date of the opening of the technical bid by MMRDA. We agree to reasonably consider any request from MMRDA to extend further validity period beyond this date.

For and on behalf of
Reliance Energy Limited

Reliance Energy Limited SANTACRUZ (E), MUMBAI Reliance Energy Centre

SEAL OF THE COMPANY

(Authorised Representative and Signatory)

Name of the Person: J P Chalasani
Designation: Director (Business Development)

Enclosures:

i. Power of Attorney
ii. Vol. I & II
iii. Check List
iv. Formats (As mentioned in the Respective Check-list

VS 16/5/05

1/5

16/5/05

16/5

16/5/05

FORMAT 31-A
CHECK LIST FOR USE OF BIDDERS

TECHNICAL PROPOSAL

Before sealing Envelope '1' the Bidder should tick mark in the bracket (✓) the following items and sign the format in token of having ascertained the correctness of the proposal.

Sl No	Document	Mark	Page No.	Remarks
1	Is Letter of Transmittal – A (Technical Proposal) given in Format-1 provided	(✓)		
2	Is Letter of Consent and Authorization given in Format-2 provided?	(✓)		Sec. 4
3	Is Affidavit given in Format-6 provided?	(✓)		Sec. 4
4	Is Technical Proposal format given in Format 7 provided?	(✓)		Sec. 4
5	Is individual Applicant Profile given in Format 8 provided?	(✓)		Sec. 4
6	Is General Information of Constituent Members to the Joint Venture Agreement given in Format 9 provided?	(✓)		Sec. 4
7	Is Matrix of Responsibilities in Joint Venture provided in Format 9A provided?	(✓)		Sec. 4
8	Is Technical Capability given in Format 11, Statement I, IA, II & III provided?	(✓)		Sec-4
9	Is Experience of Bidder in Design/Development and Operations of MRTS/RAIL Projects given in Format 12 provided?	(✓)		Sec-4
10	Is Method Statement covering General Design Approach and Construction Methodology for Developing the project facilities given in Format 13 provided?	(✓)		Sec. 4
11	Is proposed organisation given in Format 15 provided?	(✓)		Sec. 4
12	Is details mentioned as per Format 16 given in Statement I & II provided?	(✓)		Sec. 4
13	Is Particulars of Major Specialists Major Sub-Contractors/suppliers given as per Format 17 provided?	(✓)		Sec. 4
14	Is Plant and Equipment proposed to be deployed by the bidder for the work as per details given in Format 18 provided	(✓)		Sec. 4
15	Is Time Schedule as given in Format 19 provided?	(✓)		Sec. 4
16	Is Technical Specification as per Format 21 provided?	(✓)		Sec. 4
17	Is Land Requirements as given in Format 22 provided	(✓)		Sec. 4
18	Is Additional Information as given in Format 27 provided?	(✓)		Sec. 4
19	Is Form of Guarantee for Bid Security as given in Format 28 provided?	(✓)		Env. 1
20	Is Form of Bank Guarantee for Performance Security as given in Format 30 provided?	( )		–
21	Is Check List for use of Bidders as given in Format 31-A (Technical Proposal) provided?	(✓)		Env. 1

Bidders are advised to fill in the above details and give page numbers, against each so as to make it easy for the proposal opening authority to accept the proposal on the spot.

Signature: J P Chalasani
Name: J P Chalasani
Bidder: Mumbai Metro One

Reliance Energy Limited SANTACRUZ (E) MUMBAI 400 055.

FORMAT 32

BID OPENING CHECKLIST

Bid Reference: _____

Bid Opening Date: _____ Time: _____

Name of Bidder: _____

(a) Is outer envelope of Bid sealed?

(b) Is Bid - Checklist completed and signed?

(c) Is documentary Authority for signing enclosed?

(d) Date of Bid Validity / Bid Security

(e) Amount of Bid Security _____state Currency

(f) Describe any "Substitution", "Withdrawal," or "Modification" submitted.

(g) Name of Bidder representative, if bidder is not present

Signature of responsible official:_____ Date:_____

DEVELOPMENT AND OPERATION OF MASS RAPID TRANSIT SYSTEM FOR VERSOVA – ANDHERI – GHATKOPAR CORRIDOR

Technical Proposal

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Volume I

Volume II

1.0 EXECUTIVE SUMMARY

1.1 Appreciation of the Project

1.1.1 Prologue

Mumbai, the most vibrant city in the country, has historically been the commercial and financial capital of the country, with all its attendant dynamism. Most leading industrial houses are headquartered at Mumbai or have a major presence here. Mumbai (which connotes a wide spread area comprising "Brihan" or Greater Mumbai) is also a great industrial center; it is home to media, advertising and the fashion industry; it is home to the world's biggest movie and entertainment industry. Mumbai boasts of the nation's biggest airport and seaports, along with rail and road gateways to the hinterland, and leads the country in the share of international trade. Mumbai also supports a myriad other trades in a significant manner.

Mumbai's celebrated cosmopolitan culture really sets it apart from, and ahead of, the pack of other metros in the country. It is truly among the "world cities" dotting the global map. Mumbai challenges and stretches ideological boundaries, and therefore remains at the forefront of unleashing individual and collective potential. Consequently, Mumbai remains, and has always been, a strong magnet to people from all walks of life to settle, thrive and excel.

The enormous growth that the metropolis has experienced presents its own challenges for urban management and puts tremendous stress on the civic amenities. The situation is further accentuated due to peculiar geographic features of the city : Mumbai is essentially an island city (made up of seven islands), which has been sewn up and integrated with the main land. The growth has been along two principal corridors as characterized by the suburban Central and Western railway services running in the south-north direction. Each of these rail routes are flanked by the main road arteries viz. the Western express highway and the Eastern express (Sion -Panvel) highway.

1.1.2 The connectivity conundrum

While numerous options are available for north-south connectivity, few, if any, exist for the east-west connectivity, especially for the suburbs located north of central Mumbai. The connectivity between the two rail routes is available at Dadar/Wadala, while the road connectivity is available adjacent to Sion station, all located in the central part of the city.

The northern suburbs have become densely populated in the past couple of decades, leading to a spurt in residential, commercial and social (educational, healthcare etc.) development. In recognition of this phenomenon, even mainstream businesses have either completely or substantially moved their base northwards, with the Andheri-Kurla Road and the SEEPZ area being among the most prominent destinations for such re-location.

This has resulted in a ***northward shift in the center of gravity of the city's population.*** More commuters availing of the public transport now originate in the northern suburbs than ever before. The sheer lack of east-west connectivity results in severe hardships for commuters requiring to make these crossovers, especially on a daily basis.

In the current scenario, traversing between two far-flung northern suburbs, each located along the two principal flanks, is akin to negotiating the entire length of a *hairpin configuration,* in order to traverse between two points located at or near the *hairpin* tips! Consequently, locations which may be only 6km to 10 km apart require a one-way commute of anywhere between 20km to 40 km!

1.1.3 The Versova-Andheri-Ghatkopar Elevated Mass Rapid Transit Rail System (V-A-G MRTS) : A Solution Long Overdue!

In appreciation of the accelerated east-west mass transportation needs of the commuters, the Mumbai Metropolitan Regional Development Authority ["MMRDA"] has judiciously taken up the development of the V-A-G MRTS on priority. The severe space constraints, as well as the already severe traffic congestion along this identified corridor, has virtually dictated the need to develop the MRTS above grade i.e. elevated.

Once successfully commissioned, the V-A-G MRTS would serve three important purposes:

[I] Provide the much needed east-west connectivity, at the mid-points of the *hairpin* configuration

[II] Provide an alternate and more attractive mode of transport to the commuters on this stretch

[III] Provide substantial flexibility to the urban planners, by augmenting capacity and de-congesting the traffic along the corridor

Given the situation, the need to expedite the development of the V-A-G MRTS cannot be emphasized enough!

1.2 The Bid

1.2.1 Global Bids

MMRDA have invited global bids for the development as well as operation and maintenance of the proposed Mass Rapid Transit System for the Versova-Andheri-Ghatkopar corridor on a Build-Own-Operate and Transfer (BOOT) basis for a concession period of 35 years, inclusive of a 5-year construction period. . The total route length, including a spur to Sahar International Airport, is approximately 13 km of a Standard Gauge (1435 mm) track. MMRDA has invited bids in two stages – an initial detailed Technical Bid, followed by the technically qualified bidders required to submit their Financial bids.

1.2.2 Bidder

Reliance Energy Limited, the largest integrated power utility in the private sector in India, has partnered with CONNEX of France, Europe's leading operator of Rapid Transit Systems, to form a highly credible, capable and competent Consortium for submitting the bid for the commercial development, operation and maintenance of the proposed V-A-G MRTS. The Consortium proposes to design, develop and operate the V-A-G MRTS as a **commuter-centric transportation utility.**

1.2.3 The Consortium

Reliance Energy Limited ["REL"] is a part of the Reliance Group, which has unmatched credentials in operating utilities on a commercial basis. The Reliance Group's portfolio includes India's leading utilities in the petroleum, telecom and power sectors, the latter being directly operated by REL. Besides the experience in operating utilities, the Reliance Group has proven credentials in successfully developing, commissioning and managing global-scale projects in diverse sectors.

The RELIANCE Group**, founded by Dhirubhai H. Ambani (1932-2002), is India's largest business house in the Private Sector, with** Total Revenues **of over Rs 99,000 crore** (US$ 22.6 billion), Cash profit **of Rs 12,500 crore** (US$ 2.8 billion), Net profit **of Rs 6,200 crore** (US$ 1.4 billion) **and** Exports **of Rs 15,900 crore** (US$ 3.6 billion).

The RELIANCE Group**'s activities span** exploration **and** production **(E&P) of** oil and gas, refining and marketing, petrochemicals **(polyester, polymers, and intermediates),** textiles, financial services **and** insurance, power, telecom **and** infocom **initiatives. The Group** exports **its products to more than** 100 countries **the world over.**

RELIANCE **is the** largest Indian private company **on several financial parameters, and is ranked** among the largest 150 companies globally **by net profits and** among the largest 400 companies **by sales.** RELIANCE Group **revenue is equivalent to about** 3.5% **of India's GDP. The Group contributes nearly** 10% **of the country's indirect tax revenues and** over 6% **of India's exports.**

RELIANCE ENERGY LIMITED (REL) is a 75-year old company. REL, a Reliance Group company, is the LARGEST **Integrated Power Utility** company in India in the private sector with its own **Generation, Transmission, Distribution and Power Trading** operations and supplying RELIABLE and QUALITY power to more than 25 million Industrial, Commercial and Domestic consumers in several parts of India. **REL** and its affiliates distribute over **5,000 MW** of power, the largest by a private sector Utility in India.

REL and its affiliates **Own and Operate** several Power Plants with total **installed capacity of 940 MW Utility Power at five locations**. Other **Reliance group companies own and operate 1095 MW Captive Power** Plants at seven locations.

REL is in the process of setting up a **3740 MW Gas based project** near Delhi, at Dadri. The power project, to be developed in phases, will also be the **world's largest gas based power generating plant at a single location**.

CONNEX SA is a subsidiary of the French group VEOLIA -Group, the world leader in Transportation and Environmental Services (turnover 2003: € 28.6 billion)

In 2004, Connex employed 61,000 persons, carried 1,5 billion passengers for a turnover of €3,6 billion with a solid presence on four continents. Connex operates all modes of transport with 23,500 road vehicles (buses and coaches), 3,500 rail transit vehicles (trains, underground trains and light trains) and 49 ferries.

Connex, the No.1 private operator of public transport in Europe, with a presence in 23 countries and working relationships with 5,000 local authorities, has consciously positioned itself as a proactive supplier, able not only to meet various needs but to anticipate them as well.

Connex is the leading provider of contract passenger rail services in the world today.

Additional information on the consortium partners has been presented in the subsequent chapters.

1.2.4 The Associates

While the Consortium is firmly placed to undertake the project, it intends to associate with MTR Corporation, Hong Kong, the operator of the renowned Hong Kong MRTS, to provide it with crucial technical support for project management and system integration services. Extensive support has already been extended by MTR Corporation for the preparation of this Technical Proposal.

The present MTR network consists of 50 stations on 87.7 route-kilometers, serving over 2.3 million passengers daily by operating over 1000 train cars. The MTR system is ranked amongst the world's safest and most reliable system, with service delivery as high as 99.9% and punctuality attained at 99.3%.

1.2.5 The best blend

Taken together, the Consortium brings to the table unparalleled strengths in project development, commercial operations of utilities and operations of Rapid Transit Systems.

It is pertinent to highlight here that the Consortium Partners, along with their Associates, would bring to the table a propitious blend of local, European and Far East Asian best practices and sensibilities.

1.3 The Proposal

The Consortium partners, along with their associates, have deliberated at length on the appreciation of the project and the Bid Documents, in order to understand MMRDA's requirements as well as to bring out all the facets of the development in great detail. The Bidders have crystallized the result of this elaborate brainstorming exercise into **Vision and Mission Statements** for this development. The Vision and Mission Statements have served as the ***guiding posts*** for the entire Technical Bid preparation.

VISION

To create and operate a landmark rapid transit system providing strategic transportation connectivity and delivering a comfortable and pleasant commuting experience.

MISSION

- To provide a fast and safe mode of transport
- To provide a punctual and reliable service
- To ensure comfort and convenience of the users, both on board and on the premises of the MRTS
- To provide user-friendly facilities and passenger services for the convenience of new and unfamiliar commuters
- To ensure quick and easy access to the MRTS, and provide for convenient and direct connections to other transportation services, wherever possible
- To provide special amenities and services for the old, infirm and physically challenged commuters
- To be a SMART utility service provider by employing leading edge technologies and designing innovative services and solutions
- To provide a variety of user amenities on the MRTS premises in a clean and pleasing ambiance

1.4 The Technical Bid

The Methodology

The bidder has studied in detail the provisions of Vol-I, Vol-II & Vol-III of the Bid Document and was actively involved in obtaining clarifications from time to time personally as well as through email, and has understood the requirements and stipulations of the Bid Document along with later modifications issued through addendums.

The bidder has studied the project plans prepared by MMRDA and has inspected the site to appreciate the various factors determining the technical feasibility, as well as to appreciate the site related risks involved in the execution of the project.

The Scope of the Project

The scope of the project as stipulated in the bid documents covers the construction of a double line elevated standard gauge (1435mm) rail corridor along Versova – Andheri – Ghatkopar involving 13 stations including a spur to International Airport at Sahar. The total length of this corridor including the spur is 12.853 Kms.

The project also involves the construction of an elevated depot at D.N. Nagar for stabling and maintenance of coaches, and the construction of a single line entry to the depot. The length of this single line entry to depot is 450 m with additional 5 km of track within the Depot. The track at D.N.Nagar depot will be Ballast less.

An alternative site for the depot has also been identified by MMRDA at Ghatkopar end with an elevated entry beyond Asalpha station. This involves an elevated tract of 1.74 km after crossing the central railway tracks at elevated level and then with a downward ramp in 1 in 40 grade for provision of a depot at ground level. The 5 km of track at Ghatkopar depot shall be with ballast etc.

Mandatory Requirements

It is appreciated that corridor alignment, location of stations, system gauge, quality of service, car shed location, accessibility to physically challenged people, coach air-conditioning and electric traction, 25kV AC OHE are the mandatory requirements stipulated by the bid documents and the system proposed by us fully conforms to these requirements. We have however, identified certain key areas where some changes to the system are desirable. These have been presented as suggestions as appropriate place in our offer.

1.5 The Proposed Mass Rapid Transit System [MRTS]

The proposed MRTS has been designed to provide for the following service requirements and levels, which is in compliance with the stipulations in the bid documents.

1.5.1 The Service

The train service will operate from Versova to Ghatkopar. The service will call at Versova and continue to DN Nagar, Azad Nagar, Andheri, Western Express Highway (WEH), Chakala, Airport Road, Marol Naka, Sakinaka, Subhash Nagar, Asalpha Road and terminate at Ghatkopar. The Airport train service will be diverted from the Airport Road Station and terminate at Sahar Airport.

The total journey time between Versova and Ghatkopar would be within a target duration of 21 minutes, which includes the halt/dwell time.

The passenger service shall be provided from 05:30 in the morning until 24:00 of the day, operating for a period of 19.5 hours each day. The peak hours are expected to be from 08:00 to 13:00 and from 17:00 to 22:00 Hrs.

The Initial Service Level in 2011 shall be based on a train service headway from Versova of 4 minutes during peak hours and 8 minutes during non-peak hours as required in the Technical and Performance Specifications. The headway shall be reduced to 3 minutes during peak hours and 6 minutes during non-peak hours at the Ultimate Service Level in 2041.

The train service to Sahar Airport station shall be provided by diverting every second to sixth train, such that the waiting time at Sahar Airport Station does not exceed a maximum of 20 minutes.

Capacity expansion in step with increasing demand

The Bidder has provided for phase wise expansion of service capacity by adopting optimum combinations of the two possible means viz. [i] reducing the headway and [ii] increasing the number of cars per rake.

The summary of the Service Level Forecast and Fleet Expansion is provided below:

Year	Passengers per hour per direction	Headway in Peak Hour (minutes)	Total No. of Rakes (including spare trains)	Cars per Rake
2011	18600	4.0	13	4 – Cars
2021	23600	3.25	16	4 – Cars
2031	30500	3.5	14	6 – Cars
2041	39500	3.0	17	6 – Cars

Safety

The design of MRTS will employ the best design practices to minimize the likeliness for accidents to passengers on stations and in trains. The stations will be designed to minimize the risk of fire in accordance with applicable codes and local fire safety guidelines / regulations. The layout of the station will be devised so that the passengers can be evacuated quickly and safely by an immediately obvious route including through Automatic Fare Collection (AFC) gates. For emergency evacuation of a train, provision will be made to clear the platform in 4 min.

In the event of a power outage, all train and station systems and services which are vital to safety will be provided with a back-up power supply, so that, if necessary, the passengers may be evacuated without harm to their health or well-being.

A set of safety and emergency procedures will be formulated to deal with different routine and emergency situations. These will be included in Safety and Disaster Management Manuals.

Service Reliability and Availability

The equipment for the MRTS will be of a robust design. Every effort will be made to improve reliability of equipment in a cost effective manner. The target is that the overall availability of services will not be less than 97% during 1st year of operation. During 2nd and subsequent years, target service availability will be at least 99%. The maximum kilometerage between failures (MKBF) will not be less than 100,000km.

1.5.2 Rolling Stock

The Bidder offers to deploy an advance and modern Rolling Stock (Electrical Multiple Unit Stock), along with numerous state-of-the-art features on the prestigious V-A-G Mass Rapid Transit System.

The proposed design of the EMU stock will fully meet the required parameters of the MMRDA as contained in the Bid document.

The train formation has been determined keeping in mind the severe service conditions (Steep Grade and Sharp Curves) as well as the stringent operating parameters (High Acceleration, Heavier Load, Optimum Running Time and Higher Deceleration) under which the train sets are required to operate.

The proposed train formation is : DT-M1-M2-M2-M1-DT

DT – Driving Trailer

M1 – Motor Coach

M2 – Motor Coach with emergency cab and Hostler Controls

During the initial stages of MRTS operation period when the traffic demand does not warrant 6 car Train sets, the system may be operated with 4 Car Train Set consisting of 2 motor coaches and two driving Trailer coaches as a measure of economy.

The Rolling Stock shall be aerodynamically efficient and aesthetically attractive.

The coaches would be of lightweight design with 4 doorways along each side and roof mounted air-conditioning system. Each Coach will be fitted with 7 to 8 longitudinal benches made out of Stainless Steel / Glass Reinforced Plastic (GRP) which can accommodate 42 to 48 seated passengers. Standing room in coach will be ample with a normal crush load of 300 passengers (6 persons per sq. meter) and a maximum of 375 persons at dense crush load (8 persons per sq. meter). The coaches shall have vestibules for passenger distribution and emergency evacuation.

The coaches shall be designed and constructed to be energy efficient. Air-conditioning would be provided maintain a passenger area temperature of 25 deg-C and humidity of 60% for passenger comfort. The coaches would be equipped with public address (PA) systems and emergency communication system with the train crew. Internal panels for advertisements and information shall be provided in the coaches.

The Cab design shall be ergonomic with frontal emergency exit provided to the drivers. Appropriate communication systems shall be provided to ensure crew to crew, crew to control center /stations, and crew to passenger contact.

In general, all equipment and systems provided will be electromagnetically compatible with each other and with all existing external systems.

1.5.3 Track

Track for the entire alignment including Car Depot at D.N. Nagar and Airport line will be elevated and be of Standard Guage. It is, therefore, proposed to provide non-ballast track for the entire elevated portion including at the D.N. Nagar Car Depot. [At the alternative depot site at Ghatkopar, the track will be at ground level and will be a ballasted track]

Pre-cast RCC Blocks will be provided as per the design standards, and the track fittings will include Rubber pad on Steel shims, Pre-cast track bolts, CI bearings, Pandrol clips/ Vossloh fittings & Grooved Rubber Pads.

The total track length shall be 31.446 km, of which the rail section for 26.076 km shall be of 60 kg and for the 5.370 km at the 52 Turnouts shall be 49 kg.

The rail expansion joints for continuous welded track will be designed to suit the rail temperature ranging from 10 deg to 60 deg C.

Buffer stops will be provided to standard designs at Ghatkopar and Versova and Sahar Airport Station and in yards. The numbers of Buffer Stops are 26.

The track shall be designed to ensure riding comfort for the passengers, and to ensure cleanliness as well as minimal and fast maintenance for the operator.

1.5.4 Signaling

Track alignment for the corridor is on elevated structures from Versova to Ghatkopar including the spur line from Airport Road to Airport station. For this dedicated track for Mass Transit of commuters, train control and signaling system has been designed to meet a design headway of 120 seconds. It shall comprise modern Automatic Train Protection (ATP) system with CAB signaling.

Line side signals will also be provided at all stations with points and crossing, which shall be used for the purpose of back up signaling. The system shall be based on fixed block principle.

All the stations with points and crossings shall be provided with one set of Computer Based Interlocking (CBI) with facility to operate these points and crossings locally as well as being centrally controlled from Operation Control center (OCC).

The CAB-borne and wayside signaling equipment has been designed with sufficient redundancy so as to meet the desired reliability and availability requirements. The proposed system will have self-diagnostic & predictive on-line maintenance feature to minimize the

failure & recovery time. The mimic panel for this corridor shall be housed in the OCC at DN Nagar. The depot shall be provided with an independent Computer Based Interlocking.

1.5.5 Stations

The stations would be designed so as to reflect the singular character of the MRTS as distinct from other modes of transport. Each station would be uniquely designed to reflect either a bold and modern society, or to reflect a blend of modern and traditional Indian architecture. The choice would be made so that the every individual station favourably accentuates and yet does not distract from the surrounding milieu.

The design and construction of the elevated station buildings within severe space confines poses special challenges. In order to ensure smooth passenger services as well as orderly operations despite the constraints, it is proposed to plan the passenger flow at three levels viz. Road level, Concourse level and Platform level. User-friendly graphics and signage would be carefully designed and strategically located to aid the passengers to navigate quickly and smoothly in the premises. The entire station design shall also ensure ease and comfort to the old and physically challenged commuters. The construction and choice of materials shall ensure that the structure is both elegant and safe.

The Road level flow would ensure easy access to the station in general, and to the concourse level in particular. Access shall be provided by appropriately locating covered staircases as well as escalators to cater to peak load conditions. Special provision of lifts for the old and physically challenged passenger shall be made.

The Concourse level would comprise the main entrance lobby and would be the non-paid area. Commuters would be required to purchase tickets here to proceed to the paid area. The Concourse level would provide public amenities such as food and other stalls, vending machines, information kiosk etc.

The Platform level would be accessible only to ticket holding passengers. Platforms, 135 m in length, and having widths sufficient to accommodate peak rush volumes at the particular station, shall be provided on both sides.

The proposed automatic fare collection (AFC) system for MRTS will be a closed system which has controlled entry and controlled exit to and from paid areas using AFC gates. Innovative fare collection systems such as payment by smart cards, mobile phones etc. are envisaged to be deployed to enhance the user-friendliness of the system.

1.5.6 Car Depot

The car depot for the Versova – Andheri – Ghatkopar corridor will be located at DN Nagar (or alternatively at Ghatkopar). Due to space constraints the car depot will be at the elevated floor at the level of the main line track. The proposed car depot is going to deal with the running maintenance activities and the Depot activities of the Rolling Stock.

The Car Depot is intended to be a multipurpose area. It will not only serve the maintenance and repair functions of the MRTS Trains, but also will include cleaning facilities, stabling sidings, administration buildings, training facilities, stores, test track, emergency vehicles and control centre.

The following facilities would be located in the Car Depot:

a) Depot & Workshop for Rolling Stock
b) Depot for Fixed Installations
c) Depot for General services
d) Administration and Training facilities
e) Operational control centre
f) Remote control center

1.5.7 Operations Control Center [OCC]

The OCC is the "nerve center" of the entire MRTS. The OCC would be designed as a modern, hi-tech enclave to house the Operations Control staff.

The OCC would be designed to provide control over two critical functions viz. the Engineering Control (SCADA/COM) and Traffic Control (SIGNALING/COM), both housed under the same roof for better co-ordination.

1.6 Design, Engineering, Construction and Commissioning

1.6.1 Project Planning & Execution

Critical Locations

There are some locations along the alignment, which are considered as critical & involve dependency on external organizations. The alignment has primarily being planned with column locations along the central verge of the road alignment with deviations at curves and transitions. These locations will involve widening of the road and relocating the central verge for construction of column foundations for the elevated corridor. The spans of the elevated corridor have been selected to vary between 20 to 31 meters except at certain locations of road crossings and railway & expresses way crossings where longer spans of 60 M and 40 M have been adopted. At station locations shorter spans of less than 20M have been adopted. At certain locations where road diversions cannot be done portal frames have been proposed to accommodate the alignment of the rail corridor.

Diversion of Existing Underground Services

Diversion of utilities such as water supply pipelines, sewage pipelines, gas pipelines, power and communication cables etc. is likely to be a major constraint in execution if not planned in advance. It is seen that a 200mm diameter water supply pipe line is located underground along the central verge and is likely to come in the way of pile foundations all along and will have to be diverted on priority. Other similar services such as Power & Telecommunication Cables, Gas Pipe Lines needing diversion will have to be coordinated with the concerned utilities. The details of these have been presented in a separate chapter in the technical documentation furnished along with this bid.

Road Widening

There are many locations where widening of the road is necessary. Advance action for removal of encumbrances within ROW is requested in order to avoid hassles during construction stage. At station locations, acquisition of additional area outside the ROW by MMRDA in advance is desirable so that clear site is handed over to avoid delay in station buildings construction. All these locations along with sketches have been indicated in the technical documentation.

A large number of Electrical Light Posts are running along the central verge of the road will have to be diverted on the side of the Footpaths on priority to enable construction of the wayside works.

Coordination with Railways and Other Government Departments

Other critical locations affecting the progress of work would be the construction of 60M spans across the railway tracks. The design of the way structure crossing over the tracks would need approval of the Railways. The construction of these structures would also need permission and special supervision by the Railways. . Similarly, considerable interaction with BMC and other local government authorities in relation to the project will be required. The bidder would be appoint appropriate liaison personnel to coordinate these activities. MMRDA assistance and associations at higher level may also be necessary to mitigate risks involved on this account.

Traffic Control

The construction of the elevated corridor will need barricading the road for a width of 8m all along and controlling traffic to avoid accidents & delay. A special departmental force will be engaged to assist the police department for coordinating traffic during construction.

The alignment near Asalpha and between Asalpha to Ghatkopar passes through a congested area with steep approach gradients, will need special attention in planning, execution & safety during construction.

Special attention will have to be paid for timely construction of the elevated depot structure involving a large number of columns and foundations, as this will control the erection of Girders and linking of track along the corridor.

1.6.2 Design Philosophy

It is proposed to carry out the structural engineering design of Girders, Piles, etc. either through the in house capability of MTR Corporation or through a specialist structural design consultant. As it is proposed to adopt two agencies for simultaneous construction of the corridor an independent design agency is preferred to ensure common design philosophy and construction profiles. Broad details of construction methodology proposed to be adopted have been given in detail in the technical documentation. Though the methodology indicated therein provides for pre-stressed concrete Girders it may also be required to provide composite construction for longer spans of 40 & 60 M. This will be decided during project implementation. Technical documentation gives details of design philosophy, design profiles, planning, construction methodology, quality control measures, equipments and manpower etc. Details of the organization charts for construction, operation maintenance as well as for the bid preparation have been enclosed as specified in the bid document.

1.6.3 Market Study & Optimizing Operation

During the operation and management period a constant review of the market commuter demand during the different periods of the day will be carried out as a regular feature so as to control the size of rake (4 coach or 6 coach train) the frequency necessary during peak and non peak period and management of commuters at stations entering and detraining during various periods would be analyzed for providing all facilities & comforts to the passengers. These would optimized electrical consumption and ensure economic operation.

1.6.4 Company / Consortium Management &Training

REL & Connex of France have proposed to join hands and formed a joint venture for submission of this Bid and would be the major equity holders for the project. REL has got proven expertise in the areas of HR Management, Financial Management and Project Management. Connex have got international experience in operation and maintenance of mass transit and other railway systems. The technical and managerial capabilities have been envisaged to be further strengthened by the intended association of the consortium with MTR / HK as the system integrator for the project.

Experts in respective areas would interact with the Consortium member and impart training on a regular basis. Training will involve construction, operation and maintenance of Standard gauge track structure and other allied services involved in advance technical operations; Signaling & Telecommunications Operations, Radio Communication, Centralized Operation Control, 2/3 min frequency operations including Training in Inspection, Quality Control, Punctuality, Safety, Environmental aspects and Disaster Management.

2.0 RELIANCE ENERGY LIMITED – COMPANY PROFILE

2.1 Reliance Energy at a Glance

Reliance Energy Ltd (REL), established in 1929, is India's leading integrated power Utility company in the private sector. Along with its affiliates, it has a significant presence in power generation, transmission and distribution of power in the States of Maharashtra, Delhi, Orissa, Goa, Andhra Pradesh and Kerala in India.

Reliance Energy Limited (REL) is a Reliance Group company, the latter is the largest Private Sector conglomerate in India with Sales Turnover exceeding Rs. 800 billion (US $ 17 billion), in diverse infrastructure fields, viz. Power, Oil and Gas Exploration and Production, Refineries, Petrochemicals, Telecom, Infocomm, etc. It ranked 306th on revenue, net income, & assets.

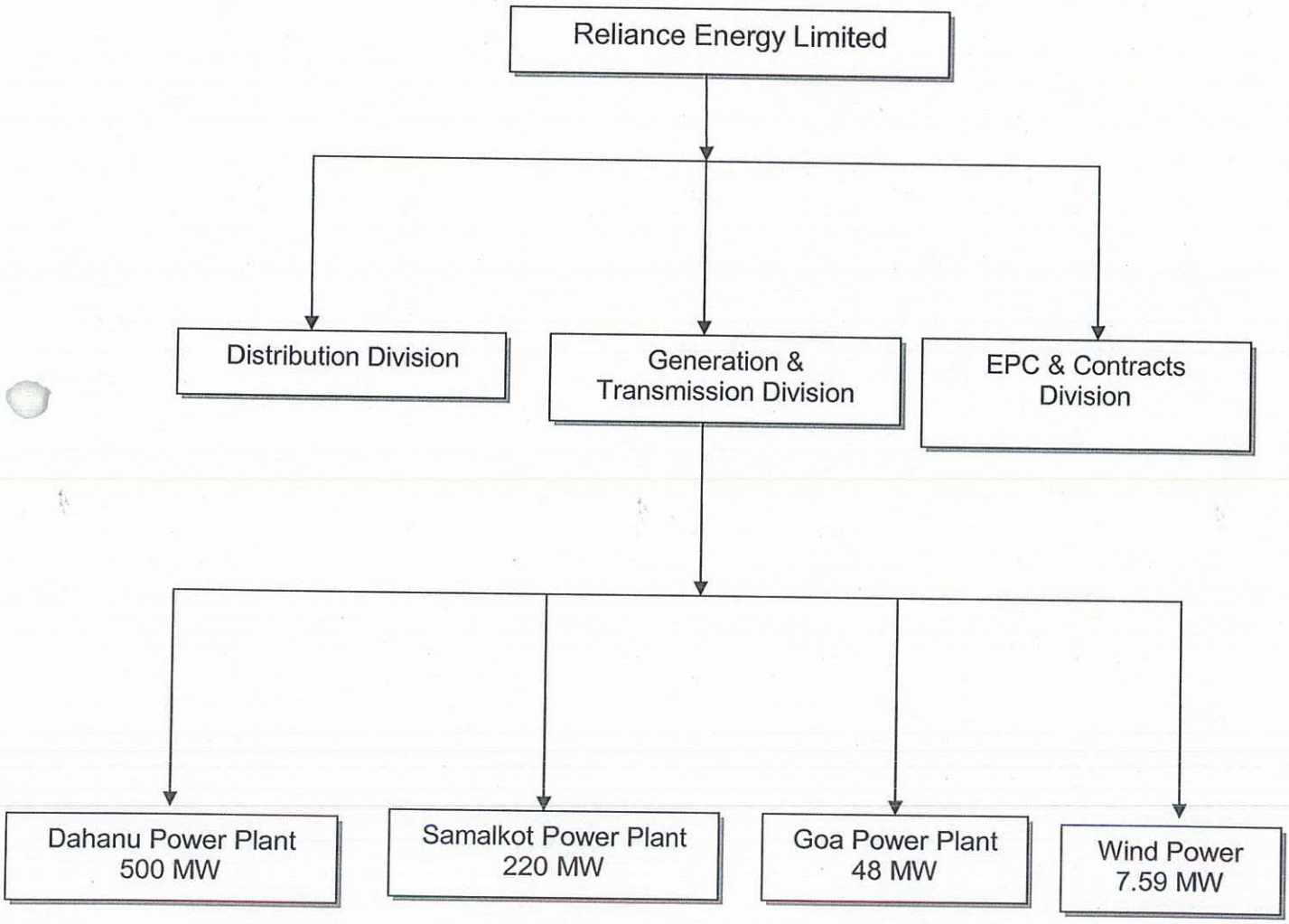
Reliance Energy, its affiliates and sister companies in the Reliance group own and operate over **2000 MW** of power generation capacity. These comprise conventional thermal plants, gas turbine based combined cycle power plants, cogeneration plants and wind electric generators.

Reliance Energy Limited and its affiliates distribute over 5,000 MW of power - the largest by a private sector Utility in India. Reliance Energy serves a customer base of about five million in Mumbai, Delhi and Orissa.

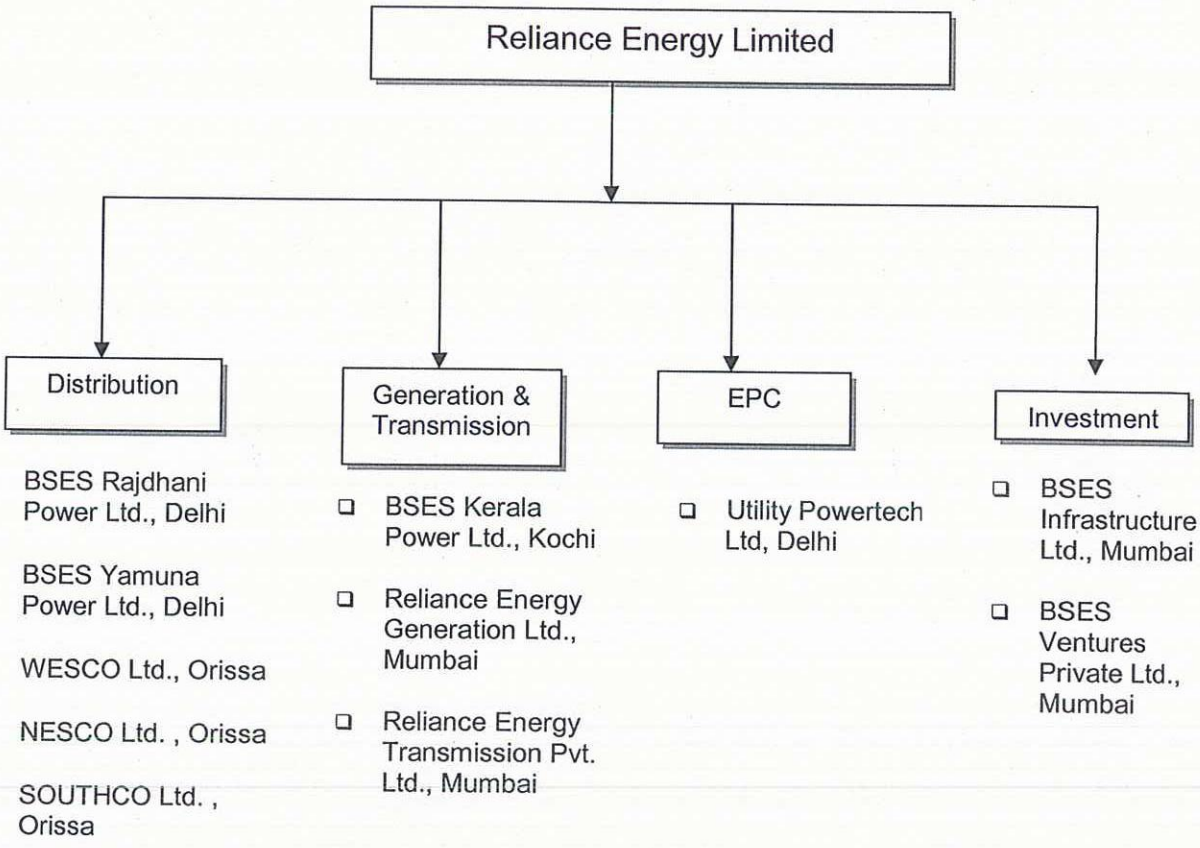
REL with its affiliate power companies rank among the top 25 listed private sector companies in India on major financial parameters.

Business Operations

The following chart outlines, in schematic form, the business divisions of Reliance Energy Ltd.


Reliance Energy Limited
Distribution Division
Generation & Transmission Division
EPC & Contracts Division
Dahanu Power Plant 500 MW
Samalkot Power Plant 220 MW
Goa Power Plant 48 MW
Wind Power 7.59 MW

The following chart outlines, in schematic form, the group companies of Reliance Energy Limited



2.1 Generation & Transmission

The Generation & transmission division has proven expertise in designing, engineering, erection, installation, commissioning, operations and maintenance of power generation and transmission projects. The division implements in-house power projects and supports ventures undertaken by other affiliate companies.

The division is fully integrated and has in-house capabilities to address every aspect of power projects including:

- Mechanical
- Electrical

- Instrumentation
- Civil
- Environmental, etc.

The division also provides engineering consultancy to external agencies and projects.

The details of power generating units owned and operated by Reliance Group as a whole is given below.

Owned By	Plant Name	Capacity (Mw)	Fuel	Technology
Reliance Energy	Dahanu TPS	500	Coal	Conventional TPS
	Goa Power Station	48	Naphtha	Combined Cycle
	Samalkot	220	NG and Naphtha	Combined Cycle
	Wind Farm, Jogimatti, Karnataka	7.59	Renewable	Wind Electric Generators
	Sub Total	**775.59 MW**		
Reliance Energy Affiliates	BSES Kerala Power	165	Naphtha	Combined Cycle
	Sub Total	**165 MW**		
Reliance Industries	Patalganga	85	Naphtha	Cogen Plant
	Hazira	290	NG/ Reltrol/ C5/ C6-C8, C9	Cogen Plant
	Naroda	40	NG/ LDO	Cogen Plant
	Jamnagar	360	LCO	Cogen Plant
	Sub Total	**775 MW**		
IPCL	Baroda	81	NG	Cogen Plant
	Nagothane	85	Lean Gas/ HSD/ Cracker Gas	Cogen Plant
	Gandhar	154	Naphtha/ Cracker Gas/ MO	Cogen Plant
	Sub Total	**320 MW**		
Reliance Group Grand Total : 2035.59 MW				

REL, its affiliates and sister companies in the Reliance group own and operate several Power Plants with installed capacity of over 2000 MW, which include 940 MW Utility Power at five locations and 1095 MW Captive Power Plants at seven locations. The experience ranges from conventional coal fired thermal Power Plant to Gas Turbine based Combined cycle and Cogeneration Plants with fuels ranging from natural gas, naphtha, Reltrol, C5, C6-C8, LDO, cracker gas, HSD, etc.. The Group has experience with Steam turbines of unit rating up to 250 MW, Siemens design (V 94.2) gas turbine, aero-derivative (LM 6000) and heavy duty industrial type (Fr 5 & 6) GE design Gas Turbines.

2.2 Distribution

REL and its affiliates distribute over 5,000 MW of power - the largest by a private power sector Utility in India. Reliance Energy serves a customer base of about five million in Mumbai, Delhi and Orissa.

2.2.1 Distribution Business in Mumbai

Reliance Energy Limited's Mumbai Electricity Supply Division is into electricity distribution in the suburbs of Mumbai. It caters to a consumer base of 2.22 million and licensed area of 384 sq km.

2.2.2 Distribution Business in Delhi

Reliance had acquired an equity stake of 51% in two of the three Distribution Companies of Delhi after unbundling and privatization of the erstwhile Delhi Vidyut Board.

- BSES Rajdhani Power Limited headquartered in New Delhi covers south and west areas and caters to a consumer base of 0.984 million and licensed area of 670 sq km.
- BSES Yamuna Power Limited headquartered in New Delhi covers central and east regions and caters to a consumer base of 0.85 million and licensed area of 210 sq km.

2.2.3 Distribution Business in Orissa

The three electricity distribution companies of Orissa viz. Western Electricity Supply Company of Orissa Limited (WESCO), North Eastern Electricity Supply Company of Orissa Limited (NESCO) and Southern Electricity Supply Company of Orissa Limited (SOUTHCO), joint ventures with Grid Corporation of Orissa Limited, a Government of Orissa Undertaking, are engaged in distribution of electricity in the State of Orissa.

- NESCO, headquartered in Balasore caters to a consumer base of 0.22 million and licensed area of 28,000 sq. km.
- SOUTHCO, headquartered in Berhampur caters to a consumer base of 0.31 million and licensed area of 47,000 sq. km.
- WESCO, headquartered in Burla caters to a consumer base of 0.27 million and licensed area of 48,000 sq. km.

2.3 Engineering Procurement & Construction (EPC)

EPC Division was set up in 1966 and was undertaking engineering, procurement and construction contracts on a turnkey basis and other value added services for major public and private sector projects both in India and Abroad. The Division has 10 regional offices in major cities of India and Overseas offices in Dubai, Nepal and Bhutan. The Division has to-date undertaken the total engineering, supply of electrical and mechanical equipment, installation and commissioning services and civil works for the following range of projects:

- Thermal, hydro, Co-generation, and gas based power generating stations;
- 400/132 KV transmission lines and switch yards;
- Overhead and underground electrical networks;
- Industrial electrification works for petrochemicals, fertilizers, steel, cement plants, refineries, ports and hotels;
- Indoor and outdoor illumination works;
- Pre-molded accessories for extra high voltage electrical cables;
- Renovation and Modernization of Delhi distribution network; and
- Other Civil Works

The EPC group has executed several projects in the Middle East. The list of overseas projects completed by the EPC group is given in the following table:

Sr. No.	Name of the Client	Nature of Work / Type of Project	Year of Completion
1	Dubai Electricity & Water Authority, Dubai, U.A.E.	132 KV GIS Substations (2 Nos.), 132 KV Cabling, 132 KV Transmission Line, SCADA Communication at Jebel Ali Ind. & Emirates Substations at Dubai.	2000
2	Electricity Corpn. Riyadh. Wadi-Gizan Electrification Scheme, Gizan, Saudi Arabia.	Supply, Installation and Commissioning of 33 kV and 13.8 kV Transmission Line LT Distribution Line, 33 kV 13.8 kV and LT Cables, Distribution Transformers and Consumer Services at Gizan.	1980
3	Royal Commission for Jubail & Yanbu Director General for Jubail Project, Jubail, Saudi Arabia.	Procurement and Construction of 34.5 kV Distribution System (Phase IV) – Supply and Installation of 34.5 kV Cable in duct banks at Jubail.	1983
4	Electricity Corpn. Riyadh. Wadi-Gizan Electrification Scheme, Gizan, Saudi Arabia.	Design, Installation and Commissioning of 13.8 kV/LT Lines, 13.8 kV Cables, Distribution Transformers and Consumer Services at Gizan.	1983
5	Electricity Corpn. Riyadh. Quaseem Rural Electrification Scheme, Quaseem, Saudi Arabia.	Erection of 33 kV Lines, Distribution Transformers and Consumer Services at Qaseem.	1984
6	Department of Power, Royal Govt. of Bhutan. Tsimalakha, Bhutan.	Design, Supply and Installation of Underground Sub-distribution System and Service Connections to Consumers' Installation including Metering Eqpt., in Thimpu and Paro, Bhutan. Switchyard equipment at Singigaon, Bhutan Supply and Installation of Substation Equipment for SAARC Complex in Bhutan.	1992

Sr. No.	Name of the Client	Nature of Work / Type of Project	Year of Completion
7	SCECO (South), Abha. Wadi-Gizan Electrification Scheme, Gizan, Saudi Arabia.	Installation of Transmission and Distribution Lines, Substation and Service Connection in 130 Villages in Sabya-Baish Area, Gizan.	1988
8	Electricity Corporation, Tabouk Regional Electrification Project, Saudi Arabia.	Stringing of 33 kV Overhead lines at ALBir and Electrification of Shwag area.	1991
9	Saudi Consolidated Electric Co. (SCECO) Southern Region, Abha. Wadi-Gizan Electrification Scheme, Gizan. Saudi Arabia.	Operation and Maintenance of the erected Transmission and Distribution Network at Gizan.	1983
10	SCECO (Central) Ar-Rayn Electrification Project, Saudi Arabia.	Electrification of Ar-Rayan area & Stringing of the Second Circuit of Anan – Ar-Rayn 33 kV Overhead Line and Rein-forcement of Distribution System in Nakhelan area.	1989
11	National Thermal Power Corporation Ltd., New Delhi (for Nepal Electricity Authority, Kathmandu, Nepal).	Installation, Testing and Commissioning of 132 KV, 66 KV and 33 KV Substations for 7th Power Project of Nepal Electricity Authority.	1999

2.4 Awards and Recognition

2.4.1 Corporate governance Awards

Reliance Energy Ltd. has received wide acclaim for the initiatives in corporate governance. These awards and recognitions greatly motivate and encourage the Reliance Energy Ltd. team to set fresh benchmarks in corporate governance, particularly in the Indian Power sector:

- The Golden Peacock Award from the Institute of Directors for excellence in Corporate Governance.
- Rotary Vocational Award for Excellence in Corporate Governance.
- The Rotary International of Gujarat, Madhya Pradesh and Rajasthan conferred the "Excellence in Corporate Governance Award" on Reliance Energy Ltd.
- ICSI Award for pursuit of Good Governance Practices in the year 2001.

2.4.2 Quality Awards

- Reliance Energy has become the first electric supply utility in the country to establish an effective and integrated ISO-9001:2000 quality assurance system. Using ISO-9001:2000 as a base, Reliance Energy had developed its own quality system which goes even beyond the requirements of ISO Standard.
- Rajiv Gandhi National Quality Award 2001 (Certificate of Merit) for providing quality and excellence in every aspect of its functioning,
- Qimpro Bench Mark Award - 2003 (Certificate of Merit) for providing quality and excellence in every aspect of its functionality

2.4.3 Environmental Excellence Awards

Reliance Energy Ltd. contributions have received wide acclaim in the areas of enriching the ecology. Reliance Energy Ltd. in the recent years has received the following Awards:

The Indo-German Annual Environment Excellence Award - 2000 by Greentech Foundation.	
FICCI Award 1999-2000 for outstanding achievement in Environment Conservation and Pollution Control by the Federation of Indian Chambers of Commerce & Industry.	
The first Millennium Business Award instituted by International Chamber of Commerce (ICC) and United Nations Environment Programme (UNEP) for its outstanding contribution to environmental management. Reliance Energy Ltd. is the only company from India and only one out of two power utilities in the world (the other being Tokyo Power Company of Japan) to have been honoured with this Award.	
Best Environmental and Ecological Implementation Gold Award conferred by International Greenland Society.	

- Dahanu Power Station was adjudged as the Best Power Station of the country in the 700 MW and below range and was conferred the Environmental Award on the occasion of Thermal Centenary Celebrations 1999.
- The G-51 Millennium Award in the field of Mother Earth Protection conferred by the Indian Institute of Ecology and Environment on the occasion of the World Environmental Congress.
- MCCI – Dr R J Rathi Award 1998 to Reliance Energy Ltd. for pollution control in the category of 'Non-Chemical Industries' by the Mahratta Chamber of Commerce & Industries (MCCI).

2.5 Organization Structure and Human Resources

2.5.1 Introduction

Our goal is to be a world class power Utility with operations encompassing "well head to the wall socket" offering uninterrupted, affordable, quality, reliable and clean power to millions of customers. Achieving this requires the company to work with a single-minded application, keeping the larger picture in focus. REL believes that this can be made possible in large measure by unleashing the latent capability of people. It is the firm belief of the Company, that quality manpower with adequate and appropriate versatility and capability is the only force that can help us in realizing our vision.

In order to ensure that our philosophy as enlisted above translated into demonstrated action, we have a sound HR strategy backed up by pro-active and progressive HR practices. The Company has in place a robust organization structure and sound manpower plan to support the long term business programmes. We track people with excellent combination of knowledge, experience, skill, attitude best suited to achieve exponential growth plans of the organization.

2.5.2 Vast pool of multi-functional human resources

Our employee strength across REL group with broad functional break-up is as provided below

REL Group Employee Strength	Officers	Other staff
Technical	2389	16641
Commercial	248	3088
Support Services	481	2126
Total	**3118**	**21855**

Different departments/ divisions have been constituted to get a right mix of experience and educational background. Technical officers would largely be engineering graduates drawn from some of the best universities in the countries and would have significant expertise in electricity generation/ supply business.

Also REL has a significant proportion of employees who are Management graduates, Chartered Accountants and post-graduates in other disciplines handing critical commercial, financial, customer service related aspects of the business.

Further, in order to induct fresh blood, REL carries out campus recruitment every year wherein the best of professional talent is identified early on to undergo tailor made training programme and get groomed as per the organization requirement. In fact almost 25% of our executive strength has been inducted through this methodology. As of date, we can boast of a high caliber, multi functional team of 1150 engineers/ professionals who are best equipped to handle any assignment in the power industry.

