THE RAMCO CEMENTS LIMITED
(formerly known as Madras Cements Ltd.)

Regional Sales Office:
3rd Floor, SUN Towrs,
Plot No.22, HUDA Techno Enclave,
Hitec City, Madhapur,
HYDERABAD - 500081.
Ph : 040 - 23119271 / 23119272
Fax : 040 - 23119273

Ref: RCL/MOEFCC/PLANT/2018 **Date 13-08-2018**

To,
The Director,
Government of India,
Ministry of Environment, Forests & Climate Change
Indira Paryavaran Bhavan
Jor Bagh Road
New Delhi - 110 003.

Sub: **Submission of information for the Additional Information Sought (ADS) For Environmental Clearance of proposed Cement Plant with Clinker Production of 3.15 million TPA & Cement Production of 2.0 million TPA along with 2 x 25 MW Thermal Power Plant at Kalvatala Village, Kolimigundla Mandal, Kurnool District, Andhra Pradesh - Reg.**

Ref: **1. Proposal No. IA/AP/IND/63579/2017**
2. MOEF & CC Lr. No. J-11011/135/2017-IA-II (I) dated 22.05.2017
3. ADS Raised by Ministry on 09.08.2018

Dear Sir,

We thank you for giving us opportunity to present our case on 06.08.2018. As per the ADS raised, we are herewith enclosing the replies to the following points raised for your consideration.

Point - 1: **The permission from the competent authority for drawl of water from the Srisailam Right Bank canal as proposed by PP.**

Submission: Andhra Pradesh Government has initiated a proposal of 0.4 TMC Reservoir at Mettupalli on Srisailam Right Bank Canal adjacent to OWK reservoir. Copy of the Preliminary Report for Mettupalli Reservoir is enclosed as **Annexure – 1**. APIIC has written a letter to The Chief Engineer (Water Resources) to expedite the work of Reservoir (**Annexure-IA)**.

RCL has obtained permission from ground water department for 652 kld of water which will be used for construction purpose. RCL would like to submit that the plant operations will be commenced only after obtaining permission from Mettupalli Reservoir.

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Point - 2: **The potential Impact of the project on the tourist spot of Bilam caves.**

Submission: The impact of the Cement Plant on Bilum Caves is enclosed as **Annexure – 2.**

Point - 3: **Detailed plan ensuring that the natural drainage pattern of the site would not be altered / blocked.**

Submission: A seasonal nalla is passing across the plant site. As per the MOEFCC specific TOR condition, the layout has been designed without disturbing the natural drainage pattern of the seasonal nalla. Also no plant activities are planned on the northern part of the seasonal nalla. The nalla will be protected by developing greenbelt on both sides of the nalla and the northern side of the nalla as per TOR point of MoEF&CC. A total of 28.3 Ha has been earmarked under this zone for development of greenbelt. This area will not be used for any other activities of the project except for green belt development. This area will be developed with local broad leaved species. **Annexure - 3** shows the layout of the cement plant with greenbelt proposed on either side of nall and in the northern part of the nalla.

A culvert will be provided over the nalla to enable the local people cross the nalla safely.

Points – 4 : **Plan for storm water management.**

Submission: Storm water network of the plant is designed without linking with the seasonal nalla. The plant site is sloping towards the Eastern direction. A network of storm water drains will be provided to collect the rain water. The collected rainwater will be discharged in the rainwater harvesting pits proposed along the eastern boundary. The over flow of rain water will be collected in the rain water pond proposed in a tank (1Ha.). The storm passes through the Rain water harvesting pits and finally gets collected in the pond. The collected water will be used in the plant. The storm water network with the RWH pits and the collection tank are shown in the **Annexure-4.**

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Point - 5: **The revised layout plan clearly showing gates and the external connectivity**

Submission: The layout with the entrance gates and the external connectivity showing approach road from the nearby main road is enclosed as **Annexure-3**.

Point - 6: **The permission from the competent authority for the over head conveyor belt across the state highway.**

Submission: This State Highway-SH 317 was panned from Gooty to Nellore and it is still in planning stage and enough funds were note allotted so far.. RCL has approached Engineer in chief, R & B State Highways, SH, PPP, CP & Managing Director, Andhra Pradesh Roads Development Corporation Vijayawada, for obtaining the necessary permission for conveyor crossing the State Highway. Copy of the letter submitted along with drawing of the conveyor is enclosed as **Annexure – 5.**

Point - 7: **In case the permission for overhead conveyor belt delayed/denied, an alternative plan for transporting raw material**

Submission: In case getting approval for the overhead conveyor will take time/denied, Ramco cement shall lay a road adjacent to the proposed conveyor belt and transport the limestone to the plant with tippers. **Annexure - 6**.

Point - 8: **The design details of Air pollution control systems**

Submission: The design details of Air pollution control systems are enclosed as **Annexure – 7**

- Air Pollution Control Equipment proposed in cement plant will be designed for outlet particulate matter emission of less than 30 mg/Nm^3.
- ESP of >99.98% efficiency will be installed to limit the particulate matter emission to less than 30 mg/Nm^3.
- Limestone injection in the CFBC boilers for control of Sulphur dioxide emissions
- Low NOx burners are proposed for maintaining the prescribed NOx emission levels.

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Point - 9: **Details of Waste heat recovery from the kiln and cooler**

Submission: RCL Commits to install 2 x 7 MW Waste Heat Recovery based Power Plants based on hot gases of Kiln and Cooler. Details of the waste heat recovery Power Plant are enclosed as **Annexure - 8**

Point - 10: **Details of alternative fuels to be used.**

Submission: RCL make provision for firing of high calorific value Hazardous wastes. Alternate fuels like Spent Carbon, and Organic Residues depending on their availability.

- Liquid wastes will be injected into the hot end of the kiln.
- Solid wastes will be introduced into the calcining zone.
- CO sensors will be installed for process control to detect incomplete combustion and allow for corrective measures.

Point - 11: **Revised CER implementation along with time bound action plan with budget.**

Submission: The revised CER is attached as **Annexure- 9**

We request the Ministry to process our proposal for grant of Environmental Clearance

Thanking you,
Yours faithfully,
For **The Ramco Cements Limited**

13/08/18

P.B. Gopalakrishna
Authorized Signatory

Encl: As above

GOVERNMENT OF ANDHRA PRADESH

WATER RESOURCES DEPARTMENT

Preliminary Report for Mettupalli Reservoir

NW: Detailed Investigation and preparation of detailed Project Report for " construction of a new Reservoir 0.40 TMC Capacity for industrial water requirements near Mettupalli (V),Owk (M),Kurnool District ".

Report Submitted by:

SRI RAMACHANDRA ENGINEERING & SURVEY
CONSULTANTS

#302, Lakshmi Nagar Colony, Puppalaguda, Near Manikonda, Hyderabad-500089.
Email : sresconsultants@gmail.com**Contact : +919441040137**

Number of States in India - 29
Union Territories - 7
JAMMU & KASHMIR
Srinagar
HIMACHAL PRADESH
Shimla
PUNJAB
Chandigarh
Dehradun
UTTARANCHAL
HARYANA
NEW DELHI
CHINA
PAKISTAN
NEPAL
SIKKIM
Gangtok
BHUTAN
ARUNACHAL PRADESH
Itanagar
RAJASTHAN
Jaipur
UTTAR PRADESH
Lucknow
BIHAR
Patna
ASSAM
Dispur
Shillong
NAGALAND
Kohima
Imphal
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TRIPURA
MYANMAR
CHHATTISGARH
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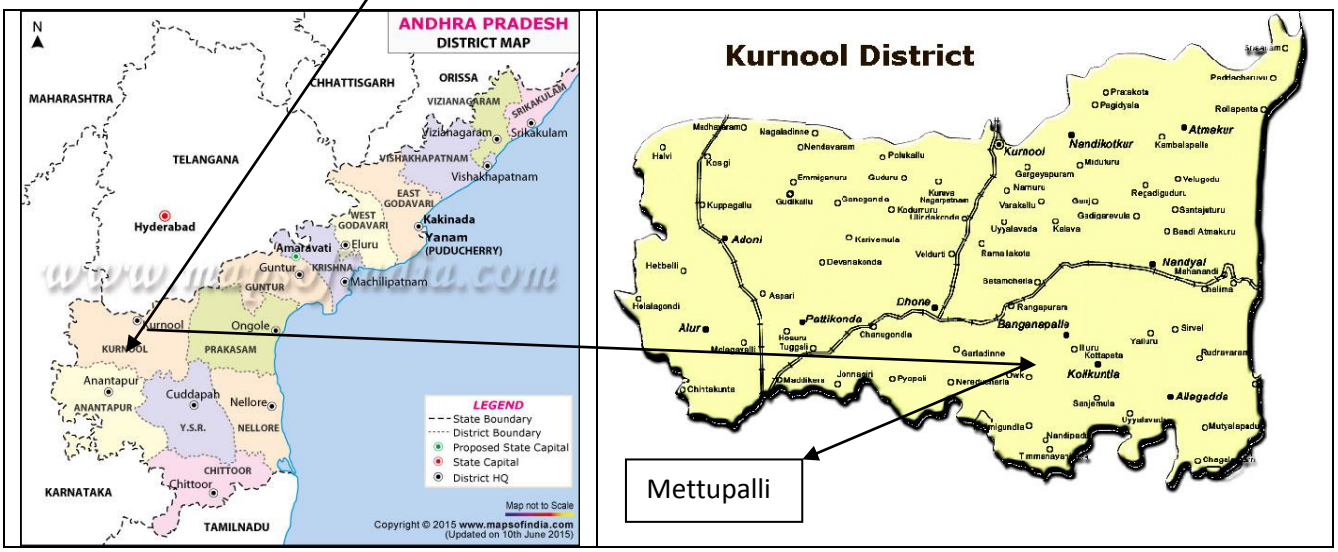
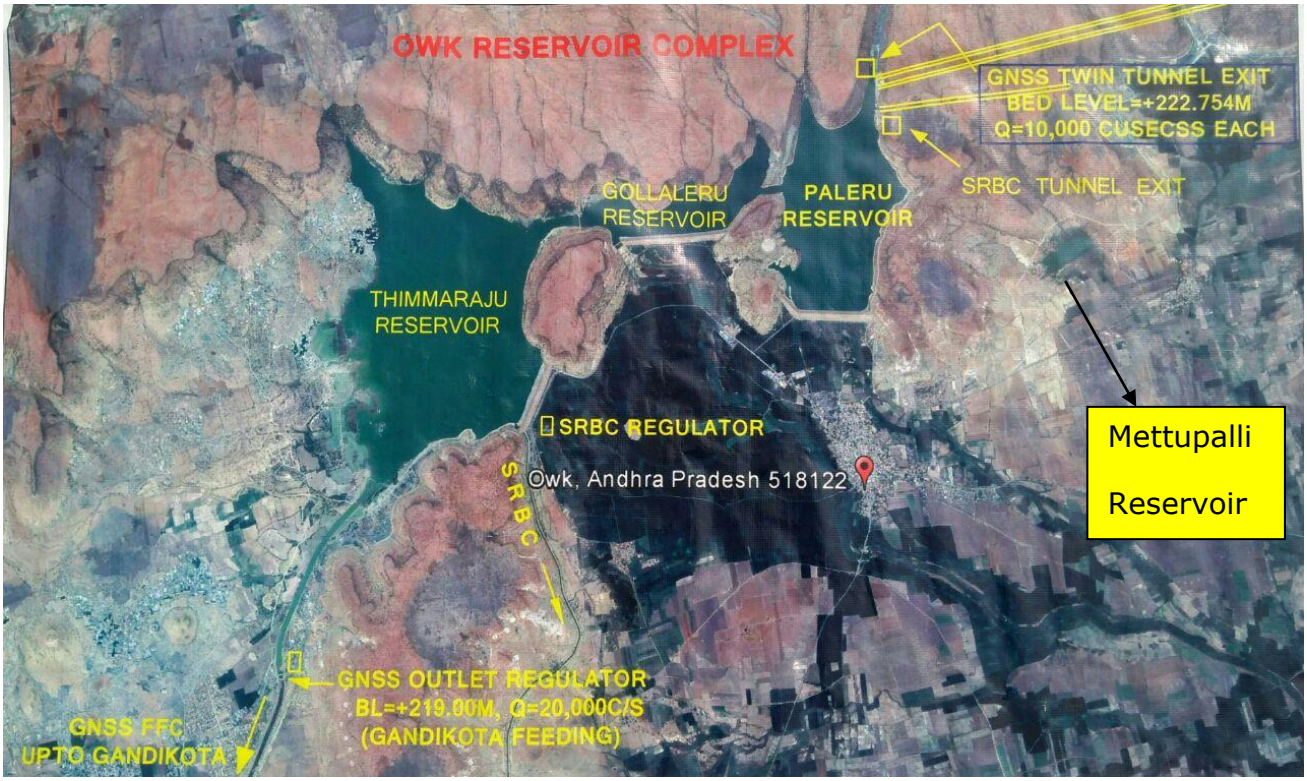
ORISSA
Bhubaneshwar
DAMAN
DIU
MAHARASHTRA
Mumbai
DADAR & NAGAR HAVELI
BAY OF BENGAL
TELANGANA
Hyderabad
YANAM
Vijayawada
(Pondicherry)
GOA
Panaji
ANDHRA PRADESH
KARNATAKA
Bangalore
Chennai
PONDICHERRY (Puducherry)
KARAIKAL
(Pondicherry)
MAHE
(Pondicherry)
TAMILNADU
LAKSHADWEEP
KERALA
Thiruvananthapuram
ARABIAN SEA
ANDAMAN & NICOBAR ISLANDS
State Capital
Union Territories
National Capital


ANDHRA PRADESH
DISTRICT MAP
MAHARASHTRA
CHHATTISGARH
ORISSA
VIZIANAGARAM
SRIKAKULAM
Vizianagaram
Srikakulam
TELANGANA
VISHAKHAPATNAM
Vishakhapatnam
EAST GODAVARI
WEST GODAVARI
Kakinada
Yanam
(PUDUCHERRY)
Hyderabad
Amaravati
Eluru
Guntur
KRISHNA
Machilipatnam
GUNTUR
Kurnool
Ongole
KURNOOL
PRAKASAM
Anantapur
Cuddapah
Nellore
ANANTAPUR
Y.S.R.
NELLORE
CHITTOOR
Chittoor
KARNATAKA
TAMILNADU
LEGEND
State Boundary
District Boundary
Proposed State Capital
State Capital
District HQ
Map not to Scale
Copyright © 2015 www.mapsofindia.com
(Updated on 10th June 2015)
Kurnool District
Nandikotkur
Atmakur
Kurnool
Adoni
Nandyal
Dhone
Pattikonda
Banganepalle
Alur
Koilkuntla
Allegadda
Mettupalli

Satellite view of Study Area:



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Chapter - 1

Preliminary Report for "Detailed Investigation and Preparation of Detailed Project Report for Construction of a New Reservoir of 0.40 TMC capacity for Industrial Water Requirements near Mettupalli (V), Owk (M), Kurnool District."

1.1. Preamble

The Government of Andhra Pradesh proposed to develop Cement Industries in Kolimigundla Mandal of Kurnool District based on the availability of raw material. The proposals were received from the Collector and District Magistrate, Kurnool vide Letter No. GM DIC/A4/2015, Dated : 27-04-2015 for providing 0.40 TMC water for upcoming Cement Industries in Kolimigundla Mandal, Kurnool District.

The water requirement for cement manufacturing industries in Kolimigundla Mandal is as follows :

S.No.	Name of the unit	Quantity of water in KL/Day
1	M/s Prism Cement Ltd, Phase-1	2600
2	M/s Prism Cement Ltd, Phase-2	1300
3	M/s Ultra Tech Cements Ltd.	4000
4	M/s Ramco Cement Ltd.	2600
5	Water for upcoming cement units 7 No's @2600 KL/Day	18200
	Total	**28700**

Total requirement of water for cement industries = 28700 KL/Day
Water requirement per year = 28700 × 365 Days = 10475500 KL
= 10475500/28571428 TMC
= 0.37 TMC ≅ **0.40 TMC**

The nearest source is Owk Reservoir and SRBC Main canal. The present storage of Owk Reservoir is sufficient for meeting the requirements of SRBC ayacut, Paleru ayacut and Thimmaraju ayacut and it cannot be spared for other purposes. Hence, It is proposed to form a new Reservoir of 0.40 TMC Capacity near Mettupalli (V), Owk (M), Kurnool District. The Government has cleared the estimate for Investigation of new reservoir for Rs. 23.70 Lakhs. The Government has also instructed to take the funds from APIIC as per the Govt. Memo No. 278744/Reforms/A2/2016, Dated : 18-07-2016. The funds were received from the Industries Department.

The tenders were called for investigating and preparation of detailed project Report for "construction of a new reservoir for 0.4 TMC capacity for industrial water requirements near Mettupalli (V), Owk (M) ,Kurnool district". The work was allotted to the Lowest tenderer M/S SRES Consultants.

1.2. Location

It is proposed to form 0.40 TMC Capacity Reservoir by converting the existing Vengalamma Cheruvu near Mettupalli (V), Owk (M), Kurnool District.

The proposed reservoir is located at a distance of

- 2.5 KM from Owk Village
- 1.5 KM from Paleru Reservoir
- 1.2 KM from Mettupalli Village

The latitude and longitude of the proposed reservoir are as follows :

Latitude : 15° 14' 0.08" N
Longitude : 78° 6' 29.59" E

1.3. Objective of the Project

The main objective of this project is to provide water to industrial needs in Kolimigundla Mandal of Kurnool District.

1.4. Scope of Work

1. Establishing and Carrying B.M. values.
2. Fixing of 20 X 20 X 75 cm size permanent bench mark stone in CC 1:3:6.
3. Conducting block levelling for finalizing the contour capacity.
4. Conducting chain survey as per standard specifications.
5. Taking cross sections at 25m interval along proposed earth bund and levels at 10m intervals.
6. Fixing of 20 X 20 X 75 cm size roughly dressed boundary / demarcation / chainage / arrow stones.
7. Drilling 80 mm dia hole through over-burden using casing shoe bit for assessing the classification of soils and foundation stabilities for bund portion.
8. Drilling 76 mm dia bore hole in hard rock using diamond core bit vertical / inclined upto 10m.
9. Conducting water tests as per the suggestions of Geologist.
10. Preparation of CA Map for computing the Catchment Area and Maximum Flood Discharge.
11. Preparation of Geological report by the Geologist including suggesting drilling and grouting pattern for both consolidation grouting of foundation and high pressure grouting including logging and preserving in wooden boxes.

