PRE-FEASIBILITY REPORT

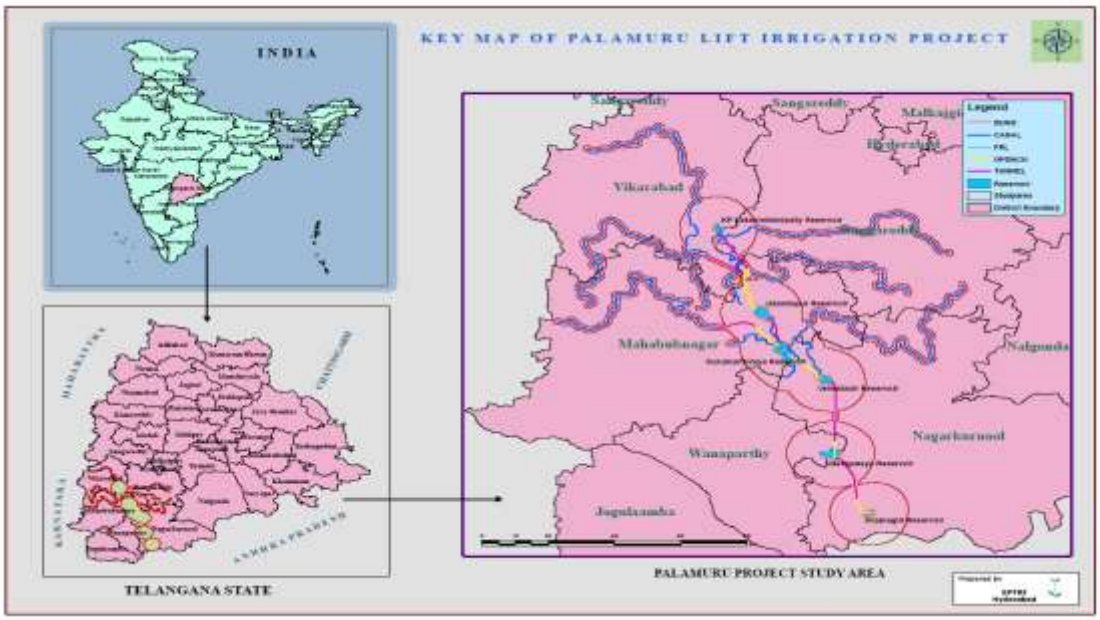
FOR THE PALAMURU – RANGAREDDY LIFT IRRIGATION SCHEME (PRLIS) FROM FORESHORE OF SRISAILAM RESERVOIR NEAR YELLUR(V),KOLLAPUR(M) TO K.P.LAKSHMIDEVIPALLY RESERVOIR AT K.P LAKSHMIDEVIPALLY(V), KONDURG (M), MAHABUBNAGAR DISTRICT, TELANGANA STATE

SUBMITTED TO

The Ministry of Environment Forest & Climate Change,
New Delhi

by

CHIEF ENGINEER, PRLIS,
I&CAD Department,
Telangana State



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1 Executive Summary

1.0 Introduction

Telangana State is situated in the central stretch of the Indian Peninsula on the Deccan Plateau. It is the 29th state of India and twelfth-largest state in the country with an extent of 114,840 square kilometres and a population of 35.3 Millions (2011 census). The region is drained by two major rivers namely Godavari and Krishna. The climate in this region is semi-arid and has skewed distribution of rainfall in space and time necessitating water management. The culturable area in the state is 75.21 lakh ha and net irrigated area is 22.89 lakh ha (30.43% of culturable area).

The economy of Telangana is mainly driven by agriculture. About 73% of the population is rural. The economy of the state is predominantly agrarian; agriculture contributes about 50% of the state's income and employs about 70% of the work force. Since agriculture is the main activity and it has close links with the development in other sectors, for overall economic progress of the state. Achieving faster agricultural growth is imperative. Thus there is an urgent need for increasing food and fiber production to meet the demands of increasing population as well as for providing rural employment.

The normal rainfall of Mahabubnagar district is 604 mm, the net irrigated area under different sources is less than 19%, which is lowest in the State. Mahabubnagar district is situated entirely in the Krishna basin and has suffered in the past due to the re-organization of the State in 1956. The district has been deprived of the benefits of Tungabadra left bank canal of Tungabadra dam. Even though two large rivers Krishna and Tungabadra flow through the district, the district is deprived of its legitimate share of irrigation water. It is necessary to provide irrigation facilities in the upland areas of district by lift irrigation.

The project implementation involves;

- Supply of Drinking water from the foreshore of Srisailam Reservoir to enroute villages & Hyderabad.
- Drawing 90 TMC of flood water in 60 days from the foreshore of Srisailam reservoir on Krishna river for irrigating 4,04,858 Ha. in the districts of Mahaboobnagar, Rangareddy & Nalgonda through Lift Irrigation Scheme. In this process construction of 6 nos. of following new reservoirs is envisaged.

The aim of the project is to irrigate upland areas of about 4,04,858 ha (10.00 lakh acres), in addition drinking water facility to en route villages, Hyderabad city and industrial use in Mahabubnagar, Rangareddy, and Nalgonda districts, by lifting 90 TMC of flood water in 60 days (1.50 TMC per day) during flood season from foreshore of Srisailam reservoir at Yellur (V), Kollapur (M) in Mahabubnagar district to K.P Laxmidevipalle (V), Kondurg (M) Rangareddy (D) (from +240 m to + 670 m)

which is the highest elevation in between Mahabubnagar and Rangareddy districts with 5 stage lifting and then by gravity.

The five stage pumping details are as follows:

1st Lift –An approach channel takes off from the foreshore of Srisailam reservoir near Yellur (V), Kollapur (M),Mahabubnagar(D). The water is drawn through tunnel connected to it and lifted to fill the proposed Anjanagiri reservoir at Narlapur village.

2nd Lift –An approach channel takes off from Anjanagiri reservoir. The water is drawn through the canal and tunnel connected to it and lifted to fill the proposed Sri Veera Anjaneya Reservoir at Yedula.

3rd Lift –An approach channel takes off from Sri Veera Anjaneya Reservoir. The water is drawn through the canal and tunnel connected to it and lifted to fill the proposed Venkatadri Reservoir at Vattem village and Kurumurthyraya Reservoir at Karvena village by linking both reservoirs with gravity canal from Venkatadri Reservoir.

4th Lift –An approach channel takes off from Kurumarthyraya Reservoir. The water is drawn through the canal and tunnel connected to it and lifted to fill the proposed Udandapur Reservoir.

5th Lift –An approach channel takes off from Udandapur Reservoir. The water is drawn through canal and tunnel connected to it and lifted to fill the proposed K.P. Lakshmidevipally reservoir.

20 No.s of Hamlets and 3 villages will come under submergence. Approximately 2481 households and 11025 population will be affected due to submergence.

An area of **23778.96 ha.** of non- forest land and **229.04 ha.** of Forest land shall be used for different components of the project.

- Submergence area under Reservoirs – **9664 ha.** (23,870 Ac.)
- Conduit Area – **2,198 ha.** (5,429 Ac.)
- Canal distribution Network area – **12,146 ha.** (30,000 Ac.)