As the business environment is becoming more and more dynamic and competitive, the Company recognizes in continuous learning to make a domain enterprise. With the above objective in view, the Company has developed "exclusive Management Institute with world class infrastructure and facilities. The Institute focuses on building self directed leadership and self motivated teams. The Institute not only caters to the In-house developmental needs of the Company, but has over a period of time emerged as a renowned Institute functioning as a training support resource for the entire power sector Utilities.

2.6 Our Financials

The performance highlights of the audited financial results of the year ending 31st March 2005 are enclosed along with appropriate bid formats.

Fitch Ratings India Private Limited has assigned a rating of AAA (ind) (Triple A ind) to the Rs. 10 Billion Non Convertible Debenture Programme of Reliance Energy Limited.

2.7 Agenda for growth

The enactment of the Electricity Act 2003 has opened up new opportunities in the Indian power sector. REL are undertaking various initiatives as part of the growth plans as discussed below:

Transmission

Reliance Energy Ltd. will develop transmission projects through the recently incorporated Reliance Energy Transmission Company Private Limited. This company will develop transmission lines associated with our generation facilities and mitigate any risk in evacuation of power from our plants. Further, the company will also participate in projects associated with the development of the national grid.

Reliance Energy Generation Private Ltd. – world's largest gas based project

Reliance Energy Ltd. has incorporated Reliance Energy Generation Private Ltd., a Special Purpose Vehicle (SPV) to develop, construct and operate two gas based power projects of approx. 4000 MW capacity each, one near Dadri in the state of Uttar Pradesh and the other at Shahapur in Raigad district of Maharashtra on a Built-Own-Operate basis. With an investment outlay of more than Rs. 200 billion (approximately US $ 2.2 billion), the power projects, to be developed in phases, will also be the world's largest gas based power generating plant at a single location. Further the proposed projects will be the single largest investment ever across any sector in the state of Uttar Pradesh as also in maharashtra and will act as a catalyst to the overall development and growth of these States.

Land for the projects has been identified and the process of land acquisition has already been initiated. The process of acquiring other requisite statutory clearances required for the project is underway. Further discussions with lenders are at an advanced stage to raise debt for the project.

The first phase of the project is expected to be commissioned in 2006.

Wind Power

It is expected that the currently evolving regulatory and legal framework for the power sector in India, may stipulate a minimum level of sourcing from non-conventional sources. As a result, in order to develop benign and environment friendly power sources, Reliance Energy is setting up 500 MW of wind based power projects in phases spread across various states in India such as Maharashtra, Gujarat, Rajasthan, Karnataka, Tamil Nadu and Andhra Pradesh.

The total installed capacity of the wind energy in the country today is in the region of 1900 MW. Reliance's proposed capacity would contribute significantly towards Government of India's goal of developing green power capacity.

Reliance Energy Ltd. proposes to invest over Rs. 10000 million (US $ 228 million) for developing the wind energy farms and will source the power to supply to its own distribution companies and the other distribution Utilities. Tender documents inviting tariff based bids for setting up the wind projects has been already issued.

2.8 Reliance Group – An Overview

Introduction

The Reliance group founded by Dhirubhai H. Ambani (1932-2002) is India's largest business house with total revenues of Rs 800 billion (US$ 16.8 billion), cash profit of over Rs 98 billion (US$ 2.1 billion), net profit of over Rs 47 billion (US$ 990 million) and exports of Rs 119 billion (US$ 2.5 billion).

The group's activities span exploration and production (E&P) of oil and gas, refining and marketing, petrochemicals (polyester, polymers, and intermediates), textiles, financial services and insurance, power, telecom and infocomm.

Reliance has emerged as India's Most Admired Business House, for the third successive year in a TNS Mode survey for 2003.

The Reliance Group Companies include:

- Reliance Industries Ltd.
- Reliance Energy Ltd.
- Reliance Capital Ltd.
- Reliance Industrial Infrastructure Ltd.
- Reliance Telecom Ltd.
- Reliance Infocomm Ltd.
- Reliance General Insurance Company Ltd.
- Indian Petrochemicals Corporation Ltd.

Reliance Industries

Reliance Industries Limited is the largest and one of the fastest growing private sector companies in India, with business activities encompassing all major growth sectors of the Indian economy such as - oil & gas exploration and production, petroleum refining & marketing, petrochemicals including intermediates, and textiles. The company manufactures and markets a wide range of products with market leadership in almost all its businesses.

All its production facilities have a common feature - global scale operations employing state-of-the-art technology in the respective fields. The Reliance Group has also ventured into power, telecom and infocomm areas, thus truly emerging as a well diversified conglomerate with global competence in technology, management and financial capabilities to meet the needs of the rapidly growing Indian market.

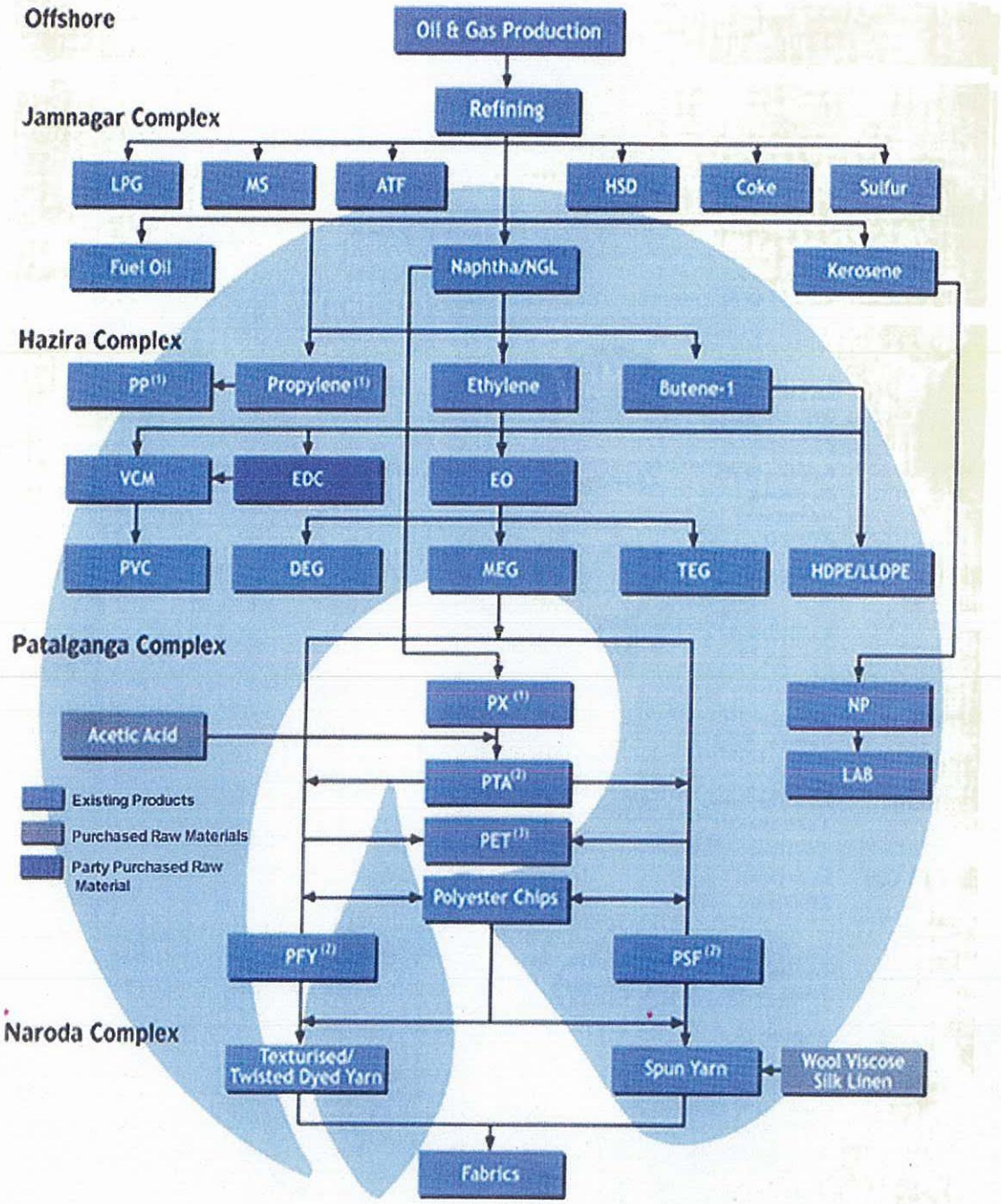
With domestic market shares ranging from 40 to 80%, Reliance is also ranked among the top 10 producers globally, for all its major products.

The various businesses of Reliance Industries Ltd. and the respective products and manufacturing plants are provided in the table below:

Business Sector	Products	Manufacturing Location	Plant Capacities
Polymers	Polypropylene	Hazira Jamnagar	1050 KT
	Polyethylene	Hazira	435 KT
	Polyvinyl Chloride	Hazira	300 KT
Chemicals			
Aromatics	Benzene	Patalganga Hazira Jamnagar	291 KT
	Orthoxylene	Jamnagar	150 KT
	Toluene	Hazira	197 KT A
	Mix-Xylene	Hazira	165 KTA
	Mix-Xylene(P)	Hazira	-
Solvents	Carbon Black Feed Stock	Hazira	-
	Remax I	Patalganga	-
	Remax II	Patalganga	-
	Heavy Alkylate	Patalganga	-
	Heavy Aromatics	Jamnagar	-

Business Sector	Products	Manufacturing Location	Plant Capacities
	Renine	Patalganga	-
	Washoil	Patalganga	-
Linear Alkyl Benzene	-	Patalganga	115 KT
Cracker Products	-	Hazira	-
Fibre Intermediates	Purified Terephthalic Acid	Hazira Patalganga	1280 KT
	Mono-Ethylene Glycol	Hazira	300 KT
	Ethylene Oxide	Hazira	50 KT
	Di-Ethylene Glycol	Hazira	34 KT
	Tri-Ethylene Glycol	Hazira	11.5 KT
	Paraxylene	Jamnagar Patalganga	1646 KT
	Textile Grade Chips	-	235 KT
Petroleum	Exploration & Production	-	-
	Refining and Marketing	-	-
	CoalBed Methane	-	-
Textiles	-	-	-
Procurement	-	-	-

The product portfolio of Reliance industries is summarised in the block diagram.



Abbreviation	Full Name	Abbreviation	Full Name	Abbreviation	Full Name
ATF	Aviation turbine fuel	LLDPE	Linear low density polyethylene	PP	Polypropylene
DEG	Di-ethylene glycol	MEG	Mono-ethylene glycol	PSF	Polyester staple fibre
EDC	Ethylene di-chloride	MS	Motor spirit	PTA	Purified terephthalic acid
EO	Ethylene oxide	NGL	Natural gas liquid	PVC	Polyvinyl chloride
HDPE	High density polyethylene	NP	Normal paraffin	PX	Paraxylene
HSD	High speed diesel	PET	Polyethylene terephthalate	TEG	Tri-ethylene glycol
LAB	Linear alkyl benzene	PFY	Polyester filament yarn	VCM	Vinyl chloride monomer

Reliance Infocom

Reliance Infocomm has created an overarching digital infrastructure using state-of-the-art technology on the strength of a 60,000 km terabit capacity optic fibre network linking more than 600 cities and towns in India. The goal of Reliance Infocomm is to progressively expand its optic fiber network and eventually cover 116,000 km, with the ability to seamlessly connect every individual, home, and office in all 640,000 villages and 2,500 towns and cities of India. Reliance Infocomm will offer revolutionary data, video and value-added services in the largest and most complex rollout in the global history of information technology and communication.

Reliance Telecom Limited

Reliance Telecom Limited (RTL) is promoted by the Reliance Group. The Company has two divisions - Basic and Cellular telephony services. RTL provides cellular services, using GSM standard, in 7 telecom circles encompassing 15 states of India. RTL has met its rollout obligation by covering 50 per cent of District Headquarters in 5 applicable circles. The total subscriber base was over 5, 40, 000 at the end of the year under review, registering a year on year growth of 42 per cent.

Indian Petrochemicals Corporation Limited

Indian Petrochemicals Corporation Limited (IPCL) is the pioneering petrochemical company in India. The company owns and operates three petrochemical complexes, a naphtha based complex at Vadodara and gas based complexes at Nagothane near Mumbai and at Dahej on Narmada estuary in bay of Khambhat. The company also owns a catalyst manufacturing facility at Rabale, Navi Mumbai. The company produces over one million tonnes of merchant products and has turnover close to US $ two billion.

2.8.1 Financial Strength of the Reliance Group

Reliance ranks amongst the world's top 200 Companies in terms of net profits.

Reliance enjoys a pre-eminent position in India's economy with group revenues of nearly 3.5 per cent of India's GDP. The group's leadership position in India is also reflected in its all round contribution to the national economy.

The group contributes:

- 5 per cent of India's total exports
- 10 per cent of the Government of India's indirect tax revenues

Reliance Industries Limited alone accounts for:

- 30 per cent of the total profits of the private sector in India
- 10 per cent of the profits of the entire corporate sector in India
- 7 per cent of the total market capitalization in India
- Weightage of 15 per cent in the Bombay Stock Exchange (BSE) Sensex
- Weightage of 12 per cent in the Nifty Index

One out of every four investors in India is a Reliance shareholder.

It thus goes without saying that REL draws strength from the group and wherever required, the requisite expertise to implement the MRTS Project successfully is available in house with the group.

3.0 ABOUT CONNEX SA

Connex is a subsidiary of the French group VEOLIA Environnement, the world leader in Environmental Services (turnover 2003: € 28.6 billion)

In 2004, Connex employed 61,000 persons, carried 1,5 billion passengers for a turnover of €3,6 billion with a solid presence on four continents. Connex operate all modes of transport with 23,500 road vehicles (buses and coaches), 3,500 rail transit vehicles (trains, underground trains and light trains) and 49 ferries.

Connex, the No.1 private operator of public transport in Europe, with a presence in 23 countries and working relationships with 5,000 local authorities, has consciously positioned itself as a proactive supplier, able not only to meet various needs but to anticipate them as well.

Connex is the leading provider of contract passenger rail services in the world today.

Connex philosophy: facilitating mobility

From Melbourne to Berlin, Bogotá to Jerusalem, Boston to Prague and Paris to Stockholm, the winds of change are sweeping through the public transportation profession. Making it easy for everyone to get from place to place within a city, region or country in the quickest, safest and most comfortable way possible – this is the critical issue in regional development policies. Public transportation firms face the daily challenge of becoming suppliers of mobility.

Freeing up downtown areas, neighbourhood services, rapid connections and users' expectations are factors that vary from one country or region to the next. Transportation systems have to be able to respond within variable contexts to priorities that are always quite specific. Innovation with regard to public transport is as much a matter of meeting new passenger mobility needs as it is of upgrading equipment.

Expanding territories

Connex serves as a long-term partner of local and territorial authorities, and it prides itself on its extensive experience in every area of transportation. The group's growth and presence in a large number of countries is the result of its ability to manage – for both local authorities and territories, and in various regulatory contexts – quality public transportation services.

Connex's originality lies in knowing how to combine network autonomy with a respect for local differences and cultures, plus a pooling of group know-how. Its tailor-made services, ranging from the design of a transportation system to overall responsibility for a public service, always benefit from the latest innovations. In the world of transportation, this decentralized culture allows the group to build up a wealth of experience, which can then be developed and modified from one site to the next in accordance with the particular issues that need to be addressed.

The borders between urban and interurban spaces are becoming blurred: territories are changing, cities are growing and finding new administrative and economic resources, and urban areas are encroaching on inner suburbs, which in turn encroach on the countryside. Connex is able to adapt its networks to these accelerating changes.

Managing mobility

Connex's Passenger Charter states, "Nothing is more valuable than a customer's time." Accordingly, a profound transformation of the public transport market is currently underway. Though transportation offerings are all about management of space and regional development where local authorities are concerned, Connex's central preoccupation is passenger satisfaction in terms of rapidity, ease of use, safety and comfort. The quality of service with regard to managing movements is thus a priority now – the era of mass-produced, standardized transportation systems has ended, though only recently.

Concepts of the "right" to transportation and freedom of movement have been readily embraced by passengers; taking such concepts into consideration is a prerequisite for enticing new public transport users, many of whom think that the car is still the only way they

can exercise this right. Travel times can no longer be just an imposition to be tolerated; for public transportation to win over new users, travel times must become chosen times. Connex

has thus enriched its offering with a number of innovative services that have the potential to become the core of the range, including transportation on demand, real-time information systems, management of exchange hubs, neighbourhood services, and park-and-ride arrangements. Their common aim involves adapting to local contexts, targeting needs on a more individual basis, taking a comprehensive approach to managing regional mobility and, in general, making public transportation more attractive and accessible for all.

These many innovations have been tested on various networks, their impact on clients is systematically evaluated, and they are provided to any Connex site that can make use of them, thanks to the group's knowledge management activities.

Information that circulates in real time

Information systems are at the heart of the relationship between clients and the transportation services that are available to them. Naturally, this means schedule information for passengers, available at the station, but they should also have access via the Internet and cell phone. This information concerns itineraries and fares, plus the increased number of electronic payment methods. Each request for information must correspond to a transportation solution that allows a client to travel at will and offers the best guarantee of flexibility, speed and reliability. In terms of signage, the information must be clearly and simply displayed. Other messages may concern the entire set of services available through the network and activities offered by the city. In Melbourne, Australia, Connector Plus keeps passengers informed about any system problems via SMS. Internet sites with interactive communicationare also available for most Connex networks.

Multi-service exchange hubs

Connex has capitalized on the idea of developing and expanding exchange hubs by offering various additional services, including ticket windows, newsstands, reservations for performances, bike rentals, cafeterias and more. There is a solid trend toward developing this type of multi-service exchange hub. At Paris La Défense (France), the Eurolum affiliate (Connex's research center) is designing a Service Village for the underground station.

Safety

When dealing with the problem of safety in public transportation, it is highway safety that immediately comes to mind – how to make school transportation safe, the need to develop stations in such a way that passengers can park and access their vehicles as safely as possible, training for drivers who must transport passenger in conditions of optimal security, fleet maintenance and renewal and much more.

Some of these issues serve as the foundation for various Connex professions and are the subject of constant vigilance, from system design through system use.

In the city, it is more the question of safety within public transportation systems that comes to mind. Lack of security, whether real or perceived, is one of the main reasons given by French people to explain their reluctance to use public transportation. This issue is also of concern to Connex personnel. To combat the lack of safety in public transport, Connex is working on three levels: technical, human and civic. These actions are grouped together under a safety agreement that was initiated by Connex and taken up by the Union for Public Transportation (UTP).Technical initiatives include equipping vehicles with various safety and video surveillance devices, which have a deterrent effect on would-be troublemakers. Human-level interventions include boosting staff presence both in stations and on vehicles and strengthening relationships between Connex personnel and passengers by improving the way in which passengers are welcomed and by providing staff (drivers in particular) with stressing conflict-management training. Finally, on a civic, "educational" level, most urban networks that have to deal with problems are developing – in collaboration with organizing authorities and a number of local players (including schools, police, courts, hospitals, associations and so on) – a number of initiatives, many aimed especially at schoolchildren in order to acquaint them with the world of public transportation as early as possible.

Transportation for all

Access to transportation should be guaranteed to all, without exception. This implies special actions to translate this right into practice, allowing both the elderly and those with reduced mobility to easily access the various forms of transportation offered by Connex. The elderly, many of whom use public transport, are demanding when it comes to quality of service, level of accessibility, clarity of information and ease of payment. Transportation should also be

comfortable, with staff members that are welcoming and trained to treat passengers with respect. Connex systematically takes these priorities into account for all of its customers, but such issues are of crucial importance in the eyes of older passengers.

Innovation and research with quality in mind

For Connex, research and marketing are the two main pillars of innovation. Eurolum, a research and innovation centre, was created in 1990 to monitor scientific and technical development, support the networks in their requests for information, carry out studies, develop multiple partnerships and take part in various research programs connected with transportation systems. The marketing department, in steady contact with the customer, analyses client behaviour and tracks satisfaction levels through surveys. The centre is constantly developing new services and transportation concepts.

For Connex, innovation involves developing service quality and meeting the new needs of customers, passengers and local authorities. The scope of investigation is very broad, covering regional development, analysis of travel patterns, safety, real-time information systems, intermodal fare ranges, reducing pollution, exchange hubs and identifying future trends.

The environment: fighting pollution on all fronts

With 24,000 road and rail vehicles on routes circling the globe, Connex is aware of its responsibilities in terms of preserving air quality and fighting the greenhouse effect by limiting the gases that cause it. Like Veolia Environnement, which has pledged to reduce its activity-related CO2 emissions by 10% by the year 2006, Connex has made firm commitments and implemented active environmental monitoring. Its four commitments are as follows:

•To reduce (by 2005) CO2 emissions by 20%,unburned hydrocarbon emissions by 16% and particle emissions by 22%.

•To offer environmental training to 90% of its drivers.

•To develop and deploy a system of environmental management for 60% of its global activities by the end of 2008.

•To have 100% of its sites in regulatory compliance by the end of 2008.

A total of 94% of the French think that developing public transportation is essential for fighting pollution. They're right: when you consider that a bus pollutes five to ten times less than an individual car per passenger carried, it's easy to see how Connex, simply by doing its job of providing 1.5 billion passenger trips per year, has become a major player in the defence of the environment. Over time, the goal is to convince car owners to use other means of transportation – innovative, cleaner methods whose multimodal framework offers them at least as much flexibility, comfort, speed and consistency as a car.

Connex trains Connex

In an industry that is powered by labor, a transportation company's primary resource is its human assets, the people who represent Connex's culture and image to its clients and who keep us informed of our customers' expectations. Their performance makes Connex projects credible and spreads the word regarding the various services we offer. They are the ones who ensure the firm's progress and success on a daily basis.

Connex trains Connex, just as Veolia Environnement trains Veolia Environnement; that is the basic principle. An ambitious training policy for meeting these objectives came with the creation in 1994 of the Urban Environment Institute, the group's skill centre, renamed the Veolia Environnement Campus in 2003. All levels of personnel are involved, from blue-collar staff up to management level. The training programs available – qualifying, accredited and leading to a diploma – are as concerned with initial training as ongoing education.

The group's operational management is very much involved in the structure of training programs: how they are carried out, evaluated and followed-up. The wide range of Connex courses includes all training levels – initial, postsecondary, continuing, accredited and leading to a diploma – available for every category of personnel.

Professional training

Apprenticeship is the cornerstone of a training policy that encourages cooperative preparation for learning a trade. The curriculum runs smoothly: a tutor supervises the apprentice, who alternates one week at the institute with two weeks in the workplace. The training results in a diploma, the CAP (Certificate of Vocational Aptitude), which more than 1.000 young people have earned as a springboard to their professional career as a driver. After the diploma,

graduates are given permanent employment contracts. The initial training is thus a tool that is central to Connex's recruitment policy.

Other training programs offering diplomas include the BEP Certificate in Industrial Vehicle Maintenance, the professional baccalaureate in Maintenance of Automated Mechanical Systems, and a university undergraduate diploma in Urban Services Management (Transportation Option), created in collaboration with the University of Cergy-Pontoise. The latter diploma is also accessible through continuing education via the Job Experience Validation (VAE) system.

There is also a managers' curriculum (created in 2002) designed to prepare group managers to work in a demanding international environment.

Prestigious partnerships

In order to award these diplomas and guarantee high-level training to future personnel, Connex has formed a number of partnerships within the French national education system and with post-secondary educational institutions. In addition to the University of Cergy Pontoise, French partners include Essec Business School and the University of Paris-Dauphine. Elsewhere in the world, partnerships have been developed with universities in Leeds, UK; San Pablo, Spain; and Tsinghua, China, as well as with Morocco's Institute of Business and Management (ISCAE).

Connex around the world

Western Europe - France: Every contract renewed

Turnover 2003: € 1,374 million
25,273 employees
Fleet: 12,650 vehicles

Fully automatic metro in Toulouse

In 2003, Connex was well-positioned with 153 urban and interurban bus networks, and was able to reinforce its presence in north western France and the Rhône-Alpes region. The contribution of the Vernay transport firm, acquired by Connex in 2002 (3,300 staff members,2,700 vehicles),was measured in terms of both the integration of the firm and its turnover. In 2003,in the same spirit of consolidating its regional presence and extending its borders, Connex took over the activities of the STAHV in the Vosges, a large (200-vehicle) urban and interurban transport firm that also provides school transportation. The STAHV has a particularly high profile in Epinal, Saint-Dié, Verdun and Remiremont. To Connex's credit, every operating contract that came up for renewal in 2003 – including those in Libourne, Calais and Villefranche sur Saône – was successfully renewed.

Reinforcing its position in the tramway market, Connex started the brand new Bordeaux network in December 2003, bringing to eight the number of tramway networks in France managed by the group — a figure that will grow to 11 in 2004. Since the beginning of 2005, Connex operate the total network of Toulouse including a fully automatic metro.

It was also another successful year for the four tourist train lines (La Rhune in the Basque country, La Mure in the Alps, the Pignes train in Provence and the Trieux steam train in Brittany) that operate under the Connex Tradition name. In 2003, the Mure train, which celebrated its first 100 years of electrification, welcomed a record 95,134 passengers.

In the area of boat transportation, the STAT network in Thonon-les- Bains has been granted a 10-year contract to run a ferry service on Lake Geneva on behalf of the city of Evian. The boat is a 110-passenger catamaran powered by solar energy. Elsewhere on the water, the Connex subsidiary of STN provides the connection between the Channel Islands of Jersey and Guernsey and the département of La Manche.

In New Caledonia, modernization continues on Noumea's suburban transport network, which is operated by Carsud, a partnership between Connex New Caledonia (51%) and the earlier network's drivers (49%), who formerly owned their own vehicles.

In Mayotte, a French territorial entity, the Compagnie Mahoraise de Transports et de Services (CMTS),a Connex subsidiary, organizes and manages transportation for schoolchildren from the island to the lagoon.

Western Europe - Germany: regionalization efforts are on track

Turnover 2003: € 292 million

3,260 employees

Fleet: 1,746 vehicles

InterConnex 2

In Germany, where regionalization offers the various länder the chance to entrust their regional network operations to a contractor of their choosing (although infrastructures, stations and traffic remain the responsibility of Die Bahn), railways seem to be a path to success or Connex, which has become Germany's largest private operator of public transportation.

Having won the contract for operating the regional line linking Niebüll, Germany with Tonder, Denmark, the NordOstSeeBahn network (a Connex subsidiary) was entrusted with the operation of the 241 kilometres Marshbahn line running between Hamburg and Westerland on the island of Sylt. The contract will run for 10 years starting in 2005. Connex's offering also includes the creation of an Interconnex line linking Westerland, Berlin and southern Germany. In 2003, NordOstSeeBahn took over the train line between Hamburg and Flensburg, and starting in 2005. Connex will operate the regional Nordharz-Netz trains between Magdeburg and the Harz Mountains in central Germany. In 2003, Connex began the operation of its eight regional rail network, the Ems-SenneWeser lines in Rhineland-Westphalia.

NordWestBahn Regional Train

In addition to its rail activities, the company operates a number of urban and regional transportation services, including the tramway in Görlitz, where Veolia Environnement was awarded the management of all municipal services.

As of January 1, 2004, Connex Germany has changed its organization, and now relies on regional bases to improve the management of the various public transportation systems, coordinate rail and road transport, and bring both means of transportation in closer contact with local authorities and passengers.

Western Europe - Spain: Barcelona launches its tramway

Turnover 2003: € 29 million
534 employees
Fleet: 315 vehicles

The company's activities on the Iberian Peninsula, where it operates five bus networks, are under the leadership of FCC-Connex. In addition, the CTSA (Spanish Transport Corporation), a bus subsidiary of FCC-Connex, was awarded a contract for the operation of the Vila-Real urban network in northern Portugal. Barcelona's tramway system is nearing completion, and was inaugurated in March 2004. Connex is responsible for the operation and maintenance of the entire system, and has subcontracted the maintenance to the manufacturer of the rolling stock and stationary equipment. In early 2004, in collaboration with the organizing authority, Connex set the standard for staff working conditions, recruitment and training, operations and safety.

Western Europe - Ireland: a tramway for Dublin

Starting in July 2004
189 employees
Fleet: 40 vehicles

Dublin inaugurate a new tramway in 2004. Its two lines, totalling 40 kilometres, will be run by Connex Ireland on behalf of the Railway Procurement Agency, the organizing authority. The lines will link Tallaght with Connolly and Sandyford with St. Stephen's Green. Some 21 million passengers are expected to use the system each year.

Western Europe - Belgium and the Flemish bus network

Turnover 2003: € 71.5 million
885 employees
Fleet: 600 vehicles

Connex has a presence in the country's Flemish region, where it is a sizeable private operator of buses. It carries out its activities under contract from the publicly held De Lijn company or from the regional government. Connex Belgium recently signed two six-year contracts for the operation of two bus lines, one in Antwerp and the other in Flanders. In addition, Connex provides various services such as transportation for schoolchildren, workers, seasonal employees and tourists plus several on-demand transportation services.

Western Europe - Denmark: Connex stays on track

Turnover 2003: € 148 million
2,771 employees
Fleet: 1,002 vehicles

Connex Transport Denmark is now the second-largest bus operator in the country. In 2003, one of the contracts for Copenhagen region – involving the operation of 44 buses – was renewed. Connex currently has a 40% market share in the Danish capital. In addition, Connex operates a rail link between northern Germany and Denmark.

Western Europe - Sweden: Stockholm leads the way

Turnover 2003: € 467 million
8,148 employees
Fleet: 2,342 vehicles

The Stockholm subway system today consists of 100 stations, of which about half are situated underground. The tunnel stretches are constructed partly in concrete, partly in rock, and make up 63.3 km of the system's total length of 110 km. This is one of the world's longest systems in terms of route length per inhabitant. The mechanical and technical designs used in Stockholm's subway are copied directly from the New York subway system, including the measurements of the rails themselves and the electrical power distribution system.

Connex has had a solid presence in Sweden since 1998, and since 1999 it has operated the Stockholm metro; in 2003, its contract for the latter was renewed until 2009.Connex also runs three suburban tramlines and one circle line for the capital city.

This contract is a model of how public services can be delegated to a private firm. By means of incentive clauses with bonuses and penalties linked to safety, turnover, timeliness, cleanliness, information, and so on, the contract incorporates various requests for improvement in service for the 250 million passengers who use the system each year.

In the rail transport sector, Connex has operated two major train lines between Stockholm, Sweden and Narvik, Norway and between the latter and Göteborg, Sweden. In the western part of the country, Connex operates the regional train line between Hallsberg and Herrlunga. Connex operates a number of urban and interurban networks, particularly in the city of Eskilstuna starting in 2002 as well as in the Skane region in southern Sweden. In 2003,Connex won the contract for operation of the urban and regional bus lines in Norrköping along with two tramlines, starting in June 2004.In addition, Connex will operate the regional bus lines in Norrbotten, northern Sweden starting in July of 2004.

The contract for Östergotland, which encompasses 200 buses, was renewed. In 2004, Connex will take over the firm of Styrsöbolaget, which perates 12 ferries in the Göteborg region.

Western Europe - The Netherlands: by car, taxi and ferry

Turnover 2003: € 196 million
2,814 employees
Fleet: 1,082 vehicles

Through its affiliates BBA (Brabant), SBM (Maastricht) and Limex (Limburg), Connex manages a number of urban and interurban bus lines. BBA also manages four taxi companies (Tiburgse Taxi Centrale [TTC], Continental Breda, Walsmits Goirle and Sieswerda) and the PZN call centre for on-demand transportation in northern Brabant. In southwest Holland, two BBA-operated ferries transport 800,000 passengers per year between Vlissingen and Breskens on the Escaut estuary.

Western Europe - Finland: urban and interurban operations

Turnover 2003: € 39 million
685 employees
Fleet: 337 vehicles

Connex operates urban and interurban bus lines in Helsinki and the greater Helsinki region, as well as certain services at Helsinki-Vantaa Airport, thus controlling 23% of the total bus market. At Tampere in central Finland, Connex runs interurban bus lines and an express bus for Helsinki. Finally, Connex operates buses between the cities of Tampere, Pori, Seinäjoki and Kauhajoki.

Western Europe - Norway surges ahead

Turnover 2003: € 71 million
1,324 employees
Fleet: 390 vehicles

After winning its first contract in 1998, Connex Transport AB has gradually established itself in Norway. Following a call for tenders for privatizing the FFR (Finnmark Fylskesrederi og Ruteselkap AS), Connex took over operations on April 1, 2003. Operating in northern Norway since 1916, FFR runs about 100 interurban buses in the Finnmark region and 11 ferries, including seven highspeed ferries and one for carrying cargo.

This acquisition not only doubled Connex's activity in Norway in 2003, but also deepened its expertise in the area of ferry operation.

Central Europe - Estonia: Tartu contracts out its network

Turnover 2003: € 3 million
187 employees
Fleet: 63 vehicles

Connex's success in winning the contract for the urban network in Tartu, the country's second-largest city with 100,000 inhabitants, allowed the company to establish a foothold in the Baltic states.

Central Europe - Czech Republic: inroads in Prague

Turnover 2003: € 54 million
2,113 employees
Fleet: 1,230 vehicles

Since 2000, Connex has been the No. 1 private operator of public transportation in the Czech Republic, running regional, national and international bus lines. In 2003,under direct contract from the organizing authority, the group took over operation of Prague's CSAD, which operates urban, interurban and international lines between Switzerland, Slovakia and the Czech Republic. In early 2004,the firm was awarded the contract for managing the bus station in Kutna Hora in Bohemia – a first for Connex in this rapidly developing country. And since 2002,Connex has operated a train line in Northern Moravia's Desna Valley.

Central Europe - Poland: the contribution of PKS

Turnover 2003: € 18 million
1,170 employees
Fleet: 344 vehicles

Connex manages five interurban networks in southeast Poland (Lancut and Sanok) as well as the urban network in Tczew and several services in Warsaw. But Connex really boosted its development in the country with the recent privatization of the PKS bus company's networks. First, Connex acquired PKS Kedzierzyn in southwest Poland (149 employees, 57 buses) in late 2002, followed by the takeover of PKS Sedziszow in the southeast in 2003 (179 employees) and PKS Brzozow (162 employees, 54 buses) in 2004. Connex is the No.1 private operator of public transportation in Poland.

Central Europe - Slovenia: Maribor chooses Connex

Turnover 2003: € 16 million
536 employees
Fleet: 224 vehicles

At Maribor in northwest Slovenia,Connex operates the Certus urban and interurban transport network, offering bus service, school transport, occasional services and tourist activities.

Light Train in Bordeaux (France)

North America - United States: Boston gives the green light

Turnover 2003: €187 million

3,767 employees

Fleet: 2,124 vehicles

Connex's US presence began in 2001, when it took over the activities of TCT (Trailways Commuter Transit) and Yellow Transportation (which operates 1,200 vehicles in the Washington-Baltimore region).These firms became the operational subsidiaries of Connex North America in the urban and regional transportation market, including taxi services and on-demand transport for sparsely populated areas and people with reduced mobility. Following this, other contracts were awarded in Fairfax, Virginia and Columbia, South Carolina, as well as one for the operation of the interurban network of Prince George County, Maryland, and one for the operation of 111 buses in Los Angeles.

In 2003, the Fairfax County authorities entrusted Yellow Transportation with the operation of the second part of its Fairfax Connector urban network, which links residential zones with several Washington metro stations. At the same time, the organizing authority of the State of Maryland delegated the operation of its interurban network between Columbia and Baltimore to Yellow Transportation.

However, it was in the area of rail transport that Connex was able to reinforce both its position in the North American market and its internal growth strategy overseas in 2003. In Boston, the organizing authority entrusted the operation of its rail network to MBCR (Massachusetts Bay Commuter Railroad Company), a company that is 60% owned by Connex, 20% by Bombardier (a Canadian railway parts manufacturer) and 20% by ACI, a Boston transportation firm. This suburban network, the fifth-largest in America, carries 146,000 passengers per day on 600 kilometers of track, with 13 lines serving 130 stations. It is the first suburban train line in the United States to be run by a private company. Connex's contribution to this network comes in the form of very strict agreements in terms of quality of service, customer service, training for personnel and modernized management methods. Connex win a new contract in Los Angeles starting in July 2005.

Boston

New contract in Los Angeles

Pacific – Australia and New Zealand: Melbourne shows its gratitude

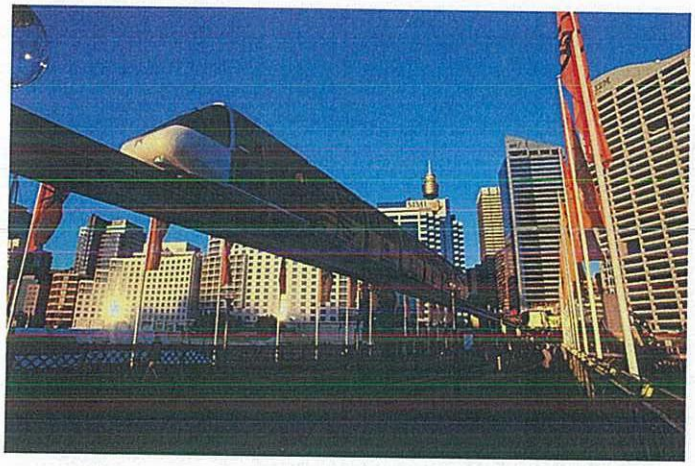
Turnover 2003: € 130 million

1,202 employees

Fleet: 631 vehicles

Commuter train in Melbourne

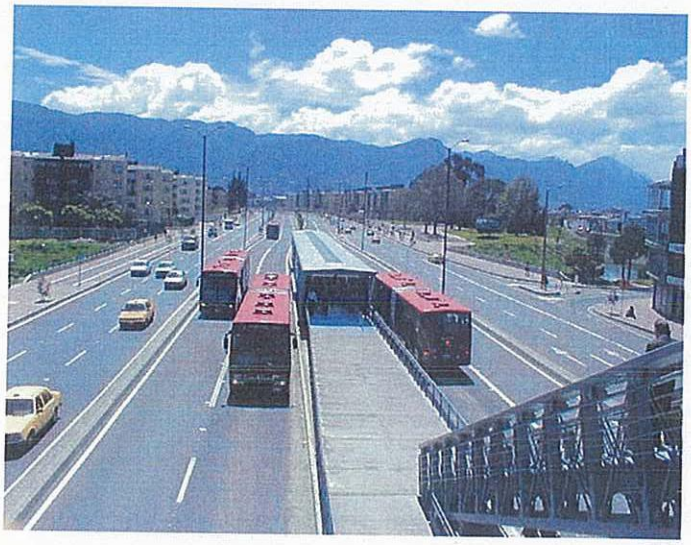
Connex gained a foothold in Australia in 1988 when it took over operation of Sydney's monorail and light-rail systems. The subsequent acquisition of the Southtrans Bus Company in Sydney reinforced the group's presence in New South Wales. In Melbourne in the State of Victoria, Connex was initially awarded the management of the Hillside Trains suburban network, representing half of the overall system. After radical modernization work on the network, station reorganization and renewal of the fleet of vehicles, Connex was awarded (after contract renegotiations) the contract for operating the entire Melbourne suburban network in early 2004, thus tripling the size of its activity in this urban area. This increase is due to Connex's proactive, original commercial dynamic on a continent where its very positive image benefits from an infusion of the group's widely recognized expertise. It also reflects Connex's skill in handling large rail contracts in major urban areas around the world. It should be noted that Connex's Australian teams were also responsible for the group's first foothold in Auckland, New Zealand, where it operate the suburban train network starting in June 2004.



Monorail in Sydney

Latin America - Colombia: a model takes shape

2003 turnover 2003: € 4 million
355 employees
Fleet: 112 articulated buses



In Bogota, a city of seven million inhabitants ,the Transmilenio concept combines reduced transport times with a significant decrease in pollution.

The Transmilenio system in Bogota, for which Connex is one of the main operators, has set a global benchmark since its 2001 launch. The city's 40 kilometers of exclusive zones for articulated buses and separate bus lanes allow it to meet massive transportation demands. The system's current capacity, about 850,000 passengers per day, is equivalent to that of a major metro line. This capacity will rise sharply with 2004's launch of Phase II, which will increase the fleet of articulated buses from 500 to more than 800; Connex will double its activity when this happens. On the current Transmilenio network, the average transportation time dropped from 70 to 30 minutes. Pollution will also drop significantly, since 3,000 old vehicles will be retired when Phase II is operational. A number of large cities are currently studying the implementation of systems similar to Transmilenio in order to restructure their urban transport networks while limiting infrastructure costs.

Middle East - Lebanon: interurban and tourist activities

Turnover 2003: € 1 million
54 employees
Fleet: 30 vehicles

Connex has had a presence in Lebanon since 1998, principally in interurban transport activities. In particular, it provides the link between Beirut and Tripoli, a line that carries 60,000 passengers per month. In the center of Tripoli, Connex inaugurated a new bus station in 2002 that offers a range of services, and Connex Lebanon is also involved in a number of tourist activities in partnership with various travel agencies and associations.

Middle East - Israel: new tramway in sight

Turnover 2003: € 6 million

141 employees

Fleet: 100 vehicles

In Israel, Connex manages two bus networks, contracts it won after the authorities decided to open the transport market to the private sector. The first is an interurban system that links Ashdod with Tel Aviv, and the second is an urban network in Tiberiade that offers a few nterurban and school transport services as well.

Connex is also part of the consortium in charge of the financing, construction, operation and maintenance of Jerusalem's future tramway.

connex

FORMAT 2

LETTER OF CONSENT AND AUTHORISATION

Date: May 9, 2005
Place: Nanterre

To,

Chief, Transport & Communications Division
Mumbai Metropolitan Region Development Authority
Bandra-Kurla Complex
Bandra (E)
Mumbai-400 051.

Dear Sir,

Sub: ***Development & Operation of Mass Rapid Transit System for Versova-Andheri-Ghatkopar Corridor***

This has reference to the Proposal being submitted by Reliance Energy Limited, as Lead Consortium Member of the bidding Consortium comprising Reliance Energy Limited and Connex SA in respect of *Selection of a Concessionaire for development of Mass Rapid Transit System for Versova- Andheri –Gahtkopar Corridor* in response to the Invitation for Bids (IFB) issued by the *Mumbai Metropolitan Region Development Authority (MMRDA*) dated August 19, 2004.

We hereby confirm that:

1. We, Connex SA, have examined in detail and have understood and satisfied ourselves regarding the contents including in respect of the following:

   - The RFP issued by MMRDA
   - All subsequent communications before submission of Bid / Proposal between MMRDA and the Bidder, represented by Reliance Energy Limited;
   - The principles of the MOU signed between/among Reliance Energy Limited and Connex SA, as members of the Bidding Consortium; and
   - The Bid being submitted by Reliance Energy Limited.

2. We authorize Reliance Energy Limited as the Lead Consortium Member and authorize the same to perform all tasks including, but not limited to providing information, responding to enquiries, entering into contractual commitments etc. on behalf of the Consortium, in respect of this Project.

For and on behalf of	:	Connex SA	SEAL OF THE COMPANY
Signature	:		
Name of the Person	:	Stéphane RICHARD	
Designation	:	General Manager	
Enclosures	:	Power of Attorney	

connex SA au capital de 195 936 240 € 383 607 090 RCS Nanterre
Siège social : Connex
"Parc des Fontaines"
169, avenue Georges Clemenceau
92735 NANTERRE Cedex
Tél. 01 46 69 30 00 - Fax 01 46 69 30 01

connex

FORMAT 3

Power of Attorney to be provided by each JV/Consortium Member in favour of Lead Member

Dated: May 9, 2005

POWER OF ATTORNEY

To whomsoever it may concern

WHEREAS we have decided to participate in the bidding process for the development and operation of Mass Rapid Transit System for Versova Andheri Ghatkopar Corridor Project on BOOT/PPP basis (the "Project") as a member of Mumbai Metro One, we, Connex SA, a company incorporated under the laws of France, the legal address of which is Parc des Fonataines, 169 avenue Georges Clemenceau, 92735 Nanterre cedex, France hereby duly authorize Reliance Energy Limited the legal address of which is Santa Cruz (E), Mumbai, 400 055, India to lawfully represent and act on our behalf as the Lead Member of the Consortium to sign any Qualification Statement, Proposal, conduct negotiations, sign contracts, incur liabilities and receive instructions for us and on our behalf and execute all other necessary matters in connection with the Project.

We hereby confirm that the Consortium Members, except for the Consortium Members who are to be assessed for Technical and financial eligibility and which shall make individual equity contributions not less than 5% of the total paid up and subscribed equity in the SPV (such equity contribution not to be diluted below 5% for a minimum period of 2 years from COD), are jointly and severally liable, together to the MMRDA for all of the obligations of the Consortium in respect of our Proposal for the Project, in accordance with this RFP document for the Project issued on August 19, 2004 and as amended prior to the date hereof.

IN WITNESS WHEREOF, we have hereunto set our respective hands this ninth day of May 2005.

By:..... Connex SA

Signature:.....

Name:..... Stéphane RICHARD

Title:..... General Manager

connex SA au capital de 195 936 24[illegible]
383 607 090 RCS Nant[illegible]
Siège social : Connex
"Parc des Fontaines"
169, avenue Georges Clemence[illegible]
92735 NANTERRE Cede[illegible]
Tél. 01 46 69 30 00 - Fax 01 46 69 30[illegible]

Note:

1. To be provided by each Consortium Member in favour of the Lead Member on their letterheads.

Reliance Energy Limited * Energy Centre * Santa Cruz (E) Mumbai

100Rs.

INDIA NON JUDICIAL

१०० रु. Rs.100

एक सौ रुपये ONE HUNDRED RUPEES

General Stamp Office, Mumbai.
Date.........
महाराष्ट्र MAHARASHTRA

D 384191

19 APR 2005
Proper Officer
207

परवानाधारक मुद्रांक विक्रेता

26 APR 2005

1327 For RELIANCE ENERGY LTD

FORMAT- 4

MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM OF UNDERSTANDING (MOU) is made and entered into this 9th day of May 2005 by and between: -

Reliance Energy Limited , a company registered under the laws of India having its registered office at Reliance Energy Centre, Santa Cruz (E), Mumbai – 400 055, India (hereinafter referred to as "REL")

AND

Connex SA., a company incorporated under the laws of France, whose principal place of business is at Parc des Fontaines, 169 avenue Georges Clemenceau, 92735 Nanterre cedex, France (hereinafter referred to as "CONNEX")

Hereinafter REL and CONNEX shall be individually referred to as the "Party" and collectively as the "Parties".

Reliance Energy Limited ★ Reliance Energy Centre

Article 1 Formation of Mumbai Metro One

1.1 Mumbai Metro One shall be responsible for submission of the BID and in the event of Mumbai Metro One being selected as the preferred bidder, for the execution of the Project in compliance with the terms of the Concession Agreement, which is to be signed between Mumbai Metro One and the Client.

1.2 REL shall be the leader of Mumbai Metro One (hereinafter referred to as "Lead Member") in connection with the preparation and submission of the BID including the negotiations and discussions with Client.

1.3 In the event of the Project being awarded, Mumbai Metro One shall form a special purpose vehicle for implementation of the Project ("SPV") wherein REL will hold a minimum of 26% and CONNEX will hold 5% of the subscribed and paid up equity capital of the "SPV" until completion of construction and thereafter for a period of two years from the date of commencement of commercial operations.

1.4 Mumbai Metro One as a whole has agreed to commit to hold a minimum of 51% equity in the SPV for a minimum period of two years from commencement of commercial operation. Mumbai Metro One will endeavor to source the balance 23% of the equity form other investors. However, in the event Mumbai Metro One fails to arrange for such participation, it will infuse the entire equity requirement up to 74% in the SPV (REL being liable for 69% and Connex for 5% of such entire equity requirement).

Article 2 Roles & Responsibility

2.1 REL in the capacity of the Lead Member for the Project shall be responsible for the following activities: -

a. Preparation and submission of the BID in accordance with the requirements of the bid documents and carrying out all discussions and negotiations with the Client as may be required. For the purpose of BID preparation REL has appointed M/s. MTR Corporation of Hong Kong (hereinafter referred to as "MTR"). It is to be noted that MTR is the developer and operator of a successful and profit making similar MRTS in Honk Kong which is known for its efficient operations and world class safety standards.

b. All finance related activities including raising funds by the SPV and management of funds of the SPV.

c. Communication with the Client and other statutory authorities relevant for the bidding for the Project and implementation and execution of the Project.

d. All Project development related activities, including obtaining by the SPV all permits, authority approvals, licenses and consents required for the implementation of the Project.

e. Providing all performance securities to the Client by the SPV.

f. Implementation of the project.

2.2 CONNEX in the capacity of the Technical partner of the consortium would undertake the following activities:

a. During the bid stage, provide inputs to REL on all aspects of bid preparation including but not limited to Capex and Opex estimation.

b. During the Construction stage, assist REL in all aspects including but not limited to selection of technical consultants, Contractors, detailed design & engineering, choice of rolling stock, OCC, ticketing system, passenger services, preparation of safety standards, value engineering and providing inputs for optimizing life-cycle cost of the project, etc. During the same time, prepare the operation in managing, recruiting, training, qualifying personnel for Operation and Maintenance.

c. During the Operation stage, assist SPV in performing operation and maintenance of the MRTS in line with best industry practices and world class standards of safety, efficiency and passenger comfort.

Article 3 Negotiation and signing of the Concession Agreement

3.1 The terms of the Concession Agreement with the Client shall be negotiated under the leadership of the REL as the Lead Member and, unless otherwise agreed by the Parties, the Lead Member shall act as the main spokesman of Mumbai Metro One during such negotiations. CONNEX agrees to give full assistance to the Lead Member for this purpose. Each Party shall participate in the negotiations for the Concession Agreement through its duly authorized representative who shall have the authority to make any necessary decisions on behalf of the respective Parties.

3.2 The Parties will give authority to SPV to sign the Concession Agreement.

Article 4 Exclusivity

4.1 Neither Party shall, directly or indirectly, alone or together with a third party, prepare or submit or participate or otherwise be interested in the preparation or submission of any other proposal for the Project during the duration of this MOU.

Article 5 Liabilities

5.1 Each Party shall be responsible for arranging financing for the SPV and for the Project prorata its shareholding in SPV.

Article 6 Confidentiality

6.1 Each Party undertakes to treat as confidential any information that it obtains from the other Party in connection with and pursuant to this MOU and to use such information solely for the purposes of the Project. No Party shall disclose such information, unless or until such information has been made generally available to the public.

6.2 The provisions of this Clause 6 shall survive expiry or termination of this MOU for a period of two (2) years.

Article 7 Disputes

7.1 Any dispute arising in connection with the interpretation or performance of the Agreement shall be finally settled by arbitration under the Rules of Arbitration of the International Chamber of Commerce by three arbitrators appointed in accordance with the said Rules. The venue of the arbitration shall be Mumbai and English shall be the governing language.