12. Investigation, Design and Estimation of ZONED EARTH DAM and apurtment works on Reservoir.
13. Design of Intake Structure (Civil & mechanical) and Preparation of necessary drawings. Investigation, Design and Estimation of spillway, Preparation of Detailed Estimate and Cost Estimate of the entire project and Preparation of HP's of Canal from source of water to Reservoir.
14. Collection of Data and preparation of DPR as per CWC Norms.
15. Satellite data to be obtained from NRSA

Chapter - 2

History

Kurnool is a city and the headquarters of Kurnool district in the Indian state of Andhra Pradesh. The city is often referred as "The Gateway of Rayalaseema". It was the capital of Andhra State from 1 October 1953 to 31 October 1956. As of 2011 census, it is the fifth most populous city in the state with a population of 4,60,184.

2.1 History

Etymologically, Kurnool is a corruption of Kandenavolu, the Telugu name by which it is referred to in the literature in the past. This place developed round the jaghir of the Nawabs of Kurnool in the course of the last century and a half.

The city served as the capital of Andhra State from 1953–1956, until in 1956, the Telangana region was merged with Andhra State to form Andhra Pradesh state, and its capital was shifted from Kurnool to Hyderabad.

2.2 District Highlights

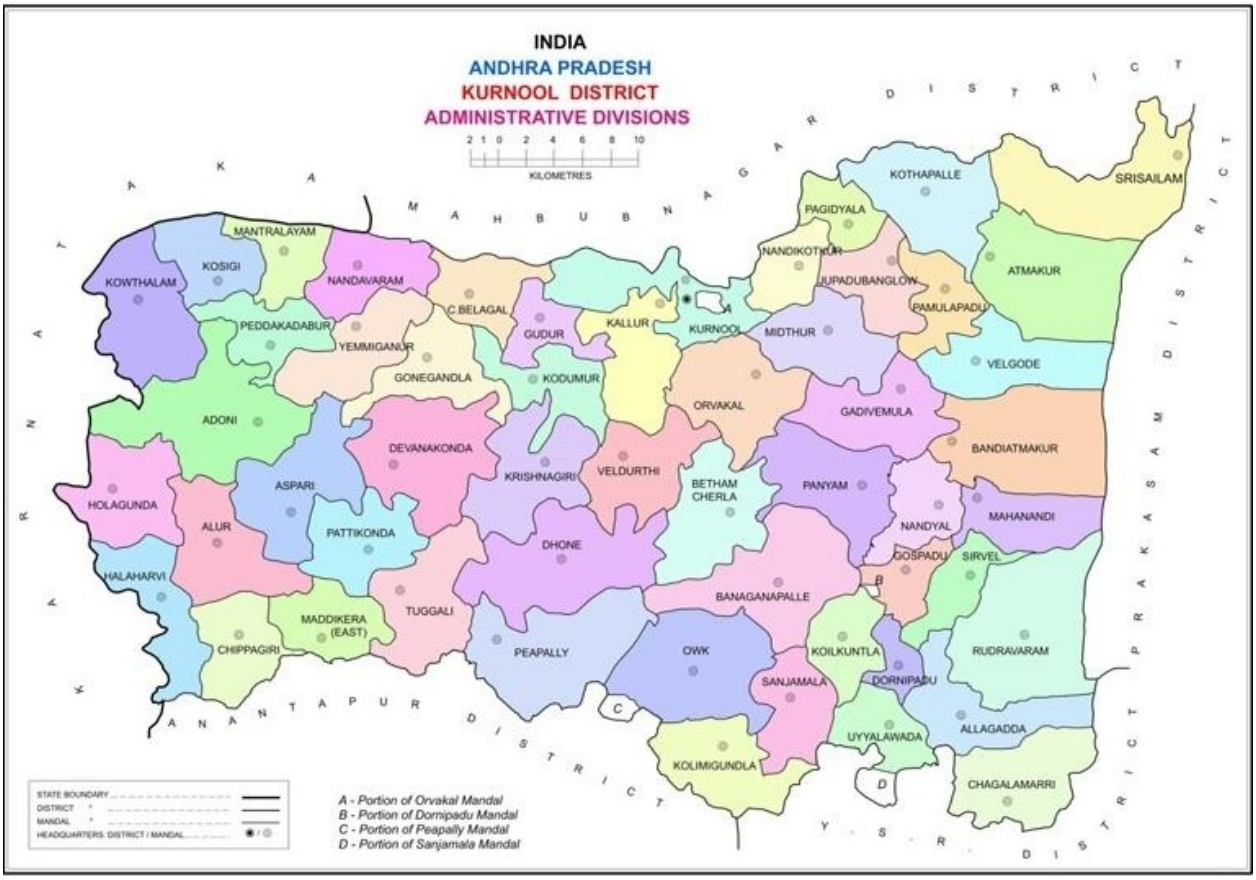
- Kurnool district stands 3rd position in terms of area with 17,658 Sq. Km. and ranks 8th in terms of population with 40,53,463 persons in the State.
- Kurnool district stands 11th in terms of urban area with 347.39 Sq. Km. and ranks 8th in terms of urban population with 11,49,286 persons in the State while it stands 4th in terms of rural area with 17,310.61 Sq. Km. and ranks 7th in terms of rural population with 29,04,177 persons in the State.
- The district ranks 10th position in terms of households with 8,87,652 as against 6,99,191 households in 2001.
- The district ranks 19th in terms of total number of villages with 898 as against 913 in 2001.
- The district ranks 15th position in the State in terms of sex-ratio with 988 as against 965 in 2001.
- The district ranks 16th in terms of density with 230 persons per Sq. Km. as against 200 in 2001.
- The district ranks 11th in terms of literacy with 21,27,161 literates as against 15,92,172 in 2001.

- The district is with 20,29,425 workers and 20,24,038 non-workers as against 17,45,220 workers and 17,84,274 non-workers in 2001.

2.3 Boundaries & Topography

2.3.1 Boundaries

Kurnool district is situated between the northern latitudes of 14° 54' and 18° 14' and eastern longitudes of 76° 58' - 78° 56'. The district is bounded by Tungabhadra and Krishna rivers as well as Mahaboobnagar district, on the west by Beilary district of Karnataka and the south by Anantapur and Cuddapah districts. The total geographical area of the district is 18,799 eq.kms.



Kurnool district lies on the South Central Western part of the Andhra Pradesh State bordering Karnataka State on the West, Mabubnagar district on the North, East by Prakasam, while Anantapur& YSR districts on the South. Kurnool town was once the State Capital of Andhra Pradesh upon bifurcation from Madras State during 1956.

2.3.2 Topography

The district has the combination of Mountains, Plateaus and Plains. A major part of Nallamala hills of Eastern Ghats run along the Eastern border in North-South direction of the district. These hills have more than 700 mtsht above the mean sea level. The other notable hill range called Erramala lies over the central part of the district. The average height of these hills is between 400 and 600 mts. The Western area of the district is entirely developed on Archaean gneisses. The hilly areas in the Eastern and central part of the district is composed of upper pre-Cambrian rocks, while the central part between these hill ranges belong to lower Palaeozoic-upper pre-Cambrian period, massive effusive of Cuddapah trap belonging to pre-Cambrian period are seen over Erramala hills. Major part of the district is covered under Usterts-Tropepts soil sub-order classification. In Eastern part, Tropepts and Rock outcrops are found associated with Orthents in a significant zone, at the South-eastern corner, extensions of Usterts-orthents are also noticed. The district has thick forest cover, which remain green over quite a long period. Superior quality of teak is found in reserved forest areas of hills. Bamboo and mountain hay are the other important floras growing in the district. In the Northern parts, where the jungle is poor, there are extensive forests.

The varied physiographic condition of the district justifies into seven regions as follows:

2.3.2.1 Alur Plateau:

(Area – 1,264.00 Sq. Km) The region lies in the South-west corner of the district with an average height of 450 metres, generally slopes towards the West. The surface configuration is flat topped with occasional areas of reserved forests and scattered scrubs. The entire plateau consists of Archaean gneisses. The soil belongs to Usterts-Tropepts sub-order association. The region covers the entire slum-area.

2.3.2.2 Tungabhadra – Hindri Plain:

(Area – 2,134.00 Sq. Km) The region comprises yemmiganur as a whole and parts of Adoni, Pattikonda, Kodumur and Kurnool areas. The major part of the region falls between the Tungabhadra and Hindri Rivers and have deposits of lower and pre-Cambrian rocks. The main soils found in the region are Usterts-Tropepts.

2.3.2.3 Adoni – Dhone Plateau:

(Area – 3,442.00 Sq. Km) This plateau extends mainly over the catchment area of Hindri River comprising parts of Adoni, Alur, Pattikonda, Kodumur, Kurnool and Dhone areas. The region is characterised by undulated surface with the existence of hillocks and areas of rock waste. The general slope is towards North-east. There are a few areas of reserved forests and scrubs mainly spread in the Eastern part in the vicinity of Erramala hills. The plateau is made up of Archaean gneisses with Usterts-Tropepts as soil sub-order association.

2.3.2.4 Erramala Hills:

(Area – 1,241.00 Sq. Km) In the central part of the district, this region lies in the South-west to North-east direction. This hilly region comprises the parts of Kurnool, Nandyal, Dhone and Banaganapalle areas with rugged topography having hills of more than 600 metres ht above MSL. The hills are mainly covered with forests of teak and Bamboo grooves. Significant areas of mountain hay and scrub is also seen over the region. The hills are composed of Upper pre-Cambrian rocks, while the Eastern part of the region has Archaean gneisses. Effusive of Cuddapah series of geologic structures are seen extensively bedded over the region. The main soil sub-order association found in Usterts-Tropepts while Orthents-Tropepts-Rock out crops are found in some upper parts of the region.

2.3.2.5 Kurnool – Nandikotkur Plain:

(Area – 1,828.00 Sq. Km) This plain region covers parts of Nandikotkur, Kurnool and Atmakur areas falling in between Erramala and Nallamala hills. The Northern boundary of the region is made by River Tungabhadra, which later joins river Krishna along the border. Being a level plain, a few small forest areas are also seen in Eastern and Western margins of the region. There are many perennial ponds and tanks. The geology belongs to lower Palaeozoic – Upper pre-Cambrian period with the occurrence of pre-Cambrian (Cuddapah trap) effusive on the Western margins of the region. The main soil sub-order association found is Usterts-Tropepts.

2.3.2.6 Nandyal – Banaganapalle – Allagadda Plain:

(Area – 4,873.00 Sq. Km) The region coinciding with Kunderu river valley lies between Erramala and Nallamala hills, which make the Western and Eastern boundaries respectively. The region covers whole of Koilkuntla and part areas of Nandikotkur, Nandyal, Allagadda and Banaganapalle. River Kunderu, a tributary of River Penner flows in the central part in Southern direction. The Madduleru and Jurreru on the West and the Galeru and Vakkileru on the East are the chief feeders of Kunderu River. With an average height between 200 and 300 metres, the region slopes towards the South. The region is mainly composed of lower Palaeozoic-upper-pre-Cambrian rock formations. There are few extensions of Upper Pre-Cambrian rocks in the Eastern and extreme Southern parts of the region. The soils mainly relate to Orthents-Tropepts-Rock out crops in the Upper part of the region, while Usterts-Tropepts sub-order association is found in lower parts.

2.3.2.7 Nallamala Hills:

(Area – 2,876.00 Sq. Km) These magnificient hills of Eastern Ghats lie over the Eastern margins of the district in a significant area. This hilly track comprises parts of Atmakur, Nandyal and Allagadda regions with rugged hilly topography. The region is mostly covered with reserved forests, which are mainly of good quality teak. The height of these hills exceeds 700mts above MSL. The entire region is composed of upper pre-Cambrian rocks, mainly rock out crops and Tropepts soils are found associated with Orhents in the region. In Southern margins Orthents are associated with Usterts.

2.4 Forestry:

The total forest area in the district is 3,535.35 Sq. km. accounting 20 percent of total geographical area of the district. The Kurnool forest division extends over the entire Revenue

limits in the district. The major parts of the forest are mainly confined to the Nallamala including its extensions and Erramalas in the Kurnool Division. Bamboo along with timber species occurs fairly over extensive areas in the district. The important minor forest produce of the district are Beedi leaves, Tamarind, Amla etc., According to the physiographic classifications, the forests of the district can be divided into (1) the sub-mountain forests, (2) forests on the slopes, (3) plateau forests and (4) hill forests. The forest department has envisaged certain schemes for development. The schemes, their potentiality of the area and the quantum of amount required for implementation are being used effectively.

2.5 Fisheries:

Kurnool district is blessed with a lot of water resources such as rivers namely; 1. Krishna, 2.Thungabhadra, 3.Hundri , 4. Banavasi, 5.Kunderu, 6.Galeru which forms a main feeder source for reservoirs like Srisailam, Gajuladinne, Velugodu and canals like K.C. (Kurnool Cuddapah) canal, T.B (Tungabhadra) low level canal, Gajuladinne canal, Telugu Ganga canal, S.R.B.C. canal etc., and several major and minor irrigation tanks. A substantial amount of fish is produced from the above water sources.

2.6 Drainage:

The principal rivers flowing in the district are Thungabhadra (and its tributary the Hundri) Krishna and Kunderu. Thungabhadra rises in the Western Ghats and after forming part of Northern boundary for some distance, separates Kurnool with Mahabubnagar while flowing in an Eastern direction and receives Hundri; thereby both these rivers fall into the river Krishna at Kundlisangam about 29 Km from Kurnool after winding North wards. The river Hundri a tributary of Tungabhadra rises in the fields of Maddikera in Maddikera Mandal receives a stream from Erramalas at Laddagiri in Kodumur Mandal and joins Tungabhadra at Kurnool. It drains much of Maddikera, Pattikonda, Deverakonda, Gonegandla, Kodumur and KallurMandals. This is a turbid stream with sudden rise and fall. The Kunderu also called Kumudavathi rises on the Western side of Erramalas, winds its way into Kunderu valley and flows in a Southern direction collecting drainage all along its course from both sides. It flows through Orvakal, Midthur, Gadivemula, Nandyal, Gospadu, Koilkuntla, Dornipadu and ChagalamarriMandals and then enters YSR district.

2.7 Soil:

The soils in Rayalaseema region may be broadly classified into two types, the black cotton soils and the red soils, subdivided into clay, loamy and sandy soils. The eastern and north-western parts of Kurnool, the northern part of Anantapur and north- western part of Kadapa have black soils, while other parts of the region have red soils. In Anantapur district 20% of soil is black and 80% is red soil. In Kadapa district alluvial and gravels, black cotton soils, red soils of the district constitute the recent and sub-recent deposits and form a cover of variable thickness over the ancient rocks. In Kumool district the soils in the north-western traversed parts by the river Hundri are black cotton while the south-eastern parts are predominantly pure red soils. The major portion, 90% of the Chittoor district is covered by red soils and remaining 10% by black soils.

Kurnool District is rich in regur and red ferruginous soils which constitute about 60 and 40 per cent respectively. They are further classified as clay, loamy and sandy soils. The black cotton soils are predominant in the Mandals of Pattikonda, Nandyal, Allagadda, Koilkuntla, Nandikotkur and Adoni. In the Eastern part of the district, red soil of a poor quality largely predominates. These soils, although generally poor in fertility, yield a very good crop with a minimum rainfall. The crops mainly raised are Jowar, cotton and pulses. Regur soil of superior quality is available in the central section together with Kurnool and PattikondaMandals. It responds well for paddy, Bengal gram, Korra (Italian millets), jowar and cotton in spite of inadequate rainfall. The availability of alluvial soil is quite small and is confined to a few villages near the confluence of the Bhavanasi and Krishna Rivers. It generally suits for raising mustard, wheat, and black gram which are valuable products.

2.8 Population:

In 2011, Kurnool had population of 4,053,463 of which male and female were 2,039,227 and 2,014,236 respectively. In 2001 census, Kurnool had a population of 3,529,494 of which males were 1,796,214 and remaining 1,733,280 were females. Kurnool District population constituted 4.79 percent of total Maharashtra population. In 2001 census, this figure for Kurnool District was at 4.63 percent of Maharashtra population.

There was change of 14.85 percent in the population compared to population as per 2001. In the previous census of India 2001, Kurnool District recorded increase of 18.72 percent to its population compared to 1991.

2.8.1 Kurnool Table Data

Description	2011	2001
Actual Population	4,053,463	3,529,494
Male	2,039,227	1,796,214
Female	2,014,236	1,733,280
Population Growth	14.85%	18.72%
Area Sq. Km	17,658	17,658
Density/km^2	230	200
Proportion to Andhra Pradesh Population	4.79%	4.63%
Sex Ratio (Per 1000)	988	965
Child Sex Ratio (0-6 Age)	938	958
Average Literacy	59.97	53.22
Male Literacy	70.10	65.96
Female Literacy	49.78	40.03

Demographic Profile

As per 2001 census, the district's Urban Population is 8,17,464 accounting 23.16 % and rural population is 27,12,030 accounting 76.84 %. Of the total population, the percentage of male population is 5.89 and the percentage of female population is 49.11.

Demographic Profile of Kurnool District

S.No.	Year	Population	Density of Population of Per sq. km.	Growth Rate
1	1901	1160829	66	0
2	1911	1259961	71	(+) 8.54
3	1921	1214022	69	(-) 3.65
4	1931	1361634	77	(+) 12.16
5	1941	1505418	85	(+)10.34
6	1951	1315499	74	(-) 12.44
7	1961	1570955	89	(+) 19.42
8	1971	1982090	112	(+) 26.17
9	1981	2407299	136	(+) 21.45
10	1991	2967942	168	(+) 23.29
11	2001	3529494	200	(+) 18.92
12	2011	4046601	229	(+) 14.65

Source: Report of the Chief Planning Office, Kurnool

From the table, the growth of population in Kurnool district during the period of 100 years i.e., from 1901 to 2001 is tremendously increased from 11, 60,829 to 35,29,494. The population pressure in the district is gradually increasing which requires the effective utilization of resources with a judicious combination of natural capital and technological resources. There is a threefold increase in the population in the district. The density of population in the district was 66 in 1901 and it increased to 89 by 1961. The density of population over a period of 100 years increased very significantly from 66 to 200 during 1901 – 2001. The growth rate of the population fluctuated between -12.44 per cent in 1951 and 18.92 per cent in 2001.

