

## **Chapter-13**

### **Cost estimates**

#### **13.0 General**

The Godavari (Inchampalli) - Cauvery (Grand Anicut) link project envisages construction of the following components.

- i) A barrage with full pond level of 87.0m near Inchampalli across river Godavari.
- ii) Link canal of length about 1211 km from the proposed Inchampalli barrage to Grand Anicut via existing Musi, Nagarjunasagar, Somasila reservoirs, comprising open canal, lifting arrangements and tunnels.
- iii) Lifting arrangements through 4 stages of 57 m (RD 0.0 km), 38 m (RD 18.0 km), 23.2m (26.50) and 11.0m (RD 60.50 km) totaling to 129.20m of static lift on main canal; a lift of 52.63m at 97.50km for Kakatiya Stage II feeder branch (at RD 97.50km on main canal), lifting through 3 stages of 64.50m (0.00km), 58.0m (75.00 km) and 74m (95.00km) for the 116 km long Gottimukkala feeder branch canal (taking off at RD 199.15km on main canal) totaling to 196.50m; a lift of 67.14m for Srisailam LBC feeder branch (Alimineti Madhava Reddy LIS) from Nagarjunasagar reservoir.
- iv) One tunnel at RD 86.35 of 9.15 km length in the reach from Inchampalli to Nagarjunasagar. 1.3 km long tunnel from RD 302.786 to 304.101 km; 4 km long tunnel at the offtake of link canal near headworks of Somasila; one km tunnel from RD 700.976 to 701.976 km; and 3.1 km long tunnel from RD 826.776 km to RD 829.876 km.
- v) Two powerhouse complexes one on canal at Musi reservoir with a head of about 9.70 m and another powerhouse at canal head at Nagarjunasagar reservoir with a head of about 20 m.

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- vi) Existing Nagarjunasagar on river Krishna, Somasila on river Pennar as balancing reservoirs enroute.
- vii) In all, 30 number of branch canals and 7 direct sluices / feeders to facilitate irrigation enroute and in the existing irrigation systems through piped distribution.
- viii) Kakatiya Stage II feeder branch (22km), Gottimukkala feeder branch (116km) and SLBC feeder branch to facilitate irrigation to SRSP Command, new areas in Munugodu and Chandur mandals of Nalgonda district and Srisailem Left Bank Canal command.
- ix) Cross drainage/ cross masonry and regulating works across the link canal.
- x) New command of about 4.53 lakh ha at 100% intensity in Nalgonda, Warangal, Khammam, Prakasam, Nellore, Chittoor, Tiruvallur, Vellore, Kancheepuram, Tiruvannamalai, Villupuram and Cuddalore districts and stabilization of 4.34 lakh ha at 138 to 140% of irrigation intensity together fetching 9.45 lakh ha of irrigation annually.
- xi) Canal top solar power generation arrangement at appropriate reaches along the link canal alignment.
- xii) The existing Grand Anicut as outfall structure on river Cauvery with FPL 59.22 m.

The Ministry of Water Resources has issued “Guidelines for preparation of detailed project reports of irrigation and multipurpose projects, 2010” which have been followed in preparation of estimates and benefits of the link project. The standard schedule of rates of various States and the minimum supporting price (MSP) of various agricultural produce as per Govt of India have been considered while evaluating the costs and benefits.

The quantities of materials and works involved in the various components have been worked out based on the engineering drawings. The

rates of various items provided in the standard schedule of rates 2018-19 of Water Resources Dept. (WRD) of, Govt. of Telangana, Andhra Pradesh and Tamil Nadu have been used and then escalated to the 2020-21 price level at 8% rate of escalation. The necessary lead, lift and material loading and unloading charges wherever applicable are added suitably. The rates for the items of insignificant nature are not available in the common schedule of rates of WRD and the same are considered from the rates available in the schedule of rates of PWD of Hyderabad, Vijayawada and Chennai region for the year 2018-19 with cost of escalation of 5% to 7.0% per annum wherever required.

### **13.1 Classification of Units**

The cost of Godavari (Inchampalli) - Cauvery (Grand Anicut) link project is estimated under five main components viz. Unit I: Head works, Unit II: Conveyance system, Unit III: Power Unit IV: Lifting arrangements Unit V: Onfarm development. The total cost of the project is estimated to be Rs. 8596236 lakh at 2020-21 price level.

**Unit I: Head works:** Includes the cost of proposed barrage at Inchampalli, modification to the existing headworks at Nagarjunasagar and Somasila reservoirs and the head regulators at all these three reservoirs/storages.