Article 8 Applicable Law & Jurisdiction

8.1 This MOU shall be governed by and construed in accordance with the laws of India. All legal suits and/ or proceedings arising out of this MOU shall be subjected to exclusive jurisdictions of the courts in Mumbai.

Article 9 Effectiveness

9.1 This MOU shall be effective upon the signing hereof and terminate upon the occurrence of any of the following events:

(a) Expiry of a period of 24 months from the date of submission of the BID to the Client.
(b) the Project is awarded to a third party;
(c) the Client cancels the Project;
(d) the Parties agree in writing to terminate this MOU.
(e) At any case at the date of 31st of December 2007
(f) Signature of a new agreement terminating the present one.

Article 10 Miscellaneous

10.1 All matters not specifically provided for in this MOU shall be discussed by the Parties in good faith and settled on the basis of mutual agreement.

Article 11 Consequential Damages

11.1 Notwithstanding anything to the contrary, in no event shall any Party be liable to the other Party for any special, indirect, incidental or consequential loss or

damage, including but not limited to business interruption, loss of business opportunity, loss of use of capital or revenue, and cost of money, arising at any time from any cause whatsoever in connection with this MOU, the Project and/or performance hereunder, even if such liability is caused by the sole or contributory or active or passive negligence, strict liability or other legal fault of the Party released hereunder.

IN WITNESS WHEREOF each of the Parties has caused this MOU to be executed as a legally binding MOU on the date first written hereinabove.

For and on behalf of
RELIANCE ENERGY LIMITED
Name and Signature Title

In the presence of

Name and Signature Title

For and on behalf of
Connex SA.

Stéphane RICHARD General Manager
Name and Signature Title

In the presence of

Name and Signature Title

Reliance Energy
A Dhirubhai Ambani Enterprise

Reliance Energy Limited
Reliance Energy Centre
Santa Cruz (E)
Mumbai 400 055

Tel: +91 (022) 3009 9999
Fax: +91 (022) 2616 0437
www.rel.co.in

Format 5

Letter of Commitment

From: Reliance Energy Limited
Reliance Energy Centre, Santa Cruz (East)
Mumbai – 400 055, INDIA

To: Chief, Transport & Communications Division
Mumbai Metropolitan Regional Development Authority
Bandra-Kurla Complex
Bandra (East)
Mumbai – 400 051

1 Reliance Energy Limited ("Equity Provider"), with its registered office at Reliance Energy Centre, Santa Cruz (East), Mumbai, India along with the other member of the Bidding Consortium comprising Connex SA, Parc des Fontaines, 169 avenue Georges Clemenceau, 92735 Nanterre cedex, France, in response to a Request for Proposals ("RFP") issued by MMRDA have submitted a Proposal dated 16 May 2005, (the "Proposal") to implement the development and operation of Mass Rapid Transit System for Versova-Andheri-Ghatkopar Corridor Project as envisaged in the RFP document issued by MMRDA for the MRT project.

2. Reliance Energy Limited ("Equity Provider"), with its registered office at Reliance Energy Centre, Santa Cruz (East), Mumbai, India, has agreed to commit 26% of the total equity of the SPV formed for the implementation of MTRS Project for a period of 15 years from the COD.

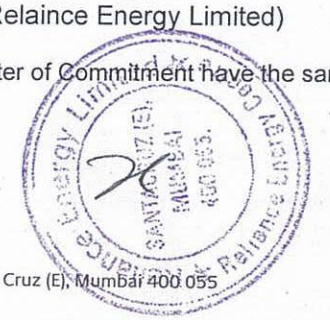
3. Reliance Energy Limited ("Equity Provider"), with its registered office at Reliance Energy Centre, Santa Cruz (East), Mumbai, India, along with the other members of the Bidding Consortium comprising of Reliance Energy Limited and Connex SA, together has agreed to commit the entire equity requirement of 74% in the SPV in case the bidder is unable to obtain equity investment from financial investors (who are not a part of the Consortium) in the SPV.

4. The signatory to this Letter of Commitment is a duly authorized representative of Reliance Energy Limited and duly empowered to represent and commit Reliance Energy Limited for the proposed Mass Rapid Transit System Project. A copy of the Power of Attorney is attached herewith.

(i)	SIGNATURE	
(ii)	NAME	J P Chalasani
(iii)	TITLE	Director (Business Development)
(iv)	DATE	16 May 2005

Encl: Power of Attorney (Relaince Energy Limited)

Note: Terms used in this Letter of Commitment have the same meaning as in the RFP and its relevant Formats.



connex

Format 5

Letter of Commitment

From: Connex SA, Parc des Fontaines, 169, avenue Georges Clemenceau, 92735 Nanterre Cedex, France

To:

Chief, Transport & Communications Division
Mumbai Metropolitan Regional Development Authority
Bandra-Kurla Complex
Bandra (East)
Mumbai – 400 051

1 Connex SA ("Equity Provider"), with its registered office at Parc des Fontaines, 169, avenue Georges Clemenceau, 92735 Nanterre cedex, France, along with the other members of the Bidding Consortium comprising, [Reliance Energy Limited, Reliance Energy Centre, Santa Cruz (East), Mumbai - 400 055, INDIA], in response to a Request for Proposals ("RFP") issued by MMRDA have submitted a Proposal dated 16 May 2005 (the "Proposal") to implement the Development and operation of Mass Rapid Transit System for Versova-Andheri-Ghatkopar Corridor Project as envisaged in the RFP document issued by MMRDA for the MRT project.

2. Connex SA, ("Equity Provider"), with its registered office at Parc des Fontaines, 169 avenue Georges Clemenceau, 92735 Nanterre cedex, France, has agreed to commit 5% of the total equity of the SPV formed for the implementation of MTRS Project for a period of 2 years from the COD.

3. Connex SA ("Equity Provider"), with its registered office at Parc des Fontaines, 169, avenue Georges Clemenceau, 92735, Nanterre cedex, France, along with the other members of the Bidding Consortium comprising of Reliance Energy Limited, Reliance Energy Centre, Santa Cruz (East), Mumbai - 400 055, INDIA, together has agreed to commit the entire equity requirement of 74% in the SPV in case the bidder is unable to obtain equity investment from financial investors (who are not a part of the Consortium) in the SPV (Reliance Energy Limited being liable for 69% and Connex SA for 5% of such entire equity requirement).

4. The signatory to this Letter of Commitment is a duly authorized representative of Connex SA and duly empowered to represent and commit Connex SA for the proposed Mass Rapid Transit System Project. A copy of the Power of Attorney is attached herewith.

Connex SA
(i) SIGNATURE .....
(ii) NAME .....Stéphane RICHARD
(iii) TITLE .....General Manager
(iv) DATE .....May 9, 2005

Note :Terms used in this Letter of Commitment have the same meaning as in the RFP and its relevant Formats.

Reliance Energy Limited ★ SANTACRUZ (E.) MUMBAI ★ By Centre

Connex
36/38 avenue Kléber - 75799 Paris Cedex 16
Tél : +33 (0)1 71 75 00 00 • Télécopie : +33 (0)1 71 75 10 00 • Web : www.connex.net
Société Anonyme au capital de 195 936 240 euros • 383 607 090 R.C.S Nanterre
Siège social : « Parc des Fontaines » • 169, avenue Georges Clemenceau • 92735 Nanterre Cedex

VEOLIA Environnement

FORMAT 6

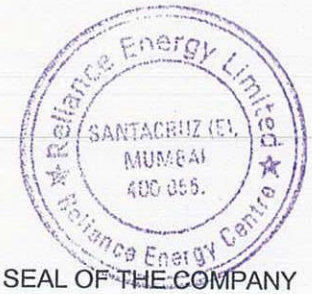
AFFIDAVIT

I, the undersigned, do hereby certify that all the information supplied relating to the Request for Proposal for development and operation of Mass Rapid Transit System for Versova-Andheri Ghatkopar Corridor is accurate, true and correct.

The undersigned authorizes and requests any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Mumbai Metropolitan Region Development Authority (MMRDA) to verify this reputation.

The undersigned understands and agrees that further qualifying information may be requested and agrees to furnish any such information at the request of the Mumbai Metropolitan Region Development Authority (MMRDA).

I understand that furnishing of false information by me could result in disqualification of Consortium for the Award of the Contract.



SEAL OF THE COMPANY

(Authorised signatory of the Company)
J P Chalasani
Director (Business Development)

Reliance Energy Limited
Reliance Energy Centre
Santa Cruz (East), MUMBAI – 400 055

Date: 16 May 2005

FORMAT 6

AFFIDAVIT

I, the undersigned, do hereby certify that all the information supplied relating to the Request for Proposal for development and operation of Mass Rapid Transit System for Versova Andheri Ghatkopar Corridor is accurate, true and correct.

The undersigned authorizes and requests any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Mumbai Metropolitan Region Development Authority (MMRDA) to verify this reputation.

The undersigned understands and agrees that further qualifying information may be requested and agrees to furnish any such information at the request of the Mumbai Metropolitan Region Development Authority (MMRDA).

I understand that furnishing of false information by me could result in disqualification of JV/Consortium for the Award of the Contract.

Stéphane RICHARD

Title of Officer General Manager

Name of Company Connex SA

Date May 9, 2005

connex SA au capital de 195 936 240 €
383 607 090 RCS Nanterre
Siège social : **Connex**
"Parc des Fontaines"
169, avenue Georges Clemenceau
92735 NANTERRE Cedex
Tél. 01 46 69 30 00 - Fax 01 46 69 30 01

Reliance Energy Limited
SANTACRUZ (E)
MUMBAI
400 055

50 Rs.

पचास रूपये

सत्यमेव जयते

भारत INDIA

५०रू. 50RS

FIFTY RUPEES

महाराष्ट्र MAHARASHTRA

844851

General Stamp Office, Mumbai

Date

L.S.V. No.....................

Proper Officer

6 MAY 2005

222

सौ. कांचन हर्षद बोंगाळे

हर्षद कॉम्पुटर सेंटर, बांद्रे कोर्टाजवळ, MAY 2005

बांद्रे (पू) मुंबई-५१. क्र. ....

श्री/श्रीमती/मेसर्स... Reliance Energy Ltd.

यांना रू........स्थावोपर मुद्रांक पेपर विकला.

000155

परवाना धारक मुद्रांक विक्रेत्या

NOTARIAL

NOTARY N. K. CHANDIRAMANI B.A.L.L.B. Greater Mumbai 306/89 GOVT. OF MAHARASHTRA

POWER OF ATTORNEY

Know all men by these presents, We **Reliance Energy Limited**, Reliance Energy Centre, Santa Cruz (E), Mumbai 400 055 India, do hereby constitute, appoint and authorise Shri J.P. Chalasani, of Reliance Energy Center, Santa Cruz (E), Mumbai - 400 055, India, who is presently employed with us and holding the position of Director (Business Development) as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the project envisaging Development & Operation of “Mass Rapid Transit System (MRTS)” for Versova – Andheri – Ghatkopar corridor in Mumbai on Build, Own, Operate and Transfer (BOOT) basis through Public-Private-Partnership in the country of India, including committing on behalf of the Company, signing and submission of all documents and providing information / responses to Mumbai Metropolitan Regional Development Authority (MMRDA), representing us in all matters before MMRDA, and generally dealing with MMRDA in all matters in connection with our bid for the said Project.

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

...2/-

50 Rs.

पचास रुपये

सत्यमेव जयते

भारत

INDIA

५०रु. FIFTY RUPEES 50RS

General Stamp Office, Mumbai

महाराष्ट्र MAHARASHTRA

L.S.V. No.....................

Proper Officer

6 MAY 2005

222

सौ. कांचन हर्षद बोंगाळे

हर्षद कॉम्प्युटर सेंटर, वांद्रे कोर्टासमोर, 12 MAY 2005

वांद्रे (पु) मुंबई-५१. क्र. ....

श्री/श्रीमती/मेसर्स ... Reliance Energy Ltd.

यांना रु. ......न्यायोचर मुद्रांक पेपर विकला.

परवाना धारक मुद्रांक विक्रेत्या 000156

844852

NOTARY N.K. CHANDIRAMANI B.A.LL.B. MAHARASHTRA

: 2 :

This Power of Attorney shall be effective, binding and operative till 16th May, 2007, or if not revoked earlier.

IN WITNESS WHEREOF Reliance Energy Limited have caused its Common Seal to be hereunto affixed at Mumbai this 13th day of May 2005.

The Common Seal of Reliance Energy Limited was hereunto affixed by Shri Satish Seth, Executive Vice Chairman of the Company in the presence of Shri Ramesh Shenoy, Company Secretary of the Company, who have signed these presents.	)	

(Satish Seth)
Executive Vice Chairman

Specimen signature of

(J.P. Chalasani)

(Ramesh Shenoy)
Company Secretary

NOTARY
N. K. CHANDIRAMANI
B.A.LL.B.
Greater Mumbai
306 / 89.
GOVT. OF MAHARASHTRA

Signature attested by

Witness

Shri Satish Seth
Executive Vice Chairman

Identified By Me
P. BAJPE, B.A.LL.B.
Advocate High Court
10, Rainbow CHS Ltd.
Opp. Vidyanagari.
Kalina, Santacruz (E)
MUMBAI-400 098

13/05/05

BEFORE ME
N. K. CHANDIRAMANI
B. A. LL. B.
NOTARY GREATER MUMBAI
GOVT. OF MAHARASHTRA
13.05.2005

POWER OF ATTORNEY - CONNEX.

CGEA Connex

Société Anonyme au Capital de 195 936 240 Euros

SIEGE SOCIAL : 163/169 Avenue Georges Clemenceau
Parc des Fontaines
92000 NANTERRE

383 607 090 R.C.S. NANTERRE

EXTRAIT DU PROCES-VERBAL DE LA SEANCE DU CONSEIL D'ADMINISTRATION DU 11 JUIN 2003

Le Conseil d'Administration de la Société s'est réuni le mercredi 11 juin 2003 à 16 heures, au Siège Social de VEOLIA ENVIRONNEMENT 36-38, avenue Kléber – 75016 PARIS, avec l'ordre du jour fixé par lettre de convocation adressée par le Secrétaire du Conseil d'Administration et notamment les points suivants :

- Approbation du procès-verbal de la séance du 10 avril 2003
- Renouvellement du mandat du Président du Conseil d'Administration
- Renouvellement du mandat du Directeur Général
- Questions diverses.

Etaient présents :

- Monsieur Henri PROGLIO, Président du Conseil d'administration,
- Monsieur Stéphane RICHARD, Directeur Général – Administrateur,
- Monsieur Antoine FREROT, Administrateur,
- Monsieur Eric MARIE DE FICQUELMONT, Administrateur,
- Monsieur Jean-Claude TURION, Administrateur.

Assistaient également à la réunion :

- Monsieur Claude RONDEAU, délégué du COMITE CENTRAL d'ENTREPRISE,
- Monsieur ROOSE, délégué du COMITE CENTRAL d'ENTREPRISE.

Etaient absent excusés :

- Monsieur Paul-Louis GIRARDOT, Administrateur,
- Monsieur Gustave KUCH, Administrateur,
- Monsieur Jérôme CONTAMINE, Administrateur,
- Monsieur Joachim BITTERLICH, Administrateur,
- Monsieur Bernard ROUER, Administrateur,
- Monsieur José MONTEIRO, délégué du COMITE CENTRAL d'ENTREPRISE,
- Monsieur Serge TEMPLERAUD, délégué du COMITE CENTRAL d'ENTREPRISE.

*
* *

Monsieur Henri PROGLIO, Président du Conseil d'Administration procède à l'accueil des Membres du Conseil et des Délégués du Personnel.

*
* *

RENOUVELLEMENT DU MANDAT DU PRESIDENT DU CONSEIL D'ADMINISTRATION

Le mandat d'Administrateur de Monsieur Henri PROGLIO ayant été renouvelé par l'Assemblée Générale Ordinaire de ce jour pour une durée de six années, le Conseil d'Administration décide à l'unanimité de renouveler ce dernier dans ses fonctions de Président du Conseil d'Administration pour la durée de son mandat d'administrateur.

Pouvoirs du Président du Conseil d'Administration

Monsieur Henri PROGLIO représentera le Conseil d'Administration, il organisera les travaux de celui-ci, dont il rendra compte à l'Assemblée Générale. Il veillera au bon fonctionnement des organes de la société et s'assurera, en particulier, que les Administrateurs sont en mesure de remplir leur mission.

RENOUVELLEMENT DU MANDAT DU DIRECTEUR GENERAL

Sur proposition du Président, le Conseil d'Administration décide à l'unanimité de renouveler également Monsieur Stéphane RICHARD en qualité de Directeur Général, pour la durée du mandat du Président du Conseil d'Administration.

Monsieur Stéphane RICHARD a déjà fait savoir qu'il acceptait ces fonctions et déclaré satisfaire à toutes les conditions requises par la Loi et les Règlements en vigueur.

Pouvoirs du Directeur Général

Monsieur Stéphane RICHARD représentera la Société dans ses rapports avec les tiers. Il sera investi des pouvoirs les plus étendus pour agir en toute circonstance au nom de la Société. Il exercera ces pouvoirs dans la limite de l'objet social et sous réserve de ceux que la loi attribue expressément aux Assemblées d'actionnaires et au Conseil d'Administration.

Monsieur Stéphane RICHARD sera autorisé à déléguer tout ou partie des présents pouvoirs à une ou plusieurs personnes, mais seulement par un mandat spécial.

.....

POUR EXTRAIT CERTIFIE CONFORME

Michèle GRANJON-LEGENDRE
Directeur Juridique

FORMAT 7

TECHNICAL PROPOSAL

We have prepared a comprehensive technical report covering the managerial and technical capabilities, our understanding of the project, key technical challenges, design details, work schedules, O&M plan etc.. The same is enclosed under Section 5 (Concept – Technical Report)

FORMAT 7 B - EXCEPTIONS AND DEVIATIONS

A. Technical

We would like to submit the following technical suggestions which in our opinion would require consideration of MMRDA for smooth and efficient operation of the proposed MRTS.

1) Airport Line

a) We consider that the Traffic Demand to & from Sahar Airport on this corridor is not expected to be enough for the financial viability of the entire project and that huge investment on this spur line from Airport Station to Sahar Airport would not justify financial viability and bank ability for this project. We therefore request that this corridor be deleted if possible and if MMRDA requires, the same should be compensated by cash payments to the bidder under a separate bill of quantities.

b) It is further suggested that initially the Airport branch line may be provided with a single line track with sub structure foundation for double line and the second line to be eventually added based on the traffic demand. The entire investment in Airport Line be done by payment to the bidder through a separate bill of quantities.

c) Shuttle service (instead of bifurcated services) for the Airport branch line should also be considered.

2) Diamond crossing:

MMRDA has indicated in the addendum that Diamond crossings are not to be used. However, the use of diamond crossings would enable improvement in the operational frequency of trains particularly at Versova and Ghatkopar end. Based on the provided track alignment data, a preliminary train simulation was conducted and the simulation results indicate that the best achievable design headway of the present layout is 3 minutes without diamond crossings. Diamond crossings are required to allow for further reduction in headway.

3) Shifting of the Ghatkopar Station:

It is suggested that Ghatkopar Station is shifted towards the west by about 40 meters to enable provision of extended dead end from the point of view of safety (e.g. train overrun due to slip or slide) and improving headway. With 40m overrun beyond Ghatkopar Station and the use of diamond crossing at Versova and Ghatkopar end, 2 minutes design headway can be achieved with automatic train operation.

4) Curvature & Gradients:

The alignment provides for a large number of curves and steep gradients. It is proposed that during the implementation and detailed survey of the project, permission be given by MMRDA to ease gradients and curvature with adequate transition length and straight alignment between reverse curves with due approval of MMRDA.

B. Commercial

Sl No	Format	Deviation	Clarification
1.	Format 4	▫ Minor modification in the "joint & several responsibility" clause for arranging financing for the SPV as envisaged in RFP document issued by MMRDA	▫ CONNEX SA ("CONNEX") has consented to hold 5% equity as required under the RFP document out of the consortium's total holding of 74% equity. Thus, with 5% equity, the responsibility of CONNEX shall be limited to an amount attributable to 5% of the equity as per the clarification of the MMRDA; Reliance Energy Limited (REL) being the lead developer and majority partner and keeping in view its strong domestic funds raising ability would like to assume and shall be completely responsible for the funding for the project.
2.	Format 10 – Past Financial Performance Data for the Lead Member of the Consortium (Reliance Energy Limited)	▫ Projection for the financial years (2005 – 06 & 2006 -07) could not be provided by REL.	▫ As a Corporate policy and as we are one of the largest Public Limited Companies REL is constrained to provide projections of its financial performances. ▫ All care has been taken however to give the latest financial figures (for Financial Year 2004 – 05) based on the Audited Financial Statements. The same has also been certified by the Auditors of the Company (the formats requires certification from a Chartered Accountant)
3.	Format 10 - Past Financial Performance Data for the Member of the Consortium (CONNEX SA, France)	▫ Actual Figures have been provided for the Financial Year 2001, 2002 & 2003 ▫ Figures for the	▫ The financial figures for the financial year 2003 – 04 for the Company is yet to be approved by the Shareholders (as also mentioned in the Format 10). It is

Sl No	Format	Deviation	Clarification
		Financial Year 2004 (year ending 31st December 2004) have been included as the projected figures ▫ Projections could not be provided for the ensuing financial year	expected to be approved in June 2005. Thus without the approval of the Shareholders, the figures have been considered as tentative, thus included as projection. ▫ As a matter corporate policy, CONNEX SA does not provide any financial projection for the future years.

FORMAT 8

INDIVIDUAL APPLICANT PROFILE

Name(s)	**Reliance Energy Limited**
Status : (Indian/Foreign)	INDIAN
Country of Registration	INDIA
Class, Category, Place & Date of Registration	1 October 1929
Address in the Country of Registration	Reliance Energy Centre, Santa Cruz (East), Mumbai – 400 055
Telephone Nos. : E-mail Address : Fax No.:	+91 22 3009 9999 www.rel.co.in +91 22 3009 9775
Local/Regional Address, if any	Reliance Energy Centre, Santa Cruz (East), Mumbai – 400 055
Telephone Nos. : E-mail Address : Fax No :	+91 22 3009 9999 www.rel.co.in +91 22 3009 9775
Primary Function of Company as disclosed by the Memorandum and Articles of Association. (Copy of the Memorandum of Association & Articles of Association is enclosed)	▫ To carry on the business of an electric power, light and supply Company in all its branches and in particular to construct, lay down, establish, fix and carry out all necessary power stations, cables, wires, lines, accumulators, lamps and works and to generate, acquire by purchase in bulk, accumulate, distribute and supply electricity and to light cities, towns, streets, docks, markets, theaters, buildings and places, both public and private. ▫ To construct, purchase, take on lease or otherwise acquire any railways, tramways or other way, omnibuses and other vehicles, ships, boats, barges and launches and to equip, maintain, work and develop the same by electricity, steam, oil, gas, petroleum, horses or any other motive power, and to employ the same in the conveyance of passenger, merchandise and goods of every description and to authorize any local authority, company or persons to use and work the same or any part thereof. *(NOTE: The above are not a exhaustive list of main Object clause; Please refer to Memorandum of Association and Article of Association for the complete detail)*
Main Promoters / Shareholders: State Name (Origin-wise) Indian (as on 31 March 2005)	1. Reliance Group Cos. – 50.15 % 2. Indian Financial Institutions – 21.52% 3. Mutual Funds – 0.58%

	4. Other Bodies Corporate – 0.56% 5. Individuals – 6.12%
Foreign	1. Foreign Institutional Investors – 17.67% 2. GDR Holders – 3.18% 3. NRI/ Overseas Corporate - 0.22%
Total Local Content	1. Percentage - 78.93 %
Total Foreign Content	2. Percentage - 21.07 %
Directors :	Name Age Citizenship
Directors :	1. Shri Anil D Ambani – 45 years – Indian 2. Shri Satish Seth – 50 years – Indian 3. Shri K H Mankad - 63 Years – Indian 4. Shri S.C. Gupta – 57 years – Indian 5. Shri J. P. Chalasani – 50 Years – Indian 6. Shri Gautam Doshi – 53 Years – Indian 7. General V. P. Malik – 66 Years – Indian 8. Shri S. L. Rao – 69 Years – Indian 9. Dr. Leena Srivastava – 45 Years – Indian 10. Shri V R Galkar – 61 Years - Indian

Name & Address of Banker(s)	1. ICICI Bank, Free Press House, MUMBAI 2. State Bank of India
Name of Lead Consortium Member a)	Reliance Energy Limited
MOU:	
a) Date of Agreement	9 th May 2005
b) Place	MUMBAI

State Country of Origin of Participants in the Following Area :

Description	Origin	Role
1. Consortium Members	**FRANCE**	Assisting the SPV in detailed design & engineering, choice of rolling stock, OCC, ticketing system, passenger services, preparation of safety standards, value engineering and providing inputs for optimizing life-cycle cost of the project, etc. During the same time, prepare the operation in managing, recruiting, training, qualifying personnel for Operation and Maintenance.
2. Construction Companies :		
- Civil/Structure		

Reliance Energy Limited SANTACRUZ (E) MUMBAI 400 055

	- Trackwork		
	- Specialists		
3.	Mechanical/Electrical Systems		
4.	Telecom/Signalling/Ticekting Systems		
5.	Rolling Stock		
6.	Other Specialists		

FORMAT 8

INDIVIDUAL APPLICANT PROFILE

Name(s)	**Connex SA**
Status : (Indian/Foreign)	French Public Limited Company
Country of Registration	France
Class, Category, Place & Date of Registration	Public Limited Company with a Board of Directors, registered on the 20th of November 1991 with the Commercial Register of Nanterre (France)
Address in the Country of Registration	163-169, avenue Georges Clemenceau 92000 NANTERRE – France
Telephone Nos. : E-mail Address : Fax No.:	+ 33 1 46 69 30 00 didier.fremaux@connex.net + 33 1 46 69 32 23
Local/Regional Address, if any	Alexandre de Mortemart VEOLIA Environnement c/o Guardian 12, Ho Chi Minh Sarani Kolkata 700071 - India
Telephone Nos. : E-mail Address : Fax No :	+ 91 33 2282 7676 + 91 98302 38777 Mortemart@aol.com + 91 33 2282 2088
Primary Function of Company as disclosed by the Memorandum and Articles of Association.*	The company shall : undertake all forms of transportation, in particular public transportation, urban and regional mass transit systems; purchase, sell and lease all types of vehicles; provide all services, equipment, parts and services related to the above; acquire, purchase, operate and use all patents, licences, brands and models that directly or indirectly relate to the company's business activities;

			generally perform all industrial, commercial, financial, moveable or immovable operations that may directly or indirectly relate to the company's scope of activities, as well as of all similar or related activities; participate in all ways in all present and future businesses or entities whose activities may contribute to meeting the aims of the present company, whether through the formation of new companies, through mergers, alliances or joint ventures. undertake all forms of transportation, in particular public transportation, urban and regional mass transit systems; purchase, sell and lease all types of vehicles.
Main Promoters/Shareholders: State Name (Origin-wise)	Indian	1.	_____ Percentage _____%
		2.	_____ Percentage _____%
		3.	_____ Percentage _____%
	Foreign	1.	VEOLIA Environnement (France) 100 %
		2.	_____ Percentage _____%
		3.	_____ Percentage _____%
	Total Local Content		Percentage _____ %
	Total Foreign Content		Percentage 100 %

Directors : Directors :			Name	Age	Citizenship
	Chairman	1)	Mr Henri PROGLIO	06/29th/1949	French
	CEO & Director	2)	Mr Stéphane RICHARD	08/24th/1961	French
		3)	Mr Antoine FREROT	06/03rd/1958	French
		4)	Mr Paul-Louis GIRARDOT	07/18th/1933	French
		5)	Mr Jérôme CONTAMINE	11/23rd/1957	French
		6)	Mr Gustave KUCH	03/16th/1939	French
		7)	Mr Jean-Claude TURION	03/04th/1925	French
		8)	Mr Bernard ROUER	02/10th/1927	French
		9)	Mr Eric-Marie de FICQUELMONT	12/18th/1954	French
		10)	Mr Joachim BITTERLICH	07/10th/1948	German

A copy of the Memorandum of Association and Articles of Association should be submitted.

Name & Address of Banker(s)	BNP PARIBAS 73, boulevard Haussmann 75008 PARIS – France CREDIT LYONNAIS 59, Rue Lafayette 75009 PARIS - France
Name of Lead Consortium Member a)	Reliance Energy Limited
b)	
Joint Venture Agreement/MOU: a) Date of Agreement	May 9, 2005
b) Place	Mumbai

State Country of Origin of Participants in the Following Area :

Description	Origin	Role
1. Consortium Members	Reliance Energy Limited – India Connex SA - France	Consortium leader Operation and Maintenance Company
2. Construction Companies :		
- Civil/Structure		
Trackwork		
Specialists		
3. Mechanical/Electrical Systems		
4. Telecom/Signalling/Ticketing Systems		
5. Rolling Stock		
6. Other Specialists		

FORMAT 9

GENERAL INFORMATION OF CONSTITUENT MEMBERS OF THE CONSORTIUM

Company/Business Name: Reliance Energy Limited

Class/Category/Place & Date of Registration: Electricity Generating/ Distribution Company

1. **Head Office Address:** Reliance Energy Centre, Santa Cruz (East), Mumbai – 400 055
Telex No. +91 22 3009 9775 , E-mail Address - www.rel.co.in
Telephone No. +91 22 3009 9999

2. **Regional Office Address (if any):**

_____
_____
_____
Telex No. _____, E-mail Address _____
Telephone No. _____

3. **Local Office Address (if any) :** Reliance Energy Centre, Santa Cruz (East), Mumbai – 400 055

Telex No. +91 22 3009 9775, E-mail Address - www.rel.co.in
Telephone No. +91 22 3009 9999

4. **Type of Organisation**
(Please tick the relevant description)

- ☐ Corporation ✓
- ☐ Joint Venture
- ☐ Other (Specify)

5. **Ownership of the Organisation**

List of stockholders/members who own 10% or more of the stocks and their interest in the company:

Reliance Group Companies	:	50.15 %
Indian FIs	:	21.52 %
Foreign Institutional Investors	:	17.67 %

6. **Main Lines of Business:**

1. Power Generation/ Distribution/ Construction; Since 1929

7. **Experience in BOT (as claimed by the Constituent Company)**

- ☐ Developing rail facilities
- ☐ Managing and operating rail related services/facilities
- ☐ Marketing rail-based services
- ☐ Raising finance for similar projects ✓
- ☐ Construction management ✓
- ☐ Working/operating in India
- ☐ Rail Based Urban Transport Project
- ☐ Rolling Stock Manufacture and Maintenance

8. **Litigation History (separately in case of constituent members of Consortium)**

Year	Project Name	Name of Client	Cause of litigation & matter in dispute	Award for or against the Applicant	Disputed Amount (in Rs.)	Actual Award (Rs.)

FORMAT 9

GENERAL INFORMATION OF CONSTITUENT MEMBERS OF THE CONSORTIUM / JOINT VENTURE

Company/Business Name: Connex SA

Class/Category/Place & Date of Registration : Public Limited Company with a Board of Directors, registered on the 20th of November 1991 with the Commercial Register of Nanterre (France).

1. **Head Office Address :**

163-169, avenue Georges Clemenceau - 92000 NANTERRE - FRANCE
Fax No.: + 33 1 46 69 32 23 E-mail Address: didier.fremaux@connex.net
Telephone No. : + 33 1 46 69 30 00

2. **Regional Office Address (if any) :**

Alexandre de Mortemart
VEOLIA Environnement c/o Guardian – 12, Ho Chi Minh Sarani – Kolkata 700071 - INDIA
Fax No. + 91 33 2282 2088 E-mail Address : Mortemart@aol.com
Telephone No.: office : + 91 33 2282 7676 mobile : + 91 98302 38777

3. **Local Office Address (if any) :**

Alexandre de Mortemart
VEOLIA Environnement c/o Guardian – 12, Ho Chi Minh Sarani – Kolkata 700071 - INDIA
Fax No.: + 91 33 2282 2088 , E-mail Address: Mortemart@aol.com
Telephone No.: Office: + 91 33 2282 7676 – Mobile : + 91 98302 38777

4. **Type of Organisation**

(Please tick the relevant description)

- [x] Corporation
- [ ] Joint Venture
- [ ] Other (Specify)

5. **Ownership of the Organisation**

List of stockholders/members who own 10% or more of the stocks and their interest in the company :

VEOLIA Environnement (100%)

6. Main Lines of Business :

The company shall :

undertake all forms of transportation, in particular public transportation, urban and regional mass transit systems;

purchase, sell and lease all types of vehicles;

provide all services, equipment, parts and services related to the above;

acquire, purchase, operate and use all patents, licences, brands and models that directly or indirectly relate to the company's business activities;

generally perform all industrial, commercial, financial, moveable or immovable operations that may directly or indirectly relate to the company's scope of activities, as well as of all similar or related activities;

participate in all ways in all present and future businesses or entities whose activities may contribute to meeting the aims of the present company, whether through the formation of new companies, through mergers, alliances or joint ventures.

undertake all forms of transportation, in particular public transportation, urban and regional mass transit systems;

purchase, sell and lease all types of vehicles.

1.	Metro of Stockholm - Sweden	Since	July 1999
2.	Metro of Toulouse - France	Since	January 2005
3	Commuter train of Melbourne - Australia	Since	April 2004
4	Commuter train of Boston	Since	July 2003
5	Light Rail Train of Bordeaux – France	Since	December 2003
6	Light Rail Train of Rouen – France	Since	December 1994
7.	Bus Rapid Transit of Bogota – Colombia	Since	December 2000

7. Experience in BOT (as claimed by the Constituent Company)

- ☐ Developing rail facilities
- ☒ Managing and operating rail related services/facilities
- ☒ Marketing rail-based services
- ☒ Raising finance for similar projects
- ☐ Construction management
- ☐ Working/operating in India

- [X] Rail Based Urban Transport Project
- [ ] Rolling Stock Manufacture and Maintenance
- [X] Rolling Stock Maintenance

8. **Litigation History (separately in case of constituent members of Consortium)**

Year	Project Name	Name of Client	Cause of litigation & matter in dispute	Award for or against the Applicant	Disputed Amount (in Rs.)	Actual Award (Rs.)

Note : To be furnished separately for each member in case of joint venture/consortium.

Enclose company profile.

Give year, type of services, main features of the project, important parameters, and value of services provided/cost of project

The main features and important parameters of each operating system are in annexes.

Reliance Energy Limited
Reliance Energy Centre

FORMAT 9 A

MATRIX OF RESPONSIBILITIES IN JOINT VENTURE

Participation Details	Reliance Energy Limited (REL) (Lead Partner)	CONNEX SA (Consortium Member)
Financial	▫ All finance related activities including raising funds by the SPV and management of funds of the SPV ▫ Providing all performance securities to the Client by the SPV	▫ Limited to providing 5% equity to the SPV as per the bid requirement
Name of the Bankers	▫ ICICI Bank ▫ State Bank of India ▫ UCO Bank ▫ HSBC Bank	
Planning	▫ REL along with the reputed international Project Management Consultant shall undertake the detailed planning of the Project. ▫ REL wishes to appoint **MTR Corporation, Hong Kong** for the above role subject to the mutually agreed terms and conditions.	▫ Providing input for the optimum utilization of the resources
Construction Equipment	▫ Detailed list of construction equipment proposed to be deployed during construction is appended as Chapter 25 of Section 5. This will be stipulated as a requirement while appointing the implementing agencies.	▫ Adequate input based on experience of operation shall be provided.
Key Personnel	▫ S C Gupta ▫ Mahesh Chand ▫ Pramod Gupta ▫ Sanjay Mulay ▫ Avadhut Kshirsagar ▫ Sanjay Date ▫ Manish Jain	▫ FREMAUX Didier ▫ JACOB Jean-Luc ▫ BOISSELET Emmanuel ▫ MARCHAND Francois ▫ MURGIER Alain ▫ MOLINARI Michele ▫ DE MORTEMART Alexandre

Participation Details	Reliance Energy Limited (REL) (Lead Partner)	CONNEX SA (Consortium Member)
Execution of Work	▫ All Project development related activities, including obtaining by the SPV all permits, authority approvals, licenses and consents required for the implementation of the Project. ▫ REL wishes to appoint MTR Corporation, Hong Kong subject to the mutually agreed terms and conditions for providing assistance to the SPV for designing and project integration to implement the project.	▫ Assisting the SPV in detailed design & engineering, choice of rolling stock, OCC, ticketing system, passenger services, preparation of safety standards, value engineering and providing inputs for optimizing life-cycle cost of the project, etc. During the same time, prepare the operating plan, managing, recruiting, training personnel for Operation and Maintenance (please refer chapter 19 of section 5).

FORMAT 10

STATEMENT - I

PAST FINANCIAL PERFORMANCE DATA OF CONSTITUENT MEMBER OF CONSORTIUM

Name: Reliance Energy Limited

(Rs. in Millions)

Item	Actual Audited Figures for the Year		
	2002 - 03	2003 - 04	2004 - 05
1. Net Worth	17,979.70	35,463.00	44,095.30
2. Term Liabilities	6,319.40	20,308.30	37,386.70
3. Current Liabilities	13,509.80	14,186.60	18,877.50
4. Fixed Assets(excl. Cap WIP)	17,606.90	30,094.20	27,201.20
5. Current Assets	18,927.60	28,465.00	86,404.40
6. Other Assets	10,303.40	28,750.40	6,962.20
7. Share Holding (%)			
• Promoters	58.22	47.89	50.15
• Financial Institutions	26.70	22.89	21.52
• Mutual Funds	0.47	0.78	0.58
• Foreign	3.13	21.39	21.07
• Public	11.48	7.05	6.68
8. Additional Information			
• Arrears of Depreciation	0	0	0
• Contingent Liabilities	7,126.60	6,709.60	7,082.70

Net Worth:

1. Share Capital (paid up)
2. General Reserve
3. Other Reserve (excluding provisions)
4. Profit & Loss A/c (Profit [+]/Loss [-])
5. Less Revaluation Reserves + Miscellaneous expenses not written off

Term Liabilities:

1. Debentures
2. Term Loans (more than one year)
   a) Bank
   b) Financial Institution
   c) From Foreign Bank/Institution
3. Term Deposits

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

4. Other Term Liabilities

Current Liabilities:

1. Short Term Borrowing from :
   a) Bank
   b) Financial Institution
   c) From Foreign Bank/Institution
   d) Others
2. Sundry Creditors (Trade)
3. Provision for Taxation
4. Dividend Payable
5. Other Statutory Liabilities

Fixed Assets:

1. Gross Block
2. Depreciation To date
3. Net Block

Current Assets:

1. Cash and Bank Balances
2. Sundry debtors
   a) Beyond one year
   b) Within one year
3. Investments (other than Long Term)
   a) Govt. Securities
   b) Others (specify major items)
4. Inventories
   a) Raw materials/non-consumable stores
   b) Stock-in-Process/Job in progress
   c) Finished Goods
   d) Other Consumable
5. Advance Payment of Taxes
6. Advance to suppliers/contractors
7. Other Current Assets (Specify Major Items)

Other Assets:

1. Investments not included in current Assets
   a) Subsidiary Companies
   b) Others (Major Items)

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

Reliance Energy Limited

SUMMARISED PAST PERFORMANCE ANALYSIS

STATEMENT - II

Name: Reliance Energy Limited

PROFIT & LOSS ACCOUNT

(Rs. in Million)

Item		Actual Audited figures for the year		
		2002-03	2003-04	2004-05
1.	Gross Sales/Turnover	26,758.10	34,066.80	41,398.10
2.	Gross Profit (excl other income)	7,242.70	11,130.70	11,361.10
3.	Operating Profit (Before Interest and Depreciation)	1863. 20	6,299.90	5,981.60
4.	Interest	763.50	699.30	1348.20
5.	Depreciation	2,598.10	3,187.20	3,464.40
6.	Operating Profit (After Interest and Depreciation) [3 – (4+5)]	691.60	2,413.40	1,169.00
7.	Other Income (Net)	834.80	1,760.20	4,527.40
8.	Net Profit Before Tax	1,526.40	4,173.60	5,696.40
9.	Provision for tax (incl. taxation of earlier years)	307.70	432.40	493.50
10.	Prior Period Expenses	0	1.0	3.30
10.	Net Profit after Tax	1,218.70	3,741.20	5,202.90
11.	a) Equity Dividend Paid	606.00	705.90	873.60
	b) Dividend Rate	44%	45%	47%
12.	Retained Profit	937.70	1,225.50	2,003.10

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

STATEMENT - III

ANALYTICAL AND COMPARATIVE DATA

Name: Reliance Energy Limited

Item		Actual Audited Figures for the Year		
		2002-03	2003-04	2004-05
1	Gross Profit Ratio	27.07	32.67	27.44
2.	Net Profit Ratio	4.42	10.44	11.33
3.	Net Worth (Rs. in Millions)	17,979.00	35,463.70	44,095.30
4.	Working Capital Gap (Rs. in Millions)	5,417.80	14,278.40	67,526.50
5.	Current Ratio	1.40	2.01	4.58
6.	Quick Ratio	0.15	1.68	8.18
7.	Term Liabilities: Net Worth	0.35	0.57	0.85
8.	Total Liabilities: Net Worth	1.21	1.04	1.34

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

Reliance Energy Limited SANTACRUZ (E) MUMBAI Reliance Energy Centre

Schedules forming part of Format 10 - Statement 1

I Net worth

Rs Mn.	2004-05	2003-04	2002-03
Share Capital	1,856.10	1,752.60	1,378.30
General Reserve	10,895.70	9,223.90	7,912.10
Other Reserves(incl. Rev. res. & Share prem.)	36,862.10	30,782.70	7,751.60
P/L A/C	2,003.10	1,225.50	937.70
Less	-	-	-
Revaluation Reserves	7,521.70	7,521.70	-
Misc. Exp. not written-off	-	-	-
Net worth (A - B)	**44,095.30**	**35,463.00**	**17,979.70**

II Fixed Assets

Rs Mn.	2004-05	2003-04	2002-03
Gross Block	51,729.70	50,112.20	32,660.40
Depreciation to date	24,528.50	20,018.00	15,053.50
Net Block	27,201.20	30,094.20	17,606.90

III Current Assets

Rs Mn.	2004-05	2003-04	2002-03
Cash & Bank Balances	60,453.70	8,601.60	513.80
Sundry Debtors	9,309.60	4,661.00	5,742.00
a) Beyond 6 months	533.50	1,185.70	1,915.50
b) Others	8,776.10	3,475.30	3,826.50
Investments (other than Long-term)			
a) Govt. Securities			
b) Others (specify)			
Inventories	3,530.90	1,041.70	767.00
a) Raw Materials	955.90	629.30	375.20
b) Stock-in-progress/Semi finished goods	13.20	13.00	15.80
c) Finished Goods	-	-	-
d) Other Consumables	2,561.80	399.40	376.00
Advance Payment of Taxes	1,186.40	1,000.50	1,730.80
Advance to suppliers/ contractors	-	-	-
Other Current Assets	11,923.80	13,160.20	10,174.00
Total Current Assets	**86,404.40**	**28,465.00**	**18,927.60**

Other current Assets:	2004-05	2003-04	2002-03
Loans and advances	11,701.10	11,955.60	8,102.20
Interest accrued on investment, deposits	241.60	96.80	60.80
Income Tax refund receivables	15.50	419.90	649.60
Fixed Assets given on lease	6.00	222.00	10.00
Contracts in progress	360.50	445.90	1,384.90
Retention on contracts	785.50	1,020.50	1,697.30
Less: Advance payment of IT shown separately above	1,186.40	1,000.50	1,730.80
Total Other Current Assets	**11,923.80**	**13,160.20**	**10,174.00**

IV Other Assets (Investments)

Rs Mn.	2004-05	2003-04	2002-03
Subsidiary Companies	-	-	-
Others	6,962.20	28,750.40	10,303.40
Total	**6,962.20**	**28,750.40**	**10,303.40**

V Term liabilities

Rs Mn.	2004-05	2003-04	2002-03
Debentures	6,850.00	6,850.00	600.00
Term loans more than one year			
a) Bank	1,000.00	0.20	-
b) Financial Institution	-	-	-
c) From Foreign Banks	-	-	-
d) External Commercial Borrowings	14,227.60	4,593.50	-
Working capital facility from bank in foreign currency	-	13.90	21.20
Working capital facility from a bank	250.00	-	-
Commercial paper	6,500.00	-	-
Term Deposits	-	-	-
Other Term Liabilities			
Foreign Currency Convertible Bonds	8,559.10	8,850.70	5,698.20
Total Term Liabilities	**37,386.70**	**20,308.30**	**6,319.40**

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

Schedules forming part of Format 10 - Statement 1

VI Current Liabilities

Rs Mn.	2004-05	2003-04	2002-03
Short-term borrowing from:	-	-	-
a) Bank	-	-	-
b) Financial Institution	-	-	-
c) From Foreign Banks	-	-	-
d) Others	-	-	-
Sundry Creditors	7,390.90	5,125.40	3,399.50
Provision for Taxations	1,263.60	1,341.90	2,261.60
Dividend payable	296.30	311.90	683.60
Other Statutory Liabilities	-	-	-
Other Current Liabilities	9,926.70	7,407.40	7,165.10
Total Current Liabilities	**18,877.50**	**14,186.60**	**13,509.80**

VI (a) Other Current Liabilities

Rs Mn.	2004-05	2003-04	2002-03
Consumer's Benefit a/c	2.70	2.70	2.70
Security Deposits from Consumers	873.60	1,209.30	923.40
Deposit & Advance from Consumers	610.90	1,243.70	1,633.00
Unclaimed dividend & Deposits	29.90	24.60	27.20
Other Liabilities	5,873.40	2,527.80	3,096.50
Provision for disputed matters	2,200.00	2,200.00	1,300.00
Provision for leave encashments	336.20	199.30	182.30
Total Other Current Liabilities	**9,926.70**	**7,407.40**	**7,165.10**

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

HARIBHAKTI & CO. *CHARTERED ACCOUNTANTS*

42, FREE PRESS HOUSE, 4TH FLOOR, 215, NARIMAN POINT, MUMBAI-400 021. ✆ : 5639 1101 / 04 / 2287 1099 • VBH - 2287 1806 • FAX : 2285 6237
91-21, BOMBAY MUTUAL CHAMBERS, AMBALAL DOSHI MARG, MUMBAI-400 001. ✆ : 5639 1106 / 5639 1107 (DIRECT) 2262 6345 • FAX : 2265 6260
E-mail : hbhakti@vsnl.com • Website : www.haribhaktigroup.com

CERTIFICATE

We have examined the audited Balance Sheets as on 31.03.2003, 31.03.2004 and 31.03.2005 of **Reliance Energy Limited** (hereinafter referred to as **"the Company"**) having its registered office at Reliance Energy Centre, Santacruz (East), Mumbai – 400 055.

On the basis of such examination and the information and explanation given to us by the company, we hereby certify that the information provided in the attached annexure is as per the audited financial statements of the Company for the respective financial years. The explanatory notes provided in the Annexure have been duly considered while arriving at the corresponding financial figures in the annexure.

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

Haribhakti & Co
Chartered Accountants

Place: Mumbai
Date: 14th May 2005

Enclosure: as above

FORMAT 10

STATEMENT - I

PAST FINANCIAL PERFORMANCE DATA* OF THE BIDDER/CONSTITUENT MEMBER OF CONSORTIUM

Name : Connex SA

Item (in € Million)	Actual Figures for the Year			Projected Figure	
	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
1. Net Worth	520	820	944	896	
2. Term Liabilities	695	918	1011	860	
3. Current Liabilities	1247	905	846	1050	
4. Fixed Assets	1748	1919	2093	1995	
5. Current Assets	694	703	693	788	
6. Other Assets	20	21	15	23	
7. Share Holding • Shareholder VEOLIA Environnement • Promoters • Financial Institutions • Mutual Funds • Foreign • Public	100%	100%	100%	100%	
8. Additional Information • Arrears of Depreciation • Contingent Liabilities					

Note :

(a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(b) Non available

1. In case of consortium participating the above information should be given for each member separately.

2. The back up information of above financial parameter should comprise the following :

Reliance Energy Limited SANTACRUZ (E) MUMBAI 400 055.

Net Worth :

1. Share Capital (paid up) _____
2. General Reserve _____
3. Other Reserve (excluding provisions) _____
4. Profit & Loss A/c (Profit[+]/Loss [-])_____

Less Revaluation Reserves + Miscellaneous expenses not written off

Note: (1) Partly paid-up shares to the extent paid up is part of the networth calculation
(2) Share application money, with an undertaking from the shareholders not to withdraw the application, can be considered as part of the networth calculations.

Item (in € Million)	Actual Figures for the Year			Projected Figure	
Net Worth	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
1. Share Capital (paid up) 2. General reserve 3. Other Reserve (excluding provisions) 4. Profit & Loss A/c (Profit [+] / Loss [-] Less Revaluation Reserves + Miscellaneous expenses not written off	435	709	774	714	
5. Other shareholders' aquity	85	111	170	182	

Note : (a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(b) Non available

Term Liabilities :

6. Debentures _____
7. Term Loans (more than one year) _____
   a) Bank _____
   b) Financial Institution _____
   c) From Foreign Bank/Institution _____
8. Term Deposits _____
9. Other Term Liabilities _____

Item (in € Million)	Actual Figures for the Year			Projected Figure	
Term Liabilites	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
6. Debentures					
7. Term Loans (more than one year)					
a) Bank					
b) Financial Institution	743	995	1084	903	
c) From Foreign Bank / Institution					
8. Term deposits					
9. Other Term Liabilities					

Note :

(a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(b) Non available

Current Liabilities :

10. Short Term Borrowing from :
    a) Bank _____
    b) Financial Institution _____
    c) From Foreign Bank/Institution _____
    d) Others _____
11. Sundry Creditors (Trade) _____
12. Provision for Taxation _____
13. Dividend Payable _____
14. Other Statutory Liabilities _____
15. Other Current Liabilities _____
    (specify major items - such advance payments received)

Item (in € Million)	**Actual Figures for the Year**			**Projected Figure**	
Current Liabilites	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
10. Short Term Borrowing from : a) Bank b) Financial Institution c) From Foreign Bank / Institution d) Others	566	285	209	218	
11. Sundry Creditors (Trade) 12. Provision for Taxation 13. Dividend Payable 14. Other Statutory Liabilities 15. Other Current Liabilities (specify major items – such advance payments received)	962	988	920	1098	

Note :

(a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(b) Non available

Fixed Assets :

16. Gross Block _____
17. Depreciation To date _____
18. Net Block _____

Current Assets :

19. Cash and Bank Balances _____
20. Sundry debtors _____
    a) beyond one year _____
    b) within one year _____
21. Investments (other than Long Term)
    a) Govt. Securities _____
    b) Others (specify major items) _____
22. Inventories _____
    a) Raw materials/non-consumable stores
    b) Stock-in-Process/Job in progress
    c) Finished Goods _____
    d) Other Consumable _____
23. Advance Payment of Taxes _____
24. Advance to suppliers/contractors _____
25. Other Current Assets _____
    (specify Major Items)

Other Assets :

26. Investments not included in current Assets
    a) Subsidiary Companies _____
    b) Others (Major Items) _____

Note : To be furnished separately for each member in case of joint venture/consortium

Audited Balance sheets and Profit & Loss account for the last 3 years to be submitted.