2.9 Drinking water:

The following are the main source of drinking water facility available in the village.

2.9.1 Tap Water-treated:

This source of drinking water refers to a source of drinking water which is provided to the villagers through pipes within their premises or to the villagers through common taps (public taps/community water points) by the Government departments, local bodies, panchayats, public or private estate agencies, etc. after treatment. Such source is treated as 'Tap water from treated source'.

2.9.2 Tap Water-un -treated:

If the villagers are drawing drinking water through pipes either directly from a well or bore well or after pumping the well or tube well water, or the water is supplied through pipes to the households of the village or through public taps without treatment. Such a source is treated as 'Tap water from un-treated source'.

2.9.3 Covered Well (CW):

A well that is (1) covered on sides from run-off water (i.e., excess water from rain, snowmelt or other sources flows over the land) through a wall lining or casting that is raised above ground level on a platform that diverts spilled water away from the well and (2) covered so that bird droppings and animals cannot fall down the hole. It is considered as covered well.

2.9.4 Un-covered Well (UW):

A well which is (1) un-covered on sides from runoff water, (2) un-covered from bird droppings and animals; or (3) both.

2.9.5 Hand Pump (HP):

Hand pump means where ground water is taken out manually by operating a hand pump.

2.9.6 Tube Well / Borehole (TW):

Tube well denotes the ground water source from where ground water is taken out through electrical or diesel pump. Spring, River/Canal, Tank/Pond/Lake are self-explanatory.

2.10 LAND USE CONCENTRATION AT MANDAL LEVELOF THE KURNOOL DISTRICT

2.10.1 FOREST LAND

The total cover area under forest is 3,18,385.42 hectares of land and accounts for 18.08% of the total geographical area. The concentration of the forest area is found high in nine mandals, medium in three mandals and low in 26 mandals. In about sixteen mandals the forest concentration is nil. The nine mandals which possess highconcentration of forest are Veldurthy, Rudravarum, Banaganapalli, Srisailam, Mahanandi, B. Atmakur, Gadivemula, Allagadda and Owk (Table 5.1). Their concentration is high in the hilly terrain of Nallamalai and Erramalai hills located in the above said mandals. The spatial distribution shows that the forest area concentration is high in the eastern mandals covering Nallamalai and*central mandals constituting Erramalais. The medium distribution is found in Dhone, Bethamcherla and Holaharvi.

2.10.2 BARREN AND UNCULTIVABLE LAND

The total area under barren and uncultivable land is about 99,416.19 hectares of land and accounts for 5.65% of the total geographical area. The barren and uncultivable land concentration is high in twenty-nine mandals, medium in eleven mandals and low in nine mandals. Their concentration is nil in five mandals. The spatial distribution shows that in major mandals of district in western, central northern, southern and south-eastern parts the concentration is high. It is medium in north-western, southern and in a few south-eastern mandals of district. It is however low in south-western and south-eastern mandals of district.

2.10.3 LAND PUT TO NON-AGRICULTURAL USES

The total area under land put to non-agricultural uses is 1,00,851.01 hectares of land and accounts to 5.73% of the total land of the district. The concentration of the land put to non-agricultural uses is high in thirty eight mandals, medium in twelve mandals and low in four mandals. The spatial distribution shows that in northern, western, southern, north-eastern and south-eastern mandals of district the concentration is high. It is medium in central and south-western mandals of district and low in Banaganapalli, Veldurthy, Mahanandi and Rudravarum mandals of the district

2.10.4 PERMANENT PASTURES AND OTHER GRAZING LANDS

The total land under permanent pastures and other grazing lands is about 4,076.92 hectares of land and accounts for 0.23% of the total geographical area. The concentration of permanent pastures and other grazing lands are high in fifteen mandals, medium in four mandals and low in nine mandals. Their concentration is not noticed in twenty six mandals of the district. The spatial distribution shows that their concentration is high in central and eastern mandals of district. Their concentration is medium in Kowthalam, Dhone, Midthur and Panyam mandals. In south-western mandals of district the concentration of permanent pastures are low and their distribution is not noticed in northern, northeastern and south-eastern mandals of the district.

2.10.5 MISCELLANEOUS TREE CROPS AND GROOVES

The total land under miscellaneous trees crops and groves are about 2,029.95 hectare of land and accounts for0.11% of the total land. Their concentration is high in seven mandals, medium in three mandals and low in twenty mandals. In twenty four mandals their concentration is found to be nil. The spatial distribution shows that their concentration is high in central mandals of district, medium in eastern mandals of district, low in western, south-western and southern mandals of district. Their distribution is not noticed in north-western, northern and south central mandals of district.

2.10.6 CULTURABLE WASTE LANDS

The total land under culturable waste is about 81,893.44 hectares of land and accounts for 4.65% of the total geographical area of the district. The concentration of culturable waste land is high in twenty four mandals, medium in sixteen mandals and low in eleven mandals. The culturable waste land is not noticed in three mandals of the district. The spatial distribution shows that the culturable waste land is high in north-eastern, central, northwestern and south central mandals of district. The distribution is medium in eastern and north central mandals of

district. However the distribution is low in south-eastern and in a few southern mandals of district.

2.10.7 OTHERS FALLOWS

The total land under other fallows is about 1,37,146.95 hectares of land and accounts for 7.79% of the total geographical area. The concentration is found high in twenty six mandals, medium in eight mandals and low in 17 mandals. The other fallows are found nil in three mandals of the district. The spatial distribution shows that on north-western, western, south-west, southern, south-eastern, central and north-eastern mandals of the district the concentration is high. It is medium in a few central and eastern mandals of district. It is low in south-central, northern and eastern mandals of the district.

2.10.8 CURRENT FALLOWS

The total land under current fallows is about 1,15,628.34 hectares of land and accounts for 6.57% of the total geographical area (Table 5.1). The spatial distribution shows that it is high in twenty seven mandals, medium in nine mandals, low in twelve mandals and nil in six mandals. The spatial distribution shows that in central, north-eastern, southern, northern and north-eastern mandals of district the concentration is high. It is medium in north-central and western mandals of district. It is however low in southern and south central mandals of district.

2.10.9 NET AREA SOWN

The total geographical area of the net sown area is 9,01,394.33 hectares of land and accounts for 51.19%of the total geographical area. The net area sown is high in thirty four mandals, medium in seventeen mandals and low in two mandals. It is nil in one mandal of the district. The spatial distribution shows that in northern, north-western, central, south-western and southern and south central mandals of district the concentration is high. The concentration is moderate in eastern and central mandals of district. The concentration is low in Owk.

2.11 Minerals:

Rayalaseema area is widely acclaimed as an invaluable source of minerals. Anantapur district is fairly known for some of its mineral deposits such as gold, diamond and barites. Gold, one of the precious minerals is available at Ramagiri in the district, and the most precious stone diamonds are found in the district at Vajrakarur area. Kurnool district possess enormous deposits of limestones. Kadapa district is the sole producer of high grade asbestos of chrysolite variety in India. There are vast resources of limestone suitable for the manufacture of cement in the district. Chittoor district is not rich in mineral wealth, steatite is the only mineral mined in Puttur and G.D.Nellore areas in the district. However, the occurrence of gold, iron and red moulding sand are also noticed in certain parts of the district.

In Kurnool district, minerals like copper, lead and zinc occur. But no workable deposit has so far been located. Occurrences of these minerals which show some prominence are mentioned below. In the Ganikalva area in Nandyal and Kurnool, there is copper. The areas were prospected by the Geological Survey of India and the Indian Bureau of Mines and around Ganikalva, the mineralisation (Average copper contents is 1.27%) was intersected only in one bore hole of the seven drilled. The Banaganapalle conglomerate is a diamondiferous formation and they are workings of this rank. Similarly, the gravels derived from the disintegration of this formation in parts of Banaganapalle, Dhone, Koilkuntla, Kurnool, Pattikonda and

NandyalMandals have yielded diamonds. A few Kilometres to the East in the Nallamala hills near Chalama, there are deep, ancient dykes which are considered to be kimberlite. Prospecting of diamonds is a highly speculating venture. Yet it is worthwhile to take up in selected areas considering the high value of the mineral. There are numerous small occurrences of iron ore (Hematite) in the district. Reasonably good deposits of iron ore are confined to the Ramallakota - Veldurthi area in Veldurthi Mandal. The Narji lime stones are a veritable stone house of cement grade variety. The preliminary study indicates that the reserves of cement grade limestone estimated at 5,100 million tonnes in KoilkuntlaMandal and the enclaves of Banaganapalle Mandal, 478.50 million tonnes in Dhone Mandal, 127,500 million tonnes in Kurnool Mandal and 85.40 million tonnes in Nandikotkur Mandal. The Panyam Cement and Mineral Industries Company Limited have their factory at Bugganipalle. There is scope for the establishment of more cement factories in the district, considering the vast reserves of cement grade limestone. Small deposits of red-oxide near Gutupalle in Dhone Mandal and Ramallakota in Veldurthi Mandal have considerable quantities. Similarly large deposits of yellow ochre are found near Bethamcherla. The following table give details of production of principal minerals in the year 2000-2010.

Minerals *[Quantity in Tonnes; Value in '000 Rs]*

Sl. No.	Year	Dolomite		Steatite		Quartz		Lime Stone		Silica Stone		Shale		Clay(others)		Iron Ore	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	**2000-01**	NA	NA	36,817	5,433	950	38	3,590	5,32,762	NA	NA	1,08,990	7,454	36,893	1,568	NA	NA
2	**01-02**	3,517	170	39,579	5,585	NA	NA	3,270	2,96,298	NA	NA	2,860	270	26,652	1,192	NA	NA
3	**02-03**	11,044	577	40,629	6,306	4,015	201	NA	NA	3,861	3,47,820	1,18,420	6,158	44,542	1,903	1	95
4	**03-04**	1,91,364	16,782	50,335	11,987	NA	NA	3,546	3,29,267	3,917	168	1,59,090	8,272	40,440	1,545	24	2,385
5	**04-05**	4,93,356	44,811	54,583	14,185	1,598	112	3,782	3,48,851	6,390	559	1,53,900	4,617	38,532	2,117	36	4,334
6	**05-06**	3,73,580	57,763	75,010	20,127	16,755	1,801	39,38,469	3,40,087	29,305	1,492	97,343	3,317	NA	NA	2,17,927	18,546
7	**06-07**	4,43,755	96,543	97,405	28,754	14,558	1,665	37,58,475	3,40,255	53,955	2,614	2,13,190	9,203	NA	NA	2,96,806	3,84,496
8	**07-08**	5,80,065	1,38,821	90,320	29,329	21,447	2,581	61,98,754	6,34,071	23,419	1,207	1,40,760	6,866	NA	NA	4,71,854	1,37,352
9	**08-09**	6,52,737	1,71,833	85,405	30,506	29,360	3,406	75,53,995	8,49,976	21,117	1,198	1,14,183	6,127	NA	NA	5,14,764	3,98,221
10	**09-10**	7,73,150	1,65,284	89,512	21,881	23,888	3,749	18,541,657	9,86,305	46,139	2,489	77,453	4,075	51,300	5,863	313319	260155

Source: Directorate of Economics and Statistics year books from 2001 to 2010

2.12 Climate

The climate of the region is normally dry sub-humid type. Rayalaseema forms a part of the semiarid region of the interior Deccan. The climatic conditions of the region can be divided into four seasons. The period from December to February is dry and comparatively cool season. Summer spreads from March to May followed by south-west monsoon from June to September, October and November contribute the post-monsoon or retreating monsoon season. In Rayalaseema region, the Anantapur district is the second driest part of the country next to the Jaisalmer district of Rajasthan.

In Kurnool district, the climate is tropical with temperatures ranging from 26 °C (78.8 °F) to 46 °C (114.8 °F) in the summer and 12 °C (53.6 °F) to 31 °C (87.8 °F) in the winter. The average annual rainfall is about 705 millimetre (28 in).

Climate data for Kurnool (1981–2010) [hide]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	37.3 (99.1)	39.9 (103.8)	43.3 (109.9)	44.8 (112.6)	45.6 (114.1)	45.6 (114.1)	38.5 (101.3)	37.8 (100)	38.7 (101.7)	38.4 (101.1)	38.8 (101.8)	34.4 (93.9)	45.6 (114.1)
Average high °C (°F)	31.7 (89.1)	34.8 (94.6)	38.2 (100.8)	40.1 (104.2)	40.5 (104.9)	36.2 (97.2)	33.6 (92.5)	32.5 (90.5)	32.9 (91.2)	32.5 (90.5)	31.2 (88.2)	30.5 (86.9)	34.6 (94.3)
Average low °C (°F)	17.9 (64.2)	20.3 (68.5)	23.8 (74.8)	26.7 (80.1)	27.5 (81.5)	25.5 (77.9)	24.5 (76.1)	23.9 (75)	23.8 (74.8)	22.8 (73)	20.1 (68.2)	17.8 (64)	22.9 (73.2)
Record low °C (°F)	8.3 (46.9)	11.1 (52)	12.8 (55)	15.5 (59.9)	19.4 (66.9)	17.6 (63.7)	19.2 (66.6)	19.9 (67.8)	17.0 (62.6)	13.0 (55.4)	9.3 (48.7)	6.7 (44.1)	6.7 (44.1)
Average precipitation mm (inches)	4.0 (0.157)	2.2 (0.087)	9.8 (0.386)	26.4 (1.039)	50.4 (1.984)	93.6 (3.685)	121.4 (4.78)	143.4 (5.646)	145.0 (5.709)	114.1 (4.492)	23.0 (0.906)	3.9 (0.154)	737.2 (29.024)
Average precipitation days	0.3	0.2	0.7	1.6	2.7	5.7	7.6	9.0	7.7	5.2	1.9	0.3	43.0
Source: India Meteorological Department (record high and low up to 2010)[16][17]													

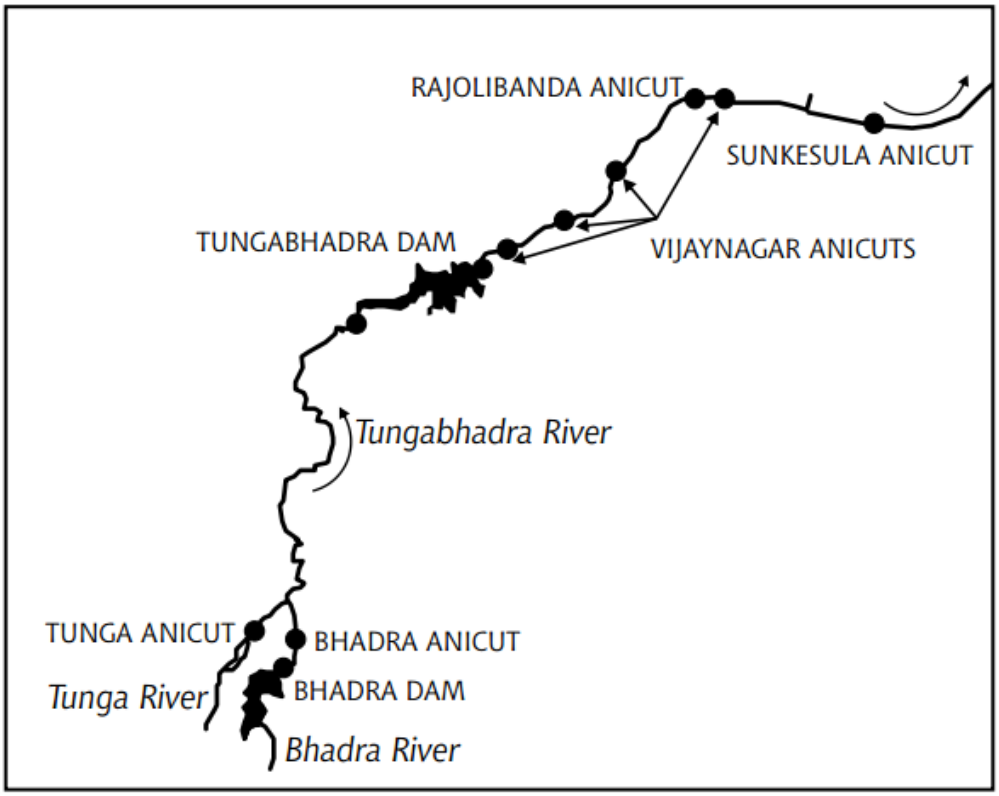
2.13 Transport

2.13.1 Road

Kurnool is well connected by road with State Capital Vijayawada. It is in halfway between [[Hyderabad and Bengaluru. National Highway 44 (India) connects Kurnool to Hyderabad. The State Highway 51 connects to Srisailam, Vinukonda, Guntur, Vijayawada. National_Highway_40_(India)_(new_numbering) runs from Kurnool to Chittoor are te major highways passing through the city. The city has a total road length of 519.22 km State owned bus transport system, APSRTC, operates buses from Kurnool bus station to other parts of the state.

2.13.2 Railways

Kurnool railway station lies on the Hyderabad – Guntakal railway line. It is classified as an A–category station in the Hyderabad railway division of South Central Railway zone.



Above: A schematic sketch of the Tungabhadra river with dams and anicut shown.

Chapter - 3

Rainfall & Climate

3.1Rainfall and Climatic Conditions

The normal annual rainfall of the district is 670mm. Of this about 425 mm of rainfall is received in South-West monsoon and about 116mm of rainfall is received during North-East monsoon. The rainfall is about 124mm in hot weather period and during winter period it is very low i.e., 4.2mm. The climate of the district is normally good. January, February and March months are usually pleasant with moderate winds from South-East. April and May are hottest months of the year. During these months the wind shifts to southwest with increased force and brings welcome showers by the end of May.

3.2Climate

The Climate of the district is normally good and healthy. January, February and March months are usually pleasant with moderate winds from South-East. April and May are hottest months of the year, during these months the wind shifts to South West with increased force and brings welcome showers by the end of May. During the succeeding four months the wind blows from western side in major parts of the district and brings fair quantum of rainfall. By the end of September the wind is light and pleasant forecasting on the set of North East monsoon. In November and December the weather is fine, rainfall is rare and wind is lightwith occurrence of heavy dew. District normal rainfall in a year is 670 mm. During 2004-2005 the rainfall received is 541.6 mm.