**Unit II: Conveyance system:** Includes the cost of main canal, canal structures, tunnels, cross regulators, canal escapes, outfall regulators., branch canal regulators/direct sluices and distribution system.

**Unit III: Hydro power:** Includes the cost of power house and appurtenant works at the off take of link canal from Nagarjunasagar project.

**Unit IV: Lifting arrangements:** Includes the cost of sump, pump house, pumps, delivery mains, sump, cistern etc at the three locations on main canal and at one location on NSLBC feeder where lifting is proposed.

**Unit V: Onfarm development:** Includes the cost of development of new command area proposed under the link canal.

The Abstract of cost of the link project is given in **Table 13.1**.

**Table-13.1 Abstract of cost of the link project**

Sl. No.	Unit	Amount (Rs.. in lakh)
1	I - Head works	392052
2	II – Conveyance system	6989726
3	III – Hydro power	91621
4	IV – Lifting arrangements	1105926
5	V – Onfarm development	16911
	<b>Total</b>	<b>8596236</b>

The total cost of the link project works out to be Rs. 8596236 lakh at 2020-21 price level. The general abstract of the cost of the project is given in **Annexure 13.1**. The details under various heads are described in the following paragraphs:

#### **13.1.1 Unit-I Head works:**

It includes the cost of the following components / structures of the project.

- i) Proposed barrage at Inchampalli across river Godavari
- ii) Head regulator at Inchampalli barrage.
- iii) Head regulator at Nagarjunasagar reservoir across Krishna river
- iv) Head regulator at Somasila reservoir across Pennar river

Total cost of Unit-I Headworks of Reaches I, II & III is estimated to be **Rs. 392052** lakh as furnished in **Annexure 13.1.1**. The sub-head wise details are given below.

#### **A. Direct Charges**

The direct charges include the following sub- heads.

- I : Works,
- II : Establishment,
- III : Tools and Plant,
- IV : Suspense and
- V : Receipts and recoveries.

The details are described below:

### **I -Works:**

#### **A- Preliminary(Reaches I,II &III): Rs. 7023 lakh**

Provision under this sub-head has been kept to cover the actual expenditure incurred on surveys and investigations, collection and procurement of data / maps / remote sensing data, cost of consultancy works through various expert agencies, environmental impact assessment etc for preparation of this detailed project report of link project. This sub head consists of many activities which are furnished.

- i) Topographical surveys and investigations,
- ii) Hydrological and meteorological surveys,
- iii) Geological and Geotechnical surveys,
- iv) Construction material survey,
- v) Borrow area survey,
- vi) Seismic studies,
- vii) Morphological studies,
- viii) Sedimentation studies of reservoirs.,
- ix) Construction of access roads to facilitate site investigations,
- x) Procurement of data / maps, procurement of remote sensing data.
- xi) Environmental impact assessment study.
- xii) Charges for consultancy works for various studies and
- xiii) Preparation of detailed project report.

A lump-sum provision @ of 2% of I-works has been considered under this sub-head. The details are given at **Annexure 13.1.1 (Reaches I, II &III)**.

**B - Land:**

The land required for head regulators. are accounted in Unit II: Canal.

**C- Works (Reaches I, II &III):** **Rs. 334891 lakh**

Under this sub-head the provisions have been made to cover the cost of various components of barrage at Inchampalli and head regulators proposed at Nagarjunasagar and Somasila. The design of various components of the head regulators are carried out by NWDA. The quantities and the cost of the various components have been evaluated as per the drawings. The details are given at **Annexure: 13.1.1 (Reaches I,II &III).**

**K - Buildings:**

The cost of buildings is considered in Unit - II. Conveyance system.

**M - Plantation (Reaches I,II &III):** **Rs. 273 lakh**

A provision of Rs. 273 lakh is made towards plantation along the approach road in the vicinity of the Inchampalli barrage and near the head works in third reach. The details are given at **Annexure: 13.1.1.**

**O- Miscellaneous (Reaches I, II &III):** **Rs.3906 lakh**

A provision @ 0.5% of I-Works is made towards plantation in the vicinity of the Inchampalli barrage, near the head works in the second and third reaches to cover the capital cost of electrification, water supply purification and distribution arrangements, sewage disposal, fire fighting equipment, telephones, wireless sets, equipment for quality control and field labs, initial equipment and other accessories for hospitals etc and R & M of above equipments / infrastructural facilities, inspection vehicles, inspection bungalow etc. Provision has also been made for other miscellaneous items such as inaugural foundation laying ceremony, compensation to work men, flood lighting, model exhibits etc. The details are given in **Annexure 13.1.1 (Reaches I,II & III).**

**P - Maintenance (Reaches I, II &III):** **Rs. 3238 lakh**

Provisions have been made under this sub-head to cover the cost of maintenance of all works during the construction period. A provision of 1% of C-Works has been made. The details are given in **Annexure 13.1.1 (Reaches I,II & III)**.