Item (in € Million)	Actual Figures for the Year			Projected Figure	
Fixed Assets	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
16. Gross Block 17. Depreciation To date 18. Net Block	1748	1919	2093	1995	

Item (in € Million)	Actual Figures for the Year			Projected Figure	
Current Assets	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
19. Cash and Bank Balances	281	368	283	266	
20. Sundry debtors a) beyond one year	694	703	693	788	

b) within one year					
21. Investments (other than Long Term)					
a) Govt. Securities					
b) Others (specify major items)					
22. Inventories					
a) Raw materials / non-consumable stores					
b) Stock-in-Process/Job in progress					
c) Finished Goods					
d) Other Consumable					
23. Advance Payment of Taxes					
24. Advance to suppliers/contractors					
25. Other Current Assets (specify Major Items)					

Note : (a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(b) Non available

Item (in € Million)	**Actual Figures for the Year**				**Projected Figure**
Other Assets	Year 1 2001	Year 2 2002	Year 3 2003	Year 4 2004 (a)	Year 5 2005 (b)
a) Subsidiary Companies	20	21	15	23	
b) Others (long term loans)	48	77	73	43	

Note : (a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(b) Non available

SUMMARISED PAST PERFORMANCE ANALYSIS*
STATEMENT – II

Name : Connex SA

PROFIT & LOSS ACCOUNT

(€. in Million)

		For the year			Following Year (Projected)
		2001	2002	2003	2004 (a)
1.	Gross Sales/Turnover	3103	3427	3678	3618
2.	Gross Profit				
3.	Operating Profit (Before Interest and Depreciation) EBITDA (c)	257	291	283	300
4.	Interest	-51	-53	-46	-39
5.	Depreciation	-139	-175	-185	-182
6.	Operating Profit (After Interest and Depreciation)	44	31	-16	-28
7.	Other Income (Net)	-5	7	-27	-1
8.	Profit Before Tax	39	38	-44	-30
9.	Provision for tax	-23	-25	-17	-22
10.	Net Profit	16	10	-67	-54
11.	a) Equity Dividend Paid b) Dividend Rate c) Minority interest	-4	-2	-11	-13
12.	Retained Profit	12	9	-78	-67

Note : (a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

(c) Earnings before interest, tax, goodwill amortization, and restructuring costs.

STATEMENT - III

ANALYTICAL AND COMPARATIVE DATA *

Name : Connex SA

Item	For the Year			Following Year
	2001	2002	2003	2004 (a)
1. Gross Profit Ratio Ebitda Ratio	8%	8%	8%	8%
2. Net Profit Ratio	1%	0%	-2%	-1%
3. Net Worth	520	820	944	896
4. Working Capital Gap	-268	-285	-227	-310
5. Current Ratio				
6. Quick Ratio				
7. Term Liabilities : Net Worth	1,3	1,1	1,1	1,0
8. Total Liabilities : Net Worth	3,7	2,2	2,0	2,1

Note : (a) The consolidated financial statements of Connex for the year ended December 31, 2004 will be approved by the Annual General Meeting of shareholders on June 2005.

* Certificate from the CA should be attached.

VIII - Auditors' report

TRANSLATED FROM THE ORIGINAL DOCUMENT ISSUED IN FRENCH

TO THE SHAREHOLDERS OF CGEA CONNEX,

In accordance with our appointment by your shareholders' general meeting, we have audited the accompanying consolidated financial statements of CGEA Connex, prepared in Euros, for the year ended December 31, 2001, as attached to this report.

The Board of Directors is responsible for the preparation of the consolidated financial statements. It is our responsibility to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted French professional standards. Those standards require that we plan and perform the audit to obtain a reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statements' presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements give a true and fair view of the group's financial position and of its assets and liabilities as of December 31, 2001, and of the results of operations of the companies included in the consolidation for the year then ended in accordance with the accounting principles generally accepted in France.

Without qualifying the opinion expressed above, we wish to draw your attention to note I which observes that:
- the CGEA Connex sub-group was set up on January 1, 1997 as a result of an internal reorganisation of the CGEA S.A. group, with net assets being transferred at net book values. As a result, goodwill was not recalculated on that date but included at amounts identical to those previously included in the consolidated accounts of CGEA S.A.,
- the presentation of the statements of income and cash flow as at December 31, 2001 has changed. Further details regarding such changes are provided in Note VII - 21 of the notes to the consolidated financial statements.

We have also carried out the verification of the information given in the management report of the Board of Directors. We have no comment to make as to its fair presentation and its conformity with the consolidated financial statements.

Neuilly-sur-Seine and Paris, April 10, 2002
The Statutory Auditors

BARBIER FRINAULT & CIE

Jean Bouquot

RSM SALUSTRO REYDEL

Philippe Arnaud - Bernard Cattenoz

connex

VIII Auditors' report

TRANSLATED FROM THE ORIGINAL DOCUMENT ISSUED IN FRENCH

TO THE SHAREHOLDERS OF CGEA CONNEX

In accordance with our appointment by your Shareholders' General Meeting, we have audited the accompanying consolidated financial statements of CGEA Connex prepared in Euros, for the year ended 31 December 2002, as attached to this report.

The Board of Directors is responsible for the preparation of the consolidated financial statements. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with French generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain a reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall consolidated financial statements presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements give a true and fair view of the Group's financial position and its assets and liabilities as of December 31, 2002, and of the result of operations of all the entities consolidated for the year then ended in accordance with accounting principles generally accepted in France.

Without qualifying the opinion expressed above, we draw your attention to the note I to the financial statements which observes that the CGEA Connex sub-group was set up on January 1, 1997 as a result of an internal reorganisation of the CGEA S.A. group, with net assets being transferred at net book values. As a result, goodwill was not recalculated on that date but included at amounts identical to those previously included in the consolidated accounts of CGEA S.A.

We have also carried out the verification of the information given in the group management report of the Board of Directors. We have no comment to make as to its fair presentation and its conformity with the consolidated financial statements.

Paris La Défense and Paris, May 2, 2003
The Statutory Auditors

BARBIER FRINAULT & CIE
Jean BOUQUOT

RSM SALUSTRO REYDEL
Philippe ARNAUD - Bernard CATTENOZ

IX Statutory auditors' report on the consolidated financial statements

For the period ended december 31, 2003

TRANSLATED FROM THE ORIGINAL DOCUMENT ISSUED IN FRENCH

In accordance with our appointment by your Shareholders' General Meetings, we have audited the accompanying consolidated financial statements of CGEA Connex, for the year ended December 31, 2003.

These consolidated financial statements have been approved by the Board of Directors. Our responsibility is to express an opinion on these consolidated financial statements, based on our audit.

1 Opinion on the consolidated financial statements

We conducted our audit in accordance with French generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance that the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements, prepared according to French generally accepted accounting principles, give a true and fair view of the financial position and the results of operations of all the entities consolidated.

2 Basis of our assessment

In conformity with the provisions of Article L.225-235, paragraph 2, of the Commercial Code, introduced by the French Financial Security Act of August 1, 2003 and applicable for the first time to this accounting period, which require that we substantiate our assessments, we draw your attention to the following:

The management of CGEA Connex is required to make estimates and assumptions which affect the amounts reported in the financial statements and accompanying notes. In our audit of the consolidated financial statements for the period ended December 31, 2003, we concluded that, of the items subject to material accounting estimates, property, plant and equipment, intangible assets and provisions for contingencies and charges might require substantiation of our assessments, on the following points:

- Concerning the methods used to value the main goodwill items and property, plant and equipment and intangible assets, as described respectively in notes V-4) and IV-1) of the notes to the consolidated financial statements, our work consisted in assessing the amounts, disclosures and assumptions used to estimate these items.
- Regarding provisions for contingencies and liabilities, we assessed the basis on which these provisions were recorded and reviewed the appropriateness of the information provided in note VIII -16) of the notes to the consolidated financial statements.

We also assessed the significant estimates and assumptions made by management to prepare the financial statements, and ensured that they were reasonable.

These assessments are an integral part of our audit of the financial statements as a whole. They therefore enabled us to issue the unqualified opinion set out in the first part of this report.

3 Specific verifications

We also verified the information provided in the group's management report. We have no comments to make as to its fair presentation and its conformity with the consolidated financial statements.

Courbevoie and Paris, April 26, 2004
The Statutory Auditors

BARBIER FRINAULT & CIE - ERNST & YOUNG
Jean BOUQUOT

RSM SALUSTRO REYDEL
Bernard CATTENOZ - Philippe ARNAUD

FORMAT 11

Statement I

TECHNICAL CAPABILITY*

Large projects promoted/built completed (Non-Railways)

Name of the Company : Reliance Energy Limited

Description of Project	Location	Year and Month of Completion of the Project and Time taken	Project Cost	Percentage Equity holding / Value of contract executed
REL's Dahanu Thermal Power Station	Dahanu, Maharashtra	July 1995, 4 years	Rs. 15,343 Million	100 %
REL's Samalkot Power Project	Samalkot, A.P.	August 2002, 3 years	Rs. 6,566 Million	100 %
REL's Goa Power Station	Goa	January 1998, 1.5 years	Rs. 47.98 Million	100 %
Tau Devilal Power Project (EPC)	Haryana	February 2005, 1.5 years	Rs. 5,260 Million	Rs. 5,260 Million
Dhuvaran CCGT, Gujarat (EPC)	Dhuvaran, Gujarat	January 2004, 1 year	Rs. 706 Million	Rs. 706 Million

Statement IA

TECHNICAL CAPABILITY*
Large projects promoted/built (Non-Railways)

For ongoing projects

Name of the Company

Description of the Project	Year and Month of commencement of the Project	Project Cost	Location	Status of Project and expected date of completion	Current Equity holding / Value of contract being executed
4000 MW Mega Power Project, Dadri, U.P.	January, 2004.	Rs 10000 Cr Approx.	Dadri, UP	Preliminary investigations completed. Clearances under process	100%
4000 MW Mega Power Project	January,2005	Rs 10000 Cr Approx.	Rewas – Shahapur, Dist. Raigad, Maharashtra	Preliminary Investigations in Progress	100%

Statement II

TECHNICAL CAPABILITY*
Experience in development of large rail projects (completed)

S.No.	Brief Description of the Project	Location	Project Cost	Value of Contract or equity investment	Period	
					Commencement	Completion

Statement II A

TECHNICAL CAPABILITY*
Experience in development of large rail projects (Ongoing)

S.No.	Brief Description of the Project	Location	Project Cost	Value of Contract or equity investment	Period	
					Date of Commencement	Expected Completion

Statement III

PROPOSED TECHNICAL KEY PERSONNEL

Name	Qualification	Organisation	Years of Experience	Field of Specialisation
S. C .Gupta	M.Sc (Engg.)	REL	33 yrs	Project Management
Mahesh Chand	B.E (Electrical)	REL	30 yrs	Procurement
D. Guha	B.E (Electrical)	REL	26 yrs	Electrical and C&I
P K Majumdhar	B.E (Mech)	REL	25 yrs	Project Planning
V K Juneja	B.E (Mech.)	REL	29 yrs	Project Management
Pramod Gupta	B.E (Mech.)	REL	24 yrs	Project Management
Sudhir Pawar	B.E (Electrical)	REL	22 yrs	Project Management
Sanjay Mulay	M.E (Mech)	REL	24 yrs	Mechanical Construction
R S Gadre	B.E (Mech)	REL	21 yrs	Mechanical Construction
Sanjay Joshi	M.E.(Civil)	REL	17 yrs	Project Planning
S N More	B.E (Civil)	REL	23 yrs	Structural Engg
A S Kshirsagar	B.E (Civil)	REL	17 yrs	Project Management
Sanjay Date	B.E (Civil)	REL	16 yrs	Structural Engg
Manish Jain	B.E (Civil)	REL	15 yrs	Civil Construction/ Infrastructure Projects
M P Kamat	B.E (Civil)	REL	16 yrs	Do
S D Gore	B.E (Civil)	REL	17 yrs	Do
S Ramesh	B.E (Electronics)	REL	25 yrs	C&I
S Mulgund	B.E (Electronics)	REL	14 yrs	C&I

Client's certificate for Project 3– Dhuvaran

GUJARAT STATE ELECTRICITY CORPORATION LTD.

REGD. & ADMN. OFFICE: VIDYUT BHAVAN, RACE COURSE, VADODARA - 390 007.
Phone No(s). : (0265) 2355193-94-95, 2338848 Fax: 2338847

GSEC / DTM / 557 / 8498
Date: 27th January 2004.

Shri A.K.Mukhopadyay
Construction Manager,
BHEL Site Office,
Dhuvaran – 388 310

Fax: (02698)-242276 / 242907

Dear Sir,

Sub: 106.617 MW Dhuvaran CCPP: Open Cycle and Combined Cycle Reliability Test & COD-Reg.
Ref: Letter No. BHE / PW / DHUVG / SOX / 01 / 1368 dtd. 24th December 2003.

For the subject matter, refer your letter as above regarding acceptance of Reliability Test for 720 Hrs and Full Load Test for 72 Hrs. In this regard, the Company is pleased to convey the completion of reliability test and full load test operation of CCPP Unit on 23rd January 2004 and acceptance thereon. After the reliability test, the unit was withdrawn from 17th January 2004 to 24th January 2004 for preparatory work of PG Test. The unit was synchronized in Open Cycle on manual mode on 25th January 2004 and in Combined Cycle mode in the evening of 26th January 2004. The Company is declaring the unit for commercial operation from 00.00 hrs on 28th January 2004. However, this will not absolve M/s. BHEL from their responsibility for completion of balance pending work.

As per your letter dtd. 24th December 2003, you shall liquidate balance issues and pending defects including auto operation control system etc. as indicated in our letter No. GSECL/DTM / 557 / 8471 dtd. 21st January 2004 before commencement of PG Test.

Further, please note that as per the contract condition- 33 and 38.4, it is your responsibility to operate / maintain the unit as per the provision till plant is taken over, failing which any advance loss of profit before taking over shall be recovered from your bills.

This is for information, please.

Yours faithfully,
For Gujarat State Electricity Corporation Ltd,

(G.M. Shah)
I/c General Manager (Proj)

\\Webserver\data_share\PROJ\DHUVARAN\Reliability Test.doc

1

Reliance Energy Limited
SANTACRUZ (E)
MUMBAI

Client's certificate for Project 3– Dhuvaran

PHONE NO. : 02656425074000 DEC. 13 2003 03:53PM P1

Dhuvaran 106.617 MW CCPP
Unit#1

PROTOCOL FOR 72 HRS. FULL LOAD TEST IN COMBINED CYCLE MODE

1. 72 hrs. full load test in combined cycle mode was conducted from 11-30 hrs. of 07.12.2003 to 11-30 hrs. of 10.12.2003. Operating parameters during this period of operation is enclosed herewith.

2. GSECL opined that the plant has generated maximum of 100 MW (GTG Load 66.4 MW & STG load 33.6 MW) at a given moment , which is falling short by 6.617 MW.

BHEL informed that the plant was tested at GT base load operation . Output of GT is governed by set of operating condition like compressor fouling due to running hours of GT(already run for approx. 1450 hrs.) , grid frequency, ambient temperature etc. Considering all these factors the output of GT at base load operation during this period was found to be in order. However the guaranteed parameters of GT and ST will be proven with respect to contract terms during PG test as per standard.

BSES BHEL DESEIN 13/12/03 GSECL

Note :

1. SOX , NOX , CO analyzer was not in service during the test. The system is in final stage of commissioning.
2. Noise level measurements were done during the test and are attached in separate annexure.
3. Gas Chromatograph is commissioned and in service. The Gas Analysis report received from GAIL, Undera on 08.12.03 was compared with Chromatograph readings and found to be matching. However GSECL requested to streamline the history logging of Chromatograph and demonstrate. BHEL / BSES informed that same will be done on or before 17.12.03.

Client's certificate for Project 4 – Tau Devi Lal

Reliance Energy Limited, Santacruz (E), Mumbai, Reliance Energy Centre

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. of India Undertaking)
पावर सेक्टर, उ.क्षे.परिसर, प्लाट नं.25, सेक्टर-16ए, पोस्ट बॉक्स सं.55,नोएडा-201301,
Power Sector-Northern Region,Plot no.25,Sector 16 A PB NO. 55, NOIDA.201301
Ph : 0120-2515476 / 2515464 / 2515479, Fax 0120-2515464 / 2515476

ISO 9001-2000,ISO 14001 and OHSAS 18001 certified company
SubContract and Purchase Department.

Date : 06.01.05

TO WHOMSOEVER IT MAY CONCERN

This is to certify that M/s. Reliance Energy Limited is executing civil works for 2 x 250 MW Tau Devilal Thermal Power Station, Panipat, Unit # 7 & 8 as per the following

Title & Name of the Project	2 x 250 MW Tau Devi Lal Thermal Power Station, Panipat, Unit # 7 & 8		
Sector in which the project falls (road/core)	Core		
Nature of Civil Work	Piling and Foundations, Industrial Buildings for various Pump Houses, Civil Works for : Coal Handling, Ash Handling, Water Treatment and Compressed Air Plants, D.G. Set, Fuel Oil Plants, Air Conditioning and Ventilation Plants, Various Control Rooms, Switch Gear Rooms etc. Main Power House, Bunker Bay, Conveyor & Pipe rack Structures, Chimney, Cooling Tower etc. in Thermal Power Station.		
Entity for which the project is being constructed	Power Generation		
Location	Assandh Road, Panipat, Haryana		
Project Cost			
Year wise billings by REL For civil works (Rs. Crore)	2001-02	2002-03	2003-04
	Nil	38.91	107.24
Date of commencement of - Project - Contract of REL	26.03.02 26.03.02		
Date of Completion/commissioning	Under Progress (Completion date -25.02.05)		

The work is being carried out satisfactorily by REL.
This is issued to M/s. Reliance Energy Limited as per their request for submission with their quotations and issued without any prejudice to the terms and conditions of the contract.

(S K Uppal)
Additional General Manager (SCP)

पंजीकृत कार्यालय-बीएचईएल हाउस, सिरी फोर्ट,नई दिल्ली-110049,Regd.Office: BHEL House, Siri Fort, N. Delhi 110049

S. K. UPPAL, AGM
Sub Contracting & Purchase
BHEL, PS-NR, NOIDA

Reliance Energy Limited

Client's certificate for Project 4 – Tau Devilal

Joy/HPGC Correspondence

Haryana Power Generation Corpn.

From

Chief Engineer/Const.,
TDLIPP, Panipat.

To

Chief Engineer/Th.Design,
HPGC, SCO 21 Sector 11,
Panchkula.

Memo No. Ch-22/SE/O&M-(III)

Dated: 7.1.2005

Sub:- Trial Operation of 250 M.W. Unit-7, TDLIPP

Reference your office order No.Ch/8/CE/TD/M-III/251/Vol.II dt.25.11.2004.

The trial operation report alongwith annexures is enclosed for taking further necessary action at your end please.

Chief Engineer/Const.,
TDLIPP, Panipat.

Encl/As above.

CC:-

1. Director/Generation, HPGC, Panchkula alongwith enclosures for kind information please.
2. Const.Manager, BHEL Site office, TDLIPP, Panipat alongwith enclosures. The list of pending works, defects and deficiencies has been handed over to him. The same should be checked, signed and returned to this office within a week as agreed.

Reliance Energy Limited

Client's certificate for Project 4 – Tau Devilal

COMMISSIONING PROTOCOL

PROJECT : TDLTPS, PANIPAT
UNIT NO : 7
RATING : 250MW
ACTIVITY : TRIAL OPERATION

I) As per BHEL: -

1. 14 days trial operation of Unit-7 commenced wef.15.12.04 at 07.00hrs and completed at 07.00hrs on 29.12.04.
2. During trial operation unit has operated on varying load generating 78.568MU at a PLF of 94%.
3. From 06.00hrs of 25.12.04 to 06.00hrs of 28.12.04 unit has run continuously for 72hrs on full load achieving average load of 255MW.
4. Unit was further operated beyond 29.12.04 to 4.01.05 at 200MW without oil support to observe the performance during load backing down and found to be satisfactory.

II) As per HPGCL: -

1. The trial operation completed at 21.00hrs on 04.01.05 to operate the Unit on varying load for 72hrs.
2. During trial operation 15.12.04 to 04.01.05 total generation was 105MU at PLF 83.2%.

BHEL HPGCL

Enclosures:

1) Generation data from 15.12.04 to 04.01.05. - Annexure 'A'
2) 72hrs full load data. - Annexure 'B'
3) 72hrs half load to full load data. - Annexure 'C'
4) Interruption details. - Annexure 'D'
5) Trial operation log data. - Annexure 'E'
6) Abstract of pending jobs. - Annexure 'F'

Note: Detailed list of pending works, defects & deficiencies under joint checking & will be submitted within a week.

ANNEXURE: FORMAT- II.

HARIBHAKTI & CO. *CHARTERED ACCOUNTANTS*

42, FREE PRESS HOUSE, 4TH FLOOR, 215, NARIMAN POINT, MUMBAI-400 021. ✆ : 2287 1099 / 5639 1101 (3 LINES) VBH - 2287 1806 • FAX : 2285 6237
19-21, BOMBAY MUTUAL CHAMBERS, AMBALAL DOSHI MARG, MUMBAI-400 001. ✆ : 2265 2675 / 5639 1106 / 7 (DIRECT) 2262 6345
FAX : 2265 6260 • E-mail : hbhakti@vsnl.com • Website : www.haribhaktigroup.com

CERTIFICATE

We have examined the books of account and other relevant records of Reliance Energy Limited (hereinafter 'the Company') having its Registered Office at Reliance Energy Centre, Santacruz East, Mumbai 400 055. On the basis of such examination and the information and explanation given to us by the management of the Company, we hereby certify that the completed project cost of the following projects of the Company are as follows:

Sr.No	Particulars	Capitalised upto	Rs. Crore
1.	Dahanu (including transmission evacuation)	31st March 1998	1534.35
2.	Samalkot Project	31st March 2003	656.65

HARIBHAKTI & CO. MUMBAI CHARTERED ACCOUNTANTS

HARIBHAKTI & CO.
Chartered Accountants

Place: Mumbai
Date: May 14, 2005

Reliance Energy Limited SANTACRUZ (E) Accepted

FORMAT 11

Statement I

TECHNICAL CAPABILITY*

Large projects operated completed (Non-Railways)

Name of the Company : Connex

Description of Project	Location	Operating Duration	Project Cost	Percentage Equity holding / Value of contract executed
Bus Rapid Transit System	Colombia Bogota	2000 / 2010		
Guided Bus Rapid Transit System	France Rouen	1993 / 2023		
Bus	France Bordeaux	2001 / 2008		
Bus	France Le Havre	1997 / 2005		
Bus	France Nancy	2002 / 2009		
Bus	France Nice	2004 / 2011		
Bus	France St-Etienne	2000 / 2012		
Bus	France Toulon	2004 / 2012		
Bus	Australia Sydney	1999 / 2005		
Bus	Canada Montreal			
Bus	Czech Republic Ostrava	2004 / 2006		

** Certificates from Clients should be attached*

Statement IA

TECHNICAL CAPABILITY*
Large projects operated (Non-Railways)

For ongoing projects

Name of the Company: Connex

Description of the Project	Location	Project Cost	Location	Status of Project and expected date of completion	Current Equity holding / Value of contract being executed
Bus Rapid Transit System	Canada York			2005	

** Certificates from Clients should be attached*

Statement II

TECHNICAL CAPABILITY*
Experience in development of large rail projects (completed)

Name of the Company: Connex

S.No.	Brief Description of the Project	Location	Project Cost	Value of Contract or equity investment	Operating Period	
					Commencement	Completion
1	Metro	Sweden Stockholm Tunnelbanan			1999	2009
2	Fully Automatic Driverless Metro	France Toulouse			2005	2005 option 2012
3	Commuter Train	Australia Melbourne			2004	2009 option 2010
4	Commuter Rail	USA Boston			2003	2008
5	Commuter Rail	USA Los Angeles			2005	2010 option 2015
6	Commuter Rail	Sweden Stockholm Saltsjöbanan			1999	2009
7	Monorail	Australia Sydney			1998	2008
8	Light Rail Train	Australia Sydney			1997	2008
9	Light Rail Train	France Bordeaux			2003	2011
10	Light Rail Train	France Rouen	€ 430 million	Construction Period 20% Operation Period 56%	1994	2024

Statement II

TECHNICAL CAPABILITY*
Experience in development of large rail projects (completed)

Name of the Company: Connex

11	Light Rail Train	France St-Etienne			2000	2005
12	Light Rail Train	Germany Berlin			2001	2011
13	Light Rail Train	Germany Görlitz			2001	unlimited guaranteed until 2001
14	Light Rail Train	Ireland Dublin			2004	2009 option 2014
15	Light Rail Train	Spain Barcelona Trambaix	€ 178 million	6,85%	2004	2029
16	Light Rail Train	Spain Barcelona Trambesos			2004	2029
17	Light Rail Train	Sweden Norrköping			2004	2011 option 2014
18	Light Rail Train	Sweden Stockholm Lidingöbanan			1999	2009
19	Light Rail Train	Sweden Stockholm Nockebybanan			1999	2009
20	Light Rail Train	Sweden Stockholm Tvärbanan			1999	2009
21	Regional Train	Germany NordWest			2000	2005 option 2015
22	Regional Train	Germany LausitzBahn			2002	2005
23	Regional Train	Germany Haller Willem			2003	2013

Statement II

TECHNICAL CAPABILITY*
Experience in development of large rail projects (completed)

Name of the Company: Connex

24	Regional Train	Germany Marschbahn Line			2005	2015
25	Regional Train	Germany OME			1998	2006
26	Regional Train	Germany NOB			2000	2010
27	Regional Train	Germany FLEX			2003	2005
28	Regional Train	Germany BOB Bayern			1998	2013
29	Regional Train	Germany WEG			2000	each year unlimited
30	Regional Train	Sweden Kinekulle			2003	2010 option 2012
31	Regional Train	Czech Republic			2002	each year
32	Regional Train	France Nice			1970	2014
33	Regional Train	France Carhaix			1892	2005
34	Long Distance Train	Germany Inter Connex 1			2002	unlimited
35	Long Distance Train	Germany Inter Connex 2			2003	unlimited
36	Long Distance Train	Sweden Norrland			2003	2008 option 2011

37	Tourist Train	France La Mure			1998	2006
38	Tourist Train	France La Rhune			1995	2013

Statement II A

TECHNICAL CAPABILITY*
Experience in development of large rail projects (Ongoing)

Name of the Company: Connex

S.No.	Brief Description of the Project	Location	Project Cost	Value of Contract or equity investment	Period	
					Date of Commencement	Expected Completion
1	Light Rail Train	Israël Jerusalem	€ 286 million	5%	2008	2038
2	Regional Train	Germany Nordharz			2005	2017

** Certificates from Clients should be attached*

Statement III

PROPOSED TECHNICAL KEY PERSONNEL

Name	Qualification	Organisation	Years of Experience	Field of Specialisation

Encl. FORMAT- II.

Agglo. de Rouen
HAUTE-NORMANDIE

ATTESTATION

****

Le Président de la Communauté de l'Agglomération Rouennaise soussigné, atteste par la présente que LA TCAR (15 rue de la Petite Chartreuse – BP 99 – 76002 ROUEN Cédex 1) filiale du groupe CGEA Connex, exploite, dans le cadre d'une concession de 30 ans, le réseau de transport public urbain de l'Agglomération Rouennaise qui transporte 130 000 voyageurs par jour et dont les caractéristiques principales sont les suivantes :

- Exploitation et maintenance des 215 bus de la flotte,
- Gestion des stations d'échanges bus/bus et bus/métrobus qui assurent plus de 10 000 correspondances par jour,
- Exploitation du métrobus, système de transport public urbain sur rail,
- Entretien des 36 km de voie simple ferroviaire et des équipements associés,
- Entretien des 56 voitures ferroviaires type tramway formant 28 rames articulées,
- Gestion et maintenance d'un système de billetterie utilisant des titres magnétiques.

Fait à ROUEN

Le,

Pour le Président et par délégation
Le Directeur Général Adjoint

Bernard VESSIER

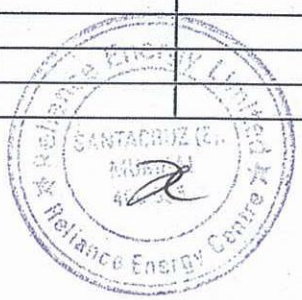
Reliance Energy Limited
SANTACRUZ (E)
MUMBAI
400 055
Reliance Energy Centre

Toute la correspondance est à adresser à M. Le Président
Agglo. de Rouen Haute-Normandie
Norwich House
14 bis avenue Pasteur BP 589
76006 Rouen Cedex 1
Tél 02 35 52 68 10 - Fax 02 35 52 68 59
E-mail : agglo@agglo-rouennaise.fr

FORMAT 12
EXPERIENCE OF BIDDER IN DESIGN/ DEVELOPMENT AND OPERATION OF MRTS/ RAIL PROJECT

1. REL wishes to appoint MTR Corporation, Hong Kong as the Designer/ System Integrator for the proposed MRTS project. In the event of such appointment, their experience in design/ development of rail based projects shall be completely and gainfully utilized.
2. CONNEX SA, a consortium member are experienced operator having presence in all most all the parts of world (52 references world wide – attached hereto). The details of their experience in operation are also appended to this format.

Connex References				
01	Sweden	Stockholm	Tunnelbanan	Metro
02	France	Toulouse		Automatic Metro
03	Australia	Melbourne		Commuter Train
04	New Zealand	Auckland		Commuter Train
05	USA	Boston	Massachusetts Bay	Commuter Train
06	USA	Los Angeles	Metrolink	Commuter Train
07	Sweden	Stockholm	Saltsjöbanan	Commuter Train
08	Australia	Sydney		Monorail
09	Australia	Sydney		Light Rail Train
10	France	Bordeaux		Light Rail Train
11	France	Rouen	TCAR	Light Rail Train
12	France	Saint-Etienne	STAS	Light Rail Train
13	Germany	Berlin	Connex Verkehr	Light Rail Train
14	Germany	Görlitz	Connex Verkehr	Light Rail Train
15	Ireland	Dublin		Light Rail Train
16	Spain	Barcelona	Trambaix	Light Rail Train
17	Spain	Barcelona	Trambesos	Light Rail Train
18	Sweden	Norrköping		Light Rail Train
19	Sweden	Stockholm	Lidingöbanan	Light Rail Train
20	Sweden	Stockholm	Nockebybanan	Light Rail Train
21	Sweden	Stockholm	Tvärbanan	Light Rail Train
22	Germany	NordWest	NWB	Regional Train
23	Germany		LausitzBahn	Regional Train
24	Germany	NordWest	Haller Willem	Regional Train
25	Germany	Nord Ostsee	Marschbahn	Regional Train
26	Germany		OME	Regional Train
27	Germany		NOB	Regional Train
28	Germany	Nord Ostsee	FLEX	Regional Train
29	Germany	Bayern	BOB	Regional Train
30	Germany		WEG	Regional Train
31	Sweden		Kinnekulle line	Regional Train
32	Czech Republic	Desna Valley		Regional Train
33	France	Nice	CFTA	Regional Train
34	France	Carhaix	CFTA	Regional Train
35	Germany		InterConnex 1	Long Distance Train
36	Germany		InterConnex 2	Long Distance Train
37	Sweden		Norrland Trafiken	Long Distance Train
38	France	La Mure	CFTA	Tourist Train
39	France	La Rhune	CFTA	Tourist Train
40	Israël	Jerusalem		Light Rail Train
41	Germany		Nordharz	Regional train
42	Colombia	Bogota		Bus Rapid Transit
43	France	Bordeaux		Connex network
44	France	Le Havre		Connex network
45	France	Nancy		Connex network
46	France	Nice		Connex network
47	France	Rouen		Connex network
48	France	Saint-Etienne		Connex network
49	France	Toulon		Connex network
50	Australia	Sydney		Connex network
51	Canada	Montreal		Connex network
52	Czech Republic	Ostrava		Connex network



Technical Details

and all that stuff...

Number of vehicles:	7
Number of cars per vehicle:	5
Track length:	7.2km, 1.5km of which is on street operation
Rail type:	Standard gauge 1435mm
Minimum curve radius:	20 metres
Maximum track gradient:	1 in 11.8 (8.5%)
Overhead line voltage:	750volts DC
Vehicle length:	29m
Vehicle width:	2.7m
Vehicle height:	3.4m (excluding pantograph)
Floor height:	35 to 29cm
Tare weight:	36.5 T
Carrying capacity:	217 (seating and standing)
Seating capacity:	74
Number of air con units:	2 per vehicle
Number of bogies:	3 per vehicle (2 motor each end, 1 trailer in middle)
Wheel diameter:	630mm
Traction motors:	8 x 45kw
Traction motor constant torque:	0 to 27km/h
Traction motor constant power:	27km/h to 70km/h
Maximum speed:	80km/h (20km/h on street)
Maximum acceleration:	1.2m/s/s
Normal braking:	Electric (regenerative if line is receptive)
Parking/safety brake:	Mechanical spring applied, hydraulic pressure released

The Metro Light Rail Control room located in Pyrmont.

Metro Light Rail maintenance team.

The Company

Metro Light Rail is owned by Metro Transport Sydney. Metro Transport Sydney is a privately owned Australian company, with three main shareholders, Utilities Trust of Australia and Australian Infrastructure Fund managed by Hastings and Colonial First State Investments.

The Light Rail is operated by Connex.

For any further enquires please contact us via:

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Email: info@connexsydney.com.au
Phone: +61 2 9285 5600
Fax: +61 2 9267 4846

metro LightRail

about Metro Light Rail

The Resurgence of Sydney's Trams

The world-wide phenomenon of a resurgence in Light Rail should not be surprising. With the growing congestion of cities, people are becoming more concerned about major issues such as rapid access and air quality. In both cases, modern light rail such as Sydney's Metro Light Rail has much to offer the public transport system.

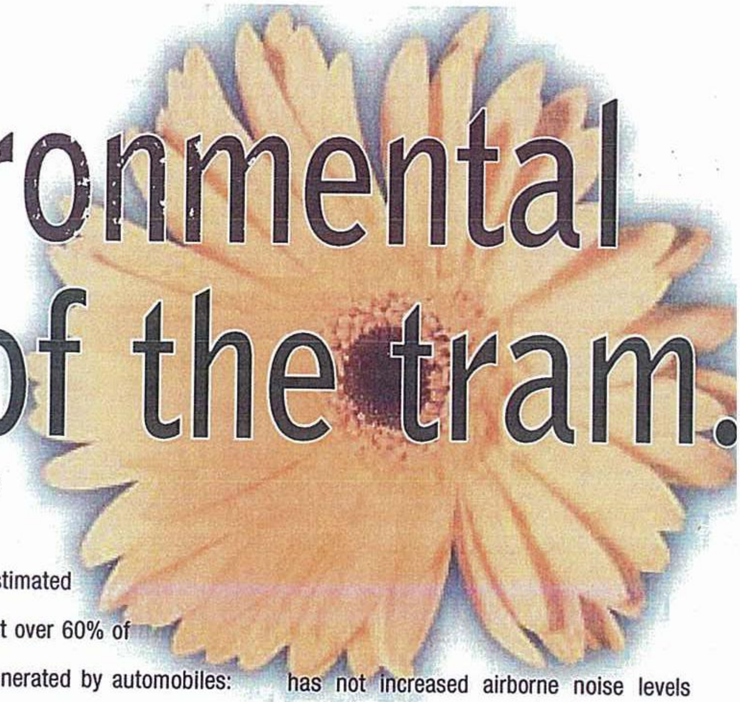
Light Rail officially returned to Sydney on 31st August 1997 between Central Station and Wentworth Park at a total cost of $65 million, with $21.5 million coming from the Commonwealth's Building Better Cities Program. Sydney welcomed the return after almost a 40 year gap.

The city of Sydney once had the largest light rail system in the southern hemisphere which was regrettably abolished and replaced by buses during the 1950s and early 60s. Sydneysiders have embraced the return of trams through patronage of the system.

To provide the residents of the inner west with an alternative transport mode to the congested roads, the line was later extended from Wentworth Park to Lilyfield on 13th August 2000 at a total cost of $20 million, with $16 million contributed from the NSW Government.

The trams return to Sydney's inner west was heralded with strong community support.

The environmental benefits of the tram.



The electrically powered tram will eventually reduce the dependence on other forms of transport and help cut the level of greenhouse gases emitted into the atmosphere, as well as lead to a decline in energy consumption.

The trams are low energy users and help reduce the amount of carbon monoxide and suspended particles in the air.

The modern design of the tram incorporates regenerative technology. This process means recycling the electricity drawn by the tram therefore reducing the need to generate more electricity.

It has been estimated in some cities that over 60% of air pollution is generated by automobiles: each car emitting about one tonne of pollution per year. By reducing the number of cars in a city translates directly to lower air pollution. One tram can keep 55 cars off the road based on four passengers per car, in reality the figure would be higher based on sole driver occupancy of cars.

The introduction of Light Rail to Sydney has not increased airborne noise levels when compared with the level of ambient noise generated by other city traffic. In fact, electrically powered trams have exceptionally low noise levels and are much quieter than most trucks and buses. Both interior and exterior noise levels are substantially higher for buses than for trams by some 5 to 15dB(A).

The system and track

The system is 7.2km of standard gauge (1435mm) dual track, 5.7km of which is a dedicated Right of Way (ROW) with the remainder being on a street running area.

The system operates 24hrs a day, 365 days a year with services every 8 to 10 minutes, during most of the day.

The track

Track construction in the ROW is of conventional ballasted track using continuously welded 53kg/m rail. In sensitive areas such as Star City, the track is directly fixed to a rubber mounted concrete slab, specially designed to reduce noise and vibration.

The on-street section is comprised of two independent concrete slabs. Grooved head rail is used for the on-street section, with the rail embedded in an elastomeric compound for noise and vibration minimisation.

The elastomeric compound also minimises the amount of stray current from the power supply.

Easy access to an efficient system

Compared with trams of 40 years ago, Metro Light Rail vehicles are 'super' trams! They are quiet, air-conditioned and can carry 200 people in comfort.

A special feature of the trams and indeed the entire system, is its accessibility. There are no steps in the trams. Specially designed low floors, wide doorways and aisles make it ideal for those with prams and strollers, wheelchairs and shopping parcels.

The modern trams make catching public transport an easier option for passengers with mobility concerns.

Light Rail Vehicles

Metro Light Rail has a fleet of seven trams featuring low floors which combined with the wide opening doors provides easy access for strollers and wheelchairs.

Security is enhanced for passengers through access to an intercom system, and all drivers are in constant radio contact with the Operations Control Centre.

A tram consists of five articulated modules and can be driven from either end. Two trams can be coupled, either for recovery of a disabled vehicle or for use in times of high patronage demand.

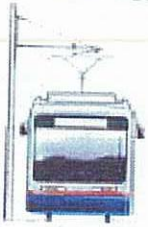
Each tram has three bogies. One power bogie on each end and a trailer bogie in the middle.

All doors on the trams have obstruction sensing strips on each edge, and will remain open should anything stop the door from closing. For safety protection a tram cannot move until all doors are closed. The tram is maintained at a comfortable temperature by two roof mounted air conditioners built in Australia for Australian conditions.

The power supply and signaling system.

The trams receive power from an overhead wire, which carries a voltage of 750V DC and varies in height between 4.5m and 5.5m.

The overhead is powered by two 1300kW sub stations, each capable of powering the entire system should the need arise. The sub stations can be remotely controlled and maintained from the Operations Control Centre via a Supervisory Control and Data Acquisition (SCADA) system.

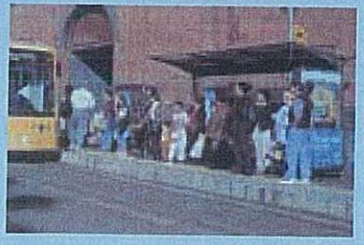


The signaling system in the ROW is a conventional relay based interlocking system and uses audio frequency jointless track circuits. Route selection is made by tram drivers at wayside panels, with the route automatically resetting after use.

The on-street signal system is line-of-sight, with the maximum speed set at 20km/h. The light rail system utilises an Automatic Train Protection system, (ATP) which transmits way-side information to computers on each tram. The ATP system's primary function is to enforce the wayside signaling . Should a driver ignore a "Stop" signal, then the ATP system will intervene and bring the tram to a standstill. The ATP has a secondary function of actively governing the speed of a tram should a driver ignore the set speed limit.

Stops

There are fourteen MLR stops in total. Three are in the street running section (Central, Capitol Square and Haymarket) and the others are located throughout the ROW in areas to best service the public.



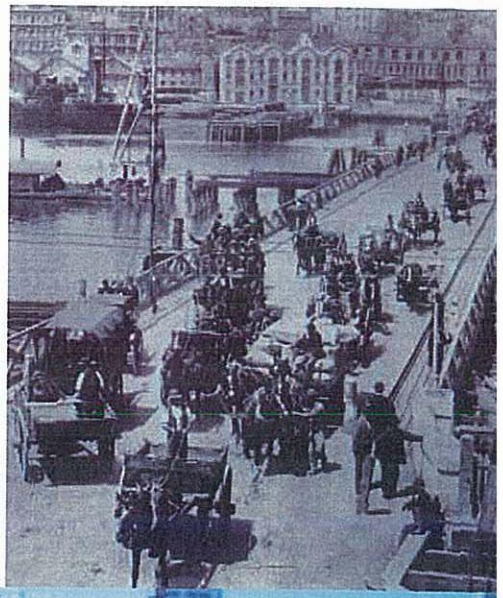
Each stop is covered with Closed Circuit Television Camera (CCTV) technology for passenger security.

Communication between the Operations Control Centre and the stops is via a fibre optic cable, which carries all voice communication, CCTV pictures and other data.

The stops are designed to offer barrier free access to the light rail system, and have special tactile tiles to assist the visually impaired.

The Crossing of Pyrmont Bridge

One of the unique features of Sydney's Metro Monorail system is that the track passes over the historic Pyrmont Bridge, the track structure utilising the unique span feature of the bridge which has been restored to its 19th Century splendor as part of the Darling Harbour redevelopment.



THEN... *Pyrmont bridge in the early 1900's.*
NOW... *Pyrmont bridge today with the Metro Monorail system.*

The central pivoting section of the bridge is still operable to allow the passage of vessels into and out of the section of Darling Harbour south of the bridge. For the passage of small vessels up to 15m mast height, the monorail track remains unbroken by the provision of a specially designed pivot column located in the centre of the bridge swing span.

For the passage of larger vessels the monorail track swings with the bridge swing span, thus temporarily interrupting the service.

An interlocking system is provided within the control system which closes and stops all monorails into stations, isolating power from the monorail track and unlocking the swinging section of the monorail beam.

The Company

Metro Monorail is owned by Metro Transport Sydney. Metro Transport Sydney is a privately owned Australian company, with three main shareholders, Utilities Trust of Australia and Australian Infrastructure Fund managed by Hastings and Colonial First State Investments. The Monorail is operated by Connex.

Maintenance and Storage

This facility is situated in Pyrmont between Convention and Haymarket monorail stations.

A traverser system is fitted to move monorails in and out of the main circuit, the traverser being able to align with five storage tracks, a monorail washing track, and tracks for maintenance and inspection.

Full work shops and the central control room are located in this complex.

The maintenance track is specially designed to allow the monorail to be run up and supported on the upthrust rollers, so allowing access to the drive bogies for maintenance purposes.

The traverser is in fact, a double traverser: the working traverser described above delivers and retrieves the monorails from storage, and the through traverser maintains the main track allowing uninterrupted service.

Interlocking is provided to prevent a second monorail from entering the section incorporating the traverser until the traverser sequence is complete and all safety checks are satisfied.

System of Operations

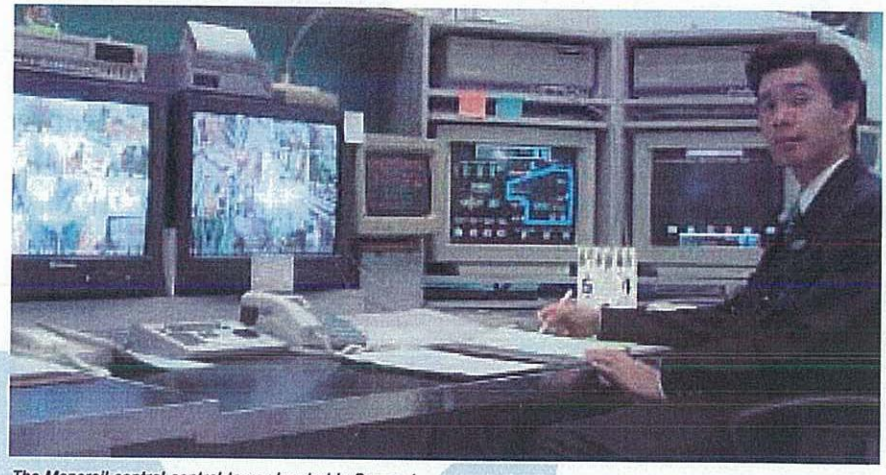
As trains are semi-automatic, the decisions regulating the normal safe operation of each train are carried out by micro-processor based control system in the front car of each train.

Unlike remote controlled craft, which are directly instructed by an operator, the monorail trains receive system status data which permits them to proceed as automatically programmed if safe operating conditions exist.

The trains also have control panels which allow manual guidance of the trains when placing into operation or during service maintenance.

Under semi automatic control, the fail safe needs of the Monorail system require that every level of information collection, processing and communication is either duplicated or simultaneously checked by separate systems to ensure that safety is never compromised.

At the central control room two main computers are linked in a master/standby relationship. Either machine may be started as master and while operating, the standby stays in a back-up mode, its data base being regularly replenished by the master to ensure that it remains conversant with system conditions and is able to assume full command within seconds, should any failure occur in the master computer.



The Monorail central control tower located in Pyrmont.

Each Monorail unit is able to carry out its own automatic control of speed, acceleration and deceleration and can also monitor and control its safety systems.

The equipment fitted consists of a series of computers and an autopilot controller. The two systems work together providing checks on each other and are fitted with standby systems in the event of failure of the working system.

The computer system comprises a main unit built into the nose cone which determines the Monorail position by means of pulse counters. The system resets to zero at every station and is supplied with power from onboard batteries.

Information on position is relayed to the central control room which in turn relays this information to other units on the loop so that each Monorail is aware of its relative position.

Further control computers are fitted to each carriage in the Monorail unit to monitor and control drive motors, doors, lights and other systems. The main computer is preprogrammed with complete information on the position/distance/speed relationships of the loop.

The autopilot controller uses a control rail cut at intervals and joined by diodes to determine the Monorail position by measuring the number of diode voltage drops between it and the unit in front.

The autopilot can then regulate speed accordingly. Diode failure can be detected by the autopilot and in the event of a short circuit diode failures are detected by a station–to–station check circuit.

Speed is monitored from a pulse generator fitted on the non-drive bogies at the front and rear of the Monorail. Information is relayed back to the central control room. The autopilot will override the computer speed control if reference signals from the nondrive bogies indicate speed beyond tolerance.

Construction and Design of a Pollution Free System.

Construction of the Monorail generated 500 jobs, with about 200 permanent employees needed to fill operations, maintenance and clerical positions.

The comfort of passengers has dictated the use of wide doorways and large tinted anti-glare windows. All the stations have elevator access, allowing those disabled in wheelchairs unimpeded access to the system. The train floor level is self adjusting according to load by means of an automatic suspension system allowing the train floor to always align with the platform level.

Quiet, pollution free electric motors propel the Monorail along the continuously welded track and, in order to further reduce noise, rubber wheels have been used for the drive wheels of the trains. The track has been fitted with expansion joints specially designed with sliding steel components to maintain a continuous smooth running surface.

metro Monorail

about Metro Monorail

History of the Monorail

The Metro Monorail came into being to move millions of visitors and Sydneysiders in and out of the 50-hectare Darling Harbour site, while linking up with existing public transport – trains, ferries and buses – at key locations in the central business district.

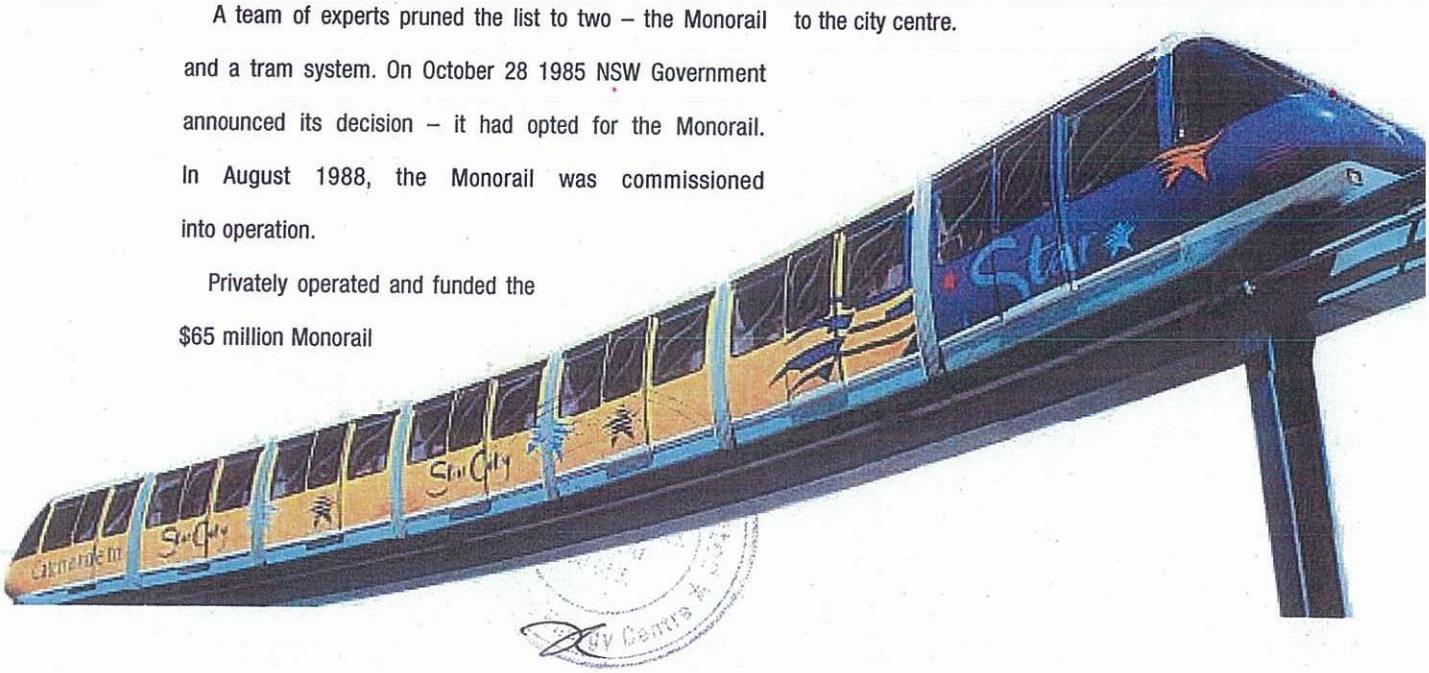
In 1984 the Darling Harbour Authority called for proposals. It received over 20 expressions of interest, among them several Monorail schemes, some operating on a track, others suspended.