Andhra Pradesh state is divided in to 7 Agro-climatic zones. Kurnool district falls under scarce rainfall zone (VI) with a rainfall of 500 mm. to 750 mm. Normal rain fall of Kurnool district, is 670 mm. Out of which nearly 68 per cent is being received from South West monsoon and 22 per cent will be received during North East monsoon Period.

Rain fall in Kurnool district is mostly erratic, insufficient and unevenly distributed. Hence, drought or floods are common phenomena. Rainfall data for the past 10 years is presented in the below table.

Rainfall Data in Kurnool from 1996-97 to 2005-06 (in mm)

Period / Month	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	Normal Rainfall
SOUTH-WEST MONSOON											
June	202	46	70	57	165	34	87	65	53	50	77
July	70	59	135	67	151	28	69	114	115	156	117
August	199	92	159	154	322	113	121	132	42	109	135
September	193	211	285	85	90	207	61	114	153	147	126
Total	664	408	649	363	728	382	338	425	363	462	455
NORTH-EAST MONSOON											
October	276	60	232	46	113	267	132	115	94	249	114

November	7	41	15	0	5	9	6	2	3	4	28
December	6	19	0	0	3	0	0	0	0	1	7
Total	289	120	247	46	121	276	138	117	97	254	149
WINTER PERIOD											
January	13	0	0	0	.2	4	0	4	1	0	3
February	1	0	1	14	0	0	0	0	3	o	2
Total	14	0	1	14	2	4	0	4	4	0	5
HOT-WEATHER PERIOD											
March	0	9	2	1	0	0	0	15	4	26	6
April	32	18	41	5	11	7	8	13	36	16	17
May	21	36	26	62	46	10	55	0	80	74	38
Total	53	63	69	68	57	17	63	28	120	116	61
Grand Total	1020	591	966	491	908	679	539	574	584	832	670

Source: Office of the Chief Planning Officer, Kurnool.

3.3Temperature

During summer months from March to June, maximum temperature ranges between 37.5°C to 42.5°C and the minimum temperature between 22.5°C to 27.9°C. The May month is hottest in all the summer months. December is coldest of all months.

3.4Types of Soil

The soils in the district are classified as clay, loamy and sandy soils. The black cotton soils are predominant in the mandals of Pattikonda, Nandyal, Allagadda, Koilkuntla, Nadikotkur and Adoni. In the eastern part of the district, red soil of a poor quality largely predominates. These soils although, generally poor in fertility, yield a very good crop with a minimum rainfall. Regar soils are predominant in the mandals of Kurnool and Pattikonda. The availability of alluvial soil is quite small and is confined to a few villages near the Banavasi and the Krishna.

3.5Cropping pattern

3.5.1 Cropping pattern in Rayalaseema Region

Cropping pattern may be analyzed between food and non-food crops and also between different individual crops. One fundamental change that occurred in the cropping pattern is that there was substantial decline of area under food crops in the entire region. The decline was too sharp in Anantapur district as compared to other districts. In the region as a whole and also in Anantapur, Chittoor and Kadapa districts, the percentage of area under non-food crops has more than doubled. As elsewhere in the dry regions of the country, commercial crops have replaced the area under food crops in Rayalaseema region. At present groundnut occupies more than half of the cropped area. The main crops which lost the area to groundnut are jowar, bajra and ragi. But considerable decline can be observed in the area under three important pulses crops i.e., red gram, green gram and horse gram.

Among the districts, Anantapur's agriculture was completely dominated by groundnut, occupying 70% of the cropped area. Incase of Chittoor and Kadapa districts also, the increase of area under groundnut was substantial. But in Kumool district the increase was not that sharp. This region is predominantly agricultural area. Large number of workers is engaged either as

cultivators or as agricultural labourers. In this region nearly 73% population engaged as cultivators and agricultural labourers. The remaining 27% engaging in other services. In Anantapur and Kumool districts 74% are depending upon agriculture, whereas in Chittoor district 73% and in Kadapa district 70% are in agriculture field.

3.5.2 Cropping pattern in Kurnool District

The cultivation is carried out in two seasons i.e., Kharif and Rabi. The major crops grown during the Kharif and Rabi seasons in the district are Paddy, Jowar, Bajra, Korra, Redgram, Chillies, Turmeric, Fruits, Vegetables, Cotton, Groundnut, Sunflower, Tobacco and Other Crops. The particulars of cultivated area under different crops in the district are presented in table below.

CROPPING PATTERN IN KURNOOL DISTRICT

S.No.	Name of the Crop	Area in Hectares	Percentage to total
1	Paddy	126680	14.09
2	Jowar	71706	7.98
3	Bajra	6747	0.75
4	Korra	5691	0.63
5	Redgram	33960	3.78
6	Chillies	12076	1.35
7	Turmeric	995	0.11
8	Fruits and Vegetables	15015	1.67
9	Cotton	36070	4.01
10	Groundnut	191356	21.28
11	Sunflower	140629	15.65
12	Tobacco	18627	2.07
13	Other Crops	239381	26.62
	Total	**898939**	**100**

Source: Report of the Chief Planning Office, Kurnool
Note: Figures in parenthesis indicates percentage to the total cropped area.

The above data shows that the major crop in the district is Groundnut with a share of 21.28 per cent of the cultivated area followed by the Sunflower with a contribution of 15.65 per cent of different crops. Paddy constitutes 14.09 per cent, Jower in 7.98 per cent, cotton in 4.01 per cent, Redgram 3.78 per cent of area and other crops in 26.62 per cent of the cultivated area. The major food grains in Andhra Pradesh is Turmeric but the turmeric cultivation in the district is low i.e., only 0.11 per cent of the total cropped area.

Year wise watershed activities in Kurnool district during 1995-96 to 2006-2007

Year	Work Done											Man days (Ha)
	Contour bun-ding (Ha.)	Stone Bun-ding (Ha.)	Rock Fill Dams (Nos)	Continuous Trenches (RMTs)*	Mini Percolation Tanks (Nos)	Check Dams (Nos)	Gabi-an (Nos)	Kuntas (Nos)	Dugout ponds (Nos)	Diversion Drains (No.)	Plantation (Ha)	
1995-96	2935.65 (42.94)	4735.65 (44.91)	4318.45 (31.99)	66318.45 (14.05)	35 (6.59)	510 (31.97)	45 (0.48)	125 (6.66)	716 (15.61)	11318 (14.55)	1216.16 (15.44)	1546316 (24.25)
1996-97	285 (4.17)	746 (7.07)	68 (0.50)	20732 (4.93)	10 (1.88)	18 (1.13)	10 (0.4)	56 (2.96)	215 (4.69)	516 (0.66)	86 (1.06)	255416 (4.03)
1997-98	618.26 (9.39)	836 (7.93)	1236 (9.15)	14345.2 (3.04)	78 (14.48)	95 (5.96)	110 (1.17)	85 (4.49)	530 (11.55)	6415 (9.25)	816.25 (10.03)	651037 (10.29)
1998-99	580 (8.48)	1520 (14.62)	1780.21 (13.18)	69435 (13.87)	45 (8.47)	346 (21.69)	150 (1.59)	150 (7.93)	690 (15.04)	12618 (16.23)	4116 (50.58)	1435612 (22.70)
1999-00	135 (1.97)	675 (6.40)	936.45 (6.94)	38418 (8.14)	32 (6.03)	135 (8.46)	160 (1.70)	1016 (53.69)	536 (11.68)	15315 (14.70)	419.6 (5.16)	945614 (14.95)
2000-01	354 (5.17)	836 (7.93)	1136 (8.41)	65435 (13.87)	65 (12.24)	210 (13.16)	256 (2.71)	125 (6.16)	715 (15.59)	6819 (8.77)	396.45 (4.87)	125619 (1.99)
2001-02	136 (1.99)	218 (2.07)	1568 (11.55)	35418 (7.51)	125 (23.54)	85 (5.33)	30 (0.32)	95 (5.2)	418 (9.11)	10316 (13.27)	120.6 (1.48)	464156 (7.34)
2002-03	763 (11.16)	186 (1.76)	836 (1.74)	50964 (10.79)	18 (3.38)	68 (4.26)	8618 (91.45)	88 (4.65)	513 (11.18)	7168 (9.22)	318 (3.90)	548316 (8.67)
2003-04	562 (8.22)	456 (4.32)	652.25 (4.83)	49536.40 (10.50)	79 (14.87)	35 (2.19)	10 (0.4)	35 (1.85)	130 (2.83)	6119 (7.87)	216 (2.65)	316412 (5.00)
2004-05	186 (2.72)	116 (1.10)	120 (0.88)	35478 (7.52)	16 (3.01)	68 (4.16)	20 (0.8)	68 (3.59)	76 (1.65)	550 (0.70)	107 (1.31)	13416 (0.21)
2005-06	267 (3.90)	218 (2.07)	768 (5.69)	25619 (5.43)	25 (4.71)	25 (1.57)	15 (0.12)	49 (2.59)	45 (0.98)	420 (0.54)	216 (2.65)	15618 (0.24)
2006-07	15 (0.22)	0 (0.00)	89 (0.66)	0 (0.00)	3 (0.56)	0 (0.00)	0 (0.00)	0 (0.00)	3 (0.06)	120 (0.15)	68 (0.83)	6349 (0.13)
Total	6836.91 (100.00)	10543.61 (100.00)	13500.36 (100.00)	471691.48 (100.00)	531 (100.00)	1595 (100.00)	9424 (100.00)	1892 (100.00)	4587 (100.00)	77738 (100.00)	8136.06 (100.00)	6323881 (100.00)

Source: District Water Management Agency, Kurnool.
***RMTs:** Running Meters

Chapter - 4

Riverine

The principal rivers flowing in the district are the Tungabhadra (and its tributary is Hundri) the Krishna and the Kunderu.

The Tungabhadra rises in the Western Ghats and after forming part of northern boundary for some distance separates Kurnool from the Telangana area flows in an eastern direction receives Hundri and falls into the Krishna River at KundaliSangam after winding northwards.

The Hundri, a tributary of Tungabhadra rises in the fields of Maddikera in Maddikeramandal receives a stream from Erramallai 29 at Laddagiri in Kodumurmandal and joins Thungabhadra at Kurnool. It drains much of Maddikera, PathikondaDevanakonda, Gonegandla, Kodumur and Kallurmandals. This is a turbid stream with sudden rise and fall. The Kunderu also called Kumudvathi rises on the western side of Erramallai winds its way into Kunderu valley and flows in a southern direction collecting drainage all along its course from either side. It flows through Orvakal, Midthur, Gadivemula, Nandyal, Gospadu, Koilakuntla, Dornipadu and Chagalamarrimandals and there enters Kadapa District.

An overview of Tungabhadra river flowing on north side of Kurnool city.

An overview of Kurnool City settlement pattern along the bank of Tungabhadra River.

Chapter - 5

Proposals for Construction of 0.4 TMC Reservoir @ Mettupalli (V)

The work of detailed investigation and preparation of detailed project report of the above project was entrusted to the SRES Consultants, Hyderabad. The Consultants studied the entire proposals as per the agreement conditions and the following proposals are submitted for favour of approval of the proposals for proceeding further work as per the agreement conditions.

5.1. Survey

The map study was conducted, and proposed Reservoir location was studied. As per the toposheet Vengalammacheruvu is the nearest location where reservoir can be formed.

The detailed survey was conducted at the proposed Reservoir site. The Benchmark given by the departmental staff at the SRBC division office 2-3, +199.954m was carried out to the reservoir site. The benchmarks are established at every 500m interval. The contour survey was conducted in the foreshore of the Reservoir for finalising the capacity of the Reservoir. About 1000-acre grid level survey was conducted. The grid levels are covered in the foreshore of the existing Vengalammacheruvu and about 500 m downstream of the Vengalammacheruvu. The maximum grid level covered up to + 275 m level.

First proposal :-
The dam alignment is proposed at about 80m downstream of existing tank.

Second proposal :-
The dam alignment is proposed at about 150m downstream of existing tank.

Third proposal :-
The dam alignment is proposed without submerging SRBC 11B Major distributory.

5.1.1. B.M. VALUES

SRES CONSULTANTS LF BOOK NO: 1						
NAME OF WORK :-" "Detailed Investigation and preparation of detailed Project Report for " construction of a new reservoir 0.40 TMC Capacity for industrial water requirements near Mettupalli (V),Owk (M),Kurnool District ".						
DCBMS FROM OWK SRBC DIVISION OFFICE 2-3 TO VENGALAMMA TANK (NEAR METTUPALLI VILLAGE						
NAME OF THE ENGINEER:			K PETER RAJ		DATE:27-09-2017	
WEATHER: SUNNY			INSTRUMENT: AUTOLEVEL SOKKIA			
S.NO	BS	FS	HI	RL	TBM	REMARKS
1	1.400		201.355	**199.955**		B/S From Owk SRBC Division office DCBM (199.954)
2	1.570	1.455	201.470	199.900		
3	1.740	1.180	202.030	200.290		
4	1.560	0.880	202.710	201.150		
5	1.250	1.365	202.595	201.345	TBM-1	Top of the Culvert near Natural Stone Pavers Company towards Owk to
6	0.980	0.685	202.890	201.910		
7	1.320	1.545	202.665	201.345	TBM-2	Top of the Culvert Beside Hanuman Temple towards Owk to Mettupalli
8	1.820	1.060	203.425	201.605		
9	3.140	0.160	206.405	203.265		
10	1.645	1.720	206.330	204.685		
11	1.895	0.930	207.295	205.400		
12	0.580	0.890	206.985	206.405	TBM-3	Top of the SRBC 11B Major Culvert
13	1.320	1.610	206.695	205.375		
14	1.405	1.120	206.980	205.575		
15	2.015	0.615	208.380	206.365	TBM-4	Top of the SRBC 11B Major Culvert towards Owk road to Vengalamma
16	2.550	1.800	209.130	206.580		
17	2.175	1.895	209.410	207.235	TBM-5	Top of the SRBC 11B Major Culvert towards Owk road to Vengalamma
18	1.660	1.110	209.960	208.300		
19	2.000	1.595	210.365	208.365		
20	2.120	0.930	211.555	209.435		
21	2.755	0.400	213.910	211.155		
		2.615		211.295	TBM-6	Top of the SRBC 11B Major Culvert towards Owk road to Vengalamma tank Beside Hill
	36.900	25.560				
Arthimatc check						
∑BS-	∑FS=	11.340				
Last RL- first RL=		11.340				
Tallied						
Levels taken by 2nd person: D PRASAD				sdxxxxxxxx		
Checked by me :		sdxxxxxx				

SRES CONSULTANTS LF BOOK NO: 2						
NAME OF WORK :-" "Detailed Investigation and preparation of detailed Project Report for " construction of a new reservoir 0.40 TMC Capacity for industrial water requirements near Mettupalli (V),Owk (M),Kurnool District ".						
DCBMS FROM OWK SRBC DIVISION OFFICE 2-3 TO VENGALAMMA TANK (NEAR METTUPALLI VILLAGE)						
NAME OF THE ENGINEER:			D PRASAD		DATE:27-09-2017	
WEATHER: SUNNY			INSTRUMENT: AUTOLEVEL SOKKIA			
S.NO	BS	FS	HI	RL	TBM	REMARKS
1	1.335		201.290	199.955		B/S From Owk SRBC Division office DCBM (199.954)
2	1.590	1.390	201.490	199.900		
3	1.760	1.200	202.050	200.290		
4	1.545	0.900	202.695	201.150		
5	1.230	1.350	202.575	201.345	TBM-1	Pavers Company towards Owk to Mettupalli Village
6	1.050	0.665	202.960	201.910		
7	1.285	1.615	202.630	201.345	TBM-2	Temple towards Owk to Mettupalli Village
8	1.860	1.025	203.465	201.605		
9	3.120	0.200	206.385	203.265		
10	1.620	1.700	206.305	204.685		
11	1.855	0.905	207.255	205.400		
12	0.630	0.850	207.035	206.405	TBM-3	Top of the SRBC 11B Major Culvert towards Owk to Mettupalli Village
13	1.355	1.660	206.730	205.375		
14	1.425	1.155	207.000	205.575		
15	1.980	0.635	208.345	206.365	TBM-4	towards Owk road to Vengalamma tank
16	2.580	1.765	209.160	206.580		
17	2.170	1.925	209.405	207.235	TBM-5	Top of the SRBC 11B Major Culvert towards Owk road to Vengalamma
18	1.635	1.105	209.935	208.300		
19	2.010	1.570	210.375	208.365		
20	2.115	0.940	211.550	209.435		
21	2.815	0.395	213.970	211.155		
		2.675	211.295	211.295	TBM-6	Top of the SRBC 11B Major Culvert towards Owk road to Vengalamma tank Beside Hill
	36.965	25.625				
Arthimatc check						
∑BS-	∑FS=	11.340				
Last RL- first RL=		11.340				
Tallied						
Levels taken by 2nd person: K PETER RAJ					sdxxxxxxxxx	
Checked by me :		sdxxxxxx				

5.2. HP's of SRBC Main Canal @KM 114.050

Discharge required	: 41.82 cumecs
Discharge designed	: 42.57 cumecs
CBL	: 224.885 m
FSL	: 228.545 m
TBL	: 229.545 m
Bed width	: 8.40 m
FSD	: 3.66 m
Free Board	: 1.00 m
Side Slopes	: 1:1 rightside bank
	1.5 :1 leftside bank
Bed fall	: 1 in 12000
Velocity	: 0.896 m/sec
Value of 'n'	: 0.018

5.3. Discharge Calculations of Conveyance canal

Water to be conveyed	: 0.4 TMC or 11326770 CUM
No of days proposed	: 60 Days
Discharge per day	: 188779.5 cumecs
Discharge m^3/sec	: 2.184948 m^3/sec ≅ **2.2 m^3/sec**

5.4. CONVEYANCE CANAL DESIGN

STANDARDS OF CANAL SECTIONS

Design as per	:	IS: 7112 - 1973 and IS 10430 - 2000				
Discharge required	:	2.2	cumecs			
Canal type	:	unlined canal				
Soil type	:	ROCKY STRATA				
FSL of SRBC Main Canal @KM 114.050	:	228.545	m		depth =	3.66 m
Bed Level	:	224.885	m			
Driving Head	:	0.3	m			
FSL of conveyance canal		228.245				
Scheme		:	Gravity canal			
Nature of canal	:		CONVEYANCE CANAL			
Value of 'n'	:	0.030				
		vertical		Horizontal		
Side slopes	:	1	:	1.5		cutting in soils
		1	:	1		cutting in Rock
Free board	:	0.5	m	as per clause 8.2 of 10430:2000		
Bank top width	:		4m+Dowell Bank for inspection 2.5 for non inspection bank			
B/D Ratio	:	2-4	as per CE/CDO guide lines for conveyance canals			
v/v_0	:	0.9-1.1				