**Q - Special Tools and Plant:** **Rs. 411 lakh**

Amount is provided under this sub head to cover special tools and plants like excavators, concrete mixers, water pumps etc. The details are given at **Annexure: 13.1.1 (Reaches I, II &III)**.

**R - Communications:** **Rs. 410 lakh**

Provision is made under this sub head to cover costs of construction of approach roads, quarry roads, bridges/culverts, temporary roads and river crossings The details are given at **Annexure: 13.1.1 (Reaches I, II &III)**.

**X - Environment and Ecology:** **Rs. 293 lakh**

The impact on environment and ecology due to barrage and head regulators is not significant. Token provision is made towards public health measures, provision of fuel to the labour, control of aquatic weeds, protection of rare and endangered species etc. The details are given at **Annexure 13.1.1 (Reach-I)**.

**Y - Losses on Stock and Unforeseen Items:** **Rs. 705 lakh**

Provision under this sub- head has been made at 0.25% of the cost of I- Works (excluding A - Preliminary, B - Land, O - Miscellaneous, P - Maintenance, Q- Special Tools and Plants and X - Environment and ecology). The details are given at **Annexure 13.1.1 (Reach-I & II)**.

The total cost of I Works of Unit - I works out to Rs. **351149** lakh for **Reaches I, II & III.**

**II - Establishment: Rs. 34518 lakh**

The link project is planned to be completed in a period of 5 years.. Provision towards establishment charges has been made @ 8 to 10% of I - Works less B - Land considering the cost of barrage and head regulator only. The details are given at **Annexure 13.1.1 (Reaches I, II & III).**

**III - Ordinary tools and plant: Rs. 3065 lakh**

Provision has been made under this head @ nearly 1.0 % of I-Works towards ordinary tools and plant to cover the cost of survey instruments, camp equipment, inspection vehicles and other small tools and plant. This provision is distinct from the Q- special tools and plant. The details are given at **Annexure 13.1.1 (Reaches I, II & III).**

**IV – Suspense: Nil**

It is assumed that all the outstanding suspense accounts would be cleared by adjustment to appropriate heads on completion of the project. As such no provision has been kept under this head.

**V - Receipt and Recoveries (Reaches I&II): Rs. (-) 191 lakh**

Under this head, the estimated recoveries are considered from resale value of Q- special T&P.

**B - Indirect charges: Rs. 3511 lakh**

Provision for audit and account charges @ about 1% of I-Works is made under 'Indirect Charges'.

Thus, the total cost of head works (Unit-I) works out to **Rs. 392052 lakh.**

### **13.1.2 Unit - II: Conveyance system**

The cost of conveyance system comprises of the cost of the components viz main canal, tunnels, branch canals, canal structures, distribution system etc along with their appurtenant works.

The cost estimation for the main canal has been made as per the designs and drawings whereas for the branch canals it is taken on proportionate factor of canal discharge and length with main canal. The total cost of Unit - II: Conveyance system is estimated to be **Rs. 6989726 lakh** at 2020-21 price level. Details are shown in **Annexure: 13.1.2**. The sub-head wise details are discussed in the following paragraphs.

#### **A. Direct charges:**

##### **I-Works:**

**A- Preliminary (Reaches I,II &III):** **Rs. 127575 lakh**

Provision under this sub head has been kept to cover the actual expenditure incurred on various surveys and investigations viz topographical surveys, geological and geotechnical investigations, construction material surveys, survey and camp equipments, charges for consultation for various studies, actual expenditure on establishment and preparation of detailed project report. A lump-sum provision @ of 2% of I-Works has been considered under this sub-head. The details are shown in **Annexure: 13.1.2 (Reaches I,II &III)**.

**B - Land** **Rs. 1089919 lakh**

The provision for cost of acquisition of land for main canal, branch canal and canal structures, compensation for property and standing crops, solatium charges, diversion of communication systems and other immovable properties, rent for use of land prior to acquisition etc., have

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been considered. The land requirement for the branch canals has been worked out based on the proportionate factors. of length and discharge of main canal. The details are shown in **Annexure 13.1.2(Reaches I, II &III)**.