The total power requirement of the project is 2944 MW and the total energy consumption of the project is 4366 Million units per annum. Total Power will be supplied by DISCOMS of the Telangana state.

The total water requirement during construction phase for construction and colonies is estimated as **3100 KLD.**

The total forest area involved for the project is **229.04 ha**. (approximately). Amrabad Tiger Reserve forest core area is 11.95 km, buffer area is 2.56 km and Eco-sensitive Zone (ESZ) is 1.56 km away from the Anjanagiri Reservoir.

The estimated cost of the project is **Rs.35,200 crores.**

B.C RATIO:

Considering all the benefits and costs incurred on all components of the project the B.C. Ratio works out to **1.23.**

2 INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION

2.1 Identification of the Project

The normal rainfall of Mahabubnagar district is 604 mm, the net irrigated area under different sources is less than 19%, which is lowest in the State. Mahabubnagar district is situated entirely in the Krishna basin and has suffered in the past due to the re-organization of the State in 1956. The district has been deprived of the benefits of Tungabadra left bank canal of Tungabadra dam. Even though two large rivers Krishna and Tungabadra flow through the district, the district is deprived of its legitimate share of irrigation water. Hence it is necessary to provide irrigation facilities in the upland areas of district by lift irrigation.

The aim of the project is to irrigate upland areas of about 4,04,858 ha (10.00 lakh acres), in addition drinking water facility to en route villages, Hyderabad city and industrial use in Mahabubnagar, Rangareddy, and Nalgonda districts, by lifting 90 TMC of flood water in 60 days (1.50 TMC per day) during flood season from foreshore of Srisailam reservoir at Yellur (V), Kollapur (M) in Mahabubnagar district to K.P Laxmidevipalle (V), Kondurg (M) Rangareddy (D) (from +240 m to + 670 m) which is the highest elevation in between Mahabubnagar and Rangareddy districts with 5 stage lifting and then by gravity.

Project Proponent is Chief Engineer, Palamuru-Rangareddy Lift Irrigation Scheme. I&CAD Department of Telangana is attempting to use latest technologies in the field of Water Resources and Information Technology to transform I&CAD as one of the most modern and service driven department.

2.2 Brief Description of the nature of the project

Palamuru - Rangareddy Lift Irrigation Scheme envisages to irrigate upland areas of Mahabubnagar, Rangareddy, and Nalgonda districts for a command area of 4,04,858 ha (10.00 lakh acres), in addition drinking water facility to en route villages, Hyderabad city and industrial use in Mahabubnagar, Rangareddy, and Nalgonda districts, by lifting 90 TMC of flood water in 60 days (1.50 TMC per day) during flood season from foreshore of Srisailam reservoir.

2.3 Need for the Project and its importance to the country or region

Mahabubnagar district is the largest district in Telangana in terms of its geographical area (18432 Sq.km), i.e. 43.73 lakh acres. Mahabubnagar is also known as Palamur. The project falls in Mahabubnagar district where major economic activity is due to agriculture, which is monsoon dependent. However, due to the inconsistent monsoons and erratic rainfall, the overall agricultural production and consequently the per capita income and the overall economy of the region is low. This area lies in the Krishna basin which is mostly semi-arid, often experiences drought. The ground water level is also low in the district.

Rangareddy district also lies in Krishna basin only with 18.80 lakh acres of geographical area. The rivers Musi and Kagna also flow through the district. From Musi water is being diverted to meet domestic and industrial needs of Hyderabad city. There are no major irrigation projects, owing to higher elevation. The nearest source of water is Krishna river from where it is required to lift and convey water.

Nalgonda district also lies in Krishna basin only with 14.974 lakh acres of geographical area. Major project Nagarjunsagar is located in the district. Owing to higher land elevation, major portion does not come under command of Nagarjunsagar Project. The total annual rainfall is less than 750 mm and further most of the mandals are having high fluoride levels causing diseases like dental and skeletal fluorosis.

In view of the above, as these districts are drought hit and backward. It is necessary to provide irrigation facilities in the upland areas of district by lift irrigation. This proposed project provides irrigation facilities to 4,04,858 ha (10.0 lakh acres), in addition to drinking water facility to enroute villages, Hyderabad city and industrial use in Mahabubnagar, Rangareddy and Nalgonda districts by lifting 90 TMC of flood water in 60 days during flood season from foreshore of Srisailam reservoir. This scheme improves the agricultural output and the per-capita income of the people of the region, while also improving groundwater scenario and clean drinking water to the people in the three districts.

2.4 Demand - Supply Gap

In the state of Telangana out of total cultivable area, 30-35% is only the net irrigated area. Though there is large tract of cultivable and fertile land in the command area, lack of irrigation facility has been depriving farmers of better yield. Through supply of water from foreshore of Srisailam reservoir in Mahabubnagar district, about 4,04,858 ha (10.00 lakh acres) are cultivated and there will be an increase in the irrigated areas leading to higher productivity and better yield.

2.5 Imports Vs Indigenous Production

The project leads to enhancement of indigenous food grain production.

2.6 Export Possibility

This project may ultimately lead to export of excess food grains.

2.7 Domestic / Export Markets

The project produce will have favourable impact on domestic and export markets.

2.8 Employment Generation

The implementation of Irrigation scheme will create employment opportunities in the project area. The employment is associated with improved farming practices as well as the construction of the irrigation scheme. A total of about 10000 unskilled, Semi Skilled & Skilled workers will be hired during construction of reservoirs, canals, tunnels, pump houses and surge pools. The people will be spread over the entire project area which comprises of **6 nos. of reservoirs and 5 lifts.**

With irrigation additional farm labour would also be required as a result of higher cropping intensity providing employment opportunities to local people within and outside the vicinity of the project area.

Further establishment of agro and ancillary industries would give rise to employment to the local people.

3 PROJECT DESCRIPTION

3.1 Type of Project Including Interlinked and Interdependent Projects, If Any

As per the EIA notification, 2006 and its subsequent amendment issued on 25th June 2014, the Environment clearance (E.C) is required by the Government of India as per schedule 1(c) of Irrigation Projects having more than 10,000 ha of Culturable Command Area (CCA). The PRLIS has been contemplated to provide drinking water facilities to 1131 villages , and irrigation facilities to 10.00 lakh acres in three districts i.e Mahabubnagar, Rangareddy and Nalgonda. The project has been divided into 18 packages upto Uddandapur Reservoir. The proposed project consists of water transmission system and distributary system for irrigation will be taken up. The project is proposed to lift water from the foreshore of existing srisailam reservoir without disturbing river morphology.

General conditions

The proposed project is fully in the Telangana State. However, it attracts the general conditions of interstate issues with Andhra Pradesh State as a part of the study area falls in Andhra Pradesh State. The proposed project area is not falling under Amrabad Tiger reserve forest as forest core area is 11.95 km, buffer area is 2.56 km and Eco- Sensitive Zone (ESZ) is 1.56 km away from the Anjanagiri reservoir.

3.2 Location (Map Showing general location, specific location and project boundary with project layout) with coordinates.

The Main Conduit of the Palamuru Rangareddy Lift Irrigation Scheme is starting from Narlapur (v) near Kollapur Mandal in Mahabubnagar District to K.P Lakshmidevipally (v) of Kondurg Mandal in Mahabubnagar District with 6 numbers of reservoirs and 5 stages of lifting.