CANAL SECTION DESIGN WITH SIDE SLOPES 1:1

DISCHARGE TO BE CONVEYED			2.2	m^3/sec		
ADD LOSSES10%			0.22	m^3/sec		
REQUIRED DISCHARGE OF CANAL			2.42	m^3/sec		
VALUE OF N			0.030			
SIDE SLOPES OF THE CANAL		1 :	1			
SLOPE OF THE CHANNEL			1:3000			
DEPTH	D	=	**1.10**			
Bed width	B	=	4.000	m		
B/D		=	3.6			
ACTUAL AREA	A	=	5.61	m^2		
P	P	=	7.111			
R	R	=	0.789			
ACTUAL VELOCITY	V	=	0.52	m/s		
DESIGNED DISCHARGE	Q	=	2.92	m^3/sec		2.42
CRITICAL VELOCITY	V_O	=	0.5569			
	V/V_0	=	0.9337	>.9	OK	

CANAL SECTION DESIGN WITH SIDE SLOPES 1:1.5

DISCHARGE TO BE CONVEYED			2.2	m^3/sec		
ADD LOSSES10%			0.22	m^3/sec		
REQUIRED DISCHARGE OF CANAL			2.42	m^3/sec		
VALUE OF N			0.030			
SIDE SLOPES OF THE CANAL		1 :	1.5			
SLOPE OF THE CHANNEL			1:3000			
DEPTH	D	=	**1.10**			
Bed width	B	=	3.500	m		
B/D		=	3.2			
ACTUAL AREA	A	=	5.665	m^2		
P	P	=	7.466			
R	R	=	0.759			
ACTUAL VELOCITY	V	=	0.506	m/s		
DESIGNED DISCHARGE	Q	=	2.87	m^3/sec		2.42
CRITICAL VELOCITY	V_O	=	0.5569			
	V/V_0	=	0.9086	>.9	OK	

5.5. CONVEYANCE CANAL STANDARDS

1	SRBC MAIN CANAL CBL @KM 114.050	224.885 m
2	FSL	228.545 m
3	FSD	3.66 m
4	3/4 TH FSD	2.745 m
5	FSL TO BE CONSIDERED	227.630 m
6	DRIVING HEAD	0.15 m
7	PROPOSED FSL	227.480 m
8	FSD	1.10 m
9	CBL	226.380 m

5.6. RESERVOIR FRL FIXATION:

The conveyance canal length is 2.35 km. The Bed Slope is provided 1 in 3000 at end the loss of head due to Bed fall and structures are 1m.

At start the conveyance canal Bed Level is +226.19, and the FSL is 227.29. At end the conveyance canal Bed Level is +225.19, and the FSL is 226.29.

The Reservoir FRL can be fixed 0.3 m less than the FSL at end so as to have a free flow in to the reservoir. Hence the reservoir FRL may be fixed at 226.00.

5.6.1. FIRST PROPOSAL:

The dam alignment is proposed 80 m downstream of Vengalamma Cheruvu. Based on the grid levels 0.5 m contours are generated and the area capacity table is worked out.

METTUPALLI RESERVOIR

RESERVOIR CAPACITY PROPOSAL - 1

Sl.No.	COUNTOUR LEVEL	COUNTUR AREA IN SQM	I - LAND	TOTAL AREA	MEAN AREA IN SQM	COUNTOUR INTERVAL	VOLUME IN CUM	CAPACITY IN TMC	CUMULATIVE IN TMC
1	208	6492.070		6492.070			0.00	0.000	0.000
2	208.5	20809.550		20809.550	13650.81	0.5	6825.40	0.000	0.000
3	209	44182.850		44182.850	32496.20	0.5	16248.10	0.001	0.001
4	209.5	64421.560		64421.560	54302.21	0.5	27151.10	0.001	0.002
5	210	89453.040		89453.040	76937.30	0.5	38468.65	0.001	0.003
6	210.5	135831.850		135831.850	112642.45	0.5	56321.22	0.002	0.005
7	211	167173.100		167173.100	151502.48	0.5	75751.24	0.003	0.008
8	211.5	202414.130		202414.130	184793.62	0.5	92396.81	0.003	0.011
9	212	244983.850		244983.850	223698.99	0.5	111849.50	0.004	0.015
10	212.5	278826.620		278826.620	261905.24	0.5	130952.62	0.005	0.020
11	213	305636.000		305636.000	292231.31	0.5	146115.66	0.005	0.025
12	213.5	331689.781		331689.781	318662.89	0.5	159331.45	0.006	0.031
13	214	371167.500		371167.500	351428.64	0.5	175714.32	0.006	0.037
14	214.5	388451.970		388451.970	379809.74	0.5	189904.87	0.007	0.044
15	215	417589.500		417589.500	403020.74	0.5	201510.37	0.007	0.051
16	215.5	447494.198		447494.198	432541.85	0.5	216270.92	0.008	0.059
17	216	478731.875		478731.875	463113.04	0.5	231556.52	0.008	0.067
18	216.5	521198.450	11125.030	510073.42	494402.65	0.5	247201.32	0.009	0.076

19	217	547516.330	8670.100	538846.23	524459.83	0.5	262229.91	0.009	0.085
20	217.5	572639.960	6898.450	565741.51	552293.87	0.5	276146.94	0.010	0.095
21	218	598637.560	5327.780	593309.78	579525.65	0.5	289762.82	0.010	0.105
22	218.5	628297.127	4022.010	624275.12	608792.45	0.5	304396.22	0.011	0.116
23	219	668311.300	3050.580	665260.72	644767.92	0.5	322383.96	0.011	0.127
24	219.5	702634.020	2185.180	700448.84	682854.78	0.5	341427.39	0.012	0.139
25	220	732862.940	1429.350	731433.59	715941.22	0.5	357970.61	0.013	0.152
26	220.5	761013.050	790.880	760222.17	745827.88	0.5	372913.94	0.013	0.165
27	221	787703.860		787703.860	773963.02	0.5	386981.51	0.014	0.179
28	221.5	812937.740		812937.740	800320.80	0.5	400160.40	0.014	0.193
29	222	837560.310		837560.310	825249.03	0.5	412624.51	0.015	0.208
30	222.5	860168.970		860168.970	848864.64	0.5	424432.32	0.015	0.223
31	223	882030.870		882030.870	871099.92	0.5	435549.96	0.015	0.238
32	223.5	902963.010		902963.010	892496.94	0.5	446248.47	0.016	0.254
33	224	923249.870		923249.870	913106.44	0.5	456553.22	0.016	0.270
34	224.5	942796.900		942796.900	933023.39	0.5	466511.69	0.016	0.286
35	225	1022209.810		1022209.810	982503.36	0.5	491251.68	0.017	0.303
36	225.5	990733.750		990733.750	1006471.78	0.5	503235.89	0.018	0.321
37	226	1009928.280		1009928.280	1000331.02	0.5	500165.51	0.018	0.339
38	226.5	1028480.200		1028480.200	1019204.24	0.5	509602.12	0.018	0.357
39	227	1046458.800		1046458.800	1037469.50	0.5	518734.75	0.018	0.375
40	227.5	1063880.690		1063880.690	1055169.75	0.5	527584.87	0.019	0.394
41	228	1081164.790		1081164.790	1072522.74	0.5	536261.37	0.019	0.413

Reservoir Lowest Level	+208.000m
F.R.L	+226.000m
T.B.L	+229.000m
Foundation Level	+206.000m
Height of Earthen Bund	23 m
Capacity at FRL 226m	0.339 TMC

As seen from the above the gross capacity of the reservoir at + 226.00 level is 0.339 TMC and live capacity is 0.319.The length of the bund 1.7 KM and the height of the Bund is 20m. This is less than the required capacity.

Considering the FRL 228 the required capacity 0.4 TMC will be available. But it is higher than the starting bed level. Hence it is not feasible. The length of the bund 1.775 KM and the height of the Bund is 24m.

5.6.2. SECOND PROPOSAL:

The dam alignment is proposed 150 m downstream of Vengalamma cheruvu. Based on the grid levels 0.5 m contours are generated and the area capacity table is worked out.

METTUPALLI RESERVOIR

RESERVOIR CAPACITY PROPOSAL - 2

Sl.No.	COUNTOUR LEVEL	COUNTUR AREA IN SQM	I - LAND	TOTAL AREA	MEAN AREA IN SQM	COUNTOUR INTERVAL	VOLUME IN CUM	CAPACITY IN TMC	CUMULATIVE IN TMC
1	206	5832.554		5832.554			0.00	0.000	0.000
2	206.5	14901.507		14901.507	10367.03	0.5	5183.52	0.000	0.000
3	207	31619.588		31619.588	23260.55	0.5	11630.27	0.000	0.000
4	207.5	46653.309		46653.309	39136.45	0.5	19568.22	0.001	0.001
5	208	65337.294		65337.294	55995.30	0.5	27997.65	0.001	0.002
6	208.5	94309.414		94309.414	79823.35	0.5	39911.68	0.001	0.003
7	209	125623.023		125623.023	109966.22	0.5	54983.11	0.002	0.005
8	209.5	156912.045		156912.045	141267.53	0.5	70633.77	0.002	0.007
9	210	193768.956		193768.956	175340.50	0.5	87670.25	0.003	0.010
10	210.5	252287.150		252287.150	223028.05	0.5	111514.03	0.004	0.014
11	211	286333.260		286333.260	269310.21	0.5	134655.10	0.005	0.019
12	211.5	293144.740		293144.740	289739.00	0.5	144869.50	0.005	0.024
13	212	337299.435		337299.435	315222.09	0.5	157611.04	0.006	0.030
14	212.5	388919.911		388919.911	363109.67	0.5	181554.84	0.006	0.036
15	213	428533.683		428533.683	408726.80	0.5	204363.40	0.007	0.043
16	213.5	462889.143		462889.143	445711.41	0.5	222855.71	0.008	0.051
17	214	496526.796		496526.796	479707.97	0.5	239853.98	0.008	0.059
18	214.5	531052.455		531052.455	513789.63	0.5	256894.81	0.009	0.068
19	215	568069.264		568069.264	549560.86	0.5	274780.43	0.010	0.078
20	215.5	601846.004		601846.004	584957.63	0.5	292478.82	0.010	0.088
21	216	636000.040		636000.040	618923.02	0.5	309461.51	0.011	0.099
22	216.5	671073.696	20818.065	650255.631	643127.84	0.5	321563.92	0.011	0.110
23	217	726478.538	17249.564	709228.974	679742.30	0.5	339871.15	0.012	0.122
24	217.5	754403.744	14429.139	739974.605	724601.79	0.5	362300.89	0.013	0.135
25	218	780848.387	11873.197	768975.190	754474.90	0.5	377237.45	0.013	0.148
26	218.5	808793.455	9640.797	799152.658	784063.92	0.5	392031.96	0.014	0.162
27	219	839451.857	7801.538	831650.319	815401.49	0.5	407700.74	0.014	0.176

28	219.5	882183.604	6074.114	876109.490	853879.90	0.5	426939.95	0.015	0.191
29	220	918377.619	4529.033	913848.586	894979.04	0.5	447489.52	0.016	0.207
30	220.5	950442.983	3177.537	947265.446	930557.02	0.5	465278.51	0.016	0.223
31	221	980451.032	2072.564	978378.468	962821.96	0.5	481410.98	0.017	0.240
32	221.5	1008934.913	1223.764	1007711.149	993044.81	0.5	496522.40	0.018	0.258
33	222	1035942.767	597.368	1035345.399	1021528.27	0.5	510764.14	0.018	0.276
34	222.5	1062225.485	193.204	1062032.281	1048688.84	0.5	524344.42	0.019	0.295
35	223	1087702.332		1087702.332	1074867.31	0.5	537433.65	0.019	0.314
36	223.5	1111949.091		1111949.091	1099825.71	0.5	549912.86	0.019	0.333
37	224	1136888.433		1136888.433	1124418.76	0.5	562209.38	0.020	0.353
38	224.5	1161332.992		1161332.992	1149110.71	0.5	574555.36	0.020	0.373
39	225	1204973.922		1204973.922	1183153.46	0.5	591576.73	0.021	0.394
40	225.5	1226381.700		1226381.700	1215677.81	0.5	607838.91	0.021	0.415
41	**226**	**1247114.219**		**1247114.219**	**1236747.96**	**0.5**	**618373.98**	**0.022**	**0.437**
42	226.5	1267214.846		1267214.846	1257164.53	0.5	628582.27	0.022	0.459
43	227	1286796.988		1286796.988	1277005.92	0.5	638502.96	0.023	0.482
44	227.5	1305805.207		1305805.207	1296301.10	0.5	648150.55	0.023	0.505
45	228	1305805.207		1305805.207	1305805.21	0.5	652902.60	0.023	0.528
46	228.5	1324746.14		1324746.140	1315275.67	0.5	657637.84	0.023	0.551
47	229	1367457.94		1367457.940	1346102.04	0.5	673051.02	0.024	0.575
48	229.5	1388187.28		1388187.276	1377822.61	0.5	688911.30	0.024	0.599
49	230	1407968.46		1407968.463	1398077.87	0.5	699038.93	0.025	0.624

Reservoir Lowest Level	+206.000m
F.R.L	+226.000m
T.B.L	+229.000m
Foundation Level	+204.000m
Height of Earthen Bund	25m
Capacity at FRL 226m	0.437 TMC

As seen from the above the gross capacity of the reservoir at + 226.00 level is 0.437 TMC and live capacity is 0.407 TMC which is the required capacity. The length of the bund 2.22 KM and the height of the Bund is 25 m. SRBC 11B Major distributory canal will be submerged in this proposal. This canal may be properly realigned outside the proposed reservoir foreshore area.

5.6.3. THIRD PROPOSAL :

The dam alignment is proposed without submerging SRBC 11B Major distributory and parallel to Vengalamma cheruvu existing bund. Based on the grid levels 0.5 m contours are generated and the area capacity table is worked out.

METTUPALLI RESERVOIR

RESERVOIR CAPACITY PROPOSAL - 3

Sl.No.	COUNTOUR LEVEL	COUNTUR AREA IN SQM	I - LAND	TOTAL AREA	MEAN AREA IN SQM	COUNTOUR INTERVAL	VOLUME IN CUM	CAPACITY IN TMC	CUMULATIVE IN TMC
1	208.500	3574.827		3574.827			0.00	0.000	0.000
2	209.000	10243.663		10243.663	6909.25	0.5	3454.62	0.000	0.000
3	209.500	18902.995		18902.995	14573.33	0.5	7286.66	0.000	0.000
4	210.000	30364.368		30364.368	24633.68	0.5	12316.84	0.000	0.000
5	210.500	71401.391		71401.391	50882.88	0.5	25441.44	0.001	0.001
6	211.000	99964.936		99964.936	85683.16	0.5	42841.58	0.002	0.003
7	211.500	132659.051		132659.051	116311.99	0.5	58156.00	0.002	0.005
8	212.000	172751.630		172751.630	152705.34	0.5	76352.67	0.003	0.008
9	212.500	200854.491		200854.491	186803.06	0.5	93401.53	0.003	0.011
10	213.000	223181.359		223181.359	212017.93	0.5	106008.96	0.004	0.015
11	213.500	244507.150	5860.65	250367.803	236774.58	0.5	118387.29	0.004	0.019
12	214.000	265128.147	10345.14	275473.287	262920.55	0.5	131460.27	0.005	0.024
13	214.500	285423.878	14939.33	300363.210	287918.25	0.5	143959.12	0.005	0.029
14	215.000	304319.044	20191.22	324510.267	312436.74	0.5	156218.37	0.006	0.035
15	215.500	321578.077	27579.52	349157.601	336833.93	0.5	168416.97	0.006	0.041
16	216.000	340301.753	35615.00	375916.753	362537.18	0.5	181268.59	0.006	0.047
17	216.500	483092.957		483092.957	429504.85	0.5	214752.43	0.008	0.055
18	217.000	510618.137		510618.137	496855.55	0.5	248427.77	0.009	0.064
19	217.500	536491.783		536491.783	523554.96	0.5	261777.48	0.009	0.073
20	218.000	564194.125		564194.125	550342.95	0.5	275171.48	0.010	0.083
21	218.500	595499.354		595499.354	579846.74	0.5	289923.37	0.010	0.093
22	219.000	639812.245		639812.245	617655.80	0.5	308827.90	0.011	0.104
23	219.500	676822.347		676822.347	658317.30	0.5	329158.65	0.012	0.116
24	220.000	708410.722		708410.722	692616.53	0.5	346308.27	0.012	0.128
25	220.500	738028.610		738028.610	723219.67	0.5	361609.83	0.013	0.141
26	221.000	766177.977		766177.977	752103.29	0.5	376051.65	0.013	0.154
27	221.500	792948.598		792948.598	779563.29	0.5	389781.64	0.014	0.168
28	222.000	819011.767		819011.767	805980.18	0.5	402990.09	0.014	0.182
29	222.500	843269.830		843269.830	831140.80	0.5	415570.40	0.015	0.197
30	223.000	866844.171		866844.171	855057.00	0.5	427528.50	0.015	0.212
31	223.500	889528.660		889528.660	878186.42	0.5	439093.21	0.016	0.228
32	224.000	911609.744		911609.744	900569.20	0.5	450284.60	0.016	0.244
33	224.500	932945.017		932945.017	922277.38	0.5	461138.69	0.016	0.260
34	225.000	823913.399		962663.711	947804.36	0.5	473902.18	0.017	0.277
35	225.500	984122.805		984122.805	973393.26	0.5	486696.63	0.017	0.294
36	**226.000**	**1004944.390**		**1004944.390**	**994533.60**	**0.5**	**497266.80**	**0.018**	**0.312**
37	226.500	1025152.930		1025152.930	1015048.66	0.5	507524.33	0.018	0.330
38	227.000	1045030.977		1045030.977	1035091.95	0.5	517545.98	0.018	0.348
39	227.500	1064594.516		1064594.516	1054812.75	0.5	527406.37	0.019	0.367
40	228.000	1084252.022		1084252.022	1074423.27	0.5	537211.63	0.019	0.386
41	228.500	1104972.713		1104972.713	1094612.37	0.5	547306.18	0.019	0.405
42	229.000	1128689.933		1128689.933	1116831.32	0.5	558415.66	0.020	0.425

Reservoir Lowest Level	+208.500m
F.R.L	+226.000m
T.B.L	+229.000m
Foundation Level	+206.500m
Height of Earthen Bund	22.5 m
Capacity at FRL 226m	0.312 TMC

As seen from the above the gross capacity of the reservoir at + 226.00m level is 0.312 TMC and live capacity is 0.300 TMC. The length of the bund 1.825 KM and the height of the Bund is 22.5 m.