A team of experts pruned the list to two – the Monorail and a tram system. On October 28 1985 NSW Government announced its decision – it had opted for the Monorail. In August 1988, the Monorail was commissioned into operation.

Privately operated and funded the $65 million Monorail gives Sydneysiders and visitors a swift and scenic ride to the numerous attractions of Darling Harbour and moves them through the retail heart of the city in style and comfort.

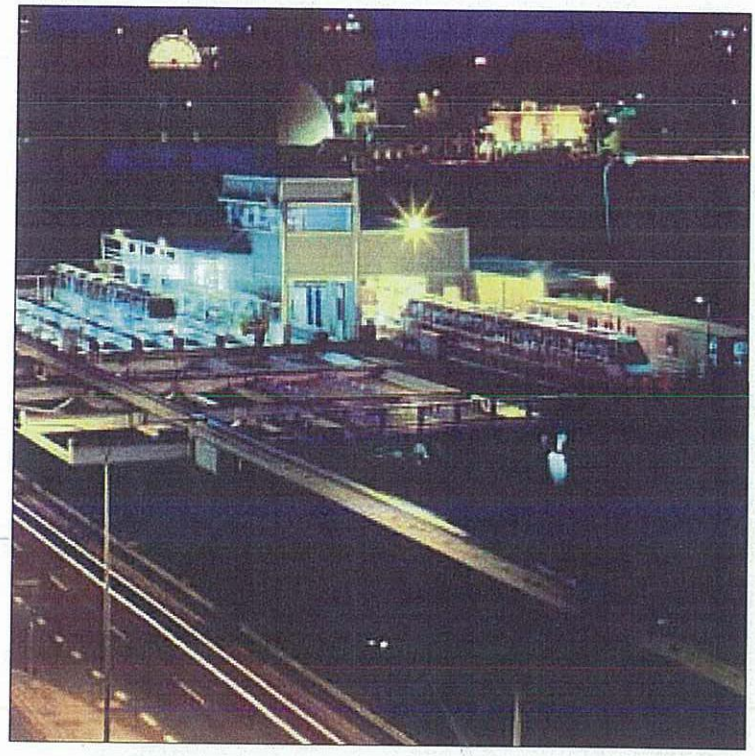
It is the ideal mode of transport to access the shops and restaurants of Harbourside, Australian National Maritime Museum, Powerhouse Museum, Queen Victoria Building, Entertainment Centre, Chinatown and Pitt St Mall.

For residents of the Pyrmont and Ultimo precinct, the Monorail provides a convenient transport link to the city centre.



Technical Details

and all that stuff...



ROLLING STOCK

Number of cars per vehicle	7
Total length of vehicle	32.12 metres
Overall width of vehicle	2.06 metres
Overall height of vehicle	2.6 metres
Height of door entrance	2 metres
Length of front and end carriage	5.55 metres
Length of middle carriages	4.12 metres
Vehicle maximum capacity	170 passengers approx.
Maximum seated per vehicle	56 passengers
Maximum monorail speed	9.2 metres per second (33 kph)
Number of drive units per monorail	6 (located between carriages)
Number of bogies	Total 8 (6 drive bogies and 2 lazy bogies) Each bogie is equipped with 2 riding wheels, 4 side thrust and 4 up-thrust wheels. The riding wheels are special 750mm diameter heavy duty pneumatic tyres fitted with patented flat tyre protection rim.
On board security/communication	Full audio communication from each carriage to control room

SYSTEM OPERATIONS

Number of monorails	6
Maximum number of circuits per hour	4
Average headway time (6 trains in service)	1.98 minutes
Number of stations	8
Platform length	27 metres

TRACK

Rail type	Box girder fabricated steel
Rail size	832mm x 700mm (height x width) 940mm top flange
Spans	30m on straights (nominal)
Support columns	690 x 125 UB (typical) rolled steel (i.e. 690mm flange to flange, 250mm wide, Universal Beam section weighing 125kg/m)
Minimum radious of curves	20m (reduced speed 5m/sec)
Maximum gradients	4.5% up 6.5% down

MAINTENANCE

Facilities	Include vehicle storage washing and cleaning, full maintenance facilties (including pit) and control room.
Number of traversers	1 with 2 beams to install and remove monorails from service.

POWER

Power supply	525 V AC 3 wire/50 Hertz
Number of feeding units	8
Number of conductor rails	2 + 1 earth using up-thrust collectors.

For any further enquires please contact us via:

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Bus and Paratransit Conference, APTA, May 5-9, 2002, Minneapolis

Paper title:

Presentation of two innovative bus rapid transit systems in Rouen, France, and Bogota, Colombia, and the key role of the operator in the design of system and organization of operation.

Name:

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Fax: + 33 1 46 69 35 68
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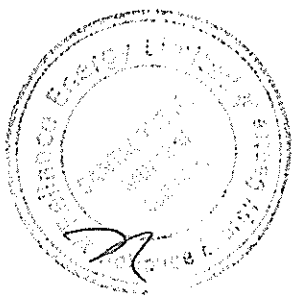
Paper abstract:

"It's a bus! It's a train! It's a BRT!"...This paper presents two innovative bus rapid transit systems (BRT) to highlight their diversity and versatility. Both TEOR In both schemes, the public transportation operators have played a key role together with the local authorities in providing their technical know-how for BRT route alignment, bus routes restructuring, choice of technology, service planning and integration with other modes, design of infrastructure, vehicles and equipment, definition of operating and maintenance rules, marketing of the new services, monitoring of service quality and commitments to increase ridership. By developing partnerships with the public authorities and providing assistance in the system design and operation organization, the operators have made a valuable contribution to smooth operation, service quality and commercial success of the new BRT system. (Transport Est Ouest Rouennais) in Rouen, France, and Transmilenio (Transporte Tercer Milenio) in Bogota, Colombia, are representative of the wide range of possibilities offered by BRT to provide for a cost-effective alternative to light rail transit systems (LRT), improve service quality, attract new clients and contribute to the improvement of the urban environment.

TEOR consists of 40 high-tech and partially-guided articulated vehicles circulating in two routes of 11 miles in some densely-populated areas of Rouen. With 3-mn headways at peak hour on the main section, it offers a capacity of 2,400 passengers per hour and direction. TEOR has contributed to the consolidation of public transportation demand and urban regeneration in the corridors served.

Transmilenio consists of 470 articulated buses, circulating in a 23-mile-long network of exclusive lanes. Ridership is 660,000 passengers per day, with headways of 16 s and a capacity of 36,000 passengers per hour and direction at peak hours in the main network section. With a capacity similar to a mass rail transit system (MRT), Transmilenio has completely revamped the organization of public transportation and the quality of urban environment in Bogota.

In both schemes, the public transportation operators have played a key role together with the local authorities in providing their technical know-how for BRT route alignment, bus routes restructuring, choice of technology, service planning and integration with other modes, design of infrastructure, vehicles and equipment, definition of operating and maintenance rules, marketing of the new services, monitoring of service quality and commitments to increase ridership. By developing partnerships with the public authorities and providing assistance in the system design and operation organization, the operators have made a valuable contribution to smooth operation, service quality and commercial success of the new BRT system.



Substantive paper:

1- INTRODUCTION

In Europe, and particularly France, the use of public transportation measured in modal share is much higher than in the USA due to cities with higher population density and less capacity of road infrastructure that constraint the use of the private car. As a result, BRT systems have experienced a strong development since the 90's, with currently systems in operation in 13 cities, 8 new systems to start operation by the end of 2002, and dozens of projects in the longer term in the Paris area and other cities in France. Similarly, there are various systems in operation and projects in development in other European countries especially Germany and the United Kingdom. There are also systems in operation in South America, in Brasil (Porto Alegre, Sao Paulo, Curitiba), Ecuador (Lima) and Colombia (Transmilenio in Bogota) and in Asia, in particular in Nagoya, Japan, and Kunming, China.

Since BRT projects are starting to mushroom in the USA, with some 18 projects registered by the FTA, this paper proposes to draw lessons from other countries and to present two innovative BRT systems to highlight their diversity and versatility. Both TEOR in Rouen, France, and Transmilenio in Bogota, Colombia, are representative of the wide range of possibilities offered by BRT to provide for a cost-effective alternative to light rail transit systems (LRT), improve service quality, attract new clients and contribute to the improvement of the urban environment.

2- PRESENTATION OF TEOR IN ROUEN

History of TEOR

The Rouen conurbation is located 75 miles west of Paris and is home to 390,000 inhabitants.

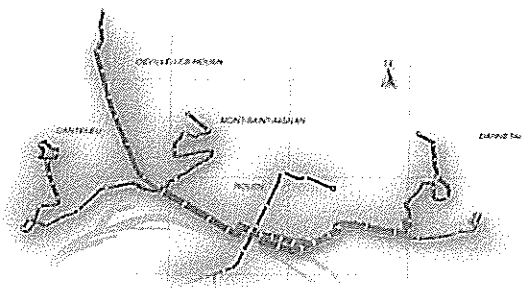
Public transportation services are organized by the public agency Community of Rouen Conurbation and services have been provided by private company TCAR, a subsidiary of international group Connex, since 1976. Public transportation modal share is 13.3 % of total motorized trips corresponding to 38.4 million trips per year. TCAR operates 36 lines of buses (212 buses), one two-branch line of LRT (28 tramways vehicles), and two lines of BRT named TEOR (40 Agora and Civis vehicles) since end of 2001.

The 9.4-mile-long line of tramway with two branches named Metrobus opened in 1994 and 1997 (second branch), serving the south-north corridor of the urban area. Following the introduction of the LRT, level of service has increased by 13.5% (measured in vehicle x miles), compared to an increase in the number of trips of 51.4 % and increase in revenues of 53.3%. Based on this commercial success, the public agency Community of Rouen Conurbation decided in 1997 to extend the development of the public transportation infrastructure with a BRT system serving the east-west corridor. This system has started operation in 2001 under the name of TEOR.

Description of TEOR

TEOR consists today of two lines (three by end of this year) of 11 miles and 35 stops (41 stops by end of this year), replacing partly former bus routes, although some TEOR sections have been created from scratch, equipped with 38 Agora articulated buses and 2 Civis vehicles (plus 55 to be delivered between 2002 and 2006), all equipped with an optical guiding system.

Figure 1: Map of TEOR routes



TEOR operates with 3-mn headways on the common section at peak hours (6-mn on each branch), offering a capacity of 2,400 passengers per hour and direction (1,200 on each branch). Commercial speed is 10.1 miles per hour.

The 38 Agora articulated buses are low-floor, equipped with a clean diesel engine fitted with particle filters, catalytic converters and using de-sulphurised diesel. The Civis vehicles are 100% low-floor new generation vehicles equipped with four electric wheel motors fed by a clean diesel powered generator (hybrid diesel-electric propulsion). All Agora and Civis vehicles are equipped with an optical guiding system enabling docking of platform at stops, and with an on-board system to give priority at traffic lights.

Figure 2: Civis vehicle

Figure 3: interior of Civis vehicle

TEOR is operated in three types of segregated right of way: separate lane, bus lane, and mixed traffic. Visual recognition of TEOR infrastructure is through its colour (red) and specific signals and passenger information.

Figure 4: TEOR stop and exclusive lane used in both directions

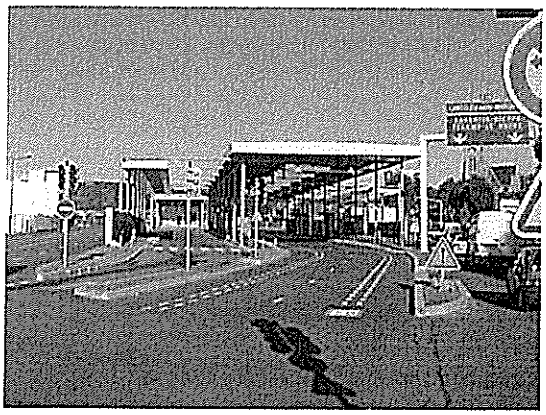
Stops have low platforms. Low-floor vehicle and guiding system to dock the platform make it possible for mobility-impaired passengers, wheel-chairs and baby buggies to access the vehicle without step. All stops are equipped with video and audio information system and ticket vending machines.

Figure 5: TEOR stop and exclusive lane in the centre of the road

The implementation of TEOR has been carried out with a restructuring of the bus lines in the corridor, avoiding competition between lines and promoting integration between lines and modes. An interchange stop linking the two TEOR lines and five bus lines has been built at the end of Mont Riboudet Avenue, this terminal also comprises a multi-storey

car park with provision for 1,000 cars, designed to encourage traffic not to enter the centre of Rouen.

Figure 6: interchange stop with fixed-routes buses and park-and-ride facility



Role of public transportation operator

The public transportation operator TCAR has been a major player in the design and implementation of the TEOR project, undertaken in partnership with the public agency Community of Rouen Conurbation, especially in the following areas:

Bus route restructuring:

While the BRT routes have been selected by the public agency, TCAR has provided comprehensive assistance to design the bus route restructuring attached to the project. The operator has used its in-house transportation demand model covering the all urban area and simulating the impact of changes in the provision of public transportation services on demand, to test various scenarios of restructuring and make some recommendations on the best solution. TCAR and the public agency have worked together to locate and design interchange stops between bus, tramway and BRT lines, and park-and-ride facilities. The operator has also designed the bus route restructuring plan during the BRT construction period which has been validated by the public agency.

BRT vehicle selection:

The operator has been working closely with the public agency and its team of consulting engineers to draft the specifications of the tender documents and to evaluate the proposals. It has brought its know-how regarding technical specifications of vehicles, and design for smooth operation and passenger attractiveness.

Training and safety:

TCAR has designed a special training program for drivers of TEOR, and has follow-up with constructors and public agency on all issues related to vehicle and operation safety.

Service scheduling:

The operator has carried out all run cuttings and bus blocks for both the BRT system and the restructuring of the bus lines, based on requirements provided by the public agency which has been responsible for validating final operating plan and timetables.

System commissioning:

TCAR is playing an important role in the current process of getting legal approval for commercial operation of the Civis vehicles. It is participating in the testing of all the system components with the constructors and consulting engineers, especially regarding rolling stock, optical guiding system, guiding marks on the pavement and docking of the stops. Commercial operation of the first Civis vehicle started in February 2002, being the very first vehicle of this type in operation in the world.

Daily operation:

Finally, the operator has been responsible for the integration of the BRT services with the other bus and LRT services (operation, sales and marketing), TCAR being in charge of daily operation and maintenance of vehicles. It also manages the traffic light priority system and the operation control centre housing the systems of track and line management of buses, LRT and TEOR, including security and safety equipment, the SAE (operation

assistance system), the passenger information system. CAR is also providing assistance to the public agency for management of the relationship with the inhabitants living in the project neighbourhood, delivering general information and technical back-up.

3- PRESENTATION OF TRANSMILENIO IN BOGOTA

History of Transmilenio

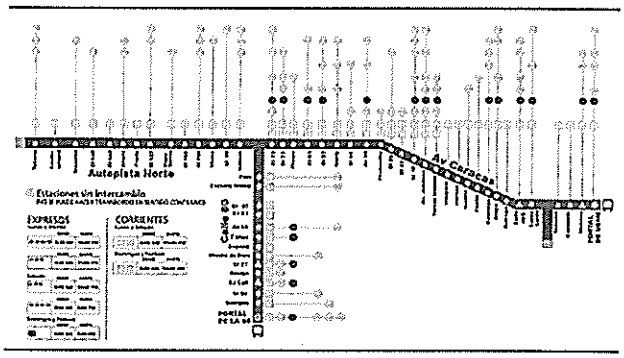
Santa Fé de Bogotá is a the capital of Colombia and has a population of 7 million. Public transport modal share is 78 % of motorized trips accounting for 8.6 million trips per working day. In Avenida Caracas, the major public transportation corridor, traffic amounts to some 36,000 bus passengers per hour and direction at morning peak. Before Transmilenio, provision of public transportation services was performed by some 21,000 buses of different types and often operated by the owner or rather small companies in a quite disorganized manner: low commercial speed (average of 8.7 miles/hour), long routes (average in the range of 18 to 22 miles), some routes operated without permits, route alignment and service frequencies not enforced, and no proper bus stops. The former system had two main advantages though: a cheap price ($ 0.25 per trip) and a good origin-destination coverage (69% of bus passengers travelling with one bus only, 25 % with one transfer only).

The city had plans to implement a high-capacity transportation system since the beginning of the 1980's as an attempt to cope with the public transportation demand. Various studies of LRT, metro and trains were carried out but no project came through, mainly for the lack of public financing. In 1998, decision was made by the Municipality to implement a less expensive and easier to construct BRT project named Transmilenio, managed and developed by a public agency depending of the City Hall and also named Transmilenio. In 1999, studies were launched to carry out the planning and detailed design of Transmilenio made of a network of seven routes covering the main areas of the city. In 2000, construction work was launched and in December 2000 the opening of the first 9.3-mile-long section of the system took place. This achievement was made possible by the choice of a rather light infrastructure of bus exclusive rights-of-way which required important road construction works but no underground or elevated civil engineering.

Description of Transmilenio

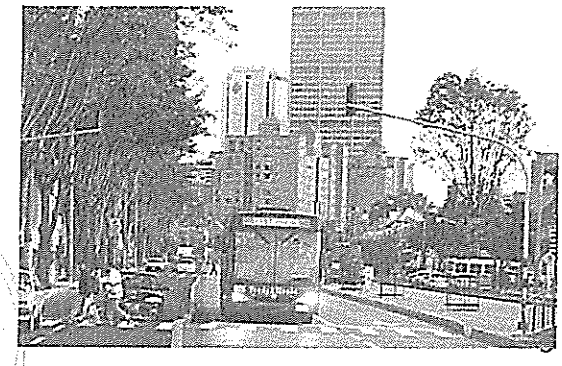
Transmilenio consists of 470 articulated buses, circulating in a 23-mile-long network of three routes made of two exclusive lanes in each direction. With headways of 16 s and a capacity of 36,000 passengers per hour and direction at peak hours in the main network section, Transmilenio has a capacity similar to a MRT. There are two types of services, express and omnibus, with an average commercial speed of 16.2 miles per hour.

Figure 7: map of Transmilenio routes and services



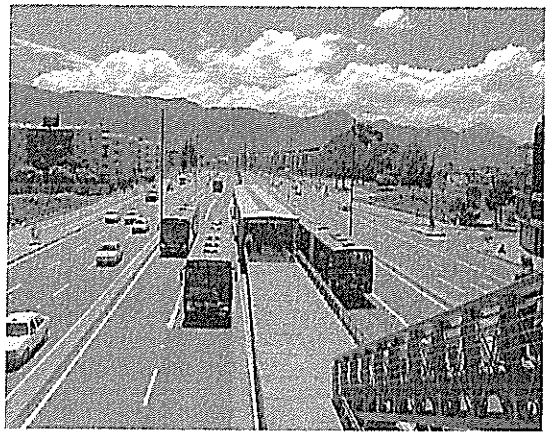
All buses are articulated 59-feet-long with a maximum capacity of 160 passengers.

Figure 8: Transmilenio articulated bus in Avenida Caracas main section etwork



Infrastructure consists of segregated lanes, two lanes in each direction in most sections, located in the centre of the road and separated from the car lanes by a low concrete wall. Buses are entirely segregated from other road traffic except at junctions.

Figure 9: Transmilenio buses at station viewed from pedestrian bridge



Access to stations is at grade at traffic junctions in the city centre and by pedestrian bridges in other areas.

Stations are closed to avoid fraud and entrance is through ticket-validation gates at both extremities. Stations have different size, depending on location and passenger traffic, and can accommodate between 1 and 3 buses in each direction. Buses have a 35-feet-high floor, and station platforms are at the same level, enabling access from station platform to bus without a step. All platforms are equipped with sliding doors opening only when the bus has docked.

Figure 10: entrance of Transmilenio station providing access to mobility-impaired passengers

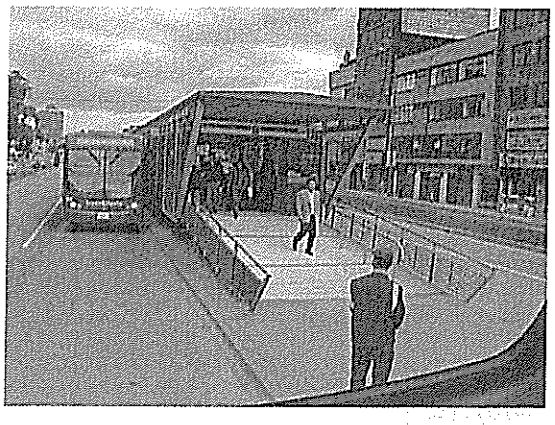
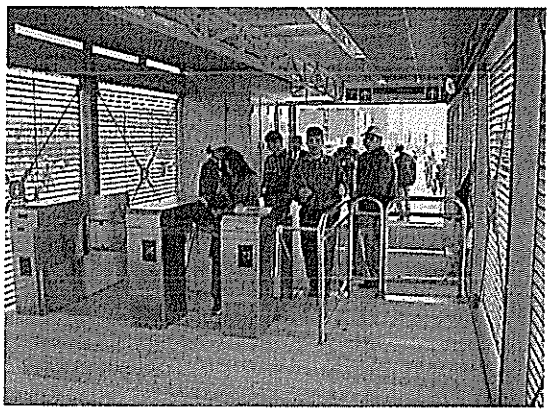


Figure 11: Transmilenio high-floor buses and platforms enable step-less passenger boarding

Ticketing system consists of contactless card for 1, 2 or 10 trips, sold at both station extremities. Tickets are validated when passing through the station gates at entrance and exit, avoiding fare evasion and enabling to register all trips origin-destination pairs.

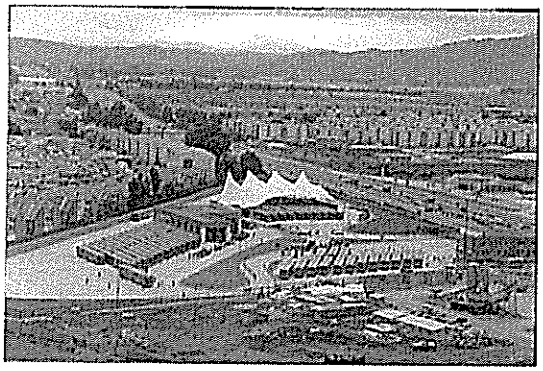
Figure 12: ticket gates at entrance of Transmilenio station



There are networks of bus feeders connecting to Transmilenio at terminal and some intermediate stations. There is an integrated ticket for both feeder buses and Transmilenio costing $ 0.40 (flat fare), which is rather cheap, given that transfer is free.

Each of the four operators has his own garage where buses are parked and maintained, and located at a terminal station.

Figure 13: Transmilenio garage, next to the Calle 80 terminal station



Transmilenio ridership is of 660,000 passengers per working day (including 180,000 combining feeder buses and Transmilenio). Transmilenio has been extremely well received by the public and turns out to be a tremendous commercial success, so that public authorities have decided to extend the Transmilenio system to the whole Bogota urban area. Transmilenio has completely revamped the organization of public transportation and the quality of urban environment in Bogota, providing for a cost-effective alternative to a metro system, improving service quality, attracting new clients and contributing to the improvement of the urban environment.

Role of the Transmilenio operators

While the public authorities financed all the planning of system and design and construction of the infrastructure, the acquisition of buses and operation of the system was contracted out to four different private operators under ten-year contracts with entire commercial risk supported by operators and without any operating subsidy. Passenger revenues are distributed to Transmilenio operators and feeder buses operators through a clearing house in proportion to their mileage,operating cost per mile and number of passengers transported.

Transmilenio operators have played a key role in the smooth operation and commercial success of the system, implementing drastic changes and new methods compared to the organization of public transportation provision before Transmilenio. They have in particular brought a valuable contribution in the following areas:

Structuring of the public transportation business:

The implementation of the Transmilenio system gave way to the creation of four operating companies (one of them being SITM, where Connex is partner with Colombian companies) Companies have been established with robust financial structure that enables financing of vehicle investment, and solid know-how in order to optimize production and deliver quality. The consolidation of the provision of the Transmilenio services has enabled to better organize and "profesionalize" operation compared to the previous situation.

Organization of human resources:

The Transmilenio operators have introduced comprehensive training programmes for drivers and other staff, to ensure operation safety and efficiency.
Working conditions and driving hours have been improved drastically compared to the previous situation which was very stressful for drivers and risky for passengers and other road users.

Bus network restructuring:

The implementation of Transmilenio has required an extensive restructuring of the existing bus routes, which number was of approximately 1,535 (official and unofficial). The bus operators have been consulted during the restructuring process so as to design a restructuring of the routes that would be jointly approved by all parties. This process was eased by the fact that some of the main bus operators who had their routes affected by the Transmilenio system were also partners in the four companies operating Transmilenio.

Bus acquisition:

The Transmilenio operators were given bus technical specifications from Transmilenio public agency. Operators called for tenders to select vehicles from

various bus providers in the Colombian market, and carried out surveys to chose between diesel and natural gas engines. The four operators finally selected diesel engines, which was viewed as more appropriate because of the local operating conditions (lack of experience of natural gas engines in Bogota, plus the fact that the City is located at an altitude of 8,530 feet). Investment has been entirely financed by operators which is paid back by revenues from fare collection.

Service planning:

A steering committee including representatives of operators and Transmilenio public agency enables discussion and approval of the changes in services, the operating plan being up-dated every six months or sooner if necessary. Operators provide assistance to Transmilenio public agency to design the type and level of services, according to passenger demand, and to improve the number of passengers transported per vehicle-mile. This work is carried out based on the passenger origin-destination matrix provided by the ticketing system and the operators' experience on the field.

Software implementation:

The Transmilenio operators have introduced the use of softwares for optimizing run cuttings, bus blocks and driver rostering, when service scheduling was carried out manually previously. This has enabled then to rationalize and optimize production, and to facilitate the interface with the Transmilenio public agency for service scheduling and data exchange.

Daily operation:

The Transmilenio operators have implemented procedures and operating rules for drivers and other operating staff, and for vehicle maintenance, and can monitor the key performance indicators regarding operation and maintenance productivity and quality, making daily operation more efficient.

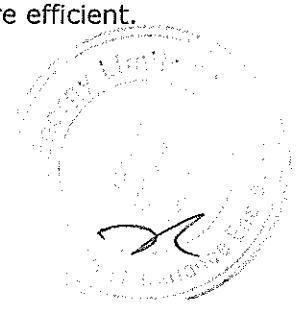
Assistance to public agency:

Finally, the Transmilenio operators provide to the public agency technical assistance on operation-related issues regarding the development of the system (especially on regulation of operation, fare collection and ticketing system, service scheduling and capacity constraints due to very high number of buses and passengers in the system).

4- CONCLUSION

In both schemes, the public transportation operators have played a key role together with the local authorities in providing their technical know-how for BRT route alignment, bus routes restructuring, choice of technology, service planning and integration with other modes, design of infrastructure, vehicles and equipment, definition of operating and maintenance rules, marketing of the new services, monitoring of service quality and commitments to increase ridership. By developing partnerships with the public authorities and providing assistance in the system design and operation organization, the operators have made a valuable contribution to smooth operation, service quality and commercial success of the new BRT system.

This papers tried to show that projects can be improved when the public transportation operators work and plan together with the public agencies in providing their technical know-how for BRT and public transportation planning, design and operation. Operators can also take some commercial risks attached to passenger patronage and revenues, and can participate in the vehicle investment. If each BRT project is specific, they all need for experience, know-how, and innovation, and a partnership including the public authorities and the public transportation operators is desirable to meet the challenge.



List of tables by title and figures by caption:

Endnotes:

List of BRT systems in France:
- 13 cities operating BRT systems in France in January 2002: Besançon, Dijon, Grenoble, Limoges, Lyon, Montpellier, Nancy, Paris, Rennes, Rouen (TEOR), Saint-Denis de la Réunion, Strasbourg, Tours
- 8 cities with BRT systems to start operation by December 2002: Annecy, Brest, Caen, Clermont-Ferrad, Maubeuge, Nice, La Rochelle, Toulon

For more information on TEOR, see website www.tcar.fr

For more information on Transmilenio, see website www.transmilenio.gov.co

Acknowledgements:

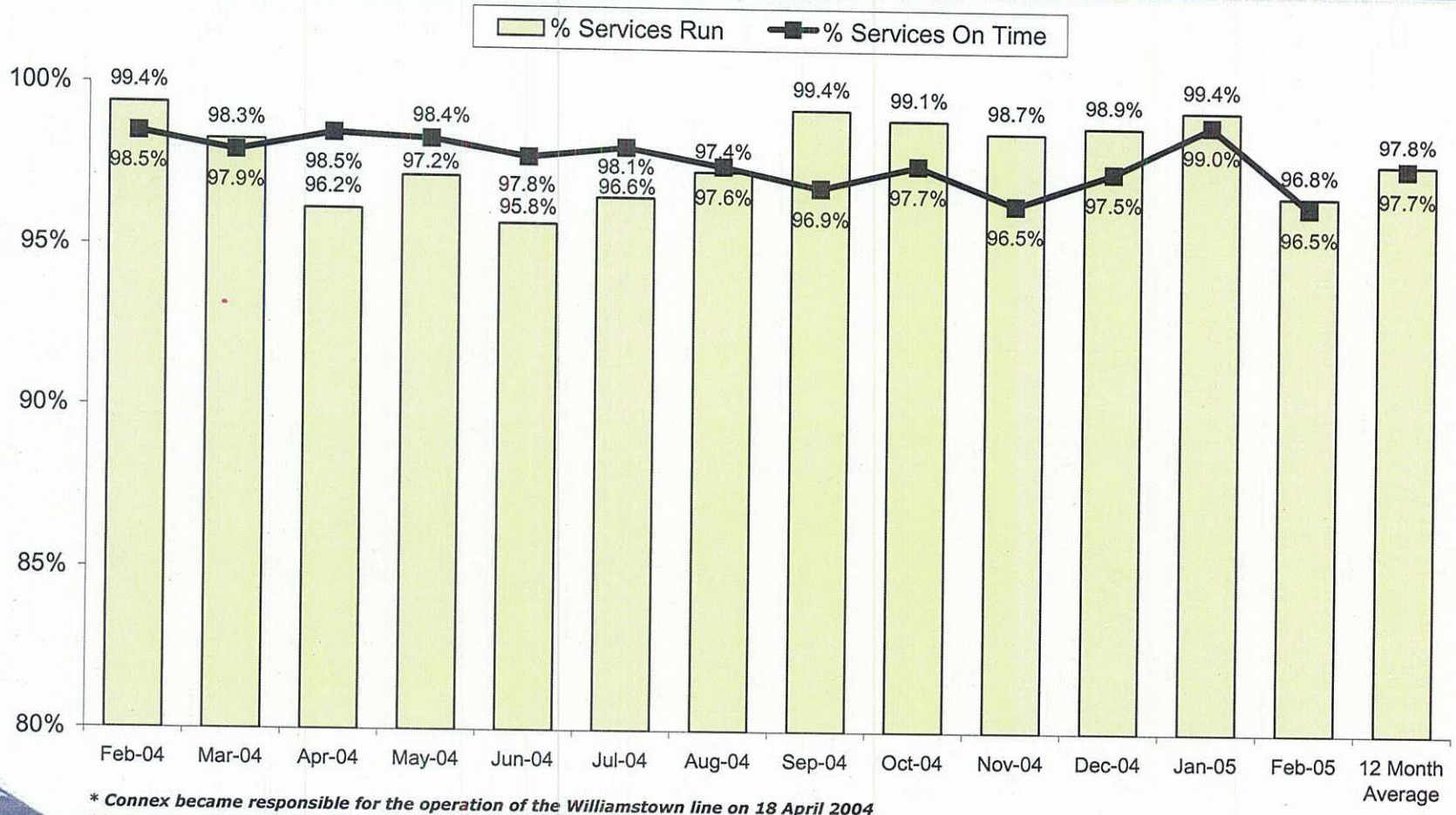
Jacques Raphel, Sébastien Holstein, TCAR (operating company of the entire Rouen public transportation system), Rouen, France.

Gustavo Gomez, Hollman Suarez, SITM (one of the four Transmilenio operating company), Bogota, Colombia.

PERFORMANCE RESULTS

February 2005

Performance results - reliability and punctuality
WILLIAMSTOWN LINE



** Connex became responsible for the operation of the Williamstown line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

Melbourne's Train Service

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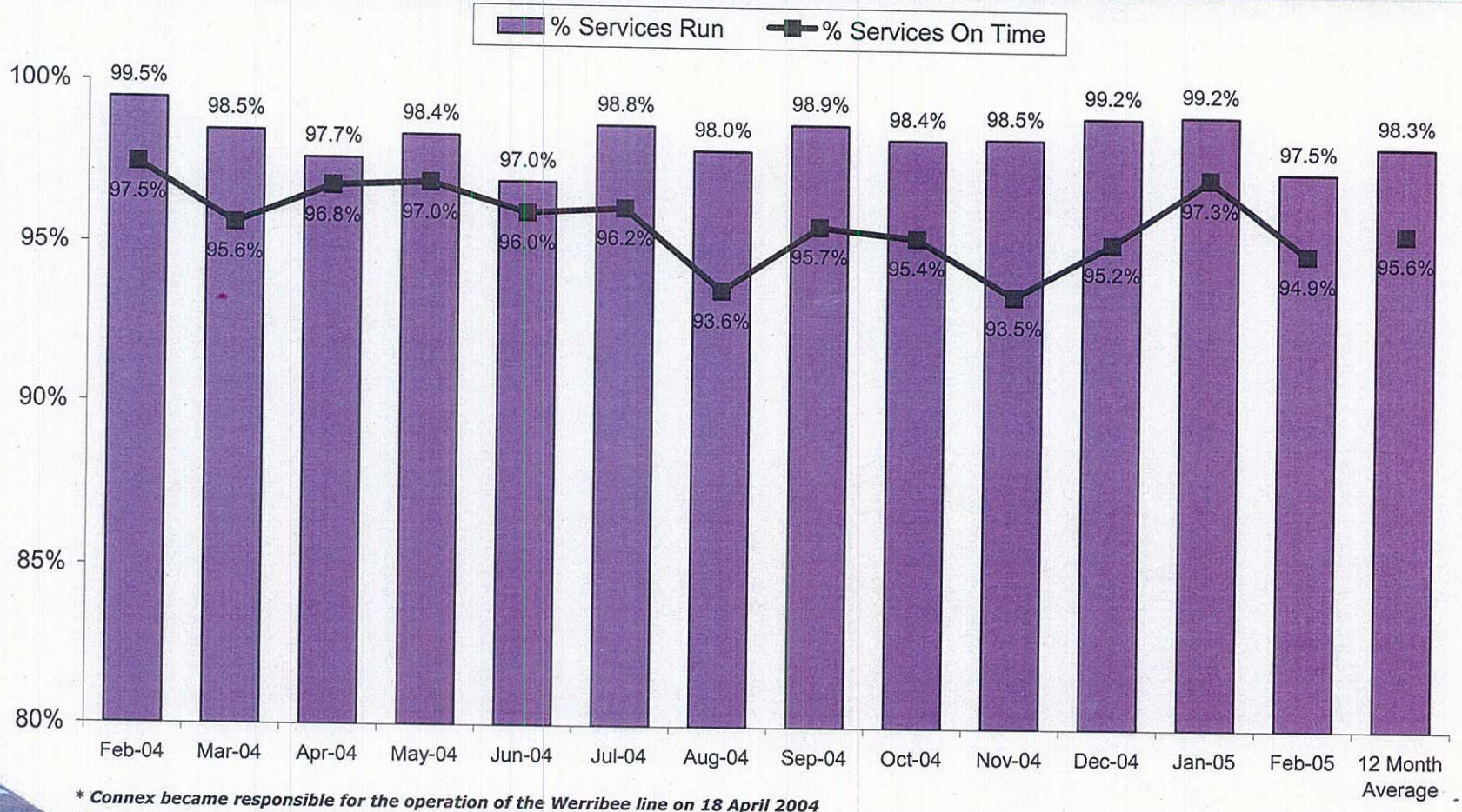
Performance results - reliability and punctuality
WERRIBEE LINE



** Connex became responsible for the operation of the Werribee line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

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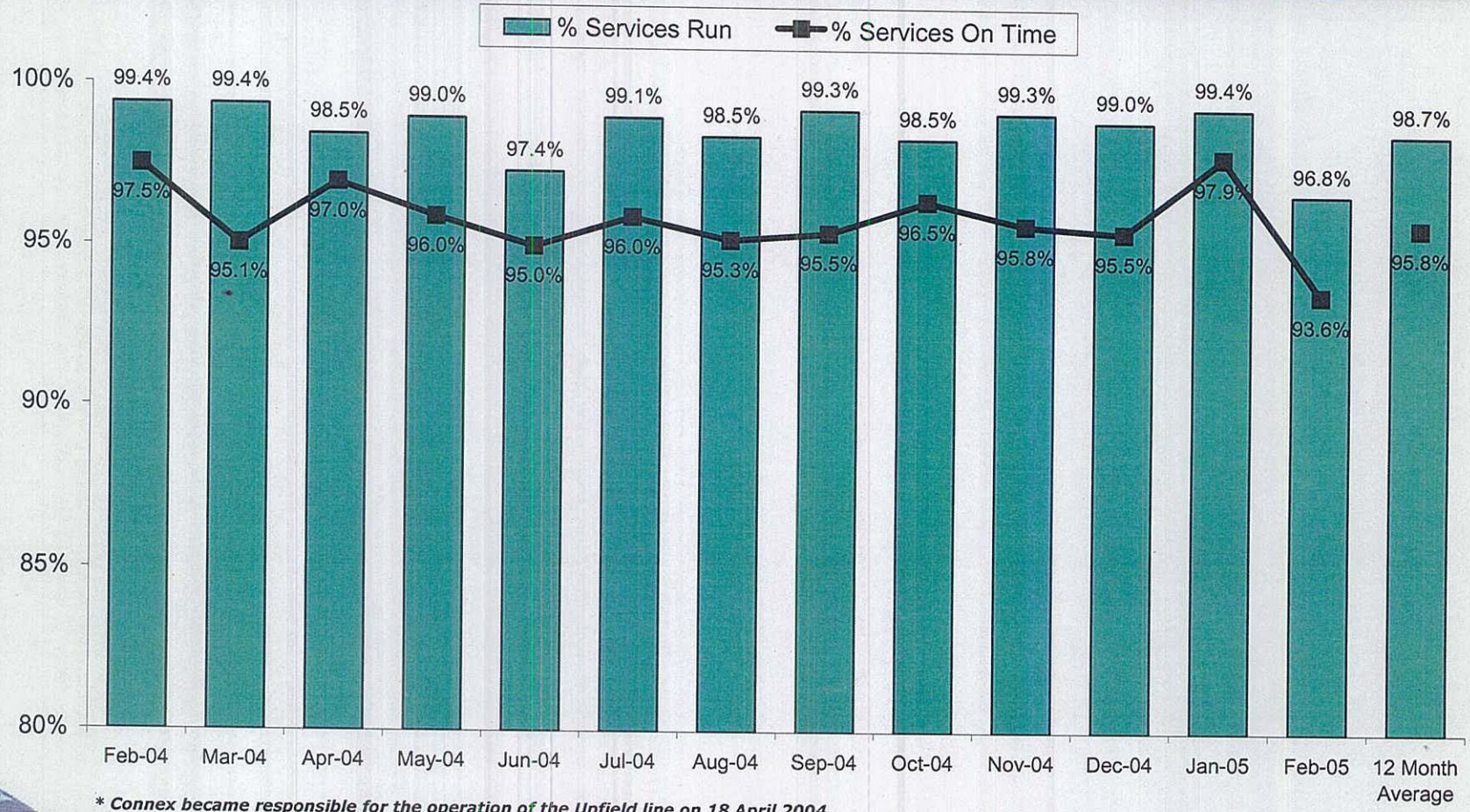
Performance results - reliability and punctuality
UPFIELD LINE



** Connex became responsible for the operation of the Upfield line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

Melbourne's Train Service

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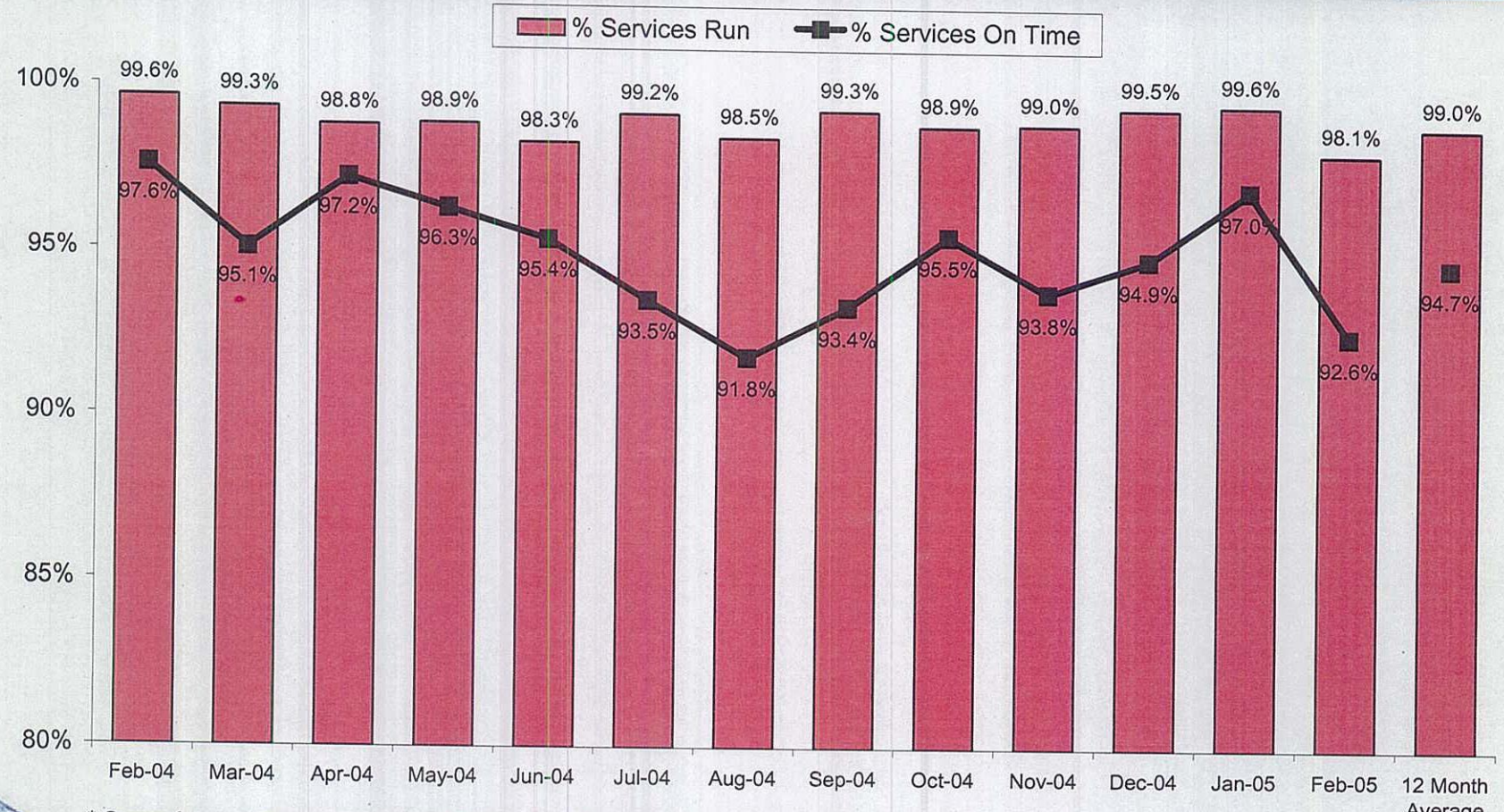
Performance results - reliability and punctuality
SYDENHAM LINE



** Connex became responsible for the operation of the Sydenham line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

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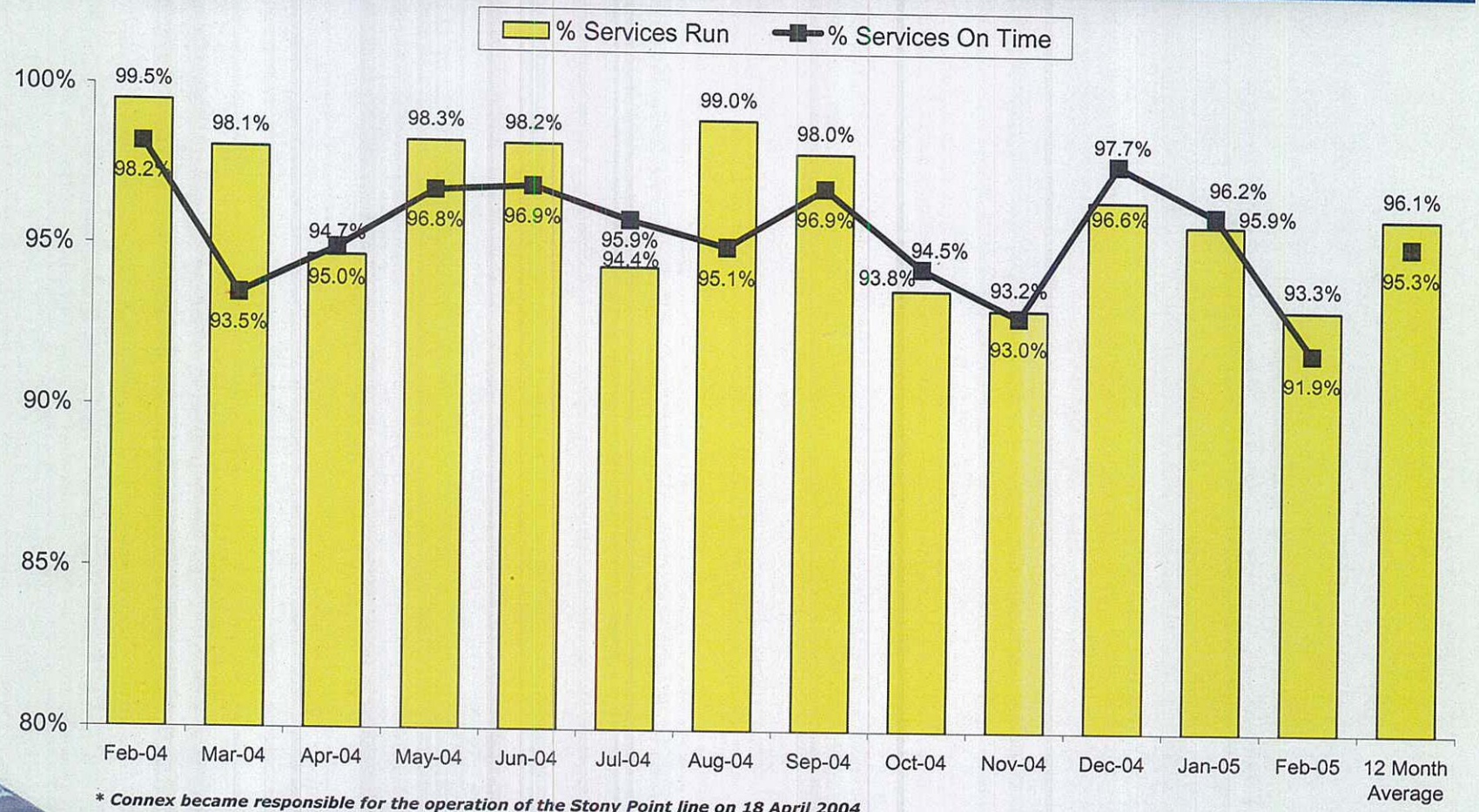
Performance results - reliability and punctuality
STONY POINT LINE



** Connex became responsible for the operation of the Stony Point line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