Location of source for the scheme.

Latitude : 16º 06’ 04” N
Longitude : 78º 23’ 59’’ E

The location map is shown in Figure 3.1.

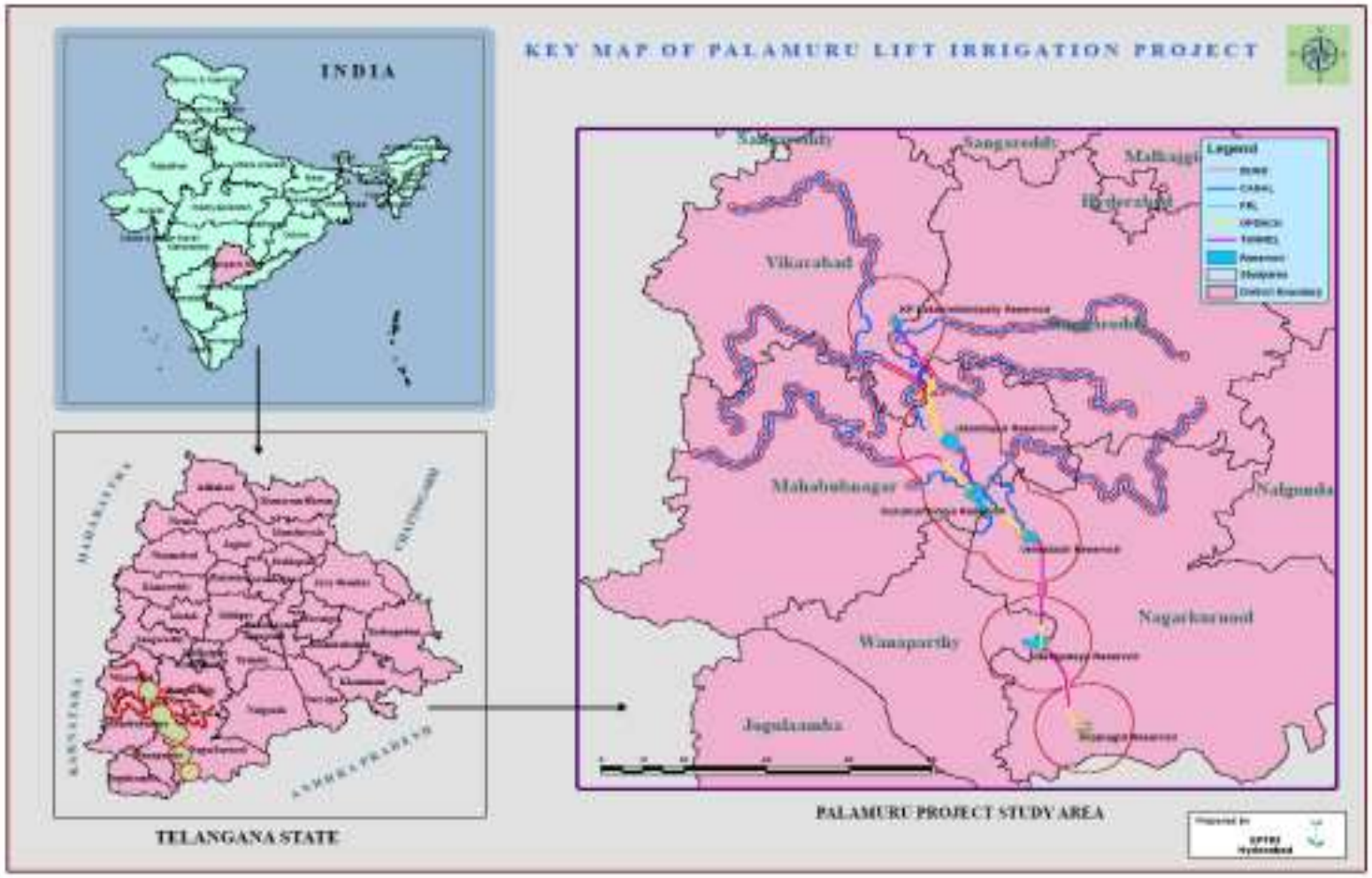

Figure 3.1 Key map

3.3 Details of Alternate Sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.

The project is envisaged to lift water from foreshore of either Jurala Reservoir (OR) Srisailam reservoir to K.P.Lakshmidevipally. A detailed study had been carried out for lifting water from Jurala Reservoir. However, lifting of water from Jurala Reservoir had been dropped in view of less storage capacity.

ALTERNATIVE SITE ANALYSIS

There were only two sources of water. Either water for the project has to be drawn from Jurala Indira Priyadarshini Reservoir OR Srisailam Reservoir. Both are lift irrigation schemes and there are no chances for gravitational flow. There is no third alternative with regard to source of water. Though Jurala is advantageous from the point of gradient, it could not be considered, because there is no adequate storage capacity in the project. The gross storage capacity of Jurala at FRL is 11.94 TMC, while the water requirement of proposed project is 90 TMC. Further, sufficient flood water is not available in Jurala. Hence it is not feasible to lift 90 TMC from Jurala Source. The gross storage capacity of Srisailam Reservoir is 215 TMC. Thus we are proposing to the water from Srisailam Reservoir, which is having sufficient capacity. With regard to Srisailam Reservoir two alternatives are explored. The details are as follows

With reference to alignment and Pump House, based on involvement of forest land we opted for Underground Pump House. Details are furnished below

Two (2) alternative alignments have been considered from foreshore of Srisailam reservoir to Anjanagiri reservoir.

S.No	DESCRIPTION	ALIGNMENT -1 (Open Pump house from foreshore of Srisailam)	ALIGNMENT - 2 (Underground Pump house from foreshore of Srisailam)
1	Land Use and Land Pattern	The land along the main conduit is partly barren and partly sandy and rocky.	The land along the main conduit is partly barren and partly sandy and rocky.
2	Forest Land	309.54 ha. (approx.)	229.04 ha. (approx.)
3	Major Advantages	-------	• The forest land submergence is reduced from 309.54 Ha. to 229.04 Ha. • Muck generation is less. • Less impact on Ambient Noise levels during operation.
4	Major disadvantages	• More Deforestation • Delay in obtaining clearances which might impact the project cost.	None
5	Social Issues	• This proposal involves displacement of 11,025 no's of humans and rehabilitation of 3 no of villages and 20 no of hamlets. • It reduces agrarian distress prevailing in the project area.	• This proposal involves displacement of 11,025 no's of humans and rehabilitation of 3 no of villages and 20 no of hamlets. • It reduces agrarian distress prevailing in the project area.
6	Techno-economic Aspects	• Open pump house	• Underground pump house and marginally cost effective.
7	Conclusions	• Even though this proposal is feasible in certain aspects the forest submergence is more in this alternative.	• Alternative- 2 is environmentally superior because of less submergence of forest land than alternative -1. • This proposal is technically feasible and economically viable.

The below Toposheet showing proposed finalized project location & Two (2) alternative Alignments.

Figure 3.2 Alternative site Maps

3.4 Size or Magnitude of Operation

The overall water demand of the scheme consists of irrigation requirement, domestic water supply for the en route villages, industrial requirements in Mahabubnagar, Rangareddy and Nalgonda districts and water supply to Hyderabad.