5.7. SRBC 11 B MAJOR DISTRIBUTORY

The HP's of Mettupalli Major 11B of SRBC are as follows :

S.No.	Name	Reach-1 (from 0.00 to 1.581 km)	Reach-2 (from 1.581 to 2.515 km)
1	Ayacut	587.21 Acres	203.78 Acres
2	Required Discharge	0.211 cumecs	0.072 cumecs
3	Designed Discharge	0.240 cumecs	0.121 cumecs
4	Section	0.62 × 0.32 m	0.30 × 0.28 m
5	Velocity	0.601 m/sec	0.506 m/sec
6	Value of 'n'	0.018	0.018
7	Bed fall	1 in 1000	1 in 1000
8	CBL	+209.785 m	+197.644 m
9	FSL	+210.105 m	+197.924 m
10	TBL	+210.405 m	+198.224 m
11	Side slope	2 : 1	2 : 1
12	Free board	0.30 m	0.30 m
13	Ground level	+ 211.030 m	+198.428 m

5.8. Recommendations

The capacity of the reservoir in the second proposal is worked out as 0.407 TMC which is the required capacity. But the existing SRBC 11B Major distributory will be submerged in this proposal.

The capacity of the reservoir in the third proposal is worked out as 0.30 TMC without submerging the existing SRBC 11B Major distributory. The required capacity can be achieved by supplementing water during the period from October to January.

5.9. Cost of the Project

S.No.	Description	Amount (in Lakhs)
1	Formation of Reservoir	9900
2	Proposed Canal	191
3	Weir	50
4	Structures (10)	300
5	Land Acquisition (100 Acres)	500
6	Reformation of existing Canal	180
7	L.S. Provision for Miscellaneous items	79
	Total	11200

The approximate cost of the project works out to Rs.112.00 Crores.

Annexure - 1A

File No.CE-I/APIIC/KNL/WStoCementIndustries/Kolimigundla/09/2016-17

R.CHENCHAIAH
CHIEF ENGINEER-I

Andhra Pradesh
Industrial Infrastructure Corporation Ltd
(A Govt. of Andhra Pradesh Undertaking)

ZONAL OFFICE ... LIMITED
APIIC
14 FEB 2018
S.No. 1052
KURNOOL

To
The Chief Engineer (Proj) & DWRO,
Water Resources (PW) Department.,
KURNOOL.

Lr.No.CE-I/APIIC/KNL/WS to Cement Industries/Kolimigundla/09/2016-17 Dt: - 01-2018

Sir,

Sub:- Water Supply to Cement Industries at Kolimigundla, Kurnool District – Preparation of DPR for Construction of 0.40 TMC Capacity Reservoir near Mettupalli (V), Owk (M), Kurnool District- Expediting the submission of DPR - Requested - Reg.

Ref:
1) Memo No: 278744/Reforms/ A2/2016, Dt:18.7.2016 of Secretary to Govt, Water Resources (Reforms) Dept addressed to the Chief Engineer (Projects), Water Resources Dept, Kurnool.
2) Lr. No. CE(P)/KNL/ DEE.1/AEE7/IWS/ 729, Dt:24.8.2016 of the Chief Engineer (P) & DWRO, Water Resources Dept, Kurnool.
3) Lr.No.SE/SRBC-2/NDL/DW/DEE/AE.1/F.EstimateV2/No.503, Dt:03.02.2017 of the Superintending Engineer, SRBC Circle No.2, Water Resources (PW) Dept., Nandyal, Kurnool District addressed to the Chief Engineer –I, APIIC Ltd, Vijayawada.
4) Lr.No.CEDWRO-TWOIWS/6/2017-AEE7, Dt:16.02.2017 of Chief Engineer & DWRO, Water Resources Dept, Kurnool.
5) T. O Lr.No.CE-I/APIIC/KNL/WS to Cement Industries/Kolimigundla/09/2016-17 Dt: 16 -3-2017

****

Kind attention is invited to the references cited.

It is aware that Water Resources Dept has taken up the preparation of DPR for Construction of of 0.40 TMC Capacity reservoir at Mettupalli (V) for Providing Water Supply to the Cement Industries at Kolimigundla, Kurnool District" as per the directions of Govt, vide ref 1st cited.

APIIC has also deposited an amount of Rs.23.70 Lakhs (Rupees Twenty Three Lakhs and Seventy Thousands Only) with Water Resources (PW) Dept., as desired towards the fee for preparation of DPR for construction of 0.40 TMC Capacity reservoir, vide ref 5th cited. But APIIC was not informed the status on the subject work, so far after depositing the amount.

Contd.. 2

In this connection it is to inform that considerable delay has already been occurred and Cement Industries at Kolimigundla are pressuring the GoAP (Inds & Com Dept) to provide water supply to their units urgently. GoAP (Inds & Com Dept) has also desires to resolve the issue by providing water supply to the Cement industries without further delay.

Hence it is requested to expedite the preparation of DPR for the subject work and submit the same at an early date so that to take further action in the matter of supplying water to Cement Industries at Kolimigundla, Kurnool District.

Yours faithfully,

CHIEF ENGINEER-I,

APIIC, VIJAYAWADA.

Copy submitted to

1) **The Secretary to Govt., Inds.&Com Dept.**, Ground floor, 2nd Block, AP Secretariat, Velagapudi for favour of information.

2) **The Commissioner of Industries**, Govt. of AP, Ist Floor, Govt. Regional Printing Press Buildings, Muthyalampadu, Near Budameru Bridge, Vijayawada -520011 for favour of information and with a request to release the sanctioned amount of Rs.23.70 Lakhs to APIIC.

3) **Copy to Zonal Manager, APIIC, Kurnool** for information and necessary, follow-up action with Chief Engineer (Projects) &DWRO, Water Resources Dept, Kurnool and inform the status on preparation of DPR on fortnightly basis till the DPR is furnished by Water Resources Dept.

Signature valid

Digitally signed by R
Chenchaiah
Date: 2018.01.1 :10.03 IST
Reason: Approve

ZONAL OF... LIMITED
APIIC
18 APR 2018
S.WO-61-

STATUS NOTE ON METTUPALLI RESERVOIR

The Government of Andhra Pradesh proposed to develop Cement Industries in Kolimigundla Mandal of Kurnool District based on the availability of raw material. The Proposals were received from the Collector and District Magistrate, Kurnool vide Lr. No. GMDIC/A4/2015 dt 27-04-2015 for providing 0.40 TMC water for upcoming industries near Kolimigundla Mandal, Kurnool District.

It is proposed to construct a new reservoir with 0.312 TMC instead of 0.40 TMC Capacity near Mettupalli (V), Owk (M), Kurnool District. The Chief Engineer (Projects), Kurnool has finalised the proposal keeping the capacity of the reservoir as 0.312 TMC without submerging SRBC XI B distributory. The shortage of 0.09 TMC storage can be compensated by simultaneously filling water during drawls by cement industries.

D (B).
18/4.
2M

The salient features of the reservoir are as follows:

Capacity of the reservoir	: 0.312 TMC
Length of bund	: 1.830 Km
Height of Earthen Bund	: 22 m
FRL	: + 226.000
TBL	: +229.000
Source of Water	: SRBC Main CANAL @ Km 114.050

1. Preliminary Investigation Report submitted to the Chief Engineer, APIIC, Vijayawada.
2. The Earthen bund alignment approved by the Chief Engineer (Projects), Kurnool.
3. The detailed investigation was carried out by the survey agency.
4. Drilling of Bore holes completed.
5. Conducting Permeability tests completed.
6. Identification of borrow area soils, Collection of soil samples. completed. The soil samples sent to the laboratory for testing.
7. Geologist inspected the site. Core samples sent to NIT, Warangal.The report has to be finalised by the Geologist
8. Based on the Geologist report, the design of earthen bund and surplus weir will be taken up.
9. Preperation of DPR will be completed by 30-04-2018.

Executive Engineer
SRBC Division No.3, OWK

BRIEF NOTE ON CONSTRUCTION OF A RESERVOIR 0.40 TMC CAPACITY FOR INDUSTRIAL WATER REQUIREMENTS NEAR METTUPALLI(V), OWK (M), KURNOOL DISTRICT.

The proposals are received from the Collector & District Magistrate, Kurnool vide letter No.GM DIC/A4/2015, dt:27.04.2015 for 0.40TMC water for upcoming cement industries in Kurnool dist. in Kolimigundla Mandal, The present storage of the owk reservoir is sufficient for meeting the requirements for SRBC aycut only and it cannot be spared for other purposes. Hence it is proposed to construct a new Reservoir for a capacity of 0.40 TMC of water for the above Industrial Purposes. The proposal for conducting detailed investigation for construction of a new reservoir near OWK is initiated as per the requirements for industrial purposes. An estimate for conducting S&L operations for the above reservoir was prepared and submitted to the Government for Rs.23.00 lakhs by the Chief Engineer(P), Kurnool vide letter No.196 Govt., dt:23.06.2015 for according administrative approval. Further the said estimate was recast with the SSRs of 2015.16 for Rs.27.00 lakhs at Secretariat on 29.09.15. Government have cleared the estimate for Rs. 23,70,000/- and instructed to contact the APIIC authorities for providing funds in this regard vide Govt. Memo No.278744/Reforms/A2/2016, dt: 18.07.2016 and accordingly the APIIC authorities were addressed by the Chief Engineer(P), Kurnool vide letter No.CE(P)/KNL/DEE.1/ AEE7/IWS/729, dt: 24.08.2016. In reply to this, the Secretary to Govt. Industries & Commerce Department, Amaravathi vide letter No.19085/Infra/A1/2016, dt: 17.10.2016 has instructed the VC&MD, APIIC Ltd., Vijayawada to provide funds under Infra Development Fund with Director of Industries. Accordingly, the Industries Department have deposited an amount of Rs.23.70 lakhs on 16.03.2017. The

estimate was technically sanctioned by the Superintending Engineer, SRBC Circle No.2, Nandyal for Rs.23.70 lakhs and tenders were called for fixing the last date of receipt of tenders as 05.06.2017. After finalization of tenders, agency will be finalized for the above survey work.

Executive Engineer,
S.R.B.C.Division No.3, OWK.

ANNEXURE - 2

IMPACT OF RCL CEMENT PLANT ON BELUM CAVES

Belum caves, in Andhra Pradesh state are the second largest caves of Indian subcontinent. It is the longest caves in plains of Indian subcontinent and famous for the formation of stalagmite and stalactite.

Actually this caves derived their name from the Sanskrit word Belum which means caves. The important features of Belum Caves include a tunnel cave length of 3229 metres, pataalaganga point, spacious chambers, long passages, siphons, fresh water galleries and many more.

The location of Belum Caves is at Belum village in Kolimigundla Mandal of Kurnool district in Andhra Pradesh state, India. Belum Caves have long passages, spacious chambers, fresh water galleries and siphons.It is about 3.8km away aeriallyfor the proposed cement plant, and 5.0 km by road.

DESCRIPTION

The caves deepest point (120 feet from entrance level) at the point known as Pataalaganga. Belum Caves has a length of 3229 metres, making it the second largest natural caves in Indian Subcontinent.

These caves were first discovered in 1884 by an English surveyor and later in 1982 and 1984 a german team explored it with the help of local people. In 1988 A.P. government declared it as “protected".

The rock formations at Belum caves are proof of what happens when water meets limestone. One of the most interesting features here is the*SaptasvaralaGuha* (The chamber of Seven Notes) where the stalactite formations produce musical sounds when struck with a wooden stick or knuckles.

Deep inside the dark and mysterious Belum caves is a perennial underground stream that forms a natural waterfall at the lowest point in the caves (150 feet below ground level)calledPatalganga, this mysterious stream appears at one point, flowing overslipper rocks, before disappearing into the depths ofearth.at 151 feet deep inside. There are couple major attractions here, Buddha statue near the caves attracts any Of all the places Patalganga is the second, as water stream just disappears after certain point.

IMPACT OF RAMCOCEMENT PLANT

Establishing a cement plant in the region will not have any adverse impact, as the activity is above ground and the caves are located at 120 feet inside below the ground level. The aerial distance of caves is 3.8 km from the cement plant boundary.

No blasting will be done for construction of the plant for laying the foundations. There is no possibility of the rock structure of the caves getting affected by the construction activity and operation of the proposed Plant.

On the other hand, with the advent of the Cement Plant, influx of tourists into the area increases. People from different parts of India (suppliers/vendors/customers/cement Buyers) will be visiting the cement plant for various activities. The Project Management will encourage the visitors of the plant to visit the Caves and thereby propagate the much needed tourism. The housing in the vicinity will pick up, due to the Cement Plant, and with the increase in population, the number of tourists visiting will increase.

Owing to presence of lot of local people surrounding the cave to make their economic activities and regular gathering of the tourists to the caves, leads to wider swath of the market, e.g. hotel chains, urban tourist attractions, resorts and other commercial establishments.

Obviously, the health facilities also improve with sizeable hospitals, pathlabs emerging in. The Government will create better road and other infrastructural facilities in the area to promote tourism to the caves.

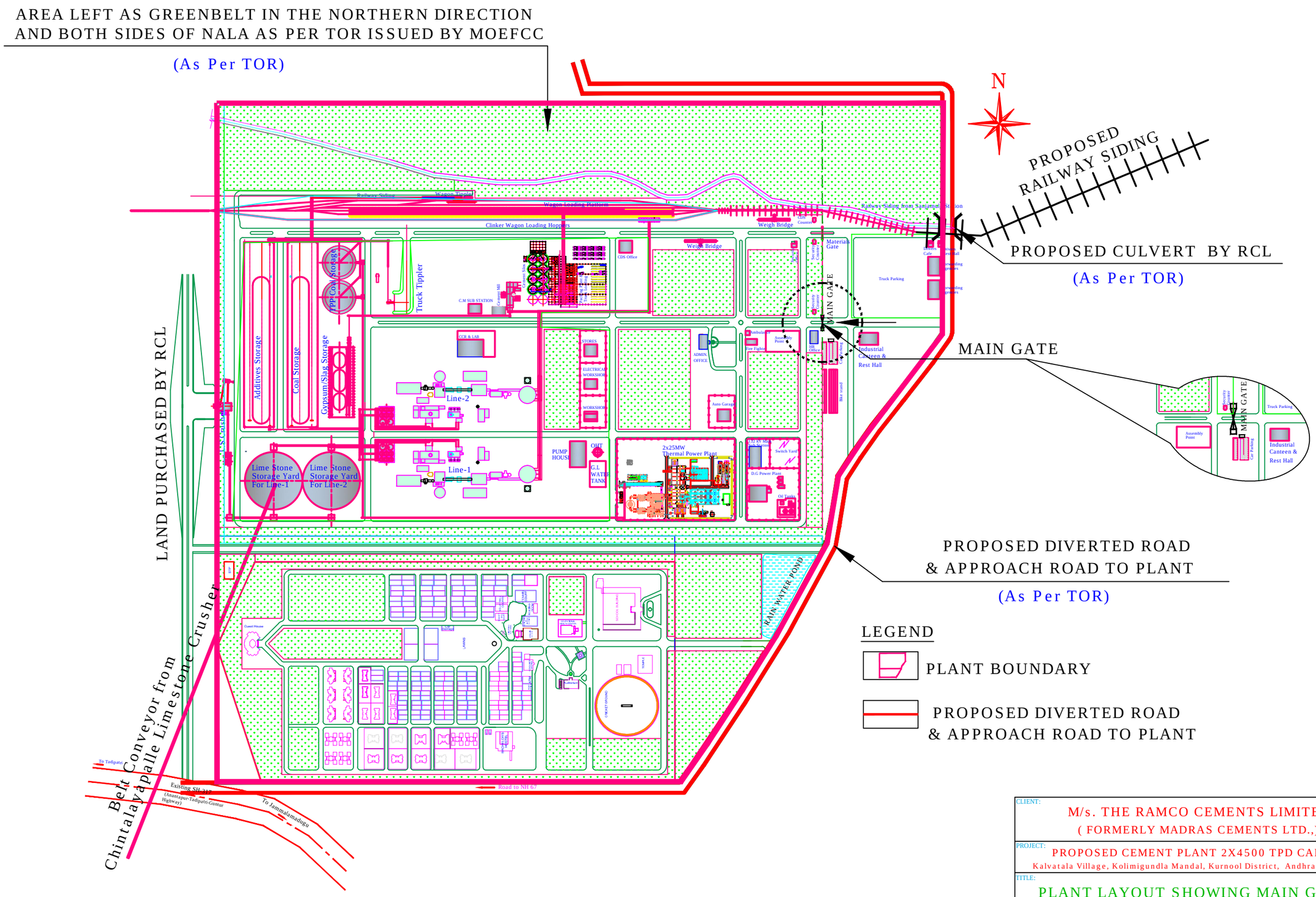
The economic status of the villagers improves and their income earning and living standard also improve. Whether nature tourism or eco-tourism, recreational and educational travel based on natural attractions is a promising means of advancing social, economic and environmental objectives near the caves. Furthermore, eco-tourism has provided an impetus to assist in greening the tourism industry on many fronts.

Ramco's Contribution;

As a part of CSR activity, Ramco cement will support the locals for establishing restaurants, transport vehicles, SHGs for the production of toys, jute bags, Agarbathis, soaps and other handicrafts so that uneducated locals can earn their livelihood at this tourist spot.

Ramco allocated about Rs. 70 lakhs for providing the infrastructure facilities at the Belum caves, as a part of Corporate Environmental Responsibility (CER).

As a whole, the impact on the Caves will be Positive.



CLIENT: M/s. THE RAMCO CEMENTS LIMITED
(FORMERLY MADRAS CEMENTS LTD.,)

PROJECT: PROPOSED CEMENT PLANT 2X4500 TPD CAPACITY
Kalvatala Village, Kolimigundla Mandal, Kurnool District, Andhra Pradesh.