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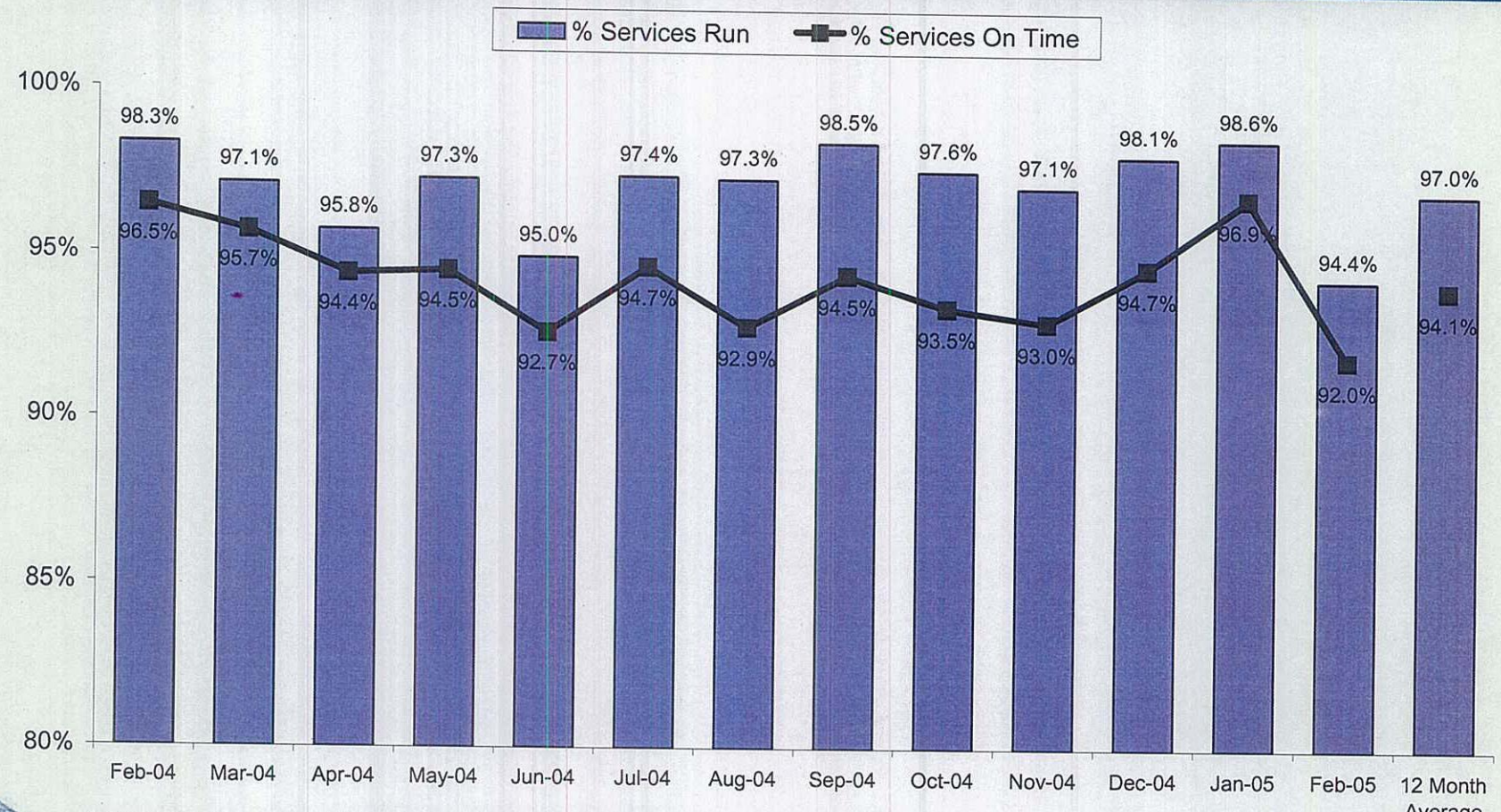
Performance results - reliability and punctuality
SANDRINGHAM LINE



** Connex became responsible for the operation of the Sandringham line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

Melbourne's Train Service

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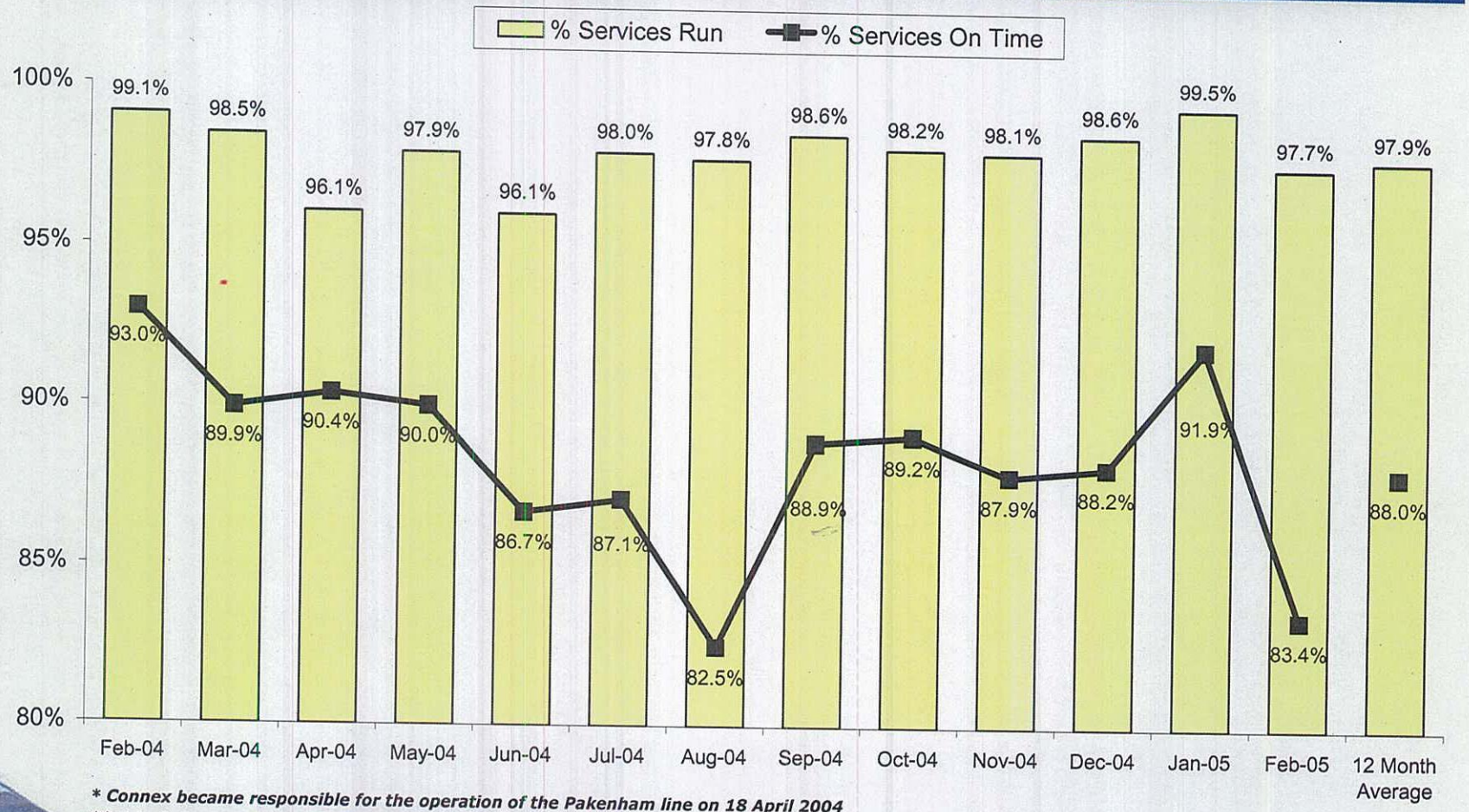
Performance results - reliability and punctuality
PAKENHAM LINE



**** Connex became responsible for the operation of the Pakenham line on 18 April 2004***

***** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable***

Melbourne's Train Service

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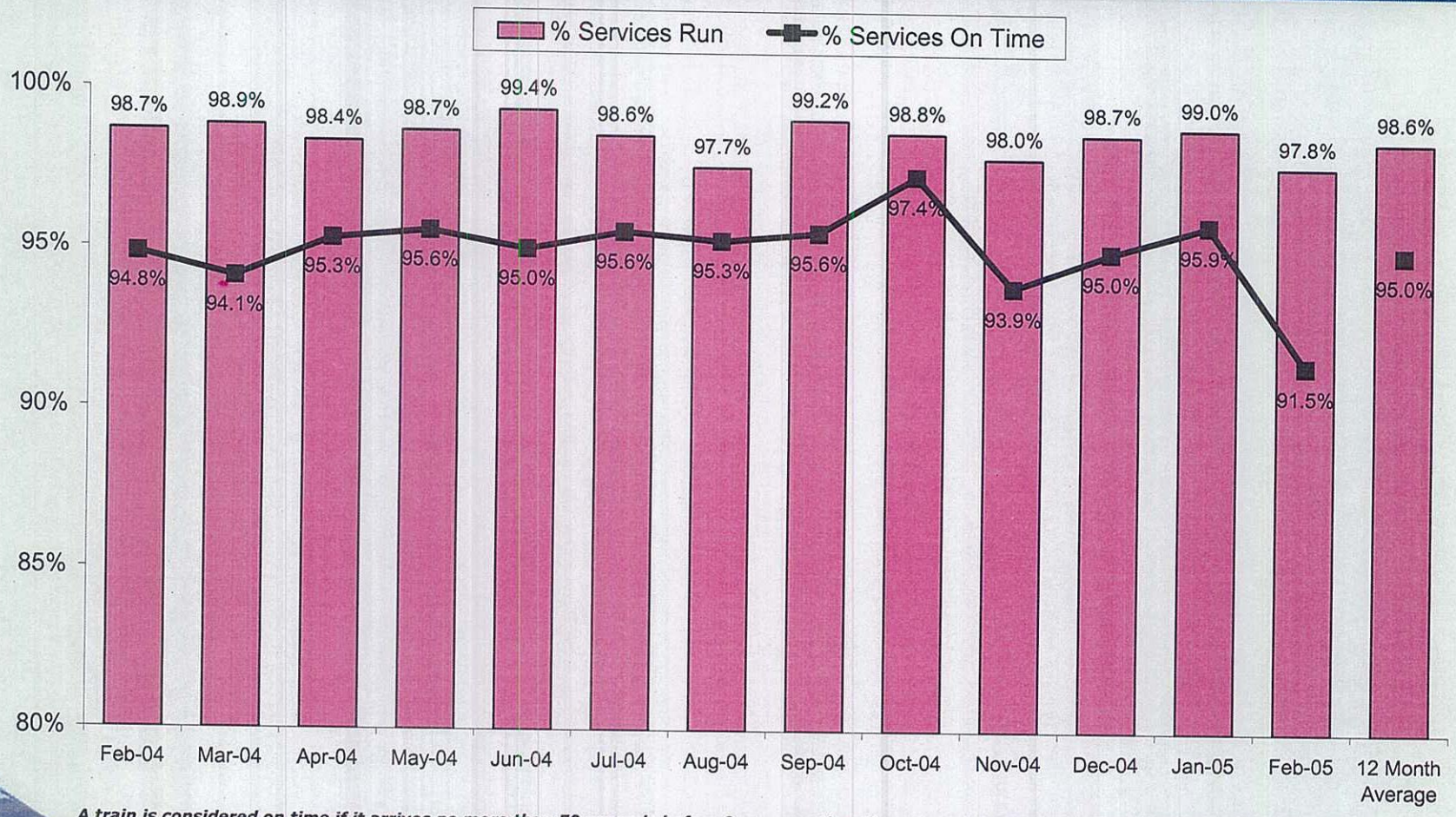
Performance results - reliability and punctuality
LILYDALE LINE



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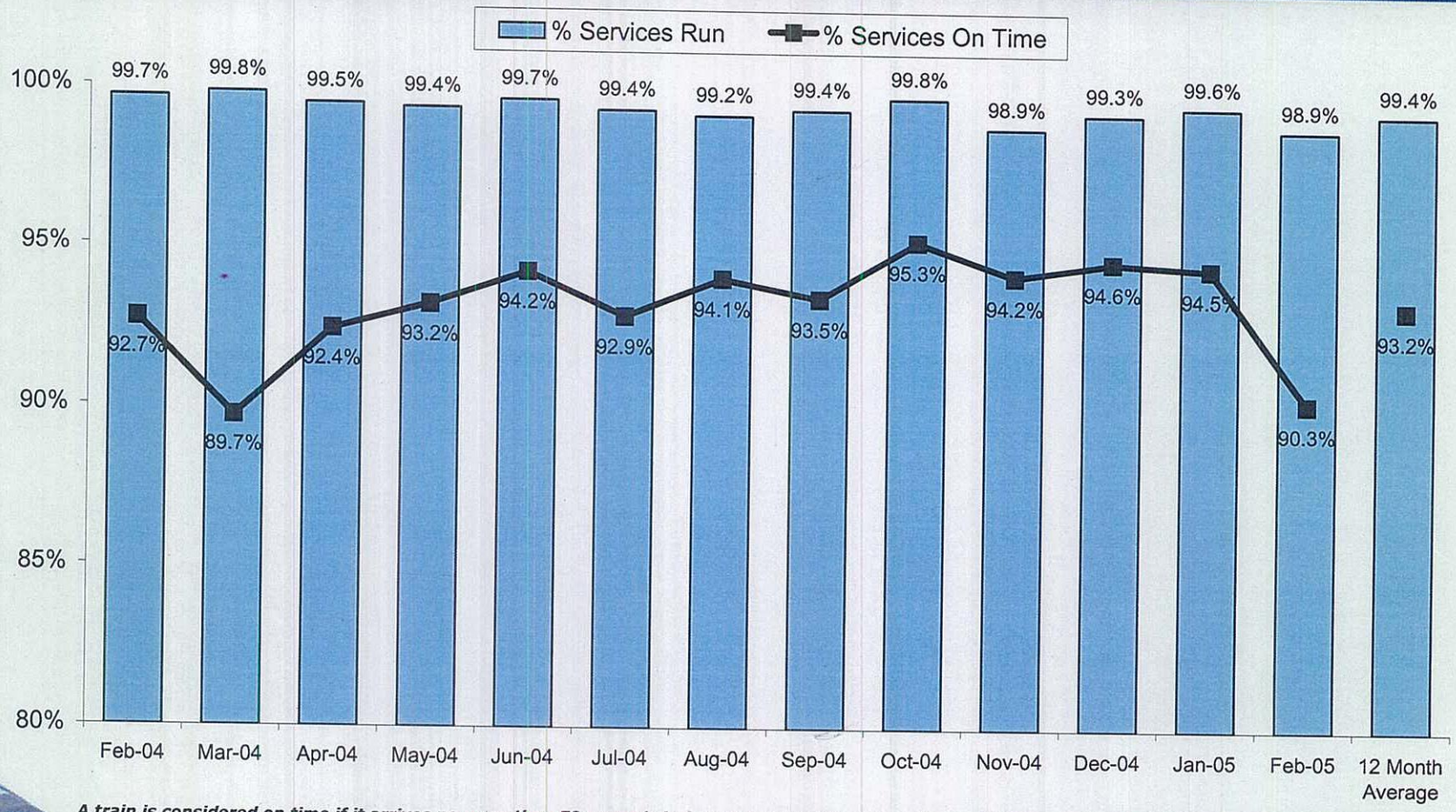
Melbourne's Train Service

connex

Performance results - reliability and punctuality
HURSTBRIDGE LINE



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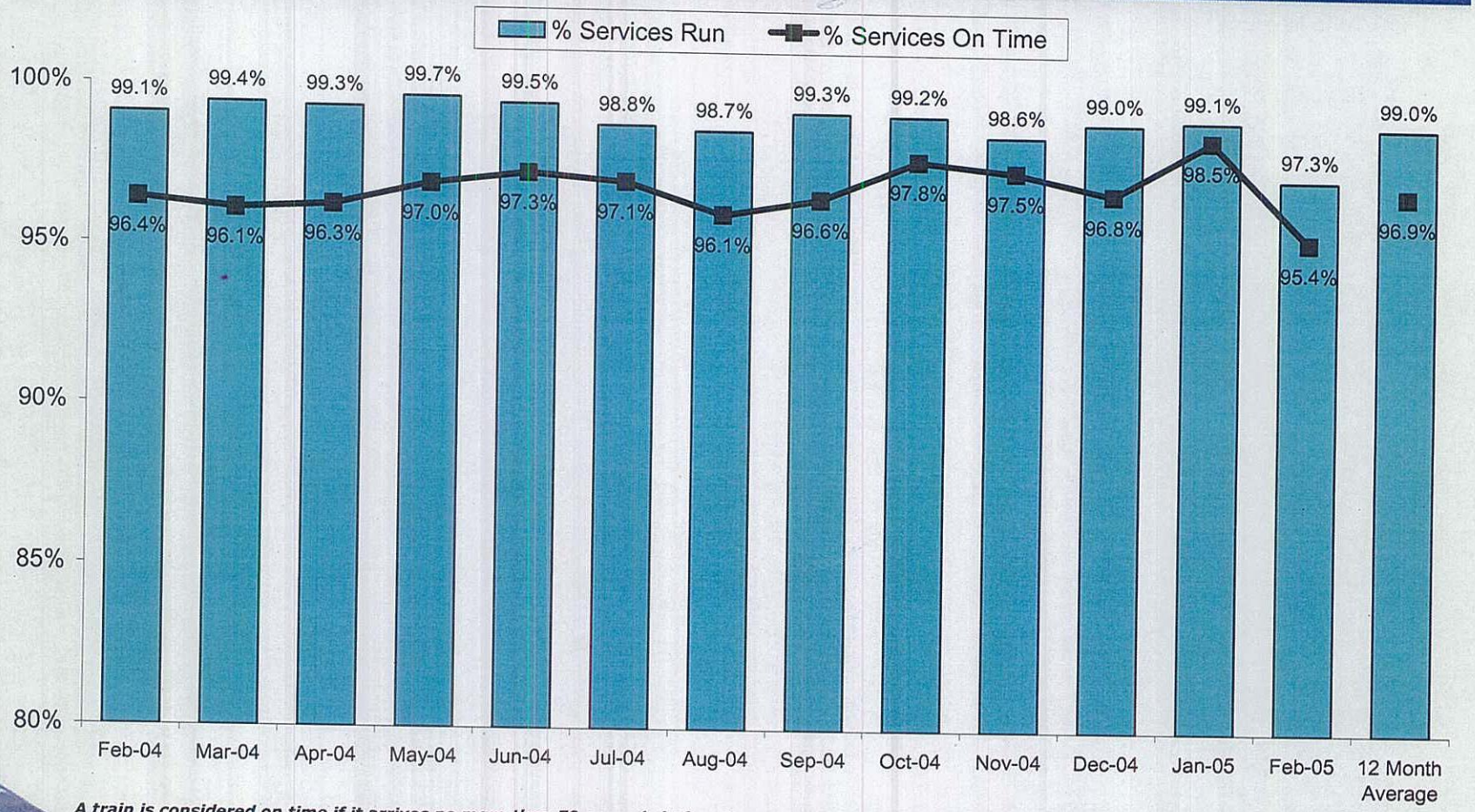
Melbourne's Train Service

connex

Performance results - reliability and punctuality
GLEN WAVERLEY LINE

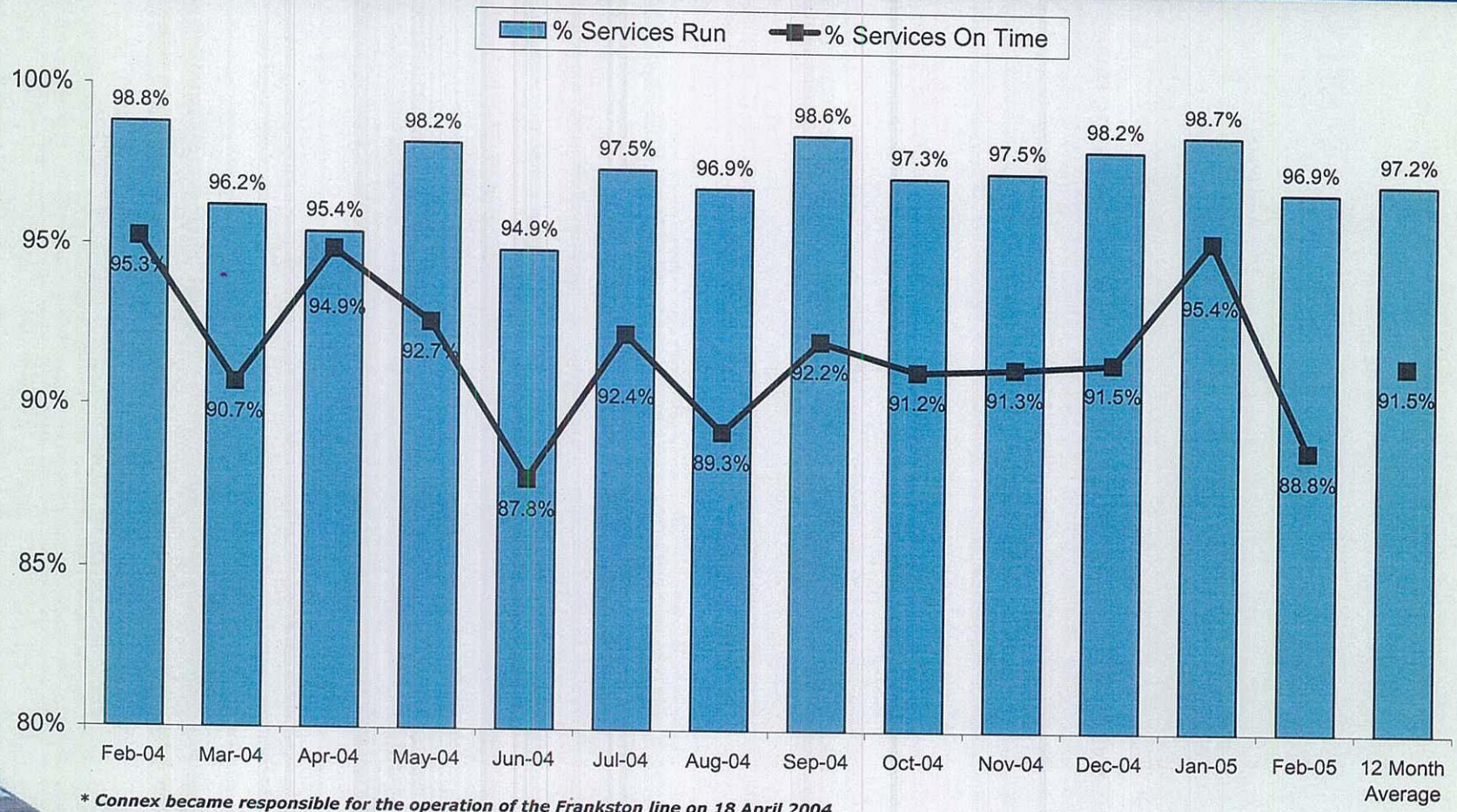


A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable

Melbourne's Train Service

connex

Performance results - reliability and punctuality
FRANKSTON LINE



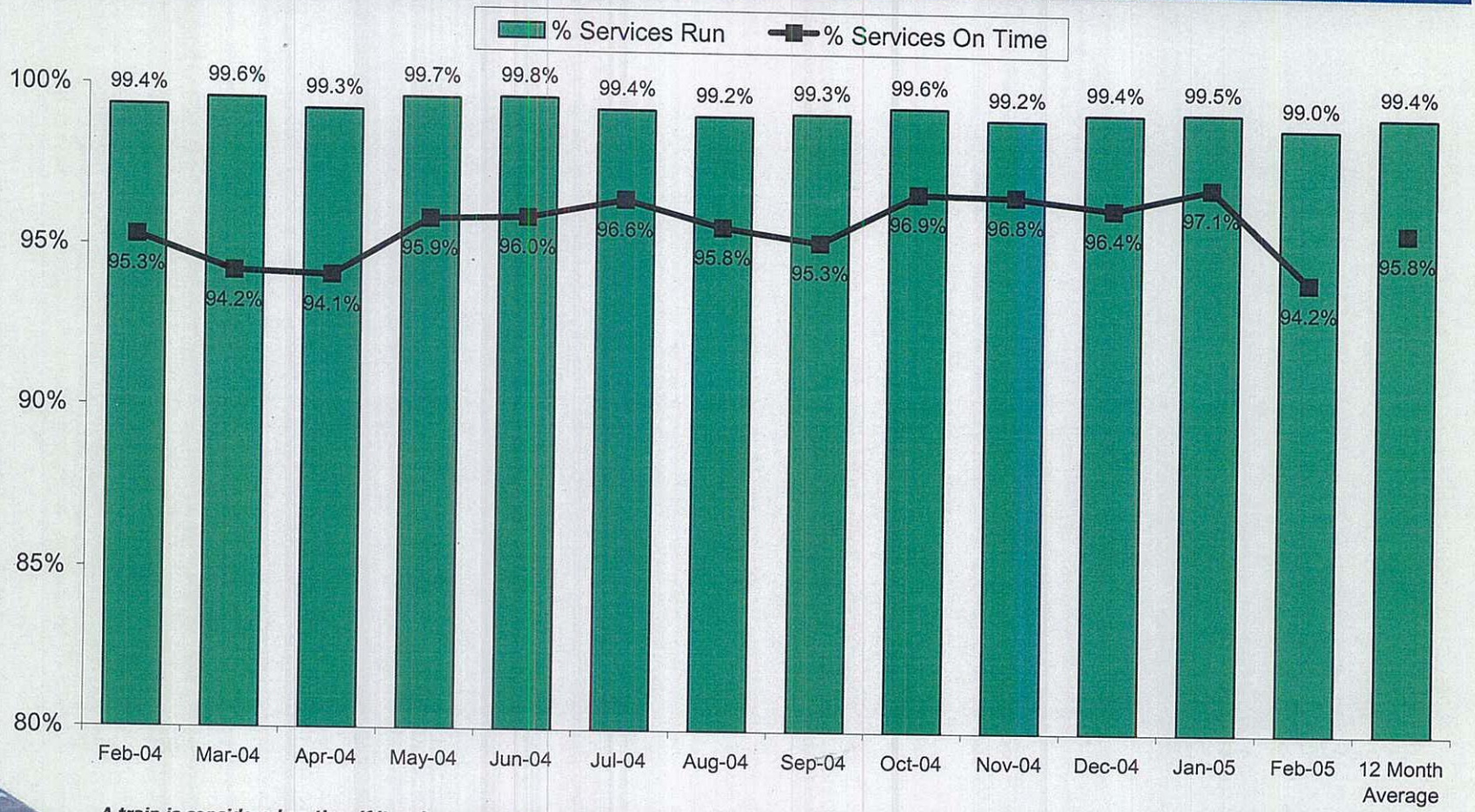
** Connex became responsible for the operation of the Frankston line on 18 April 2004*

*** a train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

Melbourne's Train Service

connex

Performance results - reliability and punctuality
EPPING LINE

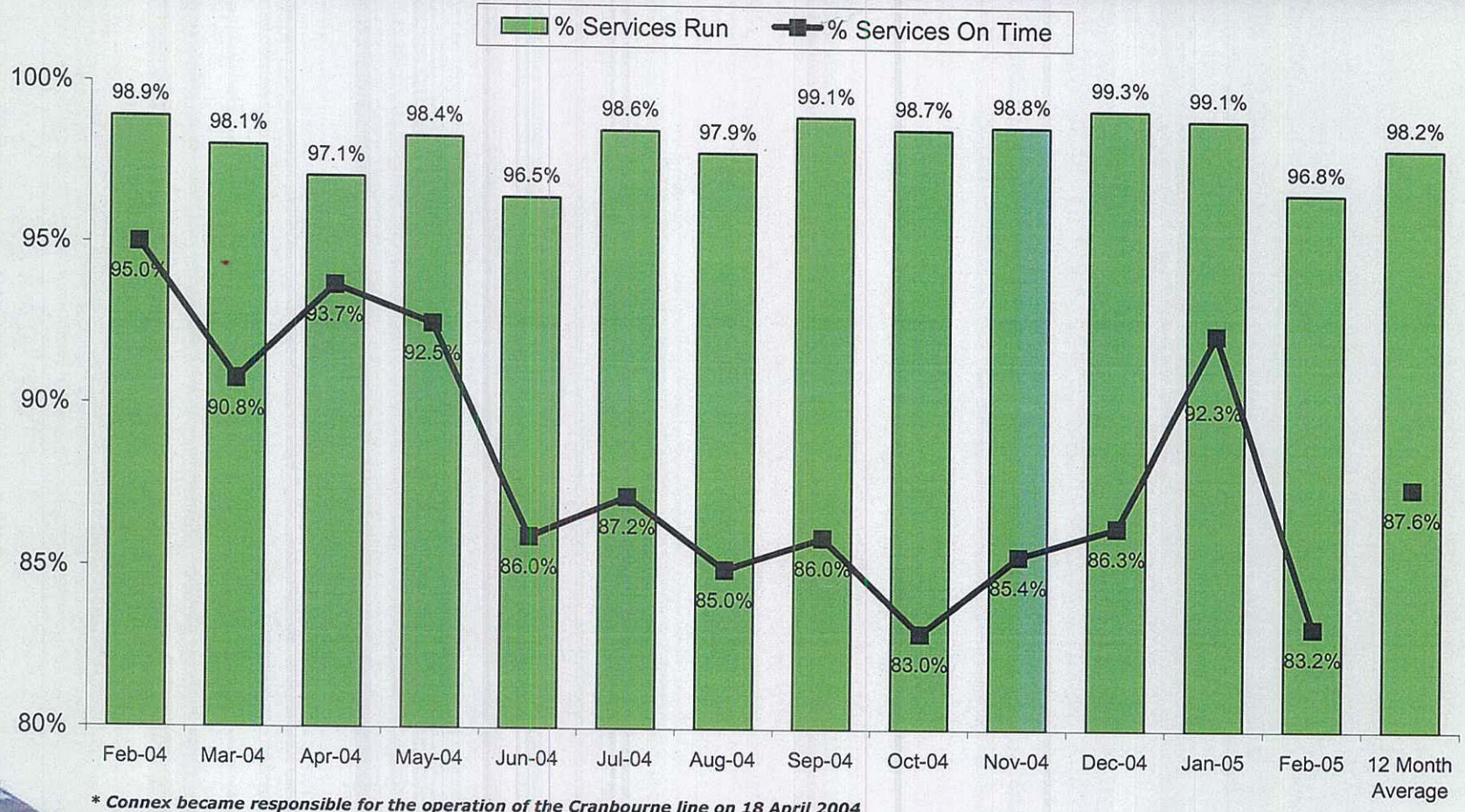


A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable

Melbourne's Train Service

connex

Performance results - reliability and punctuality
CRANBOURNE LINE



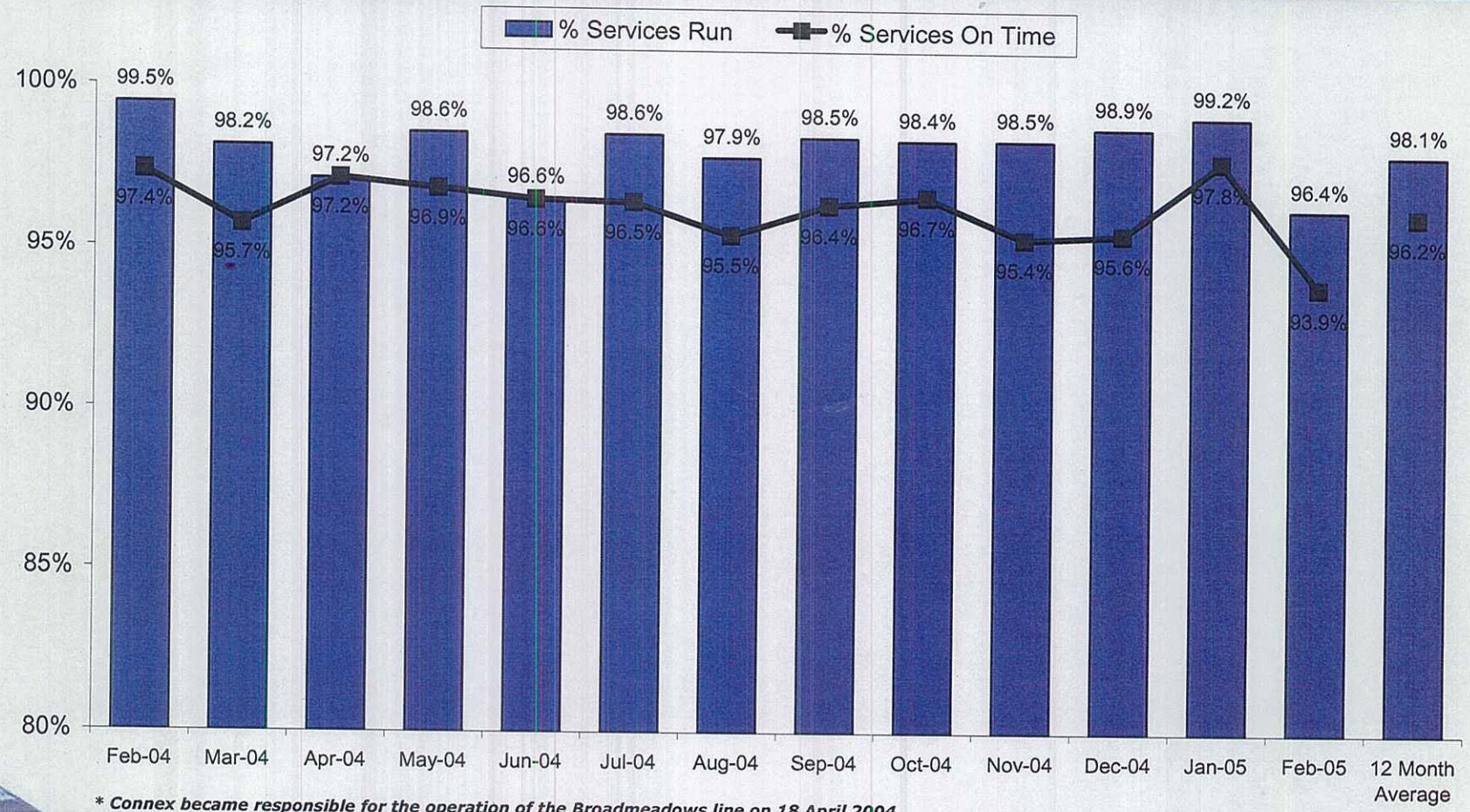
** Connex became responsible for the operation of the Cranbourne line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

Melbourne's Train Service

connex

Performance results - reliability and punctuality
BROADMEADOWS LINE



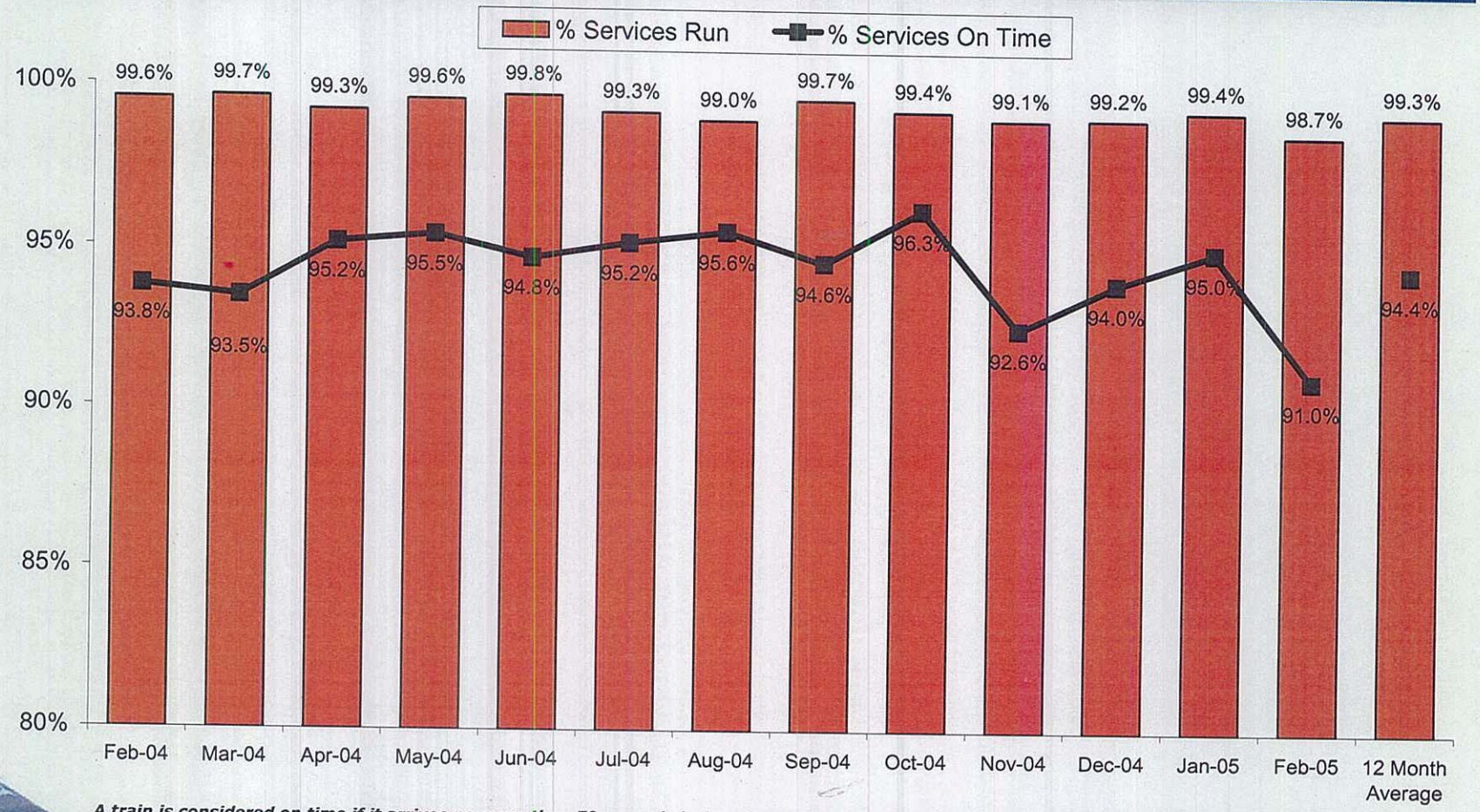
** Connex became responsible for the operation of the Broadmeadows line on 18 April 2004*

*** A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable*

Melbourne's Train Service

connex

Performance results - reliability and punctuality
BELGRAVE LINE

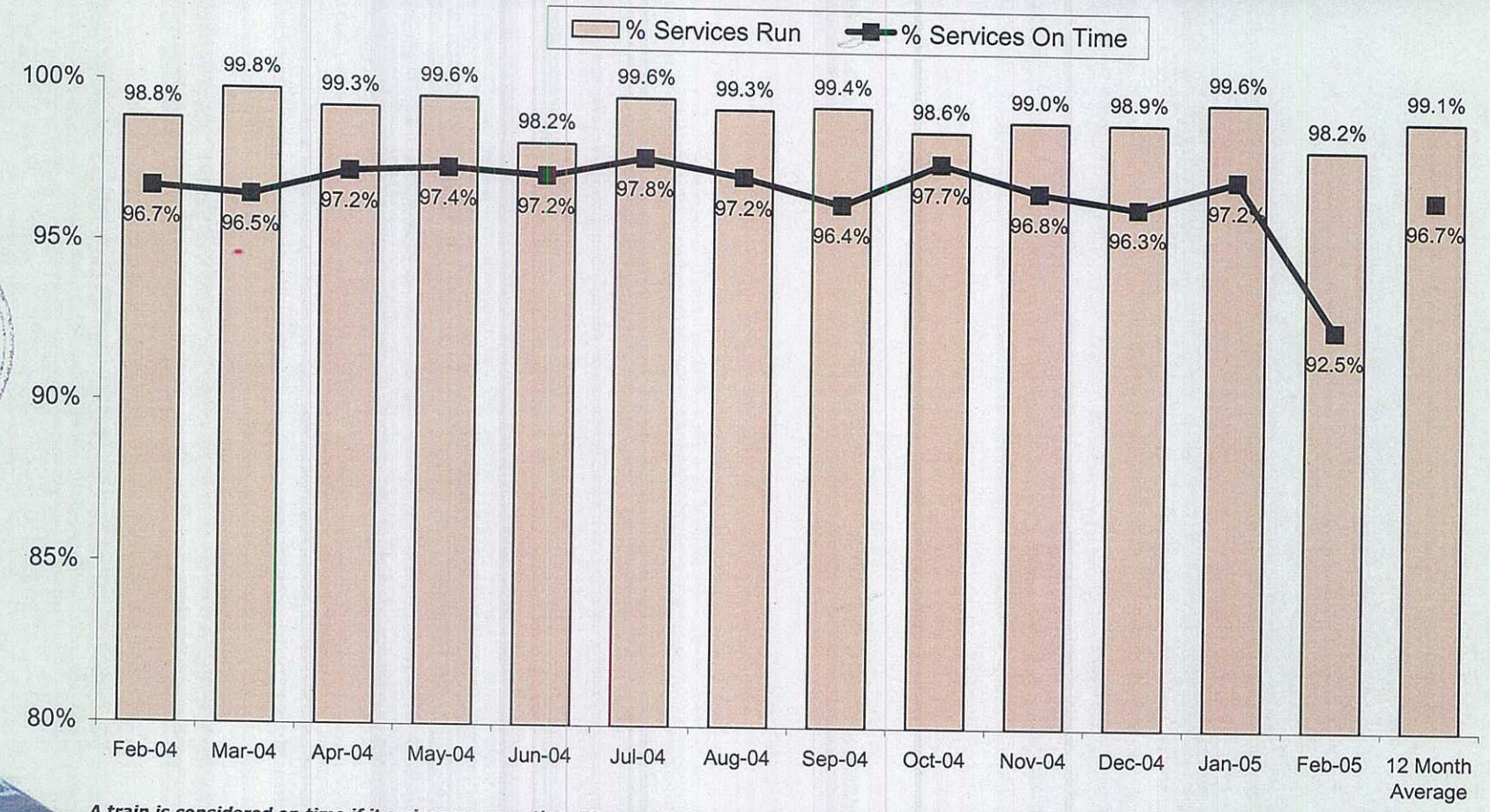


A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable

Melbourne's Train Service

connex

Performance results - reliability and punctuality
ALAMEIN LINE



A train is considered on time if it arrives no more than 59 seconds before & no more than five minutes & 59 seconds after the time in the timetable

Melbourne's Train Service

connex

SCHEDULED & CANCELLED SERVICES – February 2005

LINE	SCHEDULED SERVICES	SERVICES DELIVERED (%)	CANCELLED (NUMBER)
ALAMEIN	3300	98.2	58
BELGRAVE	2916	98.7	38
BROADMEADOWS	3216	96.4	117
CRANBOURNE	2108	96.8	68
EPPING	3088	99.0	30
FRANKSTON	3760	96.9	116
GLEN WAVERLEY	3596	97.3	96
HURSTBRIDGE	3480	98.9	39
LILYDALE	4136	97.8	92
PAKENHAM	2416	97.7	56
SANDRINGHAM	3920	94.4	220
STONY POINT	372	93.3	25
SYDENHAM	2952	98.1	55
UPFIELD	2616	96.8	84
WERRIBEE	2920	97.5	73
WILLIAMSTOWN	2928	96.8	94

Melbourne's Train Service

connex

RESULTS FOR FEBRUARY 2005

The widespread disruption left trains and drivers out of position and unable to run services. This caused further delays and cancellations and spread the affect of the storm across the whole network. The flow-on impact from the storm was felt across much of February.

There were **47,724** scheduled train services in February of which 1261 were cancelled – half due to the storm on 3 February.

There were **42,743** 'on time' trains (which arrived at their destination within five minutes of the schedule time).

The drop in performance in February was virtually entirely due to the storm on 3 February and its aftermath and reversed the improving performance trend, on most lines, of the previous three months.

In February, network-wide service delivery (the percentage of scheduled trains that actually ran) declined from 99.2% in January to 97.4%.

On-time performance declined from 96.4% in January to 91.99% in February. This result was below the 92% for compensation and customers who used a monthly, half yearly or yearly ticket to travel on the Connex network in February were eligible for a free daily ticket as compensation.

For further information, customers should check the Compensation section under News on this site.

Melbourne's Train Service

connex

RESULTS FOR FEBRUARY 2005

Network-wide performance in February was severely affected by the storm on Thursday, 3 February.

Taking into account the heavy rain that started falling on the 2nd and the immediate aftermath on the day after, this storm caused 838 trains to be cancelled for all of part of their scheduled run while 1384 trains were delayed.

Falling trees damaged overhead power lines and blocked the tracks at or near Upwey, Heathmont, Mooroolbark, Mordialloc, Mentone, Tooronga, Eltham, Middle Brighton, Seddon and Altona stations. High winds damaged overhead power lines at Hampton.

Trees at risk of falling delayed services at Alamein, Flemington Bridge and Footscray.

Flooding at Williamstown, Seaholme, Diamond Creek and Keon Park delayed or blocked trains. The flooding at Seaholme was so serious that we couldn't run trains through the 'Altona Loop' until 2.30pm on Friday, 4 February. Flooding also blocked the entrance to the City Loop used by Belgrave, Lilydale, Glen Waverley and Alamein line trains.

At least six subways at stations were flooded, preventing passengers from getting onto the station platforms.

Trains were damaged by falling trees at Tooronga station and between Mooroolbark and Croydon. Many other trains were damaged through leakage or water in their electrical systems. Despite a concerted effort by train maintenance staff, over a week after the storm we still had 22 three-carriage trains out of service with water and collision damage.

Melbourne's Train Service

connex

FORMAT 13

METHOD STATEMENT COVERING GENERAL DESIGN APPROACH AND CONSTRUCTION METHODOLOGY FOR DEVELOPING THE PROJECT

1. Method statement covering general design approach and construction methodology for developing the project has been detailed out under Chapters 7, 8, 9, 20 and 21 of Section 5.
2. The list of important codes has been furnished under Chapter 26 of Section 5.

FORMAT 15

PROPOSED ORGANISATION

1. ORGANISATION CHART

   a. Separate organization chart for Project Design and Construction Stage are enclosed along with this format.

   b. The Organization Chart for the Operation Stage is also enclosed along with this format.

2. RELATIONSHIP BETWEEN HEAD-OFFICE AND SITE MANAGEMENT

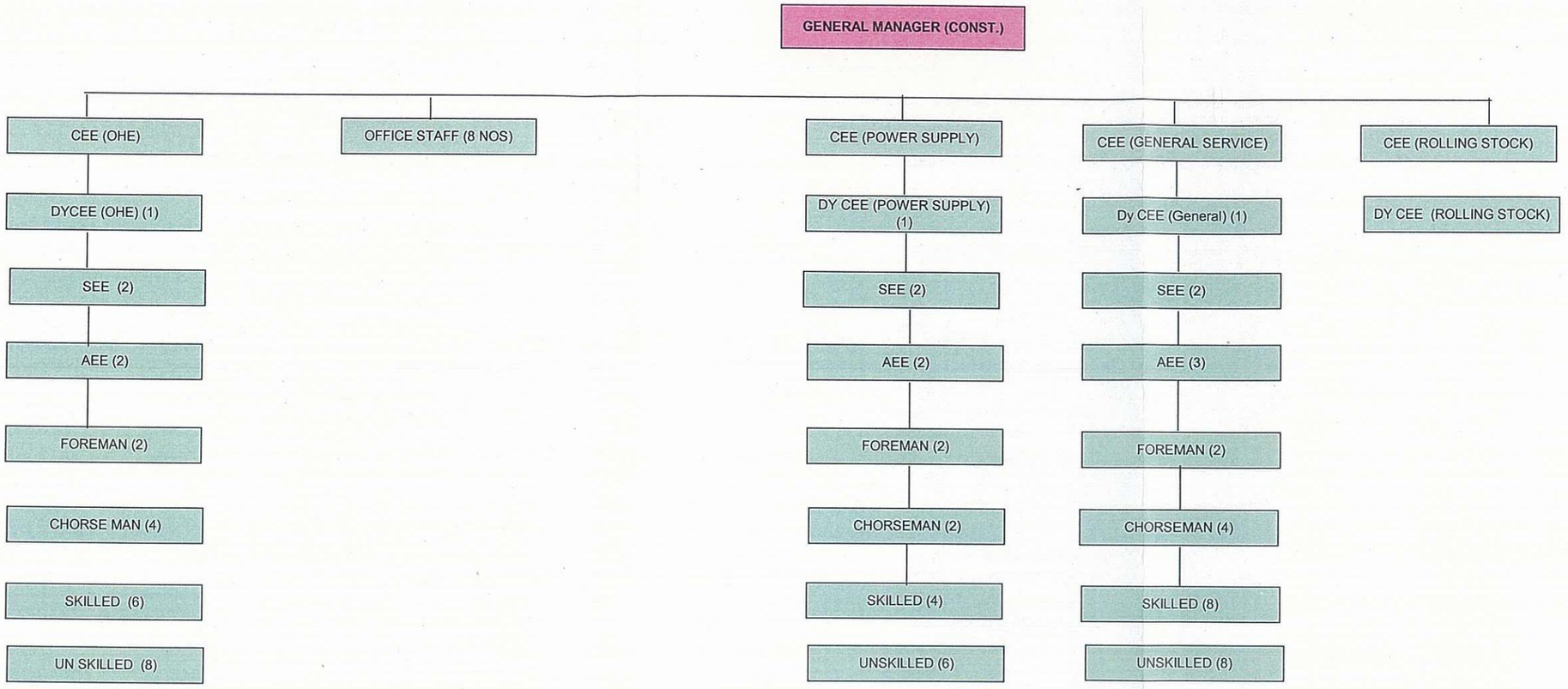
   a. REL has strong presence in the suburbs of the Mumbai city which includes its corporate office and numerous other offices along the alignment of the proposed MRTS project. We therefore foresee smooth coordination between the site office and the head office.

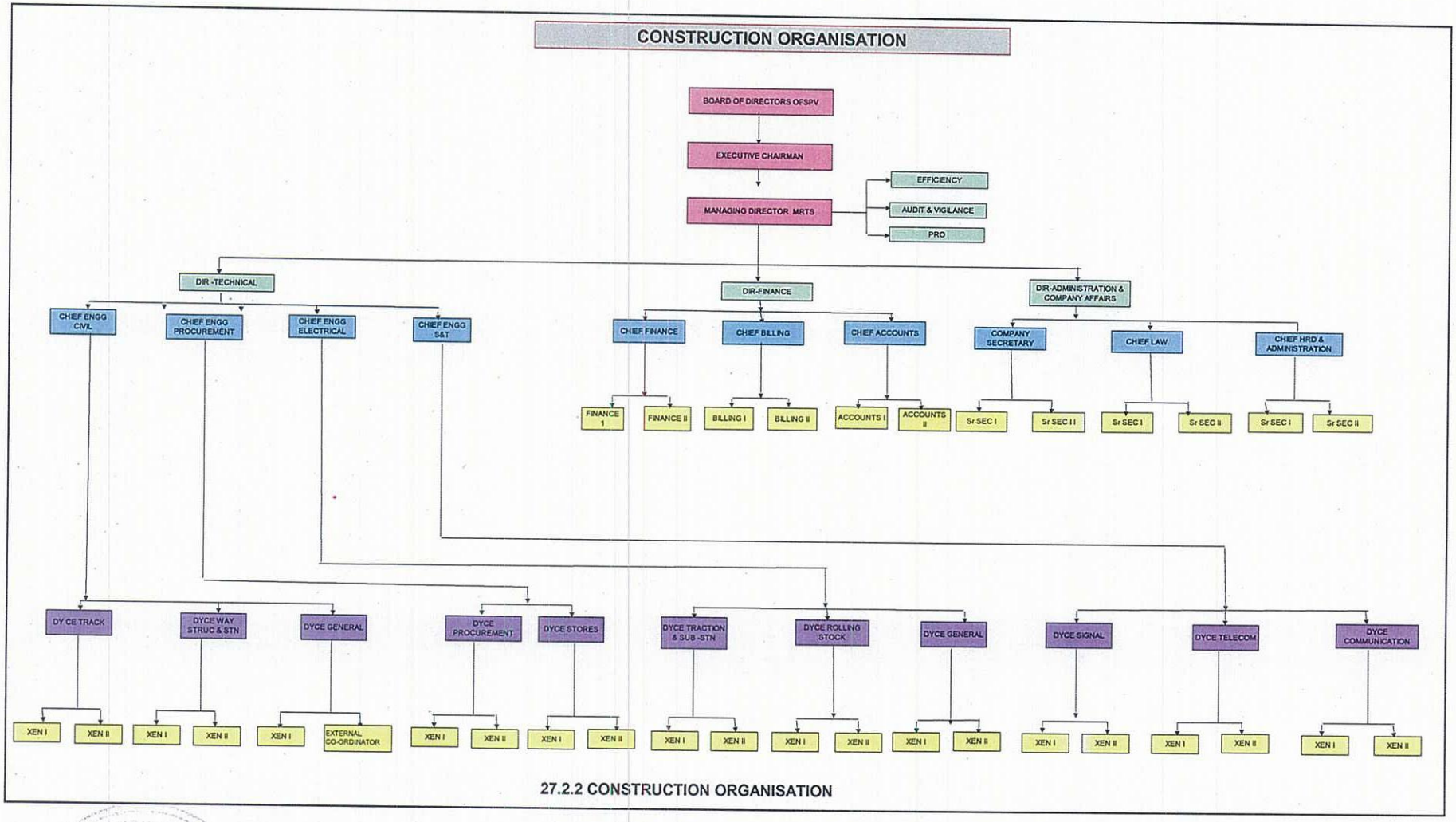
   b. As regards responsibilities, the head office would serve as a resource management and project monitoring centre; while the site office would be responsible for efficient and timely implementation of the scheduled activities. Cost control would be exercised jointly.

   c. Site office would be delegated with the appropriate powers so as to implement the project within the shortest possible time frame.