**D - Regulators.:**

**Rs. 17849 lakh**

Provision for cross regulators. at appropriate locations and regulators. for branch canals and direct sluices has been made. The cost of regulators is arrived at from cost curve of regulators derived based on the cost estimate of head regulators located at Nagarjunasagar, Somasila and Grand anicut reservoirs.. The details of the cost estimates of the regulators are furnished in **Annexure 13.1.2(Reaches I, II &III)**.

**E - Falls:**

**Rs. 50 lakh**

A lump sum provision towards the structures for canal falls is made in the third reach of the link system. The details are furnished in **Annexure 13.1.2 (Reach III)**.

**F- Cross drainage works:**

**Rs. 190890 lakh**

The cross drainage works proposed across the main canals are aqueducts, syphon aqueducts, canal syphons and super passages to facilitate the crossing of major/medium rivers/streams. The under tunnels are also proposed across the link canal for crossing the minor streams/ canals. The cost curves for each category of structures have been developed by considering the design drawings, quantity estimation and schedule of rates of the year 2016-17 for selected structures of the link project. The cost of the structures have been estimated from the cost curves. The cost of structures which may come across the branch canals have been worked out based on the proportionate factors. of canal length and discharge with main canal. The details are furnished in **Annexures 13.1.2 (Reaches I, II &III)**.

**G - Bridges:**

**Rs. 90942 lakh**

Provision has been made towards construction of road/rail bridges. The cost curve for double lane road bridge has been developed for Polavaram – Vijayawada link project by considering the design drawings, quantity estimation and schedule of rate for the year 2016-17 for selected structures. The estimates are prepared based on the cost curves. Single lane bridges have been estimated on proportionate basis of width of carriage way. Cost of railway bridges are taken at 2.5 times cost of double lane bridges per track. The cost of similar structures which may come across the branch canals have been worked out based on the proportionate factor of canal length and discharge with main canal. The details are furnished in **Annexures 13.1.2 (Reaches I, II &III)**.

**H - Escapes:**

**Rs. 9242 lakh**

Provision has been made for canal escapes at suitable locations where drainage facilities exist to take care of the 50 % of canal discharge in the eventuality of canal breaches. The cost curves developed for Nagarjunasagar – Somasila link project have been used to estimate the cost of escapes. The details are shown in **Annexure 13.1.2 (Reaches I, II &III)**.

**K - Buildings:**

**Rs. 112167 lakh**

Provision has been made under this sub-head for construction of temporary and permanent buildings for both residential and non-residential purposes for various categories of staff, offices, inspection bungalows, stores, club cum welfare halls, laboratory and research stations etc. Provision of 5 % of I Works are considered as stipulated in the guidelines for preparation of DPR of irrigation and multi-purpose projects-2010 with a ratio of 66.5 % for temporary buildings and remaining for permanent buildings. The details under this sub-head are given at **Annexure 13.1.2 (Reaches I,II &III)**.

**L - Earthwork and lining:**

**Rs. 3765361 lakh**

The cost of earthwork and lining (including tunnels) is worked out with the derived quantity and schedule of rates for the year 2016-17 and escalated to 2020-21. The cost of earth work and lining for the branch canals have been worked based on the proportionate factors of canal length and discharge of main canal. The detailed computation of earth work and lining are furnished in **Annexures 13.1.2 (Reaches I, II &III)**.

**M - Plantation:**

**Rs. 4313 lakh**

Provision has been made for plantation along the link canal on both banks, colony areas, parks, downstream of head regulators. and along the approach roads. The details of cost of plantation are furnished in **Annexure 13.1.2 (Reaches I, II &III)**.

**N – Tanks & Reservoirs:**

**Rs. 2050 lakh**

Provision has been made for improvements to the existing tanks in the command area. The details of cost are furnished in **Annexure 13.1.2 (Reaches I, II &III)**.

**O - Miscellaneous:**

**Rs. 30651 lakh**

Provision has been made to cover the capital cost of electrification, water supply purification and distribution arrangements, sewage disposal, fire fighting equipment, telephones, wireless sets, equipment for quality control and field labs, initial equipment and other accessories for hospitals etc and R & M of above equipments / infrastructural facilities, inspection vehicles, inspection bungalow etc.

Provision has also been made for other miscellaneous items such as inaugural foundation laying ceremony, compensation to work men, flood lighting, model exhibits etc. The details of the cost are furnished in **Annexure 13.1.2 (Reaches I, II &III)**.