TITLE: PLANT LAYOUT SHOWING MAIN GATE

ANNEXURE - 3

AREA LEFT AS GREENBELT IN THE NORTHERN DIRECTION
AND BOTH SIDES OF NALA AS PER TOR ISSUED BY MOEFCC

(As Per TOR)

N

PROPOSED
RAILWAY SIDING

PROPOSED CULVERT BY RCL

(As Per TOR)

MAIN GATE

PROPOSED DIVERTED ROAD
& APPROACH ROAD TO PLANT

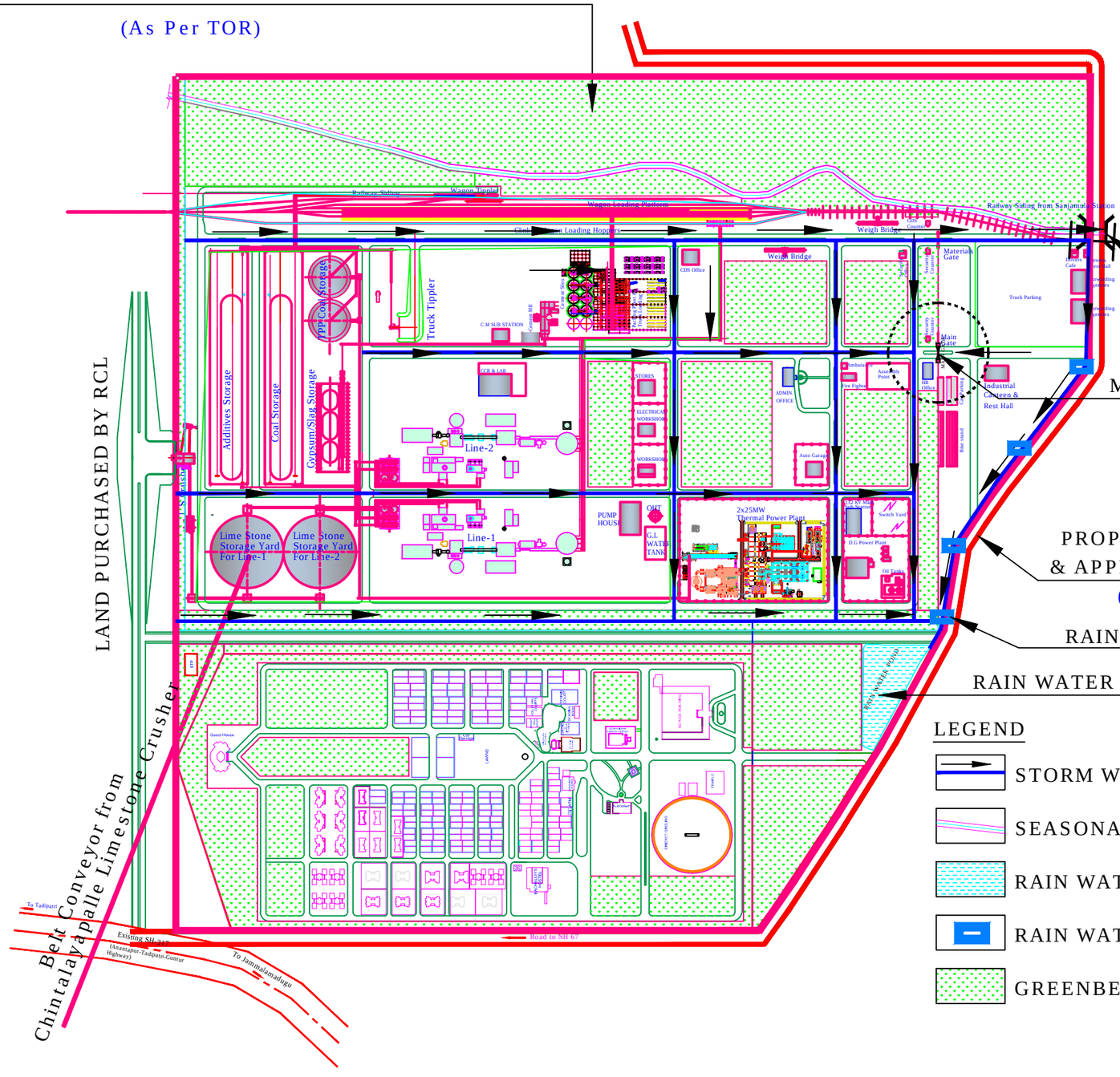
(As Per TOR)

RAIN WATER HARVESTING PITS

RAIN WATER POND

LAND PURCHASED BY RCL

Belt Conveyor from
Chintalaya palle Limestone Crusher



LEGEND

- STORM WATER DRAIN
- SEASONAL NALA
- RAIN WATER HARVESTING POND
- RAIN WATER HARVESTING PITS
- GREENBELT

CLIENT:
M/s. THE RAMCO CEMENTS LIMITED
(FORMERLY MADRAS CEMENTS LTD.,)

PROJECT:
PROPOSED CEMENT PLANT 2X4500 TPD CAPACITY
Kalvatala Village, Kolimigundla Mandal, Kurnool District, Andhra Pradesh.

TITLE:
STORM WATER MANAGEMENT PLAN

ANNEXURE - 4

THE RAMCO CEMENTS LIMITED
(formerly known as Madras Cements Ltd.)

Regional Sales Office:
3rd Floor, SUN Towrs,
Plot No.22, HUDA Techno Enclave,
Hitec City, Madhapur,
HYDERABAD - 500081.
Ph : 040 - 23119271 / 23119272
Fax : 040 - 23119273

Date: 8th August, 2018

To
The Engineer - In - Chief,
R & B - State Highways,
SH, PPP, CP & Managing Director,
AP Roads Development Corporation,
VIJAYAWADA.

Sir,

Sub: Permission for constructing Belt Conveyor Gallery Crossing at SH 317 for Transportation of Crushed Limestone from our Captive Mines- Reg.

The Ramco Cements Limited (formerly known as Madras Cements Ltd) is the flagship Unit of the RAMCO Group of companies which has been growing steadily right from its inception.

Six decades ago, Rajapalayam was a bare, backward village. A visionary, Shri.P.A.C.Ramasamy Raja laid the foundation of the RAMCO Group with Rajapalayam Mills, and thus triggered a major revolution that transformed the village into a fast growing modern industrial center.

Today, **RAMCO** is a vibrant group of Companies aggregating an annual turnover of about Rs.5500 Crores with manufacturing activities in Textiles, Cement, Fiber-Cement products, ready-made Plaster of Paris, Surgical dressings, ready-mix concrete and Dry Mortar Plant. The recent ventures are 100% Export Oriented textile Units and a Software Product Development Unit which have already attained international status. RAMCO Group has three cement plants in Tamil Nadu, one in Andhra Pradesh and one in Karnataka.

Thus, in a short span, Madras Cements has vertically grown in capacity, from a meager 0.067 million tonnes per annum to a massive 18.00 million tonnes per annum.

In continuation of our success story, we are now proposing to set up one more major Green Field cement plant with clinker capacity of 3.15 MTPA Clinker. 2.0 MTRA Cement and 2.25 MW Thermal power Plant. We propose to establish this plant in Kurnool District, Kolimigundla Mandal at Kalavatala Village with an investment of Rs.1500 crores.

Contd.....2

THE RAMCO CEMENTS LIMITED
(formerly known as Madras Cements Ltd.)

Regional Sales Office:
3rd Floor, SUN Towrs,
Plot No.22, HUDA Techno Enclave,
Hitec City, Madhapur,
HYDERABAD - 500081.
Ph : 040 - 23119271 / 23119272
Fax : 040 - 23119273

We are having Four Captive Limestone Mines for the manufacturing of cement from the above said Plant. We propose to install a belt conveyor for transporting crushed Limestone from our Captive Chintalayapalle Limestone Mine to our plant which will cross the above said State Highway No.317 near Kalavatala Village and the conveyor gallery shall be 6.00 meters above the road.

Kind Permission/ NOC is requested for constructing a Belt conveyor Gallery near Kalavatala Village at State Highway No.317.We shall design the conveyor structures as per the laid guidelines for the High ways.

This NOC is needed to be submitted to MOEF for getting the Environmental clearance for the upcoming plant at Kalavatala village.

We are herewith enclosing three sets of plans showing the details of location etc., for your kind reference and approval.

Thanking you,

Yours Faithfully,
For The Ramco Cements Limited,

P B Gopalakrishna
Authorized Signatory

Encl.: As above.

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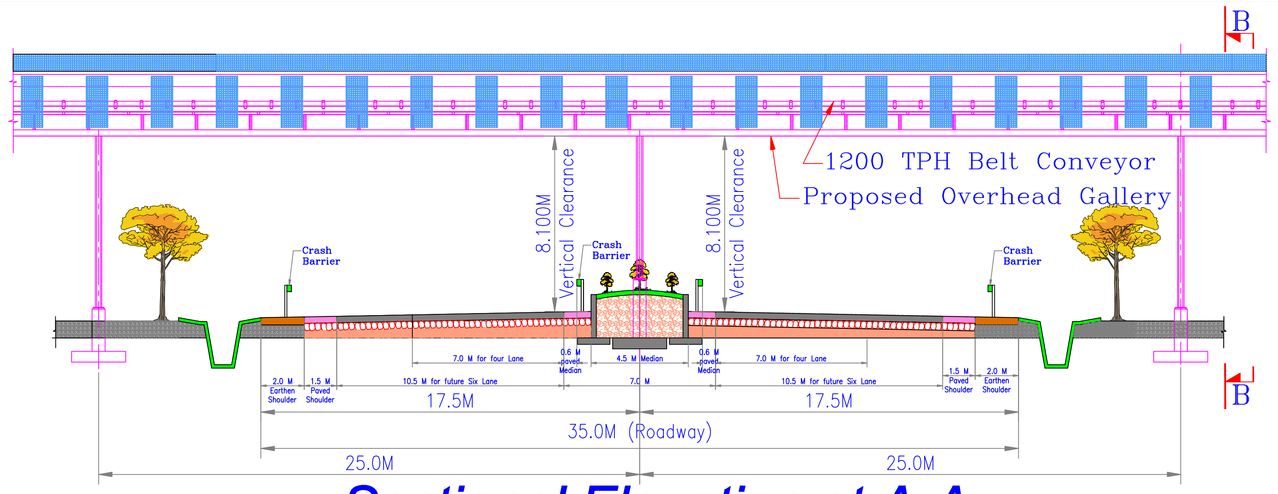
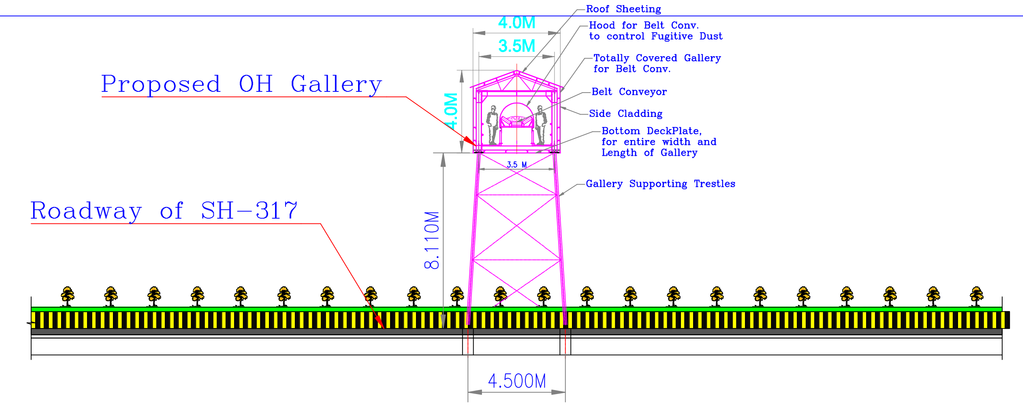
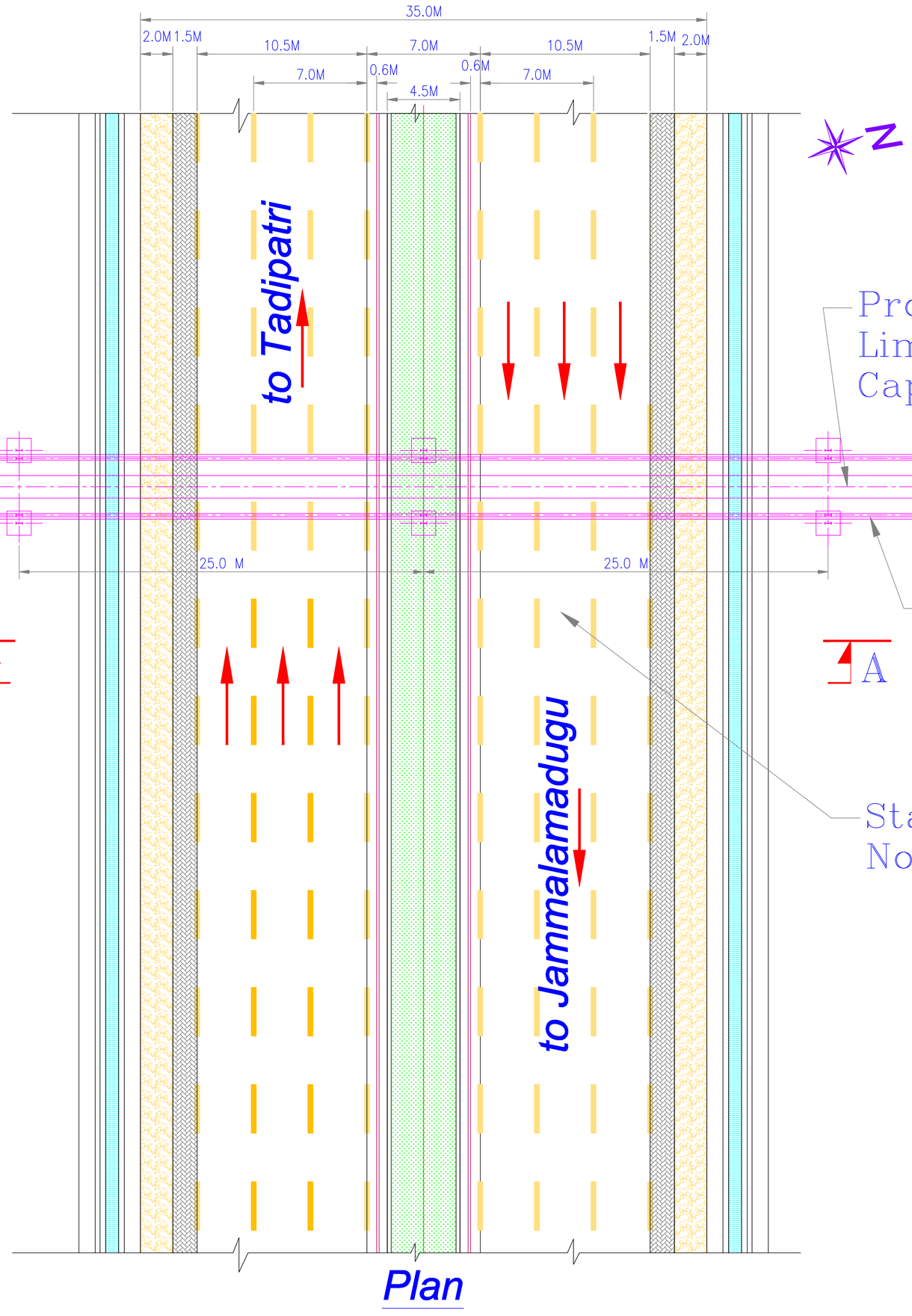
Annexure - 5



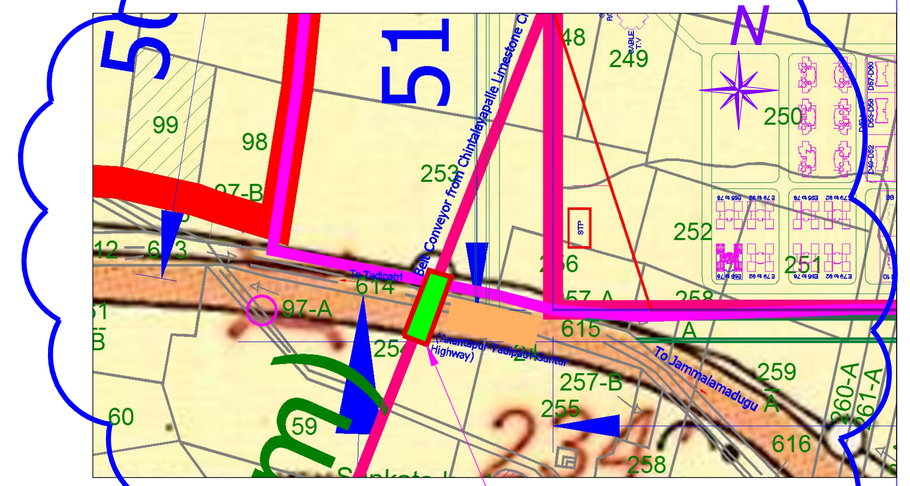
Sectional Elevation at A-A

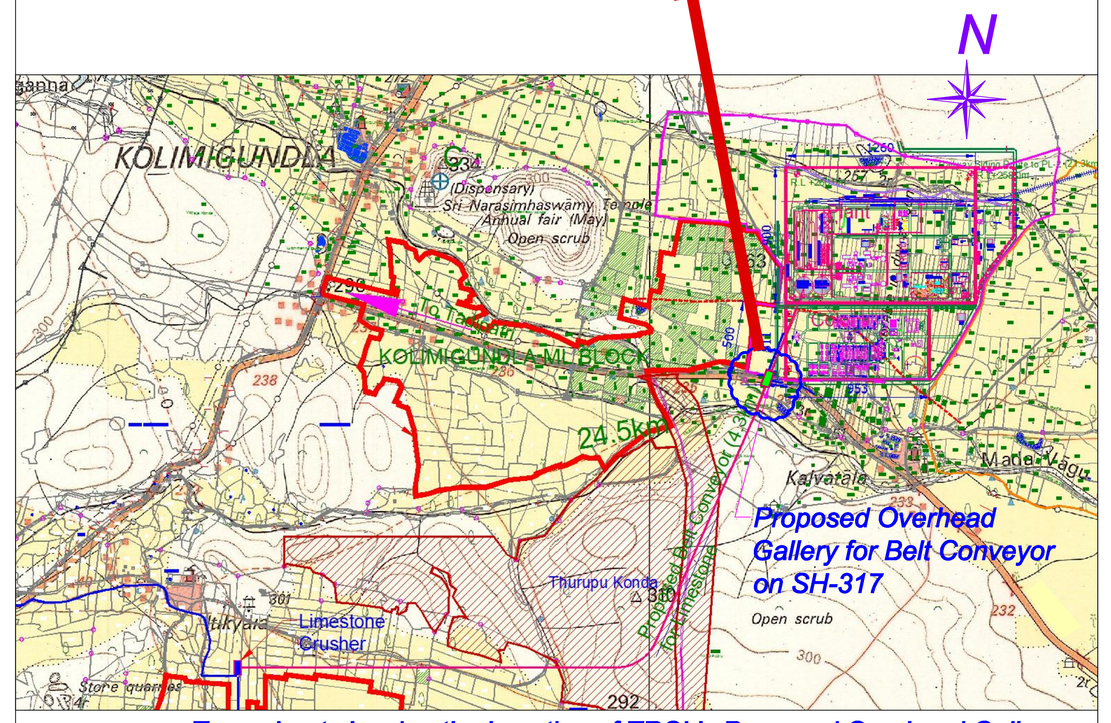


Side View B-B



Plan





Topo sheet showing the Location of TRCL's Proposed Overhead Gallery for Limestone Transport Belt Conveyor to be Provided at Kalvatala Village across State Highway No. SH-317

All Dimensions are in mm

THE RAMCO CEMENTS LIMITED.,
(FORMERLY KNOWN AS MADRAS CEMENTS LTD.)
JAYANTHIPURAM.