The total demand for these purposes comes out to be **90 TMC**. The storage reservoir details are given below:

Sl. No.	Name of Reservoir	Place (Village)	F.R.L (m)	Capacity (TMC)	Ayacut (ha).
1	Anjanagiri Reservoir	Narlapur	345.000	8.51	-
2	Veeranjaneya Reservoir	Yedula	445.000	6.55	-
3	Venkatadri Reservoir	Vattem	542.000	16.74	52239
4	Kurumurthiyraya Reservoir	Karivena	531.000	17.34	80972
5	Udandapur Reservoir	Udandapur	629.000	15.91	197571
6	K.P Lakshmidevipally Reservoir	Lakshmidevipally	670.000	2.80	74076
				67.85	**4 04 858**

Break-up of 90 TMC Utilisation :

Irrigation : 80.00 TMC
Drinking water requirement for enroute villages & Hyderabad : 8.00 TMC
Industrial requirement : 2.00 TMC

3.5 Project description with process details

Palamuru - Rangareddy Lift Irrigation Scheme envisages to irrigate upland areas of Mahabubnagar, Rangareddy and Nalgonda districts for an ayacut of 4,04,858 ha (10.00 lakh acres), in addition drinking water facility to en route villages, Hyderabad city and industrial use in Mahabubnagar, Rangareddy and Nalgonda districts, by lifting 90 TMC of flood water in 60 days (1.50 TMC per day) during flood season from foreshore of Srisailam reservoir at Yellur (V), Kollapur (M) in Mahabubnagar district to K.P Laxmidevipally (V), Kondurg (M) Mahabubnagar (D) (from + 240 M to + 670 M) which is the highest elevation in between Mahabubnagar and Rangareddy districts with 5 stage lifting and then by gravity. The scheme contemplates en route Irrigation under different reservoirs as per their commandability. There are five stages in the project starting from foreshore of Srisailam Reservoir and ending with K.P.Laxmidevipally Reservoir.

Table – 3.1 : Details Of Open Canals & Tunnels

Sl.No.	Lift	Open Canal length (km)	Tunnel Length (km)	Tunnel Dia. (m)	Discharge (cumecs)
1	Lift-1	1.250	0.150	2 x 11.50	656
2	Lift-2	5.675	16.005	2 x 11.50	656
3	Lift-3	3.100	22.000	2 x 11.50	656
4	Lift-4	9.750	8.845	2 x 8.50	377
5	Lift-5	18.800	14.400	8.00	161

Table – 3.2 : Details of Lifts

Sl.No.	Lift	Lift Height (m)	Pumps & Ratings (MW)	Pump capacity (cumecs)
1	Lift-1	104	8 x 145	85
2	Lift-2	124	9 X 145	75
3	Lift-3	121	9 X 145	75
4	Lift-4	126	5 X 145	75
5	Lift-5	72	3 X 75	55

Table – 3.3 : Details of Reservoirs

Sl. No.	Name of Reservoir	Place (Village)	F.R.L (m)	Capacity (TMC)	Ayacut (ha.)
1	Anjanagiri Reservoir	Narlapur	345.000	8.51	-
2	Veeranjaneya Reservoir	Yedula	445.000	6.55	-
3	Venkatadri Reservoir	Vattem	542.000	16.74	52239
4	Kurumurthiyraya Reservoir	Karivena	531.000	17.34	80972
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				67.85	**404858**

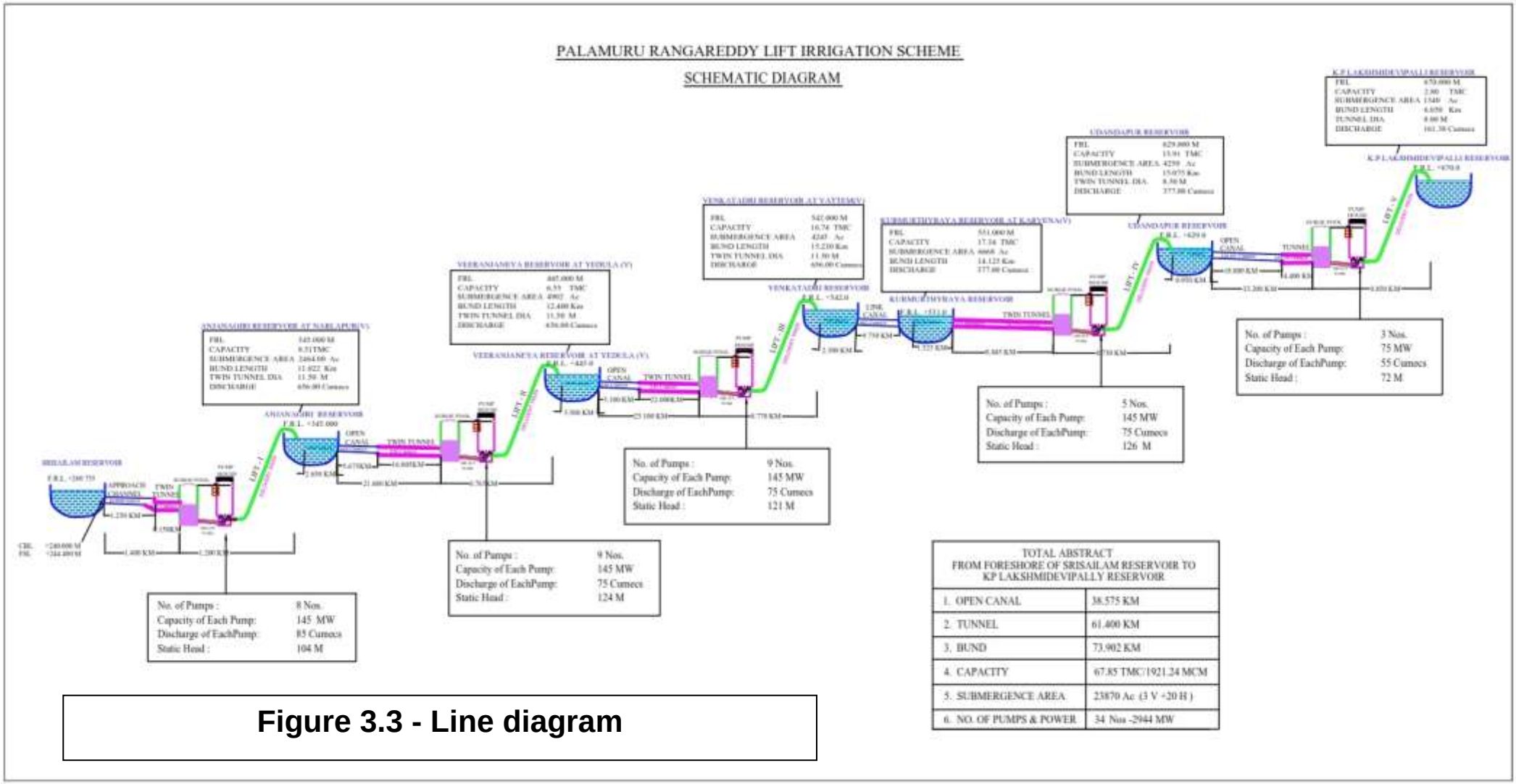


Figure 3.3 - Line diagram

3.6 Raw Material Required Along With Estimated Quantity, Likely Source, Mode of Transport of Raw Material

The construction materials are required for various project components i.e. series of reservoirs, water conveyor system consisting of gravity canal and tunnel, lift system, CM & CD structures and Distributory network system. The construction material needed for this project include cement, sand, coarse aggregates, revetment stones, reinforcement steel and structural steel. These quantities of the material are estimated as Revetment: 70,27,000 cum (1,12,43,200 MT) Coarse Aggregate: 57,62,000 cum (89,31,100 MT) Fine Aggregate: 1,33,87,000 cum (1,94,11,150 MT) Soils : 28,92,76,000 cum (52,06,96,800 MT).