**P - Maintenance: Rs. 150543 lakh**

Provision has been made to cover the cost of maintenance of all works viz. Link canal. Branch canals, buildings and temporary roads during the construction of the conveyance system. Details are appended in **Annexure 13.1.2.**

**Q - Special tools and plant: Rs. 6283 lakh**

Provision under this sub head is made to cover special tools and plants like excavators, concrete mixers, water pumps etc. The details are furnished in **Annexure 13.1.2 (Reaches I&II).**

**R - Communications: Rs. 7070 lakh**

Provision for construction of approach roads, quarry roads, bridges/culverts, temporary roads and river crossings has been made. The details are furnished in **Annexure 13.1.2 (Reaches I, II &III).**

**U - Distributaries and minors.:**

**V - Water courses and field channels: Rs. 517312 lakh**

Provision has been made for providing pipe distribution network directly to the field in place of open canal system such as distributaries and minors, water courses and field channels. The rate is considered at Rs 50000/ha for pipe distribution for entire command area. The details are furnished in **Annexure 13.1.2 (Reaches I, II &III).**

**W - Drainage:**

The cost of drainage is included in the cost of X: Environment and ecology.

**X - Environment and Ecology:**

**Rs.105299 lakh**

Provisions under this sub-head have been made towards the cost of extensive management measures to sustain environment and ecology such as land management plan (stabilisation of muck disposal management), improvement of existing drain, provision for free fuel to department engaged labour, Public Health Management and Environmental Monitoring Programme (EMP). Detailed Environmental Impact Assessment study of the link project shall be taken up in due course. The above provision also includes the improvements made for drainage system in the command area. The details are furnished in **Annexure 13.1.2 (Reaches I, II &III)**.

**Y - Losses on stock and unforeseen**

**Rs. 8160 lakh**

Provision has been made for losses on stock and unforeseen @ 0.25% on all sub-heads under I-Works excluding sub-heads A-Preliminary, B-Land, O- Miscellaneous, M-Plantation, P-Maintenance Q-special T&P and X-Environment and Ecology. The details are furnished in **Annexure 13.1.2 (Reaches I&II)**.

The total cost of I - Works under Unit - II (Conveyance system) works out to **Rs. 6288653 lakh**.

**II Establishment:**

**Rs. 594659 lakh**

Provision has been made as per guidelines @ 10% of I-Works excluding B-Land towards establishment and pensionary charges. The details are furnished in **Annexure 13.1.2 (Reaches I, II &III)**.

**III Ordinary tools and plant:**

**Rs. 48522 lakh**

Provision has been made under this head for ordinary tools and plant. This provision is distinct from the Q-special tools and plant and is meant to cover the cost of survey instruments, camp equipment and other small tools and plant. The details are given in **Annexure: 13.1.2 (Reaches I,II &III)**.

**IV- Suspense**  
**NIL**

It is assumed that all the outstanding suspense accounts would be cleared by adjustment to appropriate heads on completion of the project. As such, no provision has been kept under this head.

**V- Receipt and Recoveries: (-) Rs.29325 lakh**

Provision has been made for recoveries through resale or transfer of temporary buildings, resale of special tools and plant and transport equipment and receipts from rents on permanent buildings. The details are given in **Annexure 13.1.2.**

**B - Indirect charges Rs. 87216 lakh**

Provision for abatement of land revenue and audit and account charges are covered under 'Indirect charges' at the following rates.

- Abatement of land revenue - 5% of cost of land
- Audit and account charges - 1% of I -Works

The details are furnished in **Annexure 13.1.2 (Reaches I, II &III).** Total cost of the conveyance system (Unit II) works out to **Rs.6989726 lakh.**

**13.1.3 Unit III: Hydropower**

Includes the cost of canal head powerhouse at the offtake of link canal at Nagarjunasagar & at Musi. The cost of the powerhouse is estimated and the details are furnished in **Annexure 13.1.3(Reach-II).** The sub-head wise details are given below.

**A. Direct Charges**

**I -Works:**

**A-Preliminary: Rs. 1712 lakh**

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The provision is made for preliminaries at @ of 2% of I-Works. The details are given at **Annexure 13.1.3 (Reach-II)**.

#### **G-Bridges: Rs. 306 lakh**

The provision is made towards construction of single lane bridge across tail race channel. The details are given at **Annexure 13.1.3 (Reach-II)**.