	NAME	DATE
DESIGNED		
DRAWN	G.K.Ramesh09	08 17
CHECKED		
APPROVED		

TITLE: Plan, Elevation and Sectional View of Proposed Overhead Gallery across SH-317 at Kalvatala Village for supporting TRCL's Limestone Belt Conveyor on SH-317

SCALE: 1:200 | MATERIAL : | WEIGHT :

DRAWING NO. TRCL-Kur-005 | REV | SHEET OF

Sheet Size : A1

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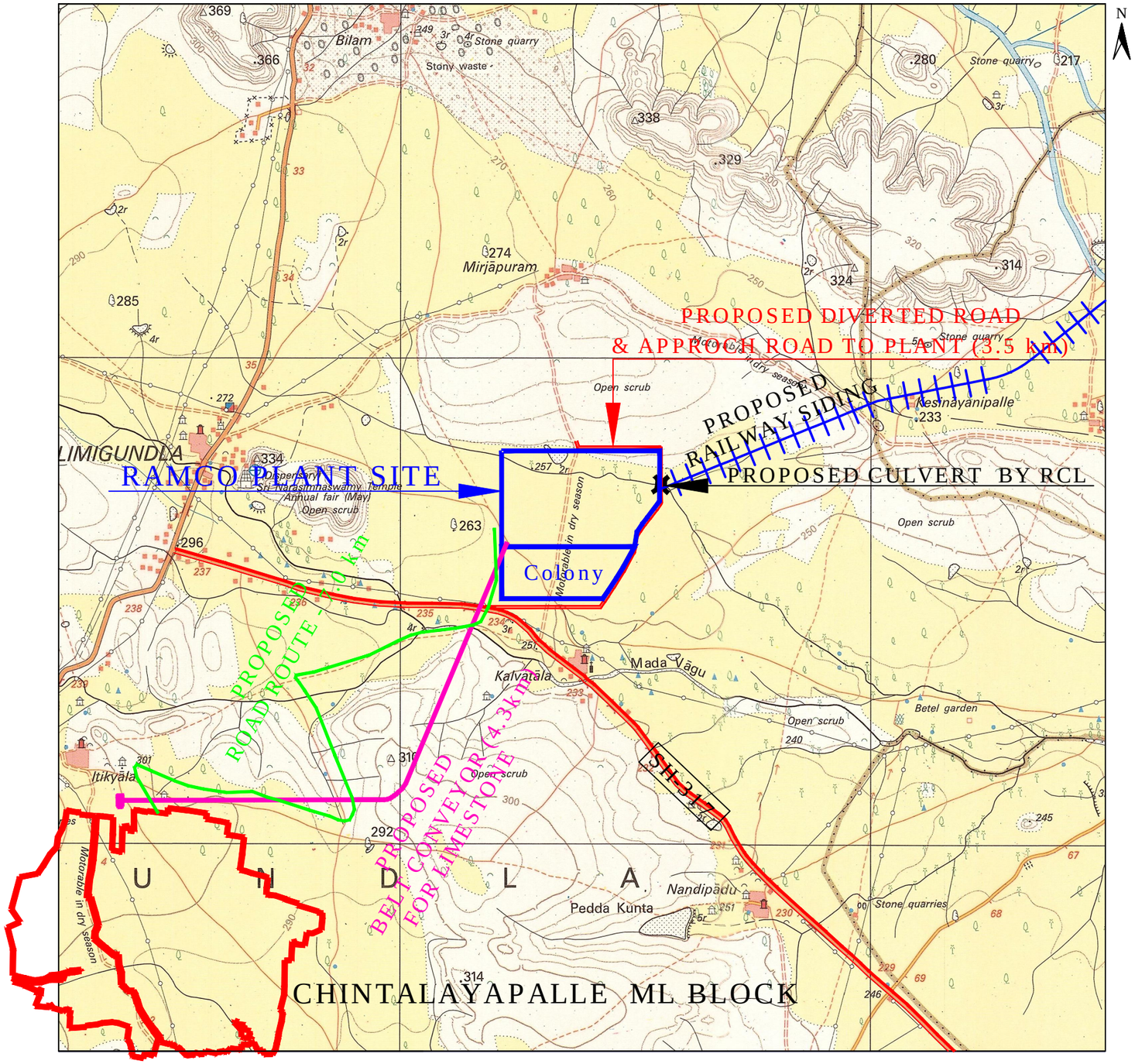
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PROPOSED ROAD ROUTE MAP



LEGEND

- RAMCO PLANT SITE
- PROPOSED CULVERT BY RCL
- PROPOSED DIVERTED ROAD & APPROCH ROAD TO PLANT (3.5 km)
- ROAD
- PROPOSED BELT CONVEYOR (4.3km) FOR LIMESTONE
- PROPOSED ROAD ROUTE - 7.0 km

ANNEXURE – 7

DESIGN DETAILS OF POLLUTION CONTROL EQUIPMENT

1	**Kiln / Raw mill Venting:**		
	Application	Venting of Kiln exhaust / Rawmill gases	
	Type of PCE	Reverse Air Bag House (RABH)	
	Gas quantity	AM^3/hr	1303000
	Design gas Temperature	Deg C	240
	Dew Point	Deg C	50
	Static Pressure	mm wg	-304
	Design Casing pressure	mmwg	+ /- 500
	Barometric pressure	mmwg	9951
	Raw gas dust content	gm/M^3	50
	Type of Dust		Mild abrasive
	Outlet dust concentration	mg/Nm3	< 30
	Air to Cloth ratio	m3/min/ m2	0.5 (n-2), One compartment in cleaning, one compartment in maintenance
	Pressure drop across filter	mmwg	150 max
	Type of filter bag		Woven glass fabric with SGT Finish
	Cleaning methods		Isolation of compartment and cleaning by reverse air fan. No cleaning by compressed air
	Compressor air required	Nm3/hr	6 - for Inlet / outlet damper operation

2	**Coal Mill Venting**		
	Application	Product collection and venting of Mill gases	
	Type of PCE	Pulse jet Bag filter (PJBF)	
	Gas quantity	AM^3/hr	320000
	Temperature	Deg C	90
	Dew Point	Deg C	60
	Static Pressure	mm wg	800
	Design Casing pressure	mmwg	+ /- 1500
	Barometric pressure	mmwg	9951
	Raw gas dust content	gm/M^3	500
	Type of Dust		Mild abrasive
	Outlet dust concentration	mg/Nm3	< 30
	Air to Cloth ratio	m3/min/m2	0.8
	Pressure drop across filter	mmwg	150 max
	Type of filter bag		Homo polymer Poly Acrylic Nitrile with Antistatic finish
	Cleaning methods		Online through compressed air purging
	Compressor air pressure	Kg/cm2	4 - 6

3	**Clinker cooler Venting**		
	Application	Dedusting of Clinker cooler excess air	
	Type of PCE		Electrostatic Precipitator (ESP)
	Gas quantity	M^3/Hr	700000
	Temperature	Deg C	350
	Dew Point	Deg C	33
	Static pressure at inlet (Operating pressure)	mmwg	-75
	Barometric Pressure	mmwg	9951
	Raw gas dust content	gm/Am^3	13 (wet)
	Clean gas dust content	mgm/Nm^3	< 30
	Pressure drop across ESP	mmwg	50
	Gas velocity across ESP	m/sec	0.9

4	**Cement Mill Venting**		
	Application	Product collection and venting of Mill gases	
	Type of PCE	Pulse jet Bag filter (PJBF)	
	Gas quantity	AM^3/hr	450000
	Temperature	Deg C	90
	Dew Point	Deg C	45
	Static Pressure	mm wg	800
	Design Casing pressure	mmwg	+ /- 1500
	Barometric pressure	mmwg	9951
	Gas inlet dust concentration	gm/M^3	750
	Type of Dust		Highly abrasive
	Outlet dust concentration	mg/Nm3	< 30
	Air to Cloth ratio	m3/min/m 2	0.8
	Pressure drop across filter	mmwg	150 max
	Type of filter bag		Acrylic Homo polymer with oil and water repellency treatment
	Cleaning methods		Online through compressed air purging
	Compressor air pressure	Kg/cm2	4 - 6

5	**Nuisance Bagfilters**		
	Application	Dedusting of material transfer points	
	Type of PCE	Pulse jet Bag filter (PJBF)	
	Temperature	Deg C	90
	Dew Point	Deg C	45
	Static Pressure	mm wg	350
	Barometric pressure	mmwg	9951
	Gas inlet dust concentration	gm/M^3	50
	Type of Dust		Highly abrasive
	Outlet dust concentration	mg/Nm3	< 30

	Air to Cloth ratio	m3/min/m2	1
	Pressure drop across filter	mmwg	150 max
	Type of filter bag		Acrylic Homo polymer
	Cleaning methods		Online through compressed air purging
	Compressor air pressure	Kg/cm2	4 - 6

ANNEXURE – 8

DETAILS OF WASTE HEAT RECOVERY IN PREHEATER AND COOLER

Waste heat recovery boiler - Preheater side			
1	Gas volume at PH Boiler inlet	Nm^3/hr	406250
2	Gas temperature at Boiler inlet	Deg C	330
3	Gas Temperature at Boiler outlet	Deg C	120
4	Type of Boiler		Vertical
5	HP steam pressure	ata	19
6	LP Steam pressure	ata	4
7	Potential power output	MW/hr	5.8
8	Pressure drop across Boiler	mmwg	90

Waste Heat Recovery Boiler - Cooler side			
1	Gas Tapping		Tapping of gas from cooler Mid
2	Provision for auxillary firing		Yes with fine coal
3	Gas volume at PH Boiler inlet	Nm3/hr	330000
4	Gas temperature at Boiler inlet	Deg C	450
5	Gas Temperature at Boiler outlet	Deg C	90
6	Type of Boiler		Vertical
7	HP steam pressure	ata	19
8	LP Steam pressure	ata	4
9	Potential power output	MW/hr	9.2
10	Pressure drop across Boiler	mmwg	60

Turbine details - 2 X 7.5 MW			
1	Type		Horizontal, Single cylinder, Impulse reaction type with axial flow multistage fully condensing turbine of Bottom / top exhaust
2	No of turbines	nos	2
3	Rated power of each Turbine	MW	7.5
4	HP steam pressure at inlet	ata	17.5
5	HP steam temperature at inlet	deg C	387 + / - 5
6	LP stem pressure at inlet	ata	3
7	LP steam temperature at inlet	Deg C	187
8	Turbine sizing criteria for rated power	% steam flow	100 (TMCR)
9	Exhaust condensing pressure	ata	0.18
10	Design ambient temperature	Deg C	42

ANNEXURE - 9

REVISED CORPORATE ENVIRONMENTAL RESPONSIBILITY (CER) BUDGET

RCL has budgeted an amount of Rs **15.50 Crores** for Corporate Environment Responsibility (CER) in accordance to the **MoEFCC's office Memorandum # F.No. 22-65/2017-IA.III dated 01.05.2018**. The Revised CER budget towards CER along with activities proposed to be covered is given

BUDGET TOWARDS CER ALONG WITH ACTIVITIES

S.No	DESCRIPTION	Budget in Rs. Lakhs (for 3 years)
1	Swachh Bharath	265.62
2	Education & Sports	115
3	Women Welfare	10
4	Roads and other infrastructures	280
5	Drinking water	200
6	Skill development	120
7	Health Care	52
8	Veterinary	3
9	Other	507.5
	Total	**1553.12**
Say Rs. 15.53 Crores		

DETAIL BREAKUP OF BUDGET TOWARDS CER ALONG WITH ACTIVITIES

1. Swachh Bharath

S.No	Description of Activity	12 months	24 months	30 months
1	Construction of 20 Nos. of toilets in 5 villages Kolimigundla village, Kalvatala village, Kanakadripalli village, Itikyala village, Nayanapalli village, etc., of the Kolimigundla Mandal each in Kolimigundla @ Rs. 1.8 lakh per toilet	60	60	60
2	Providing 175 Dust Bins & Trolleys for Kolimigundla village, Kalvatala village, Kanakadripalli village, Itikyala village, Nayanapalli village each of the Kolimigundla Mandal @ Rs. 1600 each.	15.62	0	0
3	Laying of approach road for the Belum caves from state Highway, with plantation on either side.	30	25	

S.No	Description of Activity	12 months	24 months	30 months
4	Development of waiting hall for tourists along with toilet facilities	15	-	-
	Total (Rs in lakhs)	**120.62**	**85**	**60**

2. Education & Sports

S.No	Description of Activity	12 months	24 months	30 months
1	Providing infrastructure to Schools in Kolimigundla Mandal	20	40	40
2	Providing computers for ZP School, Kolimigundla	2	3	0
3	Renovation of playground for ZP School, Kolimigundla	2	3	3
4	Purchase of various sports equipment for ZP School, Kolimigundla	2	0	0
	Total (Rs in lakhs)	**26**	**46**	**43**

3. Women Welfare

S.No	Description of Activity	12 months	24 months	30 months
1	Construction of building for self-welfare schemes at Kolimigundla Mandal head quarters	4	3	3
	Total (Rs in lakhs)	**4**	**3**	**3**

4. Roads Development

S.No	Description of Activity	12 months	24 months	30 months
1	Renovation of village internal roads and drainage system in Kolimigundla (total - 1 km length)	0	20	20
2	Renovation of village internal roads and drainage system in Chintalayapalle village (total - 1 km length)	0	20	20
3	Renovation of village internal roads and drainage system in Kalvatala village (total - 1 km length)	0	20	20
4	Renovation of village internal roads and drainage system in Nayanapalli village (total - 1 km length)	0	20	20
5	Renovation of village internal roads and drainage system in Itikyala village (total - 1 km length)	0	20	20

S.No	Description of Activity	12 months	24 months	30 months
6	Renovation of village internal roads and drainage system in Petnikota village (total - 1 km length)	0	20	20
7	Renovation of village internal roads and drainage system in Kanakadripalli village (total - 1 km length)	0	20	20
	Total (Rs in lakhs)	**0**	**140**	**140**

5. Drinking water

S.No	Description of Activity	12 months	24 months	30 months
1	Construction of elevated water tank and water pumping system at Kalvatala village	10	10	5
2	Construction of elevated water tank and water pumping system at Kolimigundla village	10	10	5
3	Construction of elevated water tank and water pumping system at Nayanapalli village	10	10	5
4	Construction of elevated water tank and water pumping system at Chintalayapalle village	10	10	5
5	De-silting & strengthening of bunds for existing water tanks in each villages	30	30	40
	Total (Rs in lakhs)	**70**	**70**	**60**

6. Skill development

S.No	Description of Activity	12 months	24 months	30 months
1	Providing skill development programme to ITI & Diploma passed out locals (for total number of 20 members) in other plants of RCL (till commissioning of the plant) for a span of 1 year per batch (Rs. 16,500 per person per month – Rs. 3.3 per month – Rs. 40 lakhs per annum – Rs. 120 lakh for 3 years)	40	40	40
	Total (Rs in lakhs)	**40**	**40**	**40**

7. Health Care

S.No	Description of Activity	12 months	24 months	30 months
1	Purchase of hospital equipment at Petnikota Primary Health Centre (PHC)	0	0	4
2	Construction of Petnikota Primary Health Centre (PHC) building	15	15	10
3	Purchase of hospital equipment at Kolimigundla Primary Health Centre (PHC)	0	0	4
4	Renovation of Kolimigundla Primary Health Centre (PHC) building	1	1	2
	Total (Rs in lakhs)	**16**	**16**	**20**

8. Veterinary

S.No	Description of Activity	12 months	24 months	30 months
1	Purchase of hospital equipment at Kolimigundla Veterinary Health Care Centre	1	0	0
2	Renovation of Kolimigundla Veterinary Health Care Centre building	1	0.5	0.5
	Total (Rs in lakhs)	**2**	**0.5**	**0.5**

9. Others

S.No	Description of Activity	12 months	24 months	30 months
1	Rain water harvesting pits @ 30 Nos. in 2 villages @ Rs. 1 lakh per pit	20	20	20
2	Plantation in poramboke & govt. lands in each village and along the road sides (Rs. 2500 per pit, 1500 pits for hectare and 5 ha area)	67.5	60	60
3	Religious buildings (renovation / construction) in all 5 villages	30	30	20
4	Lining of nallah near plant	20	20	10
5	Development / construction of public buildings like Panchayat / community centre / libraries	20	20	20
6	Construction of pucca road (for villagers movement in the eastern direction of plant) including drainage system	20	20	20
7	Plantation along the above pucca roads	4	3	3
	Total (Rs in lakhs)	**181.5**	**173**	**153**

RCL will form a coordination committee in consultation with the District Administration to prioritize the activities to be taken up under Corporate Environment Responsibility (CER).