Locally available materials, using excavated rock and soils. The construction materials will be procured from respective sources to the work sites.

3.7 Resource Optimization/recycling and reuse envisaged in the project

Resource Optimization / recycling and reuse are envisaged in this project. The excavated soil and rubble emanating from the construction of reservoirs, canals, tunnels etc. will be utilized for Earth bund, revetment, riprap & filters of the earthen dam & Aggregates for concrete if found suitable and filling of low lying areas and also for green belt development.

3.8 Availability of Water, Its Source, Energy / Power Requirement & Source Water requirement

The total quantity of water required during construction period for the construction activities and colonies is estimated **3100 KLD.** The water will be sourced from local sources.

3.9 Power requirement

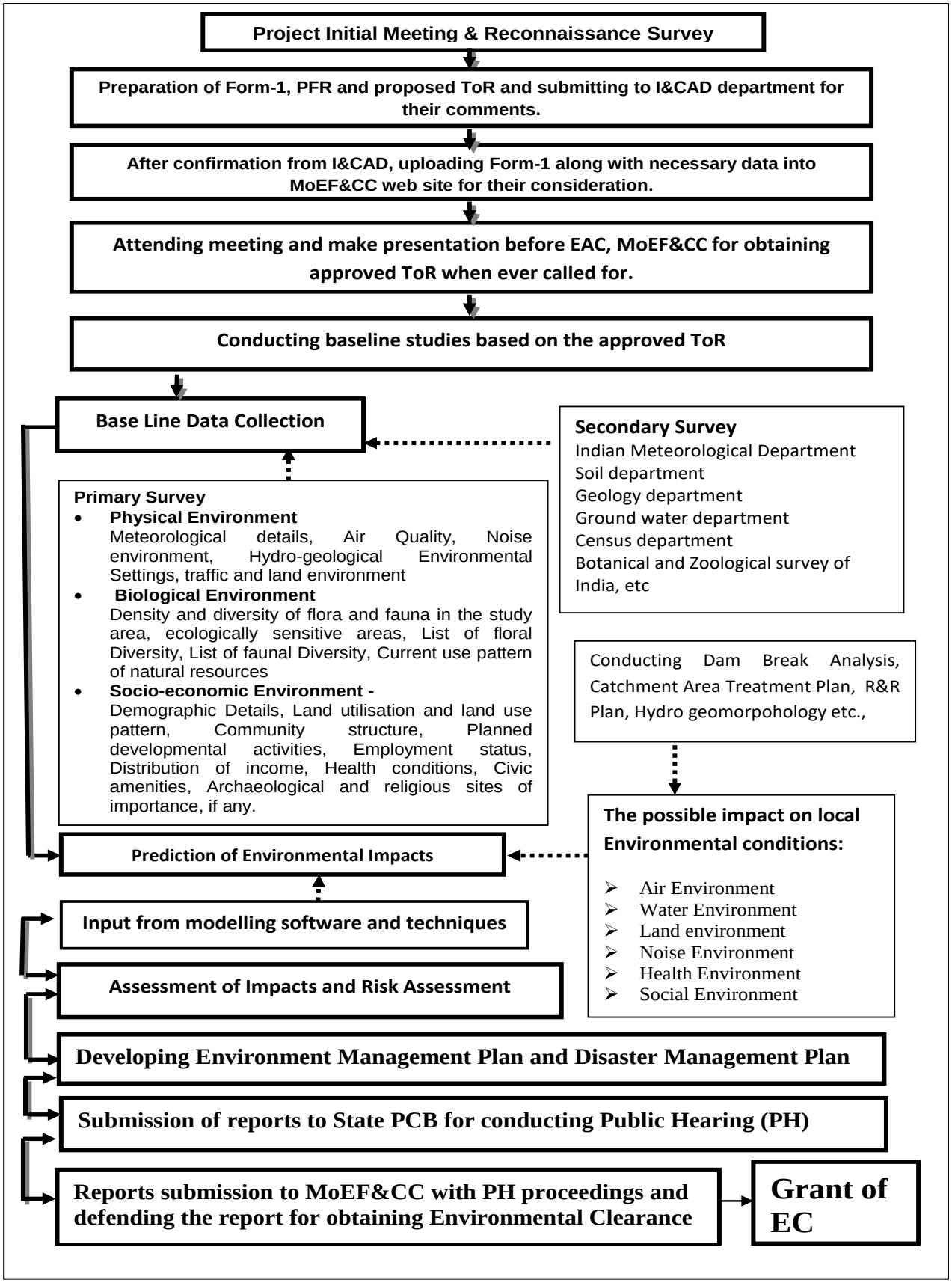
The total power requirement of the project is 2944 MW in all the 5 stages of Pumping Stations. The Power consumption of the project is 4366 Million units per annum. As the project is basically a lift irrigation project there is no power production in this project. Required Power will be supplied by DISCOMS of Telangana.

3.10 Quantity of Wastes to Be Generated (Liquid and Solid) and Scheme for Their Management/Disposal

A large quantity of muck is likely to be generated as the result of construction and tunnelling activities. The excavated soil and rubble emanating from the construction of reservoirs, tunnels etc. will be utilized for Earth bund, revetment, riprap & filters of the earthen dam & Aggregates for concrete if found suitable and filling of low lying areas and also for green belt development.

All these construction sites would be properly levelled. The levelling or reclamation of these sites will be made mandatory for the contractor, involved in the construction.
Any municipal solid waste generated in the project complex / project colony / labour colony, will be managed and handled in accordance with SWM Rules, 2016.
Regarding sanitary wastewater management septic tanks followed by subsurface dispersion be provided.