3,762.19

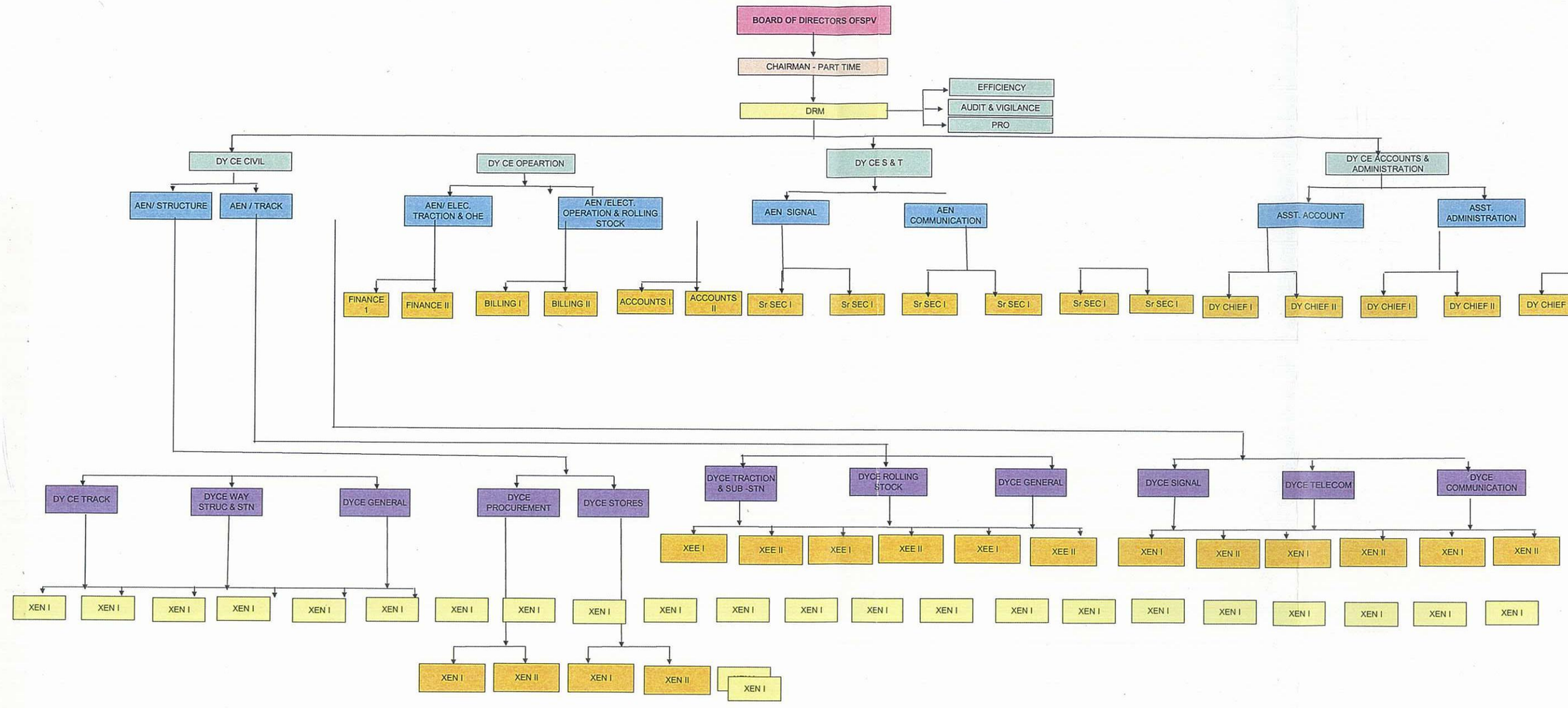
ORGANISATION CHART OPERATION AND MAINTENANCE (ELECT.)





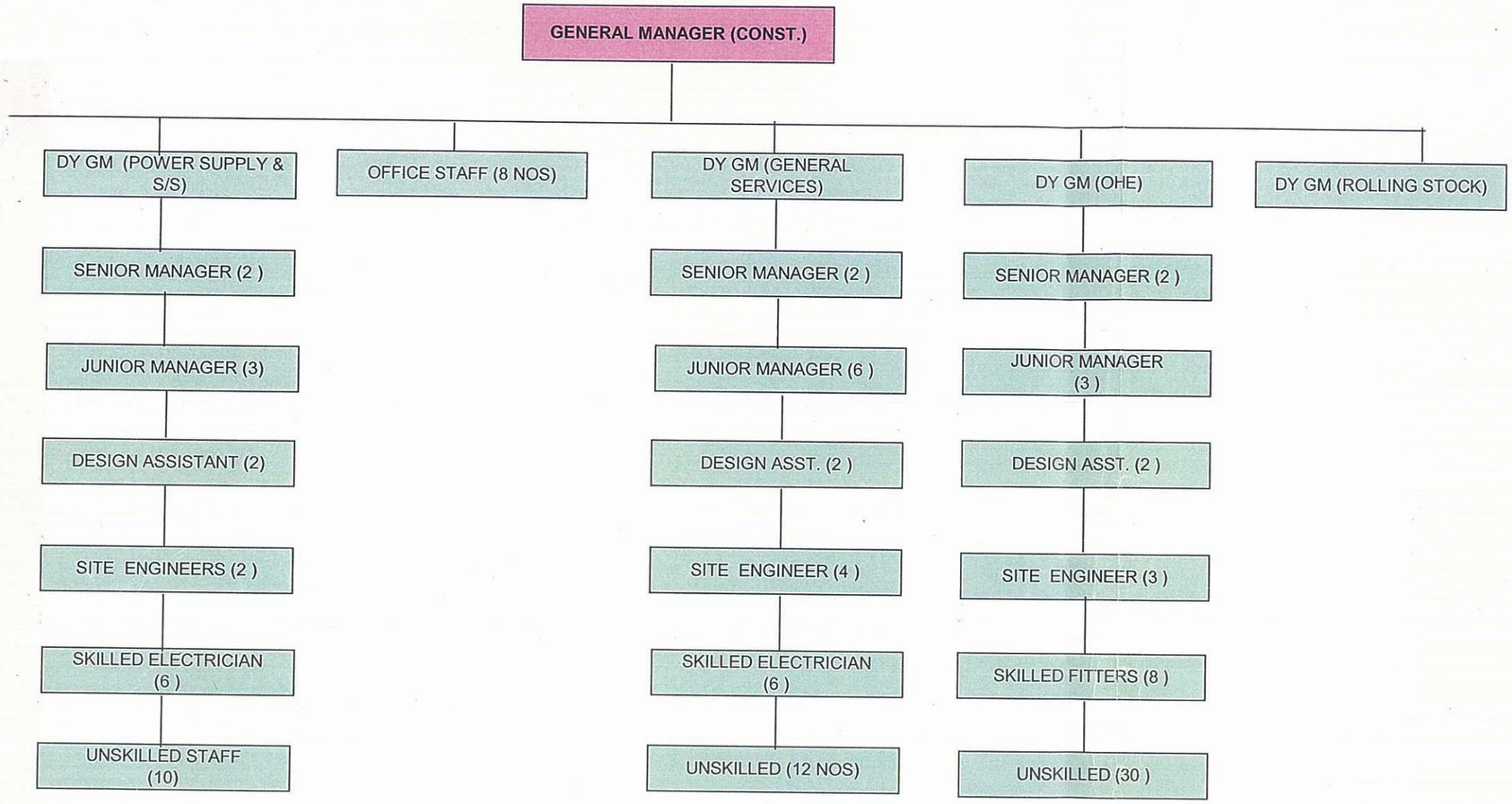
27.2.2 CONSTRUCTION ORGANISATION

ORGANISATION CHART FOR O&M AT DIVISION

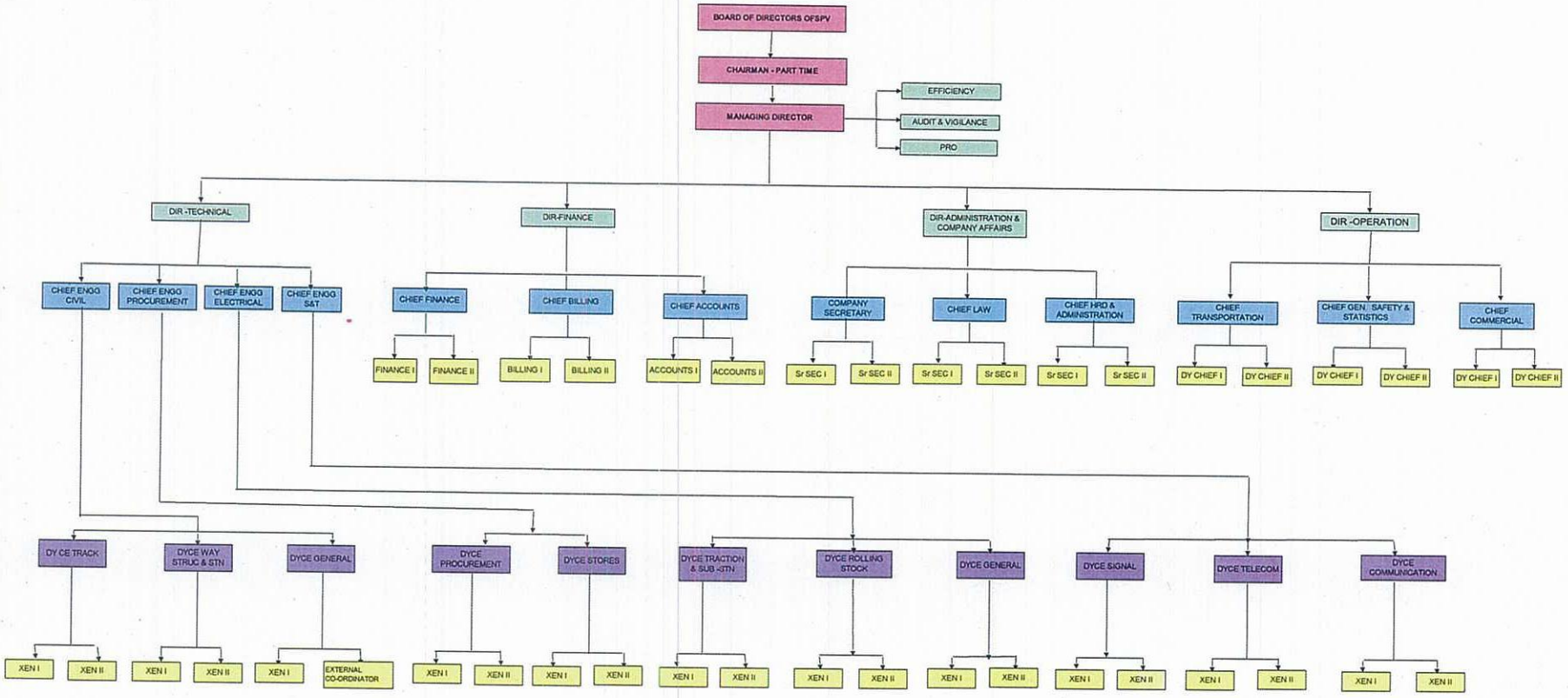


Reliance Energy Limited ★ Reliance Energy Centre

ORGANISATION CHART (CONSTRUCTION) ELECTRICAL

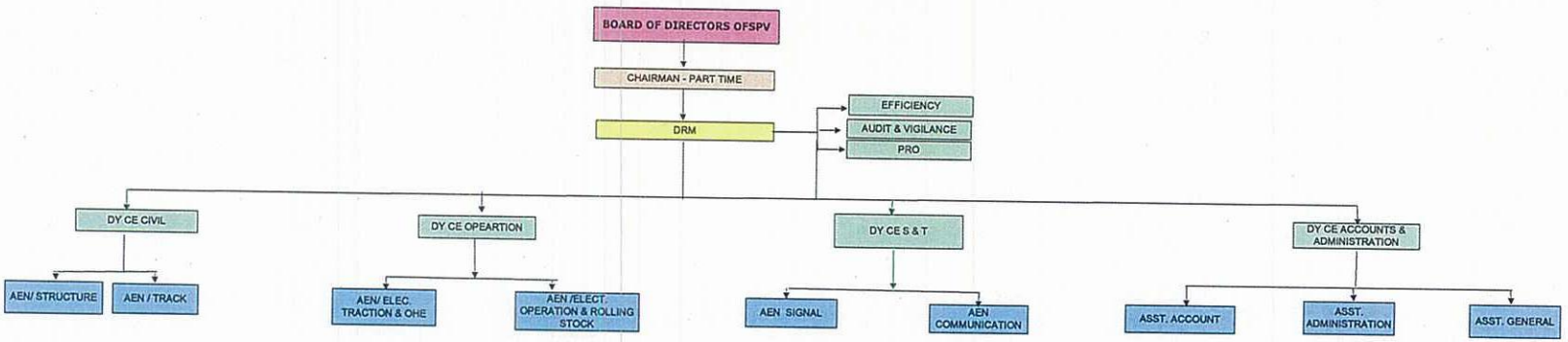


ORGANISATION CHART FOR O&M AT HQ.



27.2.3 O & M AT HQ

ORGANISATION CHART FOR O&M AT DIVISION



27.2.4 O & M AT SITE

FORMAT 16

Statement – I

STAFF PROPOSED FOR PLANNING, DESIGNING AND EXECUTION OF PROJECT

A. HEAD OFFICE

Sector	Name	Age	Years of Exp.	Education	Proposed Designation	Relevant Experience
General Management	S C Gupta	56	33	MSc. Engg		Experience of managing infrastructure projects
Administration	Arun Puranik	55	34	BSc., PGD Hotel Management, MAM		Overall administration of utility business
Technical Management	Pramod Gupta	46	24	BE, (Mech)		Project Management
Site Supervision	A S Kshirsagar	41	18	BE (Civil), MFM		Execution of civil works and project management
Finance	Ajit Varma	55	30	F.C.A.		Project Financing & Accounting

Note:

1. CVs of key persons proposed for execution of the project are enclosed.
2. CVs of experienced persons in the field who are on our panel of experts are also enclosed.

B. SITE OFFICE

Sector	Name	Age	Years of Exp.	Education	Proposed Designation	Relevant Experience
General Management						
Administration						
Technical Management						
Site Supervision						
Others						

Note:

Persons with appropriate experience in the relevant field will be suitably appointed as per the requirement and with the advice from our Project Management Consultants.

CVs OF KEY PERSONNEL

S. C. Gupta

Director (Operations)

Shri S.C.Gupta, aged 56 years, is a graduate in electrical and mechanical engineering as also M Sc.(Engineering)in power systems. He was the Group Senior Executive Vice President in Reliance Power Limited.He had been actively involved in the design and implementation of captive power plants of Reliance Industries Limited at Hazira, Patalganga, Naroda and Jamnagar totalling 750 MW and development of Independent Power Projects (IPPs)at various locations.

Mahesh Chand

Age 51 years, Graduate in Electrical Engg. and Diploma in Measurement & Instrumentation,

Over 29 years of experience in Project Egg., Project Management and Procurement, in the Capacity of Vice President was responsible for techno-commercial of mega projects of Reliance Jamnagar Refinery Project, Hazira Petrochemicals Project and Reliance Infocomm Projects. Started career with Engineers India Ltd. the leading engg. company in India.

D.Guha.

Age 49 years. BE (Elect). Vice President with more than 25 years of experience in the field of engineering. He has 19 years of experience in the field of Power plant engineering while working with NTPC. Responsibilities included from preparation of Feasibility report to detailed engineering and testing.

Has been working with Reliance for the last six and half years and was heading the engineering of the electricals of the Reliance Jamnagar Refinery and associated 360 MW captive power plant, which is the largest grass root refinery of the world.

PK Majumdar

Age -- 46 Years, Graduate Mechanical Engineer having 25 years of experience in Power field.

In the capacity of Vice President -in charge of the 500 MW Dhahanu Thermal Power Station, was responsible for the benchmark Operations & Performance of the power station which is adjudged as the best performing plant in the country for the year 03-04 and 04-05. Started career with NTPC and was involved in Commissioning,operation of 100, 210, MW units at various NTPC Thermal Power Projects.

Pramod Gupta

Age 46 years, BE (Mech.) Astt. Vice President, having 24 years of experience in Power field

Over 10 years with BHEL, responsible for Erection & commissioning, service after sales for Utility Gas & Steam turbines upto 500 MW

Over 1O years with Reliance Group; was heading Naroda CPP from Concept to Commissioning and subsequent O&M,

Over 3 years with Relinace Energy :Intially heading the operation support group for REL generating plants at Dahanu, Samalkot, Kochin, and goa and now Geration Projects (Mega Power Plants and Infrastructure Projects)

RS Gadre

Age 42, BE (Mech.) Astt. Vice President , over 20 years experience in power field.

Over 7 years experience with Reliance Group heading Mech. engg. of 500 MW Jamnagar TPS.
1 year with L&T EPC Power in proposal engg. for EPC power projects
Started career with BSES, worked on 500 MW Dahanu TPS, 2x210 MW Unchar TPS, 2x67 MW Rourkela Steel Plant.

Sudhir Pawar

Age 42 years, Graduate in Electrical Engg., Astt. Vice President having 22 years of experience.

Over 21 years of experience in Project Egg., Project Management and Procurement; out of which over 18 years with Reliance Group. Handled techno-commercials of mega project of Reliance Jamnagar Refinery, execution of Hazira & Patalganga Petrochemical Complexes and Reliance Infocomm Projects.

VK Juneja

Age 50 years, BE (Mech.) Astt. Vice President, Over 29 years of experience in Power field

Over 4 years with Reliance group; heading project development and commercials of 500 MW Jamnagar Thermal Power Plants and 475 MW Patalganga CCPP.
Over 7 years with ABB Power Segment, responsible for business development, marketing & sales of power plants
Over 13 years with BHEL in Power Plant O&M, commissioning & testing
Started career with 720 MW Badarpur TPS of NTPC

Name	**: Srinivas Ramesh**
Date of Birth	**: 31 March 1958**
Educational Qualifications	**: B Tech- Electronics and Communications**
Current Designation	**: VP**
Experience	**: Total 25 Years.**
(Name of Companies worked for / General experience describing types of works handled)	**NTPC: 7 years Maintenance / Engineering of Large utilities** **Honywell Automation: 10 Years-Project Management of Automation projects for Industry.** **Reliance Group- 8 years Power and Infocomm. Was Program Manager of Wireline Access Network.**

Name : **Sanjay R. Muley**

Date of Birth : **30th Jan 1959**

Educational Qualifications : **B.E. (Mech), M Tech**

Current Designation : **Sr. Manager**

Experience :

MSEB from 1980 to 1997

- **In MSEB was involved in Generation Project / Commissioning/Operation/Maintenance**

REL from 1997 till date

- **Engineering/Project Planning/Project development**

Avadhut Shridhar Kshirsagar

Age : 41 years
Qualifications : B.E.(Civil), MFM

18 years experience in the areas of execution of civil works for special foundations, industrial structures, power house, utilities like water treatment, sewage treatment etc., project management, commercial aspects of contracts & procurement. Currently working as Manager (Civil).

Mandar P. Kamat

Age : 40 years

Qualifications : B.E.(Civil)

17 years experience in the field of roads, bridges, commercial & utility buildings, industrial and power house structures, etc. Currently working as Additional Manager (civil).

S.N.More

Age : 45 years
Qualifications : B.E.(Civil)

23 years experience in structural engineering and designs of RCC & Steel industrial structures. Also worked as a free lance consultant for four years.

S.D.Gore

Age : 41 years
Qualifications : B.E.(Civil)

18 years experience in the areas of execution of civil works for special foundations, industrial structures, power house, utilities like water treatment, sewage treatment etc., project management, commercial aspects of contracts & procurement. Currently working as Additional Manager (Civil).

Name	:	**SANJAY DATE**
Date of Birth	:	**October 11, 1967**
Educational Qualifications	:	**BE (Civil Engineering), MS (Structural Engineering) MMS (Finance)**
Current Designation	:	**Manager**
Experience (Name of Companies worked for / General experience describing types of works handled)	:	

TATA Economic Consultancy Services, Mumbai [June 2002 – April 2005]

Advisory services on infrastructure projects, primarily in the Airport and Industrial Infrastructure sectors. Experience includes formulation of sector policy studies, preparation of techno-commercial feasibility studies and business plans, bid process management for private sector participation and negotiation support during transaction processing. Key projects include advisory support to the Hyderabad International Airport Project and Special Economic Zones at Navi Mumbai and Indore, and Policy formulation for the Offshore Maritime Services sector.

Jacobs H&G Ltd, Mumbai [May 1998 – September 2000]

Design of structures for the process and petrochemical industries, port related auxiliary structures. Activities included final design, site supervision and preliminary design for bid preparation.

STUP Consultants Ltd, Mumbai [September 1995 – April 1998]

Design of RCC and pre-stressed concrete bridges, flyovers and interchange structures, design and site supervision for rehabilitation of bridges, design and site supervision for strengthening of airport hangar structure. Projects carried out in India and Malaysia.

Banka India Limited, Mumbai [February 1995 – September 1995]

Design of RCC and pre-stressed concrete bridges and load testing schemes.

HNTB Corporation, Baton Rouge USA [February 1992 – April 1994]

Design of RCC, pre-stressed concrete and steel bridges, flyovers and interchange structures, including design of cable-stayed and bascule bridges. Also carried out site inspection and strengthening of major bridges.

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Name	:	**Manish Jain**
Date of Birth	:	**15.10.1967**
Educational Qualifications	:	**BE (Civil), Masters in Construction Management (MCM), MBA (Finance)**
Current Designation	:	**Sr. Manager**
Experience (Name of Companies worked for / General experience describing types of works handled)	:	**Arvind Techno Engineers Ltd** **Reliance Land Limited** **SembCorp E&C (India)** **Skanska** **Reliance (present)** **General Experience** **1) Execution of large industrial and commercial projects (power plant, coal handling plant, iron ore beneficiation plant, petrochemical projects, commercial and residential complex etc.)** **2) Planning and co-ordination of large commercial and residential projects** **3) Business Development – bidding for BOT/ BOOT projects (flyovers, expressways, power plant, townships etc)** **4) Marketing – for construction projects**

Name : Sanjay S. Mulgund

Date of Birth : 01st July 1968

Educational Qualifications : BE (Inst. & Control)

Current Designation : Addl. Manager (Tech.)

Experience :

Working with Reliance Energy Ltd. since 1993 and have over 13 years of multifunctional project management experience in power sector.

Basic/ detailed engineering; erection, testing/ commissioning, operation & maintenance, inspection and quality control, customer/ operator training for thermal, combined cycle power plants and switchyard, transmission, distribution SCADA systems.

Well versed in use of various computer and modern office systems, comfortable working in a multi-cultural and multi-disciplined project environment.

Successfully completed the following projects

2X250MW Dahanu Thermal Power Project

220MW Samalkot Combined Cycle Power Project

107MW Dhuvaran Combined Cycle Power Project

Projects currently associated with are

Mumbai SCADA/ DMS implementation

Mumbai MRTS

CV S OF ASSOCIATES

Curriculum Vitae

1. **Name** : P.Ponnuswamy

2. **Profession/Present Designation**: Electrical Engineer I.R.S.E.E.(Retd)

3. **No. of Years with Firm/Organisation** : 38 Years with Indian Railways

   Nationality : Indian

4. **Area of Specialization:-**

   i. Electric Traction - Electrification of Railway Lines, Construction of Sub Stations, Power Houses, Transmission Lines and Distribution Networks
   ii. Design, Manufacturing, testing, Commissioning and Maintenance of Rolling Stock
   iii. Survey, Construction, Preparation of detailed estimates and feasibility reports of Railway Infrastructure Projects.
   iv. Consultancy, Techno Economic and Feasibility studies of Transport Projects

5. **Proposed Position on Team** : Electrical Team Leader

6. **Key Qualification:-**

   i. Carried out Techno economic studies for improving Suburban Rail System in Mumbai for Bombay Urban Transport Project-II under the aegis of World Bank.
   ii. Carried out Electrification work of O.H.E and Traction Sub Station for the commuter lines in New Bombay under MTP(R).
   iii. Planned, Estimated, Constructed and Set up the EMU maintenance Car sheds at Kalwa and Sanpada for Central Railway.
   iv. Planned, Estimated, Constructed and Established a workshop for POH of Electrical Locomotives at Bhusaval(CR).
   v. As a member of Survey Team carried out Detailed survey, Prepared Feasibility Reports and Detailed Estimates for :-
      a) Optimisation of Suburban services on Central Railway- 5" , 4" and 3" frequencies.
      b) Remodelling of V.T. Suburban Yard & Platforms for double discharge facilities
      c) Running of 12 Car EMU services.
      d) Setting up of Unified POH workshop facilities for EMU's
   vi. Undertook many Consultancy studies for improving Reliability and Maintenance Standards for Railway Rolling Stock.
   vii. Prepared detailed project report covering the justification, estimated cost, financial viability and economics, phase working and implementation plan for

the Conversion of 1500V D.C. Traction system to 25KV A.C. traction system in Mumbai (C.R. & W.R.) area, made presentations before the full Board, Expanded Board, Planning Commission for getting the sanctions of Conversion projects estimated to cost above Rs 1000 crores.

viii. Visited France, Switzerland, Germany, Sweden and U.S.A. as a member of Indian Railway team to select High Horse power (Thyrsitor and 3-phase drives) Electric Locomotives for I.R.

ix. Visited Japan, Hong Kong, Singapore, Switzerland, Germany and Netherlands as a team leader of I.R. team to select a suitable modern AC/DC EMU stock for Mumbai Suburban System under the World Bank Aid for BUTP-II

x. Underwent special training in :-

a) Production Management.
b) Semi Conductor Technology
c) Job Evaluation
d) Ergonomics
e) Power Electronics
f) Management Development Programs
g) Corporate Management Programs.

7. Education :-

1) SSLC : March 1958 from Board High School, Cheyyar, Tamilnadu
2) Pre-University : March 1959 from Government Arts College, Chennai
3) B.E.(Electrical) : July1959-Jan1964 from College of Engineering (Anna University),Guindy, Chennai

8. Experience :-

Sr No	Date	Name of Employing Organisation	Title of Position	Location of Assignment
1	Sep 64 - Oct 66	I.C.F.(I.R.)	Graduate Apprentice/Assistant shop Supertindent	Perambur, Chennai
2	Nov 66 - Jan 69	C.Rly	Assistant Electrical Engineer probation	Different stations on I.R.
3	Feb 69 - Aug 71	C.Rly	Assistant Electrical Engineer,Traction Rolling Stock	Kurla Carshed
4	Sep 71 - Aug 72	C.Rly	Senior Electrical Engineer Survey & Construction	Mumbai
5	Sep 72 - Feb 75	C.Rly	Divisional Electrical Engineer(Const.)	POH workshop, Bhusaval
6	Mar 75 - Jul 78	C.Rly	Senior Electrical Engineer(PPIO)	POH workshop, Bhusaval

7	Aug 78 - Jun 79	C.Rly	Divisional Electrical Engineer	Solapur
8	Jul 79 - Jun 82	C.Rly	Sr. Divisional Electrical Engineer,Traction Rolling Stock	Kalyan
9	Jul 82 - Jun 85	C.Rly	Sr. Divisional Electrical Engineer,Traction Rolling Stock	Kurla
10	Jul 85 - Aug 85	C.Rly	Sr. Divisional Electrical Engineer,Traction Rolling Stock	Bhusaval
11	Sep 85 - Oct 85	C.Rly	Dy. C.E.E (EMU)/ HQ	Mumbai
12	Nov 85 - Feb 90	C.Rly	Suburban Railway Manager/Addl. Divisional Railway Manager	Mumbai Division
13	Mar 90 - Jul 91	C.Rly	Addl. Divisional Railway Manager	Solapur
14	Aug 91 - Jan 95	C.Rly	Chief Electrical Traction Engineer(HQ)	Mumbai
15	Feb 95 - Nov 97	C.Rly	Chief Electrical Engineer MTPR/Suburban Infrastructure	Churchgate
16	Dec 97 - Jun 02	C.Rly	Chief Electrical Engineer(PHOD)	Mumbai

Experience in last 10 years (1992-2002)

1) As Chief Electrical Engineer(HQ):-
   - Provided policy guidelines, Technical guidance, Administrative Assistance and Material management Assistance to DC traction system of Mumbai division of C.Rly Viz DC traction distribution, DC Loco maintenance unit at Kalyan, DC EMU maintenance units at Kurla and Kalwa Carsheds, POH workshop at Matunga.
   - Overseen the maintenance aspects, Outage, Operational & utilization, reliability and safety performance of DC traction units.
   - Liased with EMU production units of I.C.F./Jessop, RDSO & Rly board

2) As Chief Electrical Engineer/MTPR & Suburban Infrastructure
   - Planned & executed all electrical works under MTP projects viz
     Mankhurd-Belapur commuter lines
     Bandra-Andheri commuter lines
     Belapur-Panvel commuter lines
     Completed the Construction of Sanpada carshed, Navi Mumbai for EMU maintenance
   - Planned coordinated Techno Economic Feasibility studies & World Bank funded Consultancy studies for Mumbai Urban Transport Project-II.

3) As Chief Electrical Engineer(PHOD) of C.Rly
   - In charge of Organizing, Planning, Directing, Controlling and co-ordinating all Electrical activities of C.Rly which has the largest network of Electrical assets by way of 8500 electrified track kilometers, 750 Electric Locomotives, 120

suburban train sets, 400 A/C Passenger Coaches, 6 Electrical Loco Sheds, 3 EMU carsheds and 2 Electrical workshops

- Controlling 150 Gazetted officers, 30,000 work force, revenue budget of above $400 million and works budget of $15 million dollars per year.
- C.Rly was awarded the Railway Ministers Efficiency shield for Electrical Dept during 2000-2001 for the best performance among the zonal railways.

9. Languages Known

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

10. Postal Address : 7, Ajanta C.H.S., Plot No 46, Sector – 21, Kharghar, Navi Mumbai - 410210.

11. E-Mail address : swamyponnu @ rediffmail.com

12. Telephone Number : Residence : +91- 022- 27873943
Mobile : +91- 0-9821214207

(P.Ponnuswamy)

CURRICULUM VITAE

Proposed Position : Electrical Engineer

Name of Firm :

Name of staff : K. Mallikarjuna

Profession : Senior Professor

Date of birth :

Year with Firm/ Entity : Nationality : Indian

Membership in Professional Societies : Enclosure to IEEE membership form.

Detailed Task Assigned : N/A

Key Qualification

PAPERS

The following Papers have been submitted and presented in the institute of Energy Management Seminar, conducted from 1995 to 1999.

1) Erection and commissioning of EHV Transformer.

2) Laying of HV cables and Precaution to be taken for proper working of cables and maintenance schedule.

3) Different types of HV Circuit breaker and their operation and maintenance and trouble shooting in the traction substation.

4) Testing of EHV transformers at the time of manufacturing and acceptance.

5) Development of electric traction and technology up gradation in setting of traction substation in Mumbai of Central Railway.

6) Energy conservation in the operation of electric locomotives without affecting the traffic and the steps taken for optimum utilization of locomotives.

7) Electrical hazards in setting up of electrical high voltage substation and the precautions to be taken from the planning stage up to commissioning.

8) Functional of SCADA system in the operation of DC traction substation in Mumbai Division and resultant saving in consumption of power and reduction in power interruption for electric traction.

9) Operation of electric locomotives on heavily graded section and utilization of regenerative braking during descending the ghats in Mumbai Division.

10) Rewinding and Repair to traction motor of electric. locomotives. Precaution to be taken and test to be carried out for longer life of renowned motors.

Education

Bachelor of Engineering (Elect.)

Employment Record

a) At Naively Lignite Corporation, Madras.

Worked as Engineering in charge for 250 MW Thermal Power Station in Planning and execution of illumination system in the main power house, from May 1962 to Sept. 1962.

b) Andhra Pradesh State Electricity Board.

Worked as Jr. Electrical Engineering Tungabharda Hydro-Electric power project at Hospet. Worked in the errection department for errection of 9 MW Unit consisting of Hydraulic Turbine and electric generator, in collaboration with Hitachi/Toshiba Japan, from Feb.1963 to Sept. 1963.

c) On the Indian Railways

Designation	**: Special Class Apprentice**
Period	: Oct. 1963 to May 1964
Brief Experience	: Diesel Locomotive Shed, New Katni Central Railway.

Designation	**: Section Engineer**
Period	: May 1964 to May 1967
Brief Experience	: Maintenance & Operation of Diesel Locomotives at Diesel Locomotive Shed, New Katni, Central Railway.

Designation	**: Senior Section Engineer**
Period	: June 1967 to Mar 1974
Brief Experience	: Maintenance & Operation of DC Electric Locomotives at Electric Loco Shed, Kalyan Central Railway.

Designation	**: Assistant Electrical Engineer**
Period	: April 1974 to July 1980
Brief Experience	: Maintenance & Operation of 7 types of DC electric locomotives / EMUS and commissioning of new locomotives in Electric Loco Shed, Kalyan Central Railway.

Designation	**: Divisional Electrical Engineer**
Period	: Aug 1980 to Mar1983
Brief Experience	: Maintenance & Operation of electric locomotives in Electric Loco Shed / EMUS, Kalyan Central Railway.

Designation	**: Divisional Electrical Engineer**
Period	: April 1983 to Oct 1987
Brief Experience	: Maintenance of 1500 V DC OHE & DC traction substation of KalyanDistrict of Central Railway.

Designation	**: Divisional Electrical Engineer**
Period	: Nov 1987 to Feb 1988
Brief Experience	: Maintenance of 1500 V DC OHE & DC traction substation of Kurla District of Central Railway.

Designation	**: Dy. Controller of Store (Electrical)**
Period	: Mar 1988 to Oct 1990
Brief Experience	: Maintenance management of Electrical Spares required for electrical locomotives and other allied electrical service.

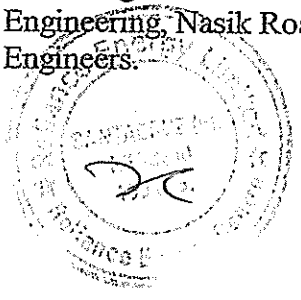
Designation	**: Dy. Chief Electrical Engineer**
Period	: Nov. 1990 to Jan. 1995
Brief Experience	: In charge of Mumbai Division Traction Distribution dept. consisting of 1500 KMOHE and 54 Traction substation and transmission line and cables.

Designation	**: Dy. Chief Electrical Engineer**
Period	: Feb. 1995 to Dec.1995
Brief Experience	: In charge of electric locomotives shed homing 130DC and DC/AC electric locomotives.

Designation	**: Dy. Chief Electrical Engineer**
Period	: Jan 1996 to Jan 1997
Brief Experience	: Coordination of all the division of Central Railway as far as Rolling Stock and traction Distribution in the office of Chief Electrical Engineer, Central Railway, Mumbai.

Designation	**: Dy. Chief Electrical Engineer**
Period	: Feb 1997 to July 1998.
Brief Experience	: Construction of OHE and substation in the suburban section of Mumbai under Metropolitan Transport Project.

Designation	**: Senior Professor**
Period	: Aug 1998 to 31st Mar 2001.
Brief Experience	: Working as senior Professor Indian Railway Institute of Electrical Engineering, Nasik Road for training of Indian Railways Electrical Engineers.



Languages	Speak	Read	Write
English	Good	Good	Good
Hindi	Good	Good	Good

Certification

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

Signature Date : _____

Full name of staff member : K. Mallikarjuna

Full name of authorized representatives : _____

BIO – DATA

Name	:	Somesh Kumar Mishra
Father's / Mother's Name	:	Shri Bhuwneshwar Mishtra/Late Smt. Prema Mishra.
Date of Birth	:	03 – 09-1964.
Present Address	:	Blue Bell 24, Godrej Sky Gardens, Takka, Panvel – 410 206. Tel: 022-27469391.Mobile +919892033197
Permanent Address	:	45B. Ram Nagar, Adhartal, Jabalpur 482 004.
Category	:	General
Educational Qualification	:	B.E. (Civil) M.E(Structural Engineering)
No. years of post degree and relevant experience	:	5 years 10 months. (In Govt.) and more than 13 years in private sector.
Service details:		

DEPAERTMENT	POST	FROM	TO	NATURE OF EXPERIENCE
MP PWD National Highway Circle Shahdol.	ADM	05- 09 -1998 .	30-09-2000	Design and Drawing of various minor and small bridges with rigid and flexible pavement approaches.
Central Railway Bridge Design Cell, PCE Office, HQ CSTM.	SE/ DESIGN			Design and Drawing of various Open Web, Plate Girder, under slung steel Bridges FOB, ROB, RUB, RCC and PSC slabs for non standard skew spans, Rehabilitation of arch bridges by FEM analysis. MW towers and rail stress calculations, POT PTFE and NEOPRENE Bearing. Also developed complex and nested LSP PROGRAM for box culverts for MBG AND IRC loading. Developing inter application between STAAD and EXCEL by writing scripts in STAPLE and VBA.

Presently working with NtrusT Technologies Pvt. Ltd. as SE/ Design

Design and Drawing of various Open Web, Plate Girder, under slung steel Bridges FOB, ROB, RUB, RCC and PSC slabs for non standard skew spans, Rehabilitation of arch bridges by FEM analysis. MW towers and rail stress calculations, POT PTFE and NEOPRENE Bearing.

The above said information is correct to the best of my knowledge.

Experience in private sector

from September 1992 to September 1998	Worked with Usha enviro & energy Pvt. Ltd.	Designed various treatment plants both biological and civil design.
from September 1985 to September 1991	Worked with various private sector design firms as free lancer.	Designed industrial sheds, galvanizing plant, acid storage tanks, multistoried buildings, farmhouses, and commercial complexes.

Details of salient works in design by me

1. Design and detailing of Huma Nalla 497/1 in BSL division BSL-NGP section of CR. Span 4 x 9.15 replacing early steel girders with PSC slabs and increase the waterway by complete redesigning the piers and abutments in RCC.The work also includes the design of launching scheme and phased dismantling of existing structure.
2. Design of Ehegaon viaduct 131/1 in BB section of BB-IGP section of CR. 45.3m underslung girders are to be redesign as the old one had lost their cambers. These girder are nonstandard reveted type underslung with phosphor bronze bearings.(first time in CR)
3. Design of Tapti Bridge 446/1 at BSL of 18 x18.3 and 6 x 24.2 m underslung. Rehabilitation of the said bridge by jacketing of the existing cylindrical piers, and load transfer scheme for the same by shear connectors.(first time in IR)
4. Design and detailing of Sangam bridge rehabilitation and load transfer scheme for Br No 181/1 PA-WD section of CR.Early steel piers are in distress condition and load transfer scheme is complicated as the plate girders are connected by a make shift cross girder.
5. Design and detailing of TATA bridge in PA division PA-KYN section of CR. The bridge was meant for TATA hydro power projects to carry the water for hydroeclectic generation from Bushi Dam to Khopoli by means of two pipelines at the base of the said bridge. TATA is planning to shift the pipeline 60-m below the base. The design includes the curvilinear PSC skew slabs and jacketing of existing piers and abutments in 3-line ghat section.
6. Load transfer scheme with the help of cross steel network in Godavri Bridge of BSL division of CR.
7. Proof checking of ROB at Theur in PA division. The ROB has 3 railway span of more than 25m. 4 lane ROB is resting on 7 PSC girders in M40. The job

Reliance Energy Limited SANTACRUZ (E) MUMBAI

CURRICULUM VITAE

NAME : **SURESH GOVINDRAO NARSAPUR**
ADDRESS : E-11 New Chandra CHS,
Veera Desai Road,
Andheri (W), Mumbai – 400 053.
NAME OF FIRM : NtrusT Technological Services Pvt. Ltd.
POSITION : TRACK / CIVIL / SURVEY ENGINEER
YEARS WITH FIRM : 1 YEARS
TOTAL EXPERIENCE : 40 YEARS
DATE OF BIRTH : 27-08-1940

QUALIFICATION	YEAR	LOCATION	AREA OF SPECIALISATION	TECH. BOARD
Diploma in Civil Engineering	1961	Dharwad	Civil Engineering	Karnataka, Bangalore

MEMBERSHIP OF PROFESSIONAL SOCIETIES

1	Life Member of Indian Institution of Bridge Engineers.
2	Life Member of Indian Institution of Permanent Way Engineers.
3	Association of Consulting Engineers (India)

EMPLOYMENT RECORD

1) Worked as Section Engineer of Karnataka State PWD [1961 – 1963]
2) Worked as Civil Engineer in Central Railway [1963 – 1987] opted for VRS
3) Leader & Partner of Bhavani Engineering Co [1987 onwards]
4) Technical Consultant for a) U.NI.T.E.S., Mumbai.
   b) M.E.C. Engineers Mumbai
   Railway Contractor
   c) N. Mohanlal & Co, Mumbai.
   Supplier of Railway track material.

EXPERIENCE

Participated in the major Civil Engineering projects of Central Railway as under:-

1) Konkan Railway Engineering Survey from Dasgaon to Chiplun & Bhatkal to Manipal.
2) Techno Economic Engineering Survey for Re Modeling of major Railway Yards. (i) Katni, (ii) Bhusawal, (iii) Mathura.
3) Metropolitan Transport Project (Railways), Mumbai; Detailed Engineering Survey and Preparation of Project Report for Sixth and Seventh corroider for Mumbai Suburban Section of Railway.
4) Engineering Survey work of Road Bridge across Kagina River near Shahabad in Karnataka PWD.

TEAM LEADER FOR ALL THE JOB UNDER TAKEN BY BHAVANI ENGINEERING COMPANY

Survey Jobs in Water Supply Scheme:-

1) Nuclear Power Plant at Tarapur.
2) Virar – Vasai.
3) BSES Thermal Power Plant at Dahanu.
4) Dombivali.
5) Ambernath.
6) Badlapur
7) Dahanu
8) Kalyan
9) Ratnagiri and many more survey jobs of MWSSB

Railway Yard / Siding Surveys:

1) Railway Siding for GBL Power Plant at Narsinghpur.
2) ACC Shridhari.
3) Improvement to Railway Siding of Birla Jute Industries Ltd. Satna.
4) Kalyani Steel Ltd. Near Pen.
5) Jindal Steel Ltd. Near Vasind
6) Mumbai Port Trust, Vadala Yard Remodeling.
7) HPCL Mahul and many more Railway sidings.

Optic Fibre Cable Route Survey

1) Kalyan to Pune 142 Kms.

LANGUAGE	READ	WRITE	SPEAK
ENGLISH	EXCELLENT	EXCELLENT	EXCELLENT
HINDI	GOOD	GOOD	GOOD
MARATHI	GOOD	GOOD	GOOD
KANNADA	EXCELLENT	EXCELLENT	EXCELLENT

COMPUTER KNOWLEDGE

1) Windows
2) MS Office
3) AutoCAD

DATE :

(S.G. NARSAPUR)

CURRICULUM VITAE (W)

Name	-	SHRI JAGDISH C. PRADHAN
Proposed Position	-	Track Engineer
Name of Firm	-	N. Trust Technological Services Pvt. Ltd.
Profession	-	Track Consultant
Date of Birth	-	3rd July 1941
Nationality	-	Indian
Years with Firm	-	One year Six Months
Membership in Professional Societies		(1) Indian Railway Services of Engineers (IRSE) (2) Fellow of the Indian Council of Arbitration (FICA) (3) Member of the Indian Council of Arbitration (MICA)

KEY QUALIFICATION

Mr. Pradhan has over 35 years of experience of track / P way &civil engineering over Central Railway and abroad relating to laying and maintenance of track and yard remodeling. He also has over 20 years of practical experience in track maintenance and yard remodeling work in Mumbai suburban section as Executive Engineer of construction wing of civil Engineering department of central Railway. Here he has handled yard remodeling of VT suburban yard for double discharge platform, including its construction. He has also been involved in Carnac Bunder yard remodeling to accommodate 26 coaches with acquiring and exchange of Railway land with state govt land in BMC area. Mr. Pradhan has also been involved in construction of a new passenger terminus at Kurla Lokmanya Tilak Terminus. With his meticulous planning intensive monitoring and legal input, the problem due to unauthorized encroachment in the center of proposed Terminus was removed.

Mr. Pradhan brings to the project vast experience of track construction from IRAQ-Baghadad Al-Quaim-Akashat Railway project through RITES and Thane-Turbhe-Vashi Railway project from MTP.He is presently working as Resident Engineer to four International Engineering consulting firms for projects with MRVC.

Some of the relevant experiences are

Civil, Track and legal consultant with RITES	2001 to 2002
Sub consultant of MTR Corporation of HongKong as coordinator to improvement in Head way –Signalling project of MRVC	2003-2004
Sub consultant of MTR CORPORATION OF Hongkong and coordinator for improvement in Relaible study project for MRVC	2004-2005
Railway Consulting Engineer of LEA associates of Canada for improvement of suburban station building design project-MRVC	2004-2005
Sub consultant SYSTRA France and coordination for establishment of Virar carshed project- MRVC	2005
Legal consultant of COLLIERS International Company for Commercial development of Railway land in suburban section-MRVC	2005

EDUCATION

1961 : Diploma in Civil Engineering (DCE) from board of technical education MP.
1963 : Bachelor of Arts (BA) from Bhopal University MP.
1978 : Bachelor Of Law (LLB) from Bhopal University MP.

EMPLOYMENT RECORD

2005-2003 : Consulting Engineer and Managing director of Ntrust Technological Services Pvt Ltd.
Projects in Operation are Improvement in Headway (Signaling), improvement in Relaible study(Signaling) project for MRVC, improvement of suburban station building design project-MRVC, establishment of Virar carshed project- MRVC and Commercial development of Railway land in suburban section-MRVC

2003-2001 RITES Ltd. As consultant undertook consulting assignments related to track and civil engg assignments such as

- Dronagiri yard – client CONCOR
- Widening of ROB at Thane – client TMC
- ROB of Pune in lieu of L-C – client PMC Pune

2001-1999 : Metropolitan Railway Project as Executive Engineer involved in construction of tracks from Thane to Turbhe – Vashi – Nerul Railway Project for EMU operation.

1999 – 1998 Central Railway
As Executive Engineer in Construction Wing of suburban section, carried out yard remodeling of Carnac bunder, VT , Kurla Terminus , Kalayan and Igatpuri Yard. Also involved in court cases relating to unauthorized encroachments, transfer of land and diversion of water supply, drainage, telephone wires, electrical cables in railway and BMC area. Involved in construction of RCC bridges, widening of water way, washing

aprons, roads, shades in workshop at Matunga, Kurla, Kalayan Carshed etc. Involved in construction of kurla terminus yard.

1998- 1983 Central Railway
As senior section engineer p.way was responsible for maintenance of suburban section between VT and Thane during night blocks etc.

1983-1980 RITES Ltd
As Track Expert involved in laying new Railway tracks in IRAQ through Mendis Junior International Company of Brazil.

1980-1963 Central Railway
As Section Engineer P.Way was responsible for efficient maintenance and safety of tracks between Itarsi and Mathura trunk route. Has accident free Record.

2004-1987 Spl. Metropolitan Magistrate (Hon)
As SMM, was involved in trial and disposal of civil and criminal petty matters in the morning courts of Mazgaon and Dadar, thus reducing the burden of the day courts by quick disposal of current petty matters.

Languages

Languages	Read	Write	Speak
English	Excellent	Excellent	Excellent
Hindi	Excellent	Excellent	Excellent

Certification

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

---

(Signature of staff member and authorized representative of the firm)

Day/Month/Year

Full name of Proposed Staff Jadish Charan Pradhan

Full name of Authorized Representative _____

Mr. Kedarnath Y. Dumakhe.

Work Experience :

1) Worked as "chief controller" with KRCL from 20-07-94 to 31-03-05.

   Responsibilities:
   Guidance to the team for preparing SWR for all the stations beyond Veer (excluding) to Kundapura (excluding).
   Man power management.
   Time tabling.
   Requirement of coaching stock for working passenger trains.
   Regulation of duties.
   Provide training to class 4 staff.
   Given lectures for refresher course of station masters.
   Attended all IRTTC meetings for planning time table.
   Implementation of computerized control operation.

2) Worked as "chief controller-suburban time table" with Indian Railways from June 1987 to June 1994.

   Responsibilities:
   Time tabling of sub-urban services of Mumbai division.
   Planning the extension of suburban services from Nerul to Belapur.
   Introduction of Dombivli local in 1994.
   Attended major accidents at site and in control.
   Mega block planning at the time of opening of Vadala flyover.
   Planning for opening of Roha station .
   Guidance givem to TNI(S.W.R) for preparation of SWR for new stations.

3) Worked as "Section Controller" from 1974 to 1987.

4) Worked as "Assistant and officiated in-charge at Kurla Central Cabin from 1962 to 1974.

5) Worked as "ASM (indoor and outdoor) from 1959 to 1962.