3.11 Schematic representations of the feasibility drawing which give information of EIA purpose


Project Initial Meeting & Reconnaissance Survey
Preparation of Form-1, PFR and proposed ToR and submitting to I&CAD department for their comments.
After confirmation from I&CAD, uploading Form-1 along with necessary data into MoEF&CC web site for their consideration.
Attending meeting and make presentation before EAC, MoEF&CC for obtaining approved ToR when ever called for.
Conducting baseline studies based on the approved ToR
Base Line Data Collection
Secondary Survey
Indian Meteorological Department
Soil department
Geology department
Ground water department
Census department
Botanical and Zoological survey of India, etc
Primary Survey
Physical Environment
Meteorological details, Air Quality, Noise environment, Hydro-geological Environmental Settings, traffic and land environment
Biological Environment
Density and diversity of flora and fauna in the study area, ecologically sensitive areas, List of floral Diversity, List of faunal Diversity, Current use pattern of natural resources
Socio-economic Environment -
Demographic Details, Land utilisation and land use pattern, Community structure, Planned developmental activities, Employment status, Distribution of income, Health conditions, Civic amenities, Archaeological and religious sites of importance, if any.
Conducting Dam Break Analysis, Catchment Area Treatment Plan, R&R Plan, Hydro geomorpohology etc.,
The possible impact on local Environmental conditions:
Air Environment
Water Environment
Land environment
Noise Environment
Health Environment
Social Environment
Prediction of Environmental Impacts
Input from modelling software and techniques
Assessment of Impacts and Risk Assessment
Developing Environment Management Plan and Disaster Management Plan
Submission of reports to State PCB for conducting Public Hearing (PH)
Reports submission to MoEF&CC with PH proceedings and defending the report for obtaining Environmental Clearance
Grant of EC

4 SITE ANALYSIS

4.1. Connectivity

The project site is approachable by road and the nearest town is Kollapur at a distance of 8 km. The nearest railway station is “Wanaparthi Road” at a distance of 63 km. The nearest airport is Hyderabad in at a distance of 130 km. Mahabubnagar is the District Head quarter, Jadcherla, Kalwakurthi, Narayanpet, Bhutpur, Devarakadra, Korangal, Shadnagar in Mahabubnagar District & Ganded, Tandur, Dharur, chevalla, vikarabad and Pargi of Rangareddy district are the major towns located in the project area.

The Secunderabad - Bangalore Railway line of SC Railway and Hyderabad - Bangalore National highway NH-44 and State highways SH-4 & SH-21 pass through the mid region of the project area and serve as important means of commuting.

4.2. Landform, Land use & Land ownership

Palamuru – Rangareddy Lift Irrigation Scheme is planned for irrigating about 4,04,858 ha (10.00 lakh acres) of cultivable command area (CCA) in the districts of Mahabubnagar, Rangareddy and Nalgonda districts. Most of the command area is drought prone area. Currently, the command area doesn’t have assured water supply. The common crops grown in this area are paddy, jowar, maize, vegetables and pulses etc.,

4.3. Existing Land use Pattern

Land proposed for utilization under this project is agriculture land, homesteads and some forest area. A total of **23778.96 ha.** of non- forest land and **229.04 ha. of Forest land** will be acquired for the purpose of construction of Reservoirs, tunnels, pump house, surge pool, canals & distributary network etc..

4.4. Topography

The proposed project is located in Deccan plateau of India. Topography is relatively mild to higher slopes.

4.5. Environmental Sensitivity

Anjanagiri reservoir is constructed near the Kolhapur protected forest area and about **229.04 ha.** shall be acquired for the purpose of the construction of the reservoir. Amrabad Tiger reserve forest core area is 11.95 km, buffer area 2.56 km and ESZ area is 1.56 km away from the reservoir.

4.6. Existing Infrastructure

The project site (Head works) is approachable by land at distance of 8.0 km and National High way (NH-44) is at distance of 41 km, Minor roads are connected to the villages within the command area.

4.7. Soil Classification

Mahabubnagar district is mainly covered by three types of soils Viz. red sandy soil (Dubbas and Chalkas) Red earth (with loamy sub-soils and Chalkas) and black cotton soils. Red sandy soils and red earth are permeable and well drained whereas the Nalgonda district soil comprises of red soil, black soil, alkaline soil and alluvium. The red soil constitutes 85 % of the area. Black soil is found over the limestone area, in the south- eastern part of the area. Alkaline soil occurs as limited patches in the central part. Alluvial soil occurs along Alair, Musi and Kagna rivers. Red Soils predominate in the Rangareddy district followed by Black soils.

4.8. Climatic data from Secondary sources

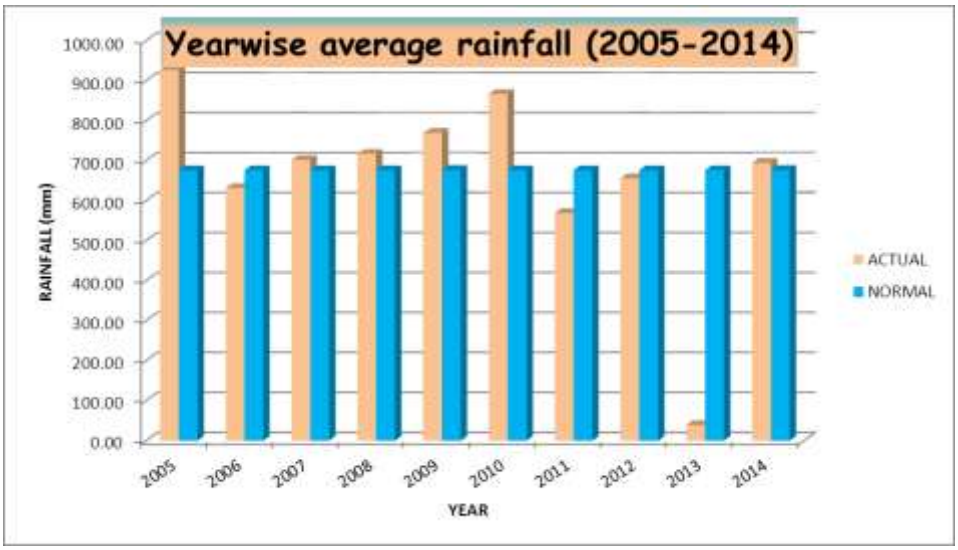
The average annual rainfall for 2005-2014 in the project area is 657.56.mm. The yearly rainfall for last ten years (2005 to 2014) has been presented in Table-4.1 and depicted graphically in Figure-4.1.

The mean seasonal rainfall distribution is 496.34 mm in South-West monsoon (June-September) to 82.65 mm in North-East monsoon (Oct-Dec), 3.41 mm rainfall in winter (Jan-Feb) and 66.54 mm in summer (March – May). The percentage distribution of rainfall, season-wise, is 76.48 % in South-West monsoon, 12.74 % in North-East monsoon, 0.54 percentage in winter and 10.25 % in summer.

Table 4.1 – Average annual Rainfall in the District

YEAR	January	February	March	April	May	June	July	August	September	October	November	December	Total
2005	3.6	7.7	15.0	25.0	16.8	52.3	236.0	137.7	231.1	195.4	5.9	0.7	927.14
2006	0.0	0.0	33.6	58.6	68.5	114.2	70.0	84.3	159.8	17.0	26.1	0.0	631.97
2007	0.0	0.0	0.0	0.0	12.8	187.1	79.2	141.7	216.1	32.8	33.0	0.0	702.65
2008	0.0	13.1	137.6	15.7	6.0	68.0	93.3	225.3	118.2	25.4	13.0	2.0	717.39
2009	0.0	0.0	2.6	4.0	21.3	96.0	53.6	215.7	203.9	142.3	27.8	1.5	768.78
2010	4.3	1.3	0.1	8.1	16.5	86.6	265.2	205.6	184.2	76.3	16.2	3.1	867.41
2011	0.0	4.2	0.4	30.6	29.1	49.6	198.0	172.0	49.2	36.1	0.2	0.0	569.27
2012	0.0	0.0	0.6	37.3	8.2	94.5	159.3	144.6	98.5	79.1	34.6	0.0	656.71
2013	0.0	0.0	0.3	3.4	1.0	18.7	5.2	3.7	7.1	0.0	0.0	0.0	39.45
2014	0.0	0.0	23.5	17.0	72.2	53.2	115.1	187.2	82.3	37.6	15.8	4.7	608.75

Figure 4 .1 – Year wise average rainfall



The annual rainfall varies from 927.14 mm to 550.00 mm during the period from 2005-2014. The years 2006, 2011, 2012 and 2013 experienced drought conditions in the project area as the annual rainfall recorded in these four years is 7%, 16%, 3% and 93% less than the long period average (LPA) respectively. The project area experiences semi-arid climate. The peak temperature recorded in the year 2014 was 41°C in the month of April and the lowest temperature of 19°C was recorded in December, 2014.

As per the SAPCC Telangana the districts which are highly exposed to the drought are Mahabubnagar and Nalgonda mainly due to their geographic location and influence of parameters like distribution of rainfall.

4.9. Social Infrastructure

In the proximity of the project site, educational, religious and transportation facilities are found. The nearest Railway station is “Wanaparthi Road” at a distance of 63 km. railway station are available. The habitants have a good transportation facility as they are accessible easily. Overall it is clearly seen that the social infrastructure in and around the project site is of a good standard.

5 PLANNING BRIEF

5.1. Planning Concept (type of industries, facilities, transportation etc) town and country planning/development authority classification

Transportation facilities -Wanaparthi Road railway station at a distance of 63 km. The habitants have a good transportation facility as there are accessible easily.

The aim of the scheme is to irrigate upland areas of about a net ayacut of 4,04,858 ha (10.00 lakh acres) in Mahabubnagar, Rangareddy and Nalgonda Districts.

5.2. Population Projection

As the course of the project is long involving different components in different locations, no centralized congregation OR influx of people is expected. Locally available manpower shall be utilized in the nearest place of work. During the peak period about 10,000 Unskilled, Semi Skilled & Skilled personnel will be deployed along the entire stretch of the project. At any point of time and place the number of people on the work site shall not be more than 300. The people will be spread over the entire stretch of the project area which comprises of 5 lifts and 6 storage reservoirs. No labour colonies are proposed, but Workshops, Workers Rest house, Sanitation & Staff quarters will be provided at close proximity to the work site.

5.3. Land use planning

Based on the classification of soils and crops grown in the area, the tentative cropping pattern proposed under the project is as follows:

Only irrigation dry (I.D) crops in Kharif season are proposed to extend irrigation facilities to 4,04,858 ha by utilizing about 90 T.M.C of water.

Existing & proposed cropping pattern details are furnished in table 5.1 & 5.2;

Table 5.1 : Existing Cropping pattern in the Command Area of PRLIS

S.No.	Type of Crop	Kharif		Rabi		TOTAL Area Karif & Rabi	
		Area in Ha.	%	Area in Ha.	%	Area in Ha.	%
1.	Paddy	52364	12.93	12268	3.03	64632	17.74
2.	Maize	67692	16.72	1479	0.37	69171	18.99
3.	Sorghum	24684	6.10	6172	1.52	30856	8.47
4.	Greengram	12439	3.07	---	---	12439	3.41
5.	Blackgram	3555	0.88	---	---	3555	0.98
6.	Redgram	61984	15.31	---	---	61984	17.01
7.	Cotton	64310	15.88	---	---	64310	17.65
8.	Castor	20621	5.09	---	---	20621	5.66
9.	Vegetables	7759	1.92	---	---	7759	2.12
10.	Groundnut	---	---	14980	3.70	14980	4.11
11.	Bengalgram	---	---	957	0.24	957	0.26
12.	Sunflower	---	---	1985	0.49	1985	0.55
13.	Safflower	---	---	1207	0.30	1207	0.33
14.	Others	1963	0.48	7858	1.94	9821	2.70
	TOTAL	**317372**	**78.39**	**46907**	**11.59**	**364277**	**100**

Table 5.2 : Proposed Cropping pattern in the Command Area of PRLIS after the Project Implementation

S.No.	Type of Crop	Kharif		Rabi		TOTAL Area Karif & Rabi	
		Area in Ha.	%	Area in Ha.	%	Area in Ha.	%
1.	Paddy	41266	10.19	33824	8.35	75090	10.57
2.	Maize	75992	18.77	56735	14.01	132727	18.69
3.	Chillies	67287	16.62	38740	9.57	106027	14.93
4.	Greengram	25182	6.22	0	0	25182	3.54
5.	Blackgram	16599	4.10	0	0	16599	2.34
6.	Redgram	36842	9.10	0	0	36842	5.19
7.	Cotton	68280	16.87	0	0	68280	9.61
8.	Castor	2300	0.57	0	0	2300	0.32
9.	Vegetables	63846	15.77	2300	0.57	66146	9.31
10.	Groundnut	0	0	97125	23.99	97125	13.67
11.	Bengalgram	0	0	7171	1.77	7171	1.00
12.	Sunflower	0	0	57854	14.29	57854	8.15
13.	Safflower	0	0	4735	1.17	4735	0.66
14.	Others	5637	1.39	8502	2.1	14139	1.99
	TOTAL	**403232**	**99.60**	**306987**	**75.83**	**710217**	**100**

5.4. Assessment of Infrastructure Demand (Physical & Social)

Project aims towards construction of reservoirs and main canal for providing water to irrigation, drinking and industrial purpose. The proposed project envisages to utilise 90 TMC of flood water in 60 days from Krishna river providing irrigation facility to 4,04,858 ha (10.00 lakh acres) of upland areas, drinking water to en-route 1131 villages of 66 mandals and Hyderabad city, water to Industrial use in Mahabubnagar, Rangareddy and Nalgonda districts.

5.5. Amenities/Facilities

Proper site services such as First Aid, Canteen / Rest Shelter, Drinking Water will be provided to the construction workers. Various facilities to be provided during construction and operation of the project are as follows:

1. Electricity will be provided by transmission lines and DG sets.
2. Drinking water will be provided to the workers by Tankers during construction.
3. To provide the first aid for any sort of injuries encountered during the operation, one first aid room will be provided. First aid kit and sufficient stock of material / medicines needed for first aid shall be provided as per requirement.
4. In future if women workers are employed, arrangement for a crèche will be made as per the requirement.
5. Necessary arrangement will be made for conducting refresher course as laid down in vocational training rules to upgrade skills of the persons involved in the project.
6. Construction workers engaged in forest areas of the project will be provided with LPG/Kerosene for cooking purpose to prevent possible tree felling in forest areas for firewood.

6 PROPOSED INFRASTRUCTURE

6.1 Industrial area/Residential area/Green belt/Social Infrastructure

Proposed Project does not involve any additional infrastructure for Industrial area, residential area, Green belt, social infrastructure etc. Project involves only infrastructure which are required for irrigated agriculture and R&R of PAFs / PDFs.

6.2 Sewerage System

Sewage generated from the colonies is proposed to be sent to septic tank followed by subsurface dispersion which are designed and constructed as per IS 2470 Part-I & Part-II.