SPECIAL ACHIEVEMENTS AND REWARDS

1) Director Project Konkan Railway Award.
2) Award for bringing the first ever regional Time-Table in 2004.
3) G.M''s Award for co-ordination of All the departments while opening of double discharge platform.
4) DRM Reward for sincerity and dedication.
5) Commendation certificate by Sr.DoM for taking prompt action for saving the life of child in Parsik tunnel.
6) Stood first in SCR course with distinction in 1984.

Personal Details

Date of Birth	-	20th June 1936
Qualification	-	Inter Science
Date of Engagement With Indian Rly		12th November 1956

Address	-	A/9,Jijai Smriti Patharli Road, Gograswadi Dombivali(E),Thane-421201.
Contact@	-	95251-2448660 , 9820674935.

PERSONAL PROFILE

PRANESH S. NARSAPUR
B.E. (Civil), M.ASCE

Capabilities and Professional Skills

- Capable of carrying out detailed Quantity Survey for Highway, Bridge and Building Projects.
- Preparing Tender BOQ, Rate Analysis.
- Preparing detailed work programme, progress reports, S Curve.
- Planning Engineering: Planning, Scheduling and Monitoring of Construction Project.
- Pre-Tendering, Tendering, Evaluation of Tender, Rate Analysis, Submitting documents for Pre-Qualification and Bidding.
- Capable of working on softwares like Autoplotter, Road Estimator, AutoCAD 2004, Primavera P3, MS Project, MS Excel (using advanced calculation formulae) and STAAD 2004 (elementary level).
- Office work related to Prequalification, Bid documents, submission of tender.
- Field Surveying, Leveling, Centerline fixing.

Vision

- To be a successful human capable of not only self-sustenance, but also contribute to the society handsomely.

Job Objective

- To contribute handsomely to the progress of the company in my capacity as a Civil engineer with continuous upgradation of my skills and derive ultimate job satisfaction in the process.

Educational Qualification

- Bachelor in Civil Engineering from Shivaji University with First Class in 2002-03.

Professional Membership

- Affiliate Member of American Society of Civil Engineer. (ASCE)

Service Record

1.	June 2003 to March 2004	:	**M/s. Bhavani Engineering Company., Bangalore.** a consultant specialized in Survey works.
	Project(s)		Short term improvement and routine maintenance of National Highway No 4. from Bangalore to Neelamagala. [20 kms.]
	Job Profile	:	◦ Quantity Surveying on behalf of Principal consultants RITES Ltd., for Billing work. ◦ Field Surveying for taking Original Ground level and Finished Road Level.
2.	April 2004 to September 2004	:	**M/s. Ajwani Infrastructure Pvt. Ltd., Mumbai.** a road contractor.
	Project(s)	:	Various Projects of Road Construction.
	Job Profile	:	Pre-tendering, Tendering, Tender Evaluation, Estimation, Billing, Project Planning using MS Project (using CPM technique).
3.	October 2004 – April 2005.	:	**M/s. XCC Engineers and Planners, Mumbai.** a Mumbai based Consultancy firm.
	Project	:	1. Widening and Strengthening of Western Express Highway from Dahisar to Malad. [8.5 kms.] MUIP Project. 2. Construction of Flyover at Thakur Complex, Kandivali. O.N.G.C. C2, C3 & C4 Recovery Project at Dahej.
	Job Profile	:	◦ Quantity calculation of Various Structures like S.W. Drain, CD's, Pedestrian subways, Vehicular Subways, Bridges on MS Excel and Road items using special software Road Estimator and Auto plotter. Checking, analyzing & rescheduling (if required) of detailed work programme submitted by Contactor. Planning and Design of Drains for Highways.(Using IRC guidelines). ◦ Calculation of Quantities for proposed new flyover at Thakur Complex. ◦ Preparation of Detailed Estimates and BOQ for O.N.G.C. Buildings at Dahej on behalf of Toyo Engineering India Ltd.
4.	April 2005 to till date	:	**M/s. SYSTRA France** An international consulting organisation in Railway and urban transport having its HO at Paris and India Office in New Delhi.
	Project(s)	:	Construction of New EMU Railway Car Shed at Virar.
	Job Profile	:	Quantity Surveying, Planning, Yard Layouts, Drainage design, Estimation, Rate Analysis, Tender BOQ.

'CURRICULAM VITAE

1.	Name	:	ARUN KUMAR MEHROTRA
2.	Address	:	D-250, Rail Nagar, A-l/Sector 50, Noida (UP) - 201 306 Tel: 0120 - 2575018
3.	Nationality	:	Indian
4.	Date of Birth	;„	06.07.1942
5.	Profession	:	Civil Engineer
6.	Specialization		Railway Engineering Worked for 36 years on Indian Railways' as an Officer of Indian Railway service of Engineers. For two years as Adviser Railway works with IRCON International Ltd, a PSU under Ministry of Railways.
7.	Academic Qualification:		B.Tech (Civil Engineering), from Indian Institute of Technology, Madras in First Division
8.	Membership of professional Institutions:		Institution of P. Way Engineers, India - Life Fellow, Institute of Rail Transport, India - Life Member, Indian Institution of Bridge Engineers, India - Life Fellow.
9.	Training in India and Abroad	:	. 12 weeks Advance course for IRSE officers at IRCEN / Pune - Nov. 72 - Jan 73. . 6 weeks Project appraisal and Review Techniques at 11M / Calcutta - July - Aug 85. . 3 weeks Management Development Programme at RSC / Vadorara - Jan - Feb 88.

. Problem of track maintenance on Mixed Heavy Density Routes' - 8 Weeks UNDP training in USA, during April -May 1992

10. Deputation Abroad

Deputation for three and a half years to Iraqi Republic Railways through RITES against Supervision contract for Construction of 480 km long new line.

11. Summary of Experience:

. Professional Railway career spanning 36 years.

. 12 years experience in Railway track management covering installation, maintenance, renewal, inspection and manpower planning together with design, specification, manpower and equipment requirements.

. 9 years experience in the field of Railway Bridges, covering inter-alia framing of policy / guide lines regarding rehabilitation / replacement of early steel girder, distressed and over aged Bridges on Indian Railway.

. 10 years experience in the managerial capacity as Principal Chief Engineer, Divisional Railway Manager and Works Manager, engineering workshop, controlling and responsible for the performance of the entire organization under the control of the respective positions held.

. 2 years as Adviser with IRCON International Ltd, as an adviser in Railway works associated with planning and construction activities of Kashmir rail projects involving a number of tunnels (the longest being 10.5 km), a large number of bridges / viaducts.

12. Professional Experience:

A. General Management: (i) Five years as CHIEF ENGINEER / PRINCIPAL CHIEF ENGINEER, CENTRAL RAIL WAY (19972002)

Principal Head of the Engineering Department of Central Railway, comprising 7151.33 route

kIn (10,896.78 track-kIn), heading a work-force of about 250 Officers in various position & 45,000 Supervisory/field staff. Responsible for planning, approval and execution of all Civil ~ngineering works, with an annual outlay of approx. Rs.I0,000 million (approx. US$ 200 million). Central Railway operates the largest suburban network in the world, serving 67 stations, carrying 3.42 million commuters everyday on 1160 trains and is the lifeline of the Mumbai Metropolis.

Dealing with policy matters related to Track, Bridge and other Civil Engineering Assets; Co-ordination at Senior Management level with the Railway, State/Central Govt. functionaries, representatives ofMNCs, Consultants, Press and Media.

(ii) Three years as DIVISIONAL RAILWAY MANAGER, WESTERN RAILWAY, AJMER (1992-95)

Overall in-charge of the Division, supervising more than 100 officers different departments. In-chargeof operation of passenger and goods trains

Keeping harmonious relationship with organised labour, Press & media. Co-ordination with various Heads of Departments at the Zonal Railway & Senior officers of the State Government.

(iii) WORKS MANAGER (ENGINEERING WORKSHOP) MANMAD (1971-73)

Responsible for fabrication of Open Web/Plate type bridge girders upto 91.5 m span, Microwave towers, other light structures like Foot-over-bridges, Cover-over platforms etc., aggregating to about 250 t per month, besides various P.Way items like turnouts, Switch Expansion Joints, Glued Joints etc.

B. Design & Planning:

(i) Six years as EXECUTIVE DIRECTOR, Civil Engineering (Bridges & Structures), RAILWAY BOARD, Ministry of Railways, Govt. of India (198692)

Responsible for framing policy/ guidelines regarding Bridges and rehabilitation! replacement of early-steel girders, distressed and over-aged bridges on Indian Railways.
Planning for the fabrication programme of Bridge girders & other structures like Microwave Towers, Foot-over-bridges etc. in various Engineering Workshops on Indian Railways. Closely associated with planning and execution of 'State of the Art' Bridges, viz. 3rd Godavari Bridge on S.C.Railway comprising 28 x 94 m Bow string type PSC girders, 39 x 48.5 m Box PSC girders over Vasai Creek on Western Railway etc.

(ii) Three years as DEPUTY CHIEF ENGINEER (BRIDGES), EASTERN RAILWAY, CALCUTTA (1983-86)

In-charge of design and drawing for steel bridge girders, RCC structures, including RCC/PSC bridges, Computation of rail stress and formation pressure for new types of rolling stock. Liaison with RDSO for various bridge designs, Bridge Standards Committee, Modernisation of Bridge Workshop.

C. CONSTRUCTION : (i) Three years and six months as SITE ENGINEER WITH IRAQ REPUBLIC RAILWAYS, on Deputation through RITES (1979-83)

Responsible for supervision of Earth- work in formation and Bridge construction activity for the new 330 km long Bhagdad-AlquaimHasaibah and 150 km long Alquaim-Akashat Railway lines. The terrain traversed necessitated construction of tall viaducts across deep valleys, high embankments with some stretches in treacherous soil, necessitating deployment of heavy earth-moving machineries. Deep cuttings involved extensive controlled blasting. Ready

Mix Concrete (RMC) used for the concreting work. Job content also involved approval of drawings, supervision of field work to ensure execution, as per prescribed specification & approved drawings and verification of Bill of qua~tities for On Account I Final Bills. Main Contractors for the project - Mis Mendes Junior International of Brazil & Consultants for the project - Mis SOTECNI of Italy.

(ii) Two years as EXECUTIVE ENGINEER (Doubling) CENTRAL RAILWAY (1973-75)

In-charge of Dhaura-Karonda section (15 km) doubling on 'A' route of Central Railway involving high embankment, deep-cuttings, a number of bridges including one major bridge of 4 x 45.72 m span through girders, construction of Micro-wave towers and other service buildings.

(iii) One year and nine months as ASSISTANT ENGINEER (Regirdering), CENTRAL RAIL WAY, JHANSI (1969-70)

Associated with Regirdering of 76.2 m span Bridge across the River Yamuna in addition to re-girdering of about 100 girders of 12.2 m spans under traffic conditions.

D. MAINTENANCE : (i) One year and four months as CHIEF TRACK ENGINEER, CENTRAL RAIL WAY (1996-97)

Overall in-charge of P.Way works on Central Railway, which inter-alia, covered Formulation of Track renewal proposals, arrangement of materials, monitoring progress and issuing Executive instructions conforming to policy guidelines.

(ii) One year as CHIEF ENGINEER (Track Modernization), CENTRAL RIALWAY - (1995-96)

Responsible for optimum utilisation of a fleet of 40 different types of Track maintenance I relaying machines deployed on Central Railway

including their proper upkeep through AMCs with the OEMs and timely procurement of spares. Issuing' Executive instructions conforming to policy guidelines.

(iii) One year as ASSISTANT ENGINEER (Maintenance), JHANSI, CENTRAL RIALWAY (1970-71)

In-charge of maintenance of track, bridges, buildings, water supply and drainage installations, loco sheds marshalling yards etc. track Renewals. Dealing with labour and Unions. Contract Management

7. RESEARCH & DEVELOPMENT

Four and half years as DEPUTY DIRECTOR, RESEARCH (CIVIL) & DY. DIRECTOR (PUBLICATIONS), RDSO (1975-79)

Dealt with up-gradation of track maintenance practices, track monitoring/recording cars, introduction of appropriate technology on Indian Railways in line with development in the advanced countries.

Responsible for publication, editing of various reports and Technical Journals issued from RDSO as official publications.

BIODATA OF SHRI M. S. EKBOTE
(Updated in April. 2004)

Name in full (in block letters)	**MR. MANIK SHRIKRISHNA EKBOTE**
Date of Birth	11th August 1943
Residential Address	A-603 Shilpa Housing Society Near MIT College Kothrud Paud Road PUNE-411 038 (INDIA) Phone no 91-20-25450040
Academic Qualifications	Bachelor of Engineering (Hons.) (Bombay University) Master of Engineering(Civil)(I. I. Sc-Bangalore)
Membership of Professional Bodies	a)Institute of Permanent Way(India)-Life Member b)Institute of Rail Transport (India)-Life Member c)Indian Institute of Bridge Engineers-Life Member
Position Last held	Additional Member(Civil Engineering) Ministry of Railways (Railway Board) Government of India New Delhi-110 001 (Retired in May 2003)
Details of Experience (General)	Worked for over 36 years on the Indian Railways as an officer of the "Indian Railway service of Engineers" and the work experience includes various facets of Railway working including Maintenance and construction of Railway lines ,Research Design of Railway Bridges and training of Railway officers for Higher positions.
	Before joining Railways in the IRSE cadre (Jan1967) I had worked for about 2 years in the CEDB (Central Engg and Design Bureau) under HSL as Asst Design engineer for the 1.8 m ton Expansion Project of Rourkela steel plant. The CEDB has subsequently been made in to separate Corporation MECON.

B-Details of Experience
(with important assignments handled)

1. Construction of Railway Lines	a) Worked on the new Railway line construction Project between Viramgam and Kandla for two years(1969-1970) in the Gujrat state of India. The project was to connect the important Port of Kandla with Hinterland by a Broad Gauge line b) Worked as Executive engineer on the New Railway line(1971-72) to a Thermal power House coming up at Ukai in Gujrat state along with a number of other Line capacity works on the Surat Jalgaon section Of Western Railway.
2. Research and Design Work	A) Worked as an Assistant Director and Deputy Director(1973-mid 1979) in the Research and design Organization of Indian Railways(R.D.S.O.- a premier R& D organisation dealing with Railway Research and Design) in the Bridge and Structures wing. During this period I had the opportunity to Conduct field trials and study for revising the Codal provisions pertaining to Bridge Impact And longitudinal forces for Railway Bridges. B) During working at RDSO I was associated with Preparation of Standard designs for concrete and Prestressed concrete Bridges to Railway Loading. The work also involved assessment of the strength of Existing Bridges for permitting heavier loading and higher speeds.
3. Maintenance of Railway Track,Bridges and other assets	A) Worked as Senior Divisional Engineer (co--Ordination) (mid 1979-mid1982) on the Vadodara Division of the western Railway. During this period I had a very good Experience of maintaining the prestigous high Speed Rajdhani route of Indian Railways. In addition I had also to plan and execute important track relaying and Bridge works on the Division. The works such as accident management , Safety etc were a part of the responsibility. C) Worked in the track cell of Western Railway as Deputy Chief Engineer(track-Modernization)(mid 1982-1987) dealing with Track recording, running of oscillograph cars

Dy C. E.(TM) C.E.(South)	analysis of data, laying of Long welded rails, promoting use of concrete sleepers , monitoring use of track machines etc. D) Worked as Territorial Chief engineer in charge Of Mumbai and Vadodara Divisions !988-89) of western Railway. Overall in charge of all aspects of Civil Engineering i.e. track maintenance , renewals, line capacity ,Bridge works etc. These two Divisions are the heaviest Divisions on the Western railway with very high intensity of Traffic
Chief Track Engineer (western Railway) (Nov 1995- Aug 1997) Chief Engineer (principle) Sep 1997- May 1998 (S. E. Railway) May 1998-Feb 2002 (Western Railway)	E) In charge of all matters concerning track , i.e . maintenance , planning for renewals , controlling Accidents , procurement and supply of P. Way Materials , controlling work budget on the Railway and controlling P. Way cadre. F) In charge of Engineering department As Principal Head of the department. Dealing with track, bridges, maintenance & construction of structures, Planning for future requirements , cadre Control, Industrial relations etc.
4) **Training and Development** Sr Professor/ IRICEN-Pune	Working as Sr. Professor on the faculty. Dealing with Training of railway officers at all levels and conducting class room lectures on subjects of curves , LWRs/CWRs, Computer Applications in civil Engineering. Bridge design calculations on Abutments, Piers and Limit state design etc.
5) **General Management** Divisional Railway (Manager) HUBLI S.C.Rly (Apr 93- Oct 96)	Working as Divisional Railway Manager, controlling functioning of the Division in all respects. Monitoring loading, earning, maintenance Of assets, manpower planning, keeping peaceful Industrial relations, maintaining contact with press, Media etc. During my tenure as DRM over 500 kms. Of gauge conversion was completed.

6) **Experience in Railway Board (Ministry)** Additional Member(Civil Engg) & (Works) (Mar 2002-May 2003)	Monitoring selection ,approval , progress of all important works under the Plan heads of New Lines, Gauge conversions, Doublings, traffic facilities, workshops etc All aspects of Policy matters on IR for Civil Engg. Track, Bridges, Procurement, Planning, Progress of track and Bridge works etc
7) **Visits Abroad** Apr 85-Jul 85 (12 weeks) UK Jul 1990 UK Mar 1993 (3 weeks) Nov 2002 (3 days)	Senior Management Course at Railway School Derby, U. K Attended a week's Seminar on Rail wheel Contact Mechanics at St. John College Cambridge, U. K. Attending a Special course on "Rail Welding" organized by M/s RITES through Zeta-Tech. Associates Cherry Hills –NJ Attended Infrastructure Managers Seminar and Meeting of UIC (International Union Of Railways) at Budapest-Hungary.
8) **Presentation Papers at Seminars**	Presented papers at a number of Technical Seminars in India Also published a number of technical Journals in India (Lists at **Annexure A**)
9)**Computer Skills**	A number of computer programs have been developed by me on a variety of subjects concerning permanent way which have been published by IRICEN-PUNE in a CD in March 2002. The list is at Annexure B. These programs have recently been modified as Visual Basic Applications

Bio Data of Mr. Vinod Kumar Sharma,
General Manager, Metro Railway, Kolkata

SECTION – 1

1.	Name	::	VINOD KUMAR SHARMA
2.	Father's name	::	Shankar Das
3.	Date of birth	::	9th December 1944
4.	Date of entry to Class I Service as IRSE Probationer	::	01-05-1967
5.	Date of superannuation	::	31-12-2004 as General Manager, Metro Railway, Kolkata.
6.	Present address	::	Office (till 31.12.04): Metro Railway, Metro Rail Bhavan 33/1, J. L. Nehru Road, Kolkata – 700 071 Residence : 8, Belvedere Park Eastern Rly. Officers Enclave 23, Belvedere Road, Alipore Kolkata – 700 027
7.	Telephone Nos.	::	(033) 2245-7320 (O) till 31.12.04 (033) 2479-1496 (R) (+91) 98313-42180(Mobile)
8.	Educational / Professional Qualifications	:: i)	Passed B. Tech in Civil Engineering from IIT, Mumbai in the year 1965.
		ii)	Passed M. Tech in Structural Engineering from IIT / Mumbai in the year 1967.
9.	Languages known	::	Can read, write and speak Hindi, English & French

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SECTION – 3

Details of Work Experience

1. **January 2002 - December 2004 :**
As General Manager, Metro Railway, Kolkata, was in overall charge of Operation and Maintenance of Metro Railway, Kolkata having a staff strength of 3600, a Revenue Budget of Rs. 90 crores and Construction budget of Rs. 130 crores. Was in charge of the following projects:

   (i) Extension of Kolkata Metro from Tollygunge to New Garia - The project involves construction of 9 kms. of Track with 6 stations, procurement of 56 coaches, Signaling based on Continuous Automatic Train Control, 3rd rail power collection and elevated track structure for more than 80% of the length. Cost of the project – Rs. 910 crores.

   (ii) Construction of Eastern Railway's Circular Railway project from Prinsepghat to Majerhat (6 Kms. length), mostly elevated track with 3 new stations and 25 KV AC electrification. Cost of the project – Rs. 120 crores.

   (iii) Construction of Eastern Railway's Circular Railway project from Dum Dum Cantonment to N. S. C. Bose Airport. The project consists of construction of new line track (mostly elevated) having a length of about 4 Kms. There are 2 new stations and the line is to be equipped with 25 KV AC traction. Cost of the project – Rs. 112 crores.

   Further during the period August 2004 to December 2004, **worked as General Manager (Construction), Northeast Frontier Railway** as an additional charge. As General Manager (Con) was incharge of all the construction projects on N F Railway. The ongoing projects consisted of 2112 kilometers of gauge conversion, double line and new lines. The value of work being executed in 2004 – 05 is expected to be Rs.560 Crores. The construction activities included tunnels, viaducts, high embankments, deep cuttings, etc. in difficult and remote regions with a number of local problems including those of law and order.

2. **December 2000 - January 2002**
As Chief Administrative Officer (Construction), Western Railway was in charge of Design, Planning and Construction of new Railway lines, Double lines, Gauge Conversion, Electrification, Line capacity works including Signalling works for the undivided Western Railway having a route Km. of 5,100 on Broad Gauge and 4,340 on Metre Gauge. Notable works progressed :- Quadrupling from Borivali to Virar, including new Vasai Creek Bridge, 5th line from Bandra to Borivali, Train Describer System for suburban section of Western Railway, Works for Running of 12 coach suburban rakes and Electrification of Surat – Jalgaon section. Funds utilized during the year amounted to Rs. 350 crores.

3. **January 1997 - December 2000**

   As Director, Indian Railways Institute of Civil Engineering (IRICEN), Pune, was in charge of entire functioning of the Training Institute, which imparts training to Civil Engineering officers of the Indian Railways in the fields of Track, Bridges and Structures. Was responsible for ISO – 9001 certification of the institute in 1998 the first for a Railway training institute. Also acted as coordinating faculty and delivered lectures on Project Management, Metro Construction, Tenders and Contracts, Track structure, etc. to trainee officers.

4. **August 1994 – December 1996**

As Dean, Indian Railways Institute of Civil Engineering (IRICEN), Pune, was responsible for the planning and scheduling of courses, . Also planned and coordinated out-station field courses which were organised for zonal railways. Planned and coordinated with out-side bodies and conducted courses for outside organization such as Gammon India and FCI at IRICEN. As teaching faculty delivered lectures on :- Bridge design and construction, Track structure and maintenance, Metro construction, Project Management, Tenders and contracts, etc.

5. **July/August 1994**

Was deputed to Algerian National Railway with headquarters in Algiers for assisting the Algerian Railways for finalizing the project reports on construction of 5 new railway lines.

6. **January 1994 - July 1994**

As Chief Track Engineer, Northeast Frontier Railway was in over-all charge of all track matters including track maintenance and renewals, procurement of track materials, concrete sleepers production and laying, track machines working, coordination of gauge conversion works, etc.

7. **February 1992 – January 1994**

As Chief Bridge Engineer, Northeast Frontier Railway was in over all charge of Design, Construction and Maintenance of bridges including restoration works of bridges due to washaways, coordination of bridge works on Gauge Conversion projects

8. **June 1990 - February 1992**

As Additional Divisional Railway Manager, Guwahati, was in overall charge of functioning of all departments, connected with all operation & maintenance activities associated with running of passenger and freight trains in Guwahati area of Lumding Division.

9. **May 1985 - April 1990**

Was deputed through RITES for 5 years on the Algerian National Railways for the construction of 160 Km. long new railway line from Ain Touta to M'Sila. Was in-charge of designs and supervision of construction of earthwork and bridges and track laying, involving heavy earthmoving machinery and entirely mechanized bridge work and track laying.

10. **January 1982 - April 1985**

As Dy. Chief Engineer, Bridges on Central Railway, was in-charge of preparation of design and drawings of bridges, Machinery & Plant planning and procurement for Civil Engineering Department, Planning and design of road over bridges, etc.

11. **January 1980 - January 1982**

As Senior Divisional Engineer, was in-charge of maintenance and renewal of track and structures over the Trunk Route section on Central Railway and large colonies involving track renewal works, laying of long welded rails and track maintenance by on-track machines. In addition performed the duties of coordination of functioning of Civil Engineering branch on the Division.

12. **From September 1972 to December 1979**

As Assistant/Deputy Director RDSO was engaged in projects associated with the design, laying and maintenance of Long Welded Rails, Rail-wheel-interaction, development of track recording-cum-research car and rehabilitation schemes of weak track formations.

13. **From September 1971 to August 1972**

As Executive Engineer in Central Railway, Mumbai was responsible for execution of various types of works, such as surveys for New lines, construction of road over and rail under bridges in heavy traffic density and electrified suburban sections, traffic facility works, construction of multi-storied buildings and yard remodeling, etc.

14. **From May 1967 to September 1971**

As Assistant Engineer in Central Railway (after completion of 2 years probationary training), was responsible for carrying out surveys for new lines in difficult Ghat sections of Western Maharashtra, construction and maintenance of railway lines, yards, service buildings, colonies, etc.

15. **Other important works executed**

Was Chairman of the Civil Engineering Committees on standardization for 4 years (from January 1997 to December 2000) on the Railways including the Track Standards Committee and Bridge Standards Committee. Was also responsible for revision of Arbitration Clause in General Conditions of Contract of the Indian Railways, consequent upon the promulgation of Arbitration & Conciliation Ordinance, 1996. In addition to above, was actively associated with the revision / evolution of the following manuals for Indian Railways:-

1. Indian Railways Permanent Way Manual (revised)
2. Indian Railways Manual for Track Machines (new)

Was deputed by the Ministry of Railways on study tour of Swedish Railways in 1995 and also studied the functioning of Metro systems of Vienna, Los Angeles and New York.

SECTION - 2

Position held during the Railway Service

Sl. No.	Designation & Organisation	Period	
		From	To
1	General Manager, Metro Railway, Kolkata	Jan 2002	Dec 2004
2	Chief Administrative Officer (Construction), Western Railway, Churchgate, Mumbai	Dec 2000	Jan 2002
3	Director, Indian Railways Institute of Civil Engineering (IRICEN), Pune	Jan 1997	Dec 2000
4	Dean, Indian Railways Institute of Civil Engineering (IRICEN), Pune	Aug 1994	Dec 1996
5	On deputation to Algerian National Railway (through IRCON)	15th Jul 1994	15th Aug 1994
6	Chief Track Engineer, N. F. Railway, Guwahati	Jan 1994	July 1994
7	Chief Bridge Engineer, N. F. Railway, Guwahati	Mar 1992	Jan 1994
8	Addl. Divisional Railway Manager, N. F. Railway, Guwahati	June 1990	Feb 1992
9	On deputation to Algeria (through RITES)	May 1985	Apr 1990
10	Deputy Chief Engineer, Central Railway, Mumbai	Jan 1982	Apr 1985
11	Senior Divisional Engineer, Central Railway, Jhansi	Jan 1980	Jan 1982
12	Assistant / Deputy Director, RDSO, Lucknow	Sept 1972	Dec 1979
13	Executive Engineer, Central Railway	Sept 1971	Aug 1972
14	Assistant Engineer, Central Railway	May 1967	Sept 1971

Proposed Position : Consultant, Railway Signalling and Telecommunication.

Name of Firm : (To be filled in by the firm)

Name of Staff : VASANT NARAYAN PHADNIS (V. N. Phadnis)

Profession : Telecommunication and Railway Signalling

Date of Birth : Second August Nineteen hundred and Thirty-four (02.08.1934)

Years with Firm/Entity : (To be filled in by the firm) Nationality : Indian

Membership of Professional Societies:

(i) Chartered Engineer of Institution of Engineers, India (C. Eng(I))
(ii) Fellow of the Institution of Railway Signal and Telecommunication Engineers (FIRSTE)
(iii) Fellow of the Institution of Engineers, India (FIE)

Detailed Tasks Assigned: (To be filled in by the firm)

(list tasks the consultant will carry out; match to the objectives of the project)

Key Qualifications:

Training:

a) Computer Training:

i) Autocoder- Seven weeks with IBM, Delhi in 1970
ii) FORTRAN - Two weeks with TIFR< Bombay in 1965.
iii) PASCAL – Four weeks with NCSDCT, Bombay in 1979.
iv) CICS/VTAM – Two weeks with CN/TRACS, Canada in 1985.

b) Job Evaluation: Six weeks with Administrative Staff College, Hyderabad (ASCI) in 1978.

c) Project Formulation and Implementation – Four weeks with NITIE, Bombay in 1978.

d) International Railway Systems –

i) Rapid Transit Systems – Six months with London Transport and British Rail and Firms under UNDP Fellowship, in 1976.
ii) Freight Computerization – Two weeks on TRACS with CN, Canada in 1985.

Experience:

a) 5 years in Operation and Maintenance of Railway Signalling and Telecom. Systems:

i) Northern Railway Wireless and Land line systems (Assistant Engineer), one year during 1960-1961.
ii) Central Railway Divisional Signalling and Telecom. Systems at Nagpur and Bombay VT, for six months during 1972.
iii) North Eastern Railway Signalling Systems, as Deputy Chief Signal Engineer, for one year in 1975-1976.
iv) Northern Railway Communications Systems, as Chief Communications Engineer, for six months in 1982-1983.
v) Central Railway Signalling and Communication Systems, as Principal Chief Signal and Telecommunication Engineer, for two years in 1990-1992.

b) 5 years in Construction of Railway Signalling and Telecommunication Systems:

i) Northern Railway, Special Signalling Works on Ferozepur Division, for 1 and ½ years during 1961=1962.
ii) Northern Railway New Line Construction to BG Standards, as Senior Engineer, for 2 and ½ years during 1962-1964.
iii) Eastern Railway Signalling and Telecom. Works, including RRI and multichannel Microwave Links, for one year during 1984-1985.

c) 9 years in Planning and Design of Systems for Railways:

i) Planning and Design of Rapid Transit System for Bombay, Signalling and Telecom. Member of MPT® Team for Sixth and Seventh Corridor Report, for 3 years in 1972-1975.
ii) Co-ordination and Planning of Indian Railways Telecom. Systems, as Additional Director in the Railway Board, for 3 years in 1979-1982.
iii) Planning an Integrated Telecom. Network for Indian Railways with System for Freight Computerization as first phase, as Chief Telecom. Manager of Central Organization for Freight Information System (COFOIS), for 3 years during 1984-1987.

d) 9 years in Training of Signalling and Telecom. Engineers:

i) Training of Signalling and Telecom. Engineers and Supervisors (Indian and Foreign), as Senior Lecturer at Indian Railway Institute of Signal Engineering and Telecom. (IRISET), Secunderabad, for 7 years during 1964-1972.
ii) Training of Signalling and Telecom. Engineers and Supervisors (Indian and Foreign), as Dean of the faculty at Indian Railway

Institute of Signal Engineering and Telecom. (IRISET), Secunderabad, for 1 years during 1987-1988.

e) 3 years with International Consultants, Canadian National Railway (CN) Team for TRACS Freight Computeriztion Scheme and German Team DETECON for Integrated Telecom Planning for Indian Railways during 1984-1987.
f) 2 years for rehabilitation, operation and training for High Speed Baghdad-Al Quaim-Akashat Railway Line, as Chief Manager (signal and Talecom.) of the team deputed by Indian Railways, through RITES, during 1988-1990
g) Since retirement from active railway service worked as Consultant:
    - To RITES for Delhi RTS Project Report.
    - To RITES for Fibre Optic cable installation on Mumbai VT- Kalyan Section of Central Railway.
    - Peerless Finance and General Investment for V-SAT and e-mail network.
    - HSCCI for data communication for Bhopal Hospital Project.
    - Tata Infotech for Train Management System (TMS) and Mobile Train Radio Systems Quotation for suburban systems of Central and Western Railways.

Give an outline for staff member's experience and training most relevant to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. Use about 1/2 to 3/4 page.

Education: i) Passed Bachelor's Degree in Telecommunication with Distinction from University of Poona, India in 1956.

ii) Two years Probationary Course in the Indian Railway Service of Signal Engineers (IRSSE) of the Superior Revenue Establishment of the Indian Railways, during 1956-1958.

Summarize college/university and other specialized education of staff member, giving names of schools dates attended, and degrees obtained in the following order:

Highest degree, discipline, university name, state, country, year

Next level, etc....

Employment Record:

- 1992-to date : Consultant in the field of Telecommunication and Railway Signalling.
- 1990-1992 : Principal Chief Signal and Telecommunication Engineer, Central Railway.
- 1988-1990 : Chief Manager (Signalling and Telecom.), RITES Team for BAAR Project, Iraq.
- 1987-1988 : Dean of the Faculty, IRISET, Secunderabad.
- 1985-1987 : Chief Telecom. Manager, COFOIS, New Delhi.

- 1984-1985 : Chief Signal and Telecom. Engineer (Construction), Eastern Railway, Calcutta.
- 1983-1984 : Chief Communication Engineer, Northern Railway, New Delhi.
- 1979-1983 : Additional Director (Signal and Telecom.), Railway Board, New Delhi.
- 1976-1979 : Deputy Chief Signal and Telecom Engineer (Planning), Western Railway, Churchgate, Bombay.
- 1975-1976 : Deputy Chief Signal Engineer, North Eastern Railway, Gorakhpur.
- 1972-1975 : Deputy Chief Signal and Telecom. Engineer, Metropolitan Transport Project, Bombay.
- 1972- 1972 : Senior Signal and Telecom Engineer (Microwave), Central Railway, Bombay.
- 1964-1972 : Senior Lecturer in Electronics, IRISET, Secunderabad.
- 1962-1964 : Senior Signal and Telecom. Engineer (Construction), Chunar-Chopan-Garhwa Road Rail Project, Northern Railway, Chopan.
- 1961-1962 : Assistant Signal and Telecom. Engineer (Special Works), Northern Railway Ferozepore Division, Ferozepore.
- 1960-1961 : Assistant Signal and Telecom. Engineer (Wireless), Northern Railway, New Delhi.
- 1958-1960 : Probationary Assistant Signal and Telecom. Engineer, Northern Railway, New Delhi.
- 1956-1958 : Assistant Lecturer in Radio Engineering at the College of Engineering, Poona.

Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organizations, titles of positions held, and locations of assignments. For experiences in the last 10 years, also give types of activities performed and client references where appropriate. Use about 2 pages. If someone has been employed at one organization but has moved up in ranks, please list from the earliest date of employment and the latest position. Note that previous positions held at the organization included other positions. I.E., 1969-Present, Oregon State University - Professor of Education. Previous positions include Adjunct Professor of Education, Assistant Professor, etc....

Year -Present Position and Employer.

Brief description of duties/responsibilities.

Selected Consultancies

Identify relevant consultancies using the following

Since retirement from active railway service worked as Consultant:

- To RITES for Delhi RTS Project Report.(1993-1996)
- To RITES for Fibre Optic cable installation on Mumbai VT- Kalyan Section of Central Railway.(1997-1999)
- Peerless Finance and General Investment for Planning and Tendering for V-SAT and e-mail network.(1996)
- HSCCI for data communication for Bhopal Hospital Project.(1998)

- Tata Infotech for Train Management System (TMS) and Mobile Train Radio Systems. Quotation for suburban systems of Central and Western Railways.(1999-2002)

Year, Position, Name of Project, Country, description of duties.

(i.e - 1993-1994, Agricultural Analyst, Agricultural Policy Development Project, Burundi. Responsible for etc....)

Languages: English, Hindi, Marathi –Excellent for speaking, reading and writing.

Kannada- Good for speaking, fair for reading and writing.

French – fair for reading, poor for speaking and writing.

(For each language indicate proficiency: excellent, good, fair or poor in speaking, reading and writing. i.e. English - excellent speaking, reading, and writing; Bengali - good speaking and reading, poor writing, etc...)

Certification:

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

_____

Signature of Staff Member or authorized official from the firm

_____

Day/Month/Year

(VASANT NARAYAN PHADNIS)

CURRICULUM VITAE

Proposed Position	:	Consultant Signal Engineer & Co- Team Leader.
Name of the Firm	:	NtrusT Technological Services Pvt. Ltd.
Name of the Staff	:	V.P. Rajan
Profession	:	Consultancy in Railway Signalling Projects and Designs.
Date of Birth	:	10th April 1940,
Year with Firm/Entity	:	Recently Associated **Nationality** : Indian
Membership in Professional Societies	:	Nil
Detailed Task Assigned	:	Nil

Key Qualification

Over 30 years of all round experience in Signal & Telecom. Department of Indian Railways. Important assignment were Design of signalling circuit and plans, planning and works programme on Central Railway – Inspection and testing of Signal and Telecom Equipments as per IRS specification or quality assurance and use on Railways such as Point machine, Relays of various types, Audio Frequency track circuit equipments, Single and 3 phase track circuit equipment, Electronic axle counters, Signal accessories, Terminal, fuses, various types of cables, track insulation materials, power equipment's, such as batteries, battery chargers, inverters, converters, stabilizers etc.-Planning, installation, testing and commissioning of Signaling equipment and also their maintenance in busy suburban section of Mumbai Division -5 years of imparting training to Railway Apprentices and trainees in Signalling Practices of Indian Railways – Installation, testing , commissioning and maintenance of signalling equipment in 25KV AC electrified section of Bhusawal division. Experience also includes design of signaling circuit with Siemens's practice for ten panels and five RRI stations and Automatic Signalling in Mumbai suburban section.

Successfully completed 14 months of initial and promotional training in Signal Engineering at Indian Railways Institute of Signal Engineering & Telecommunications, Secunderabad, 7 months of training at various field installations on Central Railway and 2 months of orientation course at Railway staff college, Vadodara.

Reliance Energy Limited
Reliance Energy Centre

Education

B.Sc. (Physics & Maths) Kerala University in 1961.

Employment Record

From May 1998 to till date : Signal Consultant to various companies including NtrusT Technological Services Pvt. Ltd.

From 1964 to 1998 served in various capacities in the Signal & Telecom. Department of Indian Railways. Some of the key position held include :

Senior Signal & Telecom Engineer (HQ) – IRSSE – 1 year.

Design of Signalling plans & circuits, planning and works programme in Central Railway.

Deputy Director (S & T) inspection, RDSO-IRSSE-3.5 years.

Inspection and testing of Signal & Telecom Equipments as per IRS Specification for quality assurance and use on Railways such as Point Machine, Relays of various types, Audio frequency track circuit equipments, Single and 3 phase track circuit equipments, Electronics axle counters, signal accessories, Terminals, fuses, various types of cables, track insulation materials, power equipments, such as batteries, battery charger, inverters, converter, stabilizers etc.

Divisional Signal & Telecom Engineer (Const.) IRSSE-4.5 years.

Planning Design of Signalling circuits, installation, testing and commissioning of major Route Relay interlocking along with yard remodelling at Lonavla, CSTM & Bhusawal and panel interlocking at 4 stations on new Project line between Mankhurd and Belapur, Replacement of aged track circuit equipments with 3 phase track circuit (120 nos.) addition of 60 new signal along with track circuit in the automatic section between Thane and Kalyan station in the busy electrified suburban section of Mumbai Division. Major alteration along with yard remodeling at busy Itarsi RRI in Bhusawal Division.

Asst. Signal & Telecom Engineer (Const.)- 4.5 years.

Planning, design of installation, installation, testing and commissioning of signalling work such as Route Relay interlocking, Panel Interlocking, Automatic block Signalling & Intermediate Block Signalling as a replacement of worn-out signaling gears as well as new works. Design of signaling circuit for panel and RRI (Entrance Exit Siemen's System) and Automatic Signalling. Tackled about 10 panels and 5 RRI Installations in busy suburban section of Mumbai Division.

Asst. Signal & Telecom Engineer (Maintenance) – 2 years.

Maintenance of Signalling gears in busy suburban section of Mumbai Division of Central Railway.

Sr. Instructor (Signal) – 5 years.

Imparting training to Apprentices and trainees in signalling practice on Central Railway at the Basic Training centre at Byculla.

Languages	Speak	Read	Write
English	Good	Good	Good
Hindi	Good	Good	Good
Malayalam	Good	Good	Good

Certification

I, the undersigned , certify that to the best of my knowledge and belief, this data correctly describe me, my Qualificaions and Experience.

Signature

_____ Date : _____

Full name of staff member: V.P. Rajan

Full name of uthorized representative : - _____

Proposed Position	:	**Telecommunication and Railway Expert**
Name of Firm	:	Consulting Engineering Services (India) Limited
Name of Staff	:	**BALWANT GANGADHAR KALE**
Profession	:	Telecommunication Engineering & Railway Signalling
Date of Birth	:	30 July 1932
Years with Firm	:	1 Year **Nationality:** Indian
Membership of Professional Societies	:	Fellow, Institution of Engineers Fellow, Institution of Electronics & Telecom Engineers Fellow, Institution of Railway Signalling & Telecommunication Engineers

Key Qualifications:

Mr. Kale has more than 40 years of experience in the field of Railway Signalling and Telecommunication Engineering with 33 years of valuable experience in Indian Railways Service of Signal Engineers. While carrying out different projects under 1st to 7th Development Plans, he was involved in implementation of modern signalling techniques to enhance safety and line capacity, building of telecommunication infrastructure and improvement of customer services and public information systems. He had the excellent opportunity of working in different parts of India for Indian Railways as well as for Nigerian Railways, German Federal Railways (DB) and RITES.

Mr. Kale has successfully implemented projects involving **improvement of line and yard capacities making use of Inter-Locking, automatic signalling, three and four aspect signalling, panel and route relay interlocking, for busy Bombay Suburban sections** and **Intermediate Block Inter-Locking in the approach to Bombay Suburban Section.** He was also responsible for installation and commissioning of a pioneering multidisciplinary safety project of **Auxiliary Warning System on the busy suburban section of the Western Railway.**

His experience in **modern signalling** embraces design of **state-of-art metal to metal relays, solid state elements, microprocessor based evaluation and regulatory systems, inductive elements, opto electronics, AC immunisation, audio frequencies, track circuit elements and others.**

Mr. Kale has undergone advanced training in modern signalling and telecom technologies with Deutsche Bundesbahn Siemens AG Telefunken. During his engagement with German Railways, Siemens and Halske, he was acquainted with use of electronic digital equipment to enhance safety for centralised traffic control at Frankfurt and Münich.

Mr. Kale was responsible for planning, design, installation and commissioning of first ever fully indigenous **Multichannel Microwave system** on the major trunk routes. He was primarily involved in planning, procuring and installing first ever **Optical Fibre Communication Cable Network for Indian Railways**, which till now serves as the backbone of communication on the suburban section of Western Railway.

To enhance the facilities for the commuters on the sub-urban section, Mr. Kale actively participated in planning and installation of **Ticket Vending Machines, Passenger Information System** including **centrally recorded announcements, Centralised Control of Clocks, CCTV** etc.
He also actively participated in devising telecommunication facilities to help disaster management

Education : Bachelor of Engineering(Hons) in Telecommunication Engineering, Government Engineering College, Jabalpur, M.P., 1951-55.

Other Training : Telecommunication Installation and Maintenance, P&T Deptt., 1955
Electrical Power Distribution, Nagpur Electric Light & Power Co., 1953
Professional Training in Railway Signalling Technology and Telecommunication Administrative Training, Railway Staff College, 1957-59
Advanced Training in Modern Signalling & Telecommunication Technologies, Deutsche Bundesbahn Siemens AG Telefunken Gmbh, 1963-65
Integrated Circuits, Institute of Signal & Telecom Engineering, 1980
Microwave Electronic Integrated Circuits, Institute of Electronics and Telecom Engineers, Indian Railways, 1992

Employment Record:

FROM 1997 TO DATE	:	**CONSULTING ENGINEERING SERVICES (INDIA) LIMITED, Consultant**
FROM 1990 TO 1997	:	**FREELANCE CONSULTANT** Prepared the Project report on Telecommunication for Mumbai Metro rail project (MMPG) through UNITES. Involved in design of signaling and communication works for new railway tracks for UNITES. Feasibility report on Telecommunication for Reliance Industries Ltd. Planning and construction of point to multipoint, TDM/TDMA multi channel microwave project for W S Industries Bangalore.
FROM 1955 TO 1990	:	**INDIAN RAILWAYS SERVICE OF SIGNAL ENGINEERS** Joined as **Assistant/Telecommunication Engineer Signal** and retired as **Principal Chief Signal & Telecommunication Engineer.**
FROM 1989 TO 1990	:	Principal Chief Signal and Telecom Engineer in Central Railway
FROM 1988 TO 1989	:	Principal Chief Signal and Telecom Engineer in S C Railway
FROM 1985 TO 1988	:	Principal Chief Signal and Telecom Engineer (Construction in Western Railway)
FROM 1983 TO 1985	:	Chief Signal and Telecommunication Engineer in N.East Frontier Railway.
FROM 1981 TO 1983	:	Chief Communication Engineer in Western Railway in charge of maintenance of Signal and Telecommunication
FROM 1981 (JAN TO JULY)	:	Officer on Special Duty on Railay Board for Safety awarness
FROM 1980 TO 1981	:	Chief Communication Engineer in Central Railway

FROM 1972 TO 1980	:	Deputy Chief Signal and Telecommunication Engineer (Construction) In charge of all telecom projects in Central Railway
FROM 1968 TO 1972	:	On deputation to NIGERIAN RAILWAYS for management of signal and telecommunication on Nigerian Railways .
FROM 1965 TO 1968	:	Joint Director and Deputy Director signalling and telecommunication in Railway Board
FROM 1963 TO 1965	:	**GERMAN RAILWAYS (Advanced Training)** On electronics and railway safety.

Languages:	Speak	Read	Write
English	Excellent	Excellent	Excellent
Hindi	Excellent	Excellent	Excellent
Marathi	Excellent	Excellent	Excellent
Germany	Good	Good	Good

Certification :

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

Signature **Date :** _____

Full name of staff member : **BALWANT GANGADHAR KALE**

Full name of authorized representative : _____

FORMAT 17

PARTICULARS OF MAJOR SPECIALISTS/MAJOR SUBCONTRACTORS/SUPPLIERS

Section or Works	Approx. Value in USD or INR	Name(s) & Address(s) of Subcontractor(s)	Description, Location similar works previously executed
1.			
2.			
3.			
4.			
5.			
6.			

Note:

1. We wish to appoint MTR Corporation, Hong Kong as the Project Management Consultants and system integrator subject to the mutually agreed terms and conditions.
2. Appointment of other contractors and suppliers shall be undertaken in the consultation of the project management consultants through a globally cometitive bidding process.

FORMAT 18

PLANT AND EQUIPMENT PROPOSED TO BE DEPLOYED BY THE BIDDER FOR THE WORK

List of plant and equipment to be deployed has been furnished under the Chapter 25 of Section 5.

FORMAT 19

TIME SCHEDULE

Bar Charts for overall implementation of the project, civil and track works, electrical installation and rolling stock are enclosed under chapter 22 of Section 5.

FORMAT 21

TECHNICAL SPECIFICATION

The tehnical specification covering the basic design concepts, various system componjents of MRTS, method statements, list of codes etc. have been covered in depth in Section 5 – Technical Report.

FORMAT 22

LAND REQUIREMENT

Tentative requirement of land for car depot, stations and ROW along with maps and table containing area statements and land use for temporary establishment, pre-cast yards, work shops etc with project location have been provided under Chapter 6 of Section 5.

100 Rs.

महाराष्ट्र MAHARASHTRA

C 849174

अ.क्र.
किंमत रु.
श्री./श्रीमती....UCO BANK
हस्ते.....D.N. Road, Mumbai 400 023.
राहणार.....

मुद्रांक विक्रेत्या
ऋचा एस. गोडबोले
परवाना क्र. : १०/२००१
सही.....
मुद्रांक विक्रीचे ठिकाण : सी/६८ कस्तुरी प्लाझा,

Saraswathi .K

BANK GUARANTEE FOR BID SECURITY

WHEREAS, Reliance Energy Limited having its Registered/Head Office at Reliance Energy Centre, Santacruz(East), Mumbai-400055 who is the Lead Consortium Member of the Bidding Consortium comprising Reliance Energy Limited and Connex SA (hereinafter called "the Bidder") wishes to submit his Proposal for the Development and Operation of Mass Rapid Transit System for Versova-Andheri-Ghatkopar Corridor in Mumbai in the State of Maharashtra hereinafter called "the Proposal",

Sub Treasury Office
Kalyan
06 MAY 2005

Contd..2

UCO BANK
66/05
B.O. No.
ADV.
MUMBAI

UCO BANK
ADV.
DEPT.
MUMBAI

Reliance Energy Limited
SANTACRUZ (E)
MUMBAI
Reliance Energy Centre

KNOW ALL MEN by these presents that we UCO Bank, Uco Building, at D.N.Road, Mumbai 400 023 and having our Head Office at 10, B.T.M. Sarani, Kolkata (hereinafter called "the Bank") are bound unto the Mumbai Metropolitan Region Development Authority, Bandra- Kurla Complex, Bandra (E)Mumbai 400 051 (MMRDA), (hereinafter called "the Employer") in the sum of Rs **5,000,000 (Rupees Five millions)** for which payment can truly be made to the said Bidder. The Bank binds themselves, their successors and assigns by these presents.

Sealed with the Common Seal of the Bank this 11 MAY 2005 day of May 2005.

THE CONDITIONS of this obligation are:

(a) If the Bidder withdraws his proposal within 180 days from the closing date of submission of proposals for the above said proposal (hereinafter called the period of validity); or

(b) If the Bidder having been notified of the acceptance of this proposal by the MMRDA during the period of validity;

i) fails or refuses to execute the Concession Agreement; and/or

ii) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

We undertake to pay the amount of Rs.**5,000,000 (Rupees Five millions)**to the MMRDA upon receipt of its first written demand, without the MMRDA having to substantiate its demand, provided that in his demand, the MMRDA will note that the amount claimed by it is due to its owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

Contd..3

UCO BANK * 66105 * B.G. No. ADV. D. N. ROAD, MUMBAI

UCO BANK ADV. DEPT. MUMBAI

Reliance Energy Centre

Notwithstanding anything contained herein above, this guarantee is limited to Rs. **5,000,000 (Rupees Five millions)**and shall remain in force until **15th November 2005.** All claims hereunder must be presented to the guarantor, not after the said date, all your right under the said guarantee shall be forfeited we shall be discharged from all liabilities under this guarantee thereafter.

SIGNATURE OF AUTHORISED
REPRESENTATIVE OF THE BANK
For UCO Bank

Witnes: 1)

O. P. H. MATHUR
P. F. No. 15793

2)

S. S. Kadam
PFM No. 35943

FOR UCO BANK

JT. MANAGER MANAGER

D. G. KAMATH
PF No. 34746

V. SUBRAMANIAN
PFM 10995

UCO BANK
66/05
B.G. NO.
ADV.
MUMBAI

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