6.3 Industrial waste management

Not Applicable

6.4 Solid waste management

Domestic solid waste will be disposed as per the SWM Rules, 2016.

6.5 Power requirement & Supply / Source

The total power requirement for the project is **2944 MW** in all the 5 stages of Pumping Stations. As the project is basically a lift irrigation project there is no power production in this project. The power required will be supplied by DISCOMS of Telangana.

7 REHABILITATION & RESETTLEMENT (R&R) PLAN

- The project envisages acquisition of **23778.96 ha.** of non- forest land and **229.04 ha.** of forest land for various project appurtenances. A resettlement & Rehabilitation (R&R) Master Plan highlighting the guidelines of land acquisition and provision for rehabilitation measure will be formulated. The rehabilitation policies of the state government of Telangana and RFCTLARR Act, 2013, Government of India will serve as basis for preparation of the R& R plan for the project affected families.

Table 7.1 Details of Land Acquisition

Extent of land required (ha)	Title of land (ha)	
	Govt land	Patta land
24,008	4,802	19,206

Table 7.2 Reservoir wise submergence of villages/Hamlets

Name of the reservoir	No.of Households	Population
Anjanagiri reservoir	218	908
Veerajaneya reservoir	541	2360
Venkatadri reservoir	259	1032
Kurumurthyraya reservoir	188	840
Udandapur reservoir	1275	5885
KP- Lakshmidevipally reservoir	0	0
Total	**2481**	**11025**

Forest Land

Around **229.04 ha.** of forest land is affected in the project.

8 PROJECT SCHEDULE & COST ESTIMATES

8.1 Likely Date of Start of Construction and Likely Date of Completion

The project consisting of Reservoirs, tunnels, pump houses, excavation and lining of canals of all links and other structures such as super passages, aqueducts, drops, bridges etc. will be completed in 30 months from the date of signing agreement.

8.2 Estimated Project Cost Along With Analysis In Terms Of Economic Viability of the Project

The project comprises of the following major components.

1. Reservoirs
2. Excavation of canals
3. Construction of tunnels
4. CM and CD works
5. Land acquisition
6. Lift system
7. Underground pump houses
8. Sub-stations etc.

Table 8.1 financial requirement for project works

S.No	Item	Cost (Rs. Crores)
1	Work Items	29827.91
2.	L.S.Provisions	2153.09
3.	Non work items	2570.00
4.	Rehabilitation & Resettlement	588.00
5.	Unforeseen works	61.00
	Total	**35,200**

The total amount of the estimate is worked out to **Rs. 35,200 crores.**

9 ANALYSIS OF PROPOSAL

9.1 Financial and Social Benefits with Special Emphasis on the Benefit to the Local People Including Tribal Population, If Any, In the Area

Palamuru –Rangareddy Lift Irrigation Scheme envisages to irrigate the upland areas of about a net ayacut of 4,04,858 ha (10.00 lakh acres), in addition drinking water facility to enroute villages, Hyderabad city and industrial use in Mahabubnagar, Rangareddy, and Nalgonda districts, by lifting 90 TMC of flood water in 60 days(1.50 TMC per day) during flood season from foreshore of Srisailam reservoir near Yellur(V),Kollapur(M) in Mahabubnagar district to K.P Laxmidevipalle (V), Kondurg (M) ,Rangareddy (from +240 to + 670 m) which is the highest elevation in between Mahabubnagar and Rangareddy districts with 5 stage lifting and then water flows by gravity.

The importance of irrigation is to increase agricultural output and employment. The proposed project is expected to provide employment in different activities such as construction, transportation and plantation activities during construction phase and subsequently in agro - and other industries. The total man power requirement for the construction period is 10000. The people will be spread over the entire project area which comprises of 6 nos. of Reservoirs.

It is contemplated to irrigate a command area of 4,04,858 ha (10.00 lakh acres) in three districts and provide drinking water to en route villages as well as Hyderabad and industrial requirements. The cost of the project is **Rs. 35,200 crores**.

Table -9.1 Benefits without and with project

Item	Without project (in Lakhs)	With project (in Lakhs)
Net value of produce	29051.14	820784.08
Net Annual benefits		791732.94
Drinking water supply		11506.63
Industrial water supply		8304.33
Fisheries returns		8505.25
Total Annual benefits	**29051.14**	**1640833.23**

The Benefit - Cost Ratio works out to be 1.23.

Table – 9.2 Total cost for B-C ratio

PALAMURU RANGAREDDY LIFT IRRIGATION SCHEME

Rs. In Lakhs

Sl.No	PARTICULARS	BEFORE IRRIGATION	AFTER IRRIGATION
A.	**GROSS RECIEPTS**		
1	Gross Value of the farm produce	57039.42	1053785.25
2	Dung Receipts @ 30% of the fodder expenditure	2566.77	31613.56
3	Total (A): Gross Reciepts(1+2)	59606.20	1085398.81
B.	**EXPENSES**		
1	Expenditure on Seeds	16466.32	78094.74
2	Expenditure on Manure		
3	Expenditure on Pesticides		
4	Expenditure on Hired Labour		
5	Fodder expense @ 15%/10% of Gross value of farm produce	8555.91	105378.53
6	Depreciation on implements @ 2.7% of Gross value of farm produce	1540.06	28452.20
7	Share & Cash rent @ 5%/3% of total gross value of farm produce	2851.97	31613.56
8	Land revenue @ 2% of total gross value of farm produce	1140.79	21075.71
9	Total (B): Expenses (1 to 8)	30555.06	264614.73
C.	**NET VALUE OF PRODUCE**		
1	Total Gross Reciepts	59606.20	1085398.81
2	Minus total expenses	30555.06	264614.73
3	NET VALUE OF PRODUCE	29051.14	820784.08
D.	**ANNUAL BENEFITS**		
1	Net value after irrigation	820784.08	
2	Net value before irrigation	29051.14	
3	Net annual benefits	791732.94	
4	Revenue from Domestic water supply 227 M cum @ 50.69 Lakhs per M cum.	11506.63	
5	Revenue from Industrial water supply 57 M cum. @ 145.69 Lakhs per M cum.	8304.33	
6	Fisheries (Average Reservoirs Area*Rate as per Fisheries Department)	8505.25	
	Total (D)	820049.15	
E.	**ANNUAL COSTS**		
1	Interest on Capital @ 8% of estimated total cost of the project Rs 35,200 Cr	352000.00	
2	Depreciation of the project @ 1 % of the project cost Rs 35,200 cr	3520.00	

3	Annual operation and maintenance charges @ Rs. 223/Ha	902.83
4	Maintenance of Head works @ 1% of the cost of Head works Rs 14500 Cr	14500.00
5	Depreciation of Pumping System @ 3.33% of the estimate cost of Pumping station assuming life of the system as 30 Years. Rs 14500	48285.00
6	Power charges for lift irrigation Rs 248980 Lacs	248980.00
7	Total (E):	668187.83
	BENEFIT COST RATIO 820049.15 / 668187.83	**1.23**

1	at 10% Interest if Benefit reduces by 10%, BC Ratio is	1.104
2	at 10% Interest if Cost increases by 10%, BC Ratio is	1.115
3	at 10% Interest rate if Benefit reduces by 10% & Cost increases by 10% BC Ratio is	1.004