#### **J&S-Power house civil & electrical works: Rs. 81103 lakh**

Under this sub-head the provisions have been made to cover the cost of civil and electrical works of power plant viz. powerhouse, turbines, penstocks etc. The detailed cost estimate is furnished in **Annexure 13.1.3 (Reach-II)**.

#### **O - Miscellaneous: Rs. 912 lakh**

Provision has been made to cover the capital cost of electrification, water supply purification and distribution arrangements, fire fighting equipment, telephones, wireless sets, equipment for quality control and field labs, and R & M of above equipments / infrastructural facilities, inspection vehicles, etc. The details of the cost are furnished in **Annexure 13.1.3 (Reach-II)**.

#### **P - Maintenance: Rs. 811 lakh**

Provisions have been made under this sub-head to cover the cost of maintenance of all works during the construction period. A provision of 1% of the cost of power plant civil & electrical works (J & S) has been made. The details are given at **Annexure: 13.1.3 (Reach-II)**.

#### **Q - Special Tools & Plants: Rs. 455 lakh**

Provision under this sub head is made to cover special tools and plants like excavators, concrete mixers, water pumps etc. The details are furnished in **Annexure 13.1.3 (Reach-II)**.

**R - Communications: Rs. 82 lakh**

Provision for construction of black top road to power house has been made. The details are furnished in **Annexure 13.1.3 (Reach-II)**.

**Y - Losses on stock and unforeseen Rs. 206 lakh**

Provision has been made for losses on stock and unforeseen @ 0.25% of I-Works excluding sub-heads A-Preliminary & Q-special T&P. The details are furnished in **Annexure 13.1.3(Reach-II)**.

The total cost of I- Works under Unit - III: Hydropower works out to Rs. **85587** lakh. The details are furnished in **Annexure 13.1.3 (Reach-II)**.

**II - Establishment: Rs. 4913 lakh**

The link project is planned to be completed in a period of 5 years. Provision towards establishment charges has been made @ about 10% of civil works and 4% of power plant electrical works. The details are given at **Annexure 13.1.3**.

**III - Ordinary tools and plant: Rs. 553 lakh**

Provision has been made under this sub-head @ 1.0 % of civil works & 0.5% of power plant electrical works towards the cost of ordinary tools and plant viz. survey instruments, camp equipment, inspection vehicles and other small tools and plant. The details are given at **Annexure 13.1.3**.

**IV - Suspense: NIL**

It is assumed that all the outstanding suspense accounts would be cleared by adjustment to appropriate heads on completion of the project. As such no provision has been kept under this head.

**V - Receipt and Recoveries:** **(-) Rs. 288 lakh**

Under this head, the estimated recoveries are from resale of special T&P.

**B - Indirect charges:** **Rs. 856 lakh**

Provision for audit and account charges are covered under 'Indirect Charges' at the following rates:

Audit and Account charges at 1% of I-Works

Thus, the total cost of Unit-III: Hydropower works out to **Rs. 91621 lakh.**

#### **13.1.4 Unit IV: Lifting arrangements**

Lifting arrangements through 4 stages of 57 m (RD 0.0 km), 38 m (RD 18.0 km), 23.2m (26.50) and 11.0m (RD 60.50 km) totaling to 129.20m of static lift on main canal; a lift of 52.63m at 97.50km for Kakatiya Stage II feeder branch (at RD 97.50km on main canal), lifting through 3 stages of 64.50m (0.00km), 58.0m (75.00 km) and 74m (95.00km) for the 116 km long Gottimukkala feeder branch canal (taking off at RD 199.15km on main canal) totaling to 196.50m; a lift of 67.14m for Srisaïlam LBC feeder branch (Alimineti Madhava Reddy LIS) from Nagarjunasagar reservoir. These consist of sump, pump house, raising main and delivery cistern. The cost of sump, delivery cistern and cost of raising main are worked out based on the design drawings, quantity estimation and schedule of rates. The cost of civil works pertaining to pump house, electro - mechanical equipments and draft tube gates are estimated. The details of cost of lifting arrangements are furnished in **Annexure 13.1.4 (Reaches –I & III).**

##### ***A. Direct Charges***

##### **I -Works:**

**A - Preliminary:** **Rs. 19923 lakh**

The provision is made for detailed survey and investigations for establishing the final location of different project components at pre-construction stage @ of 2% of works. The details are given at **Annexure 13.1.4 (Reaches –I & III)**.

**J&S-Pump house civil & electrical works: Rs. 987610 lakh**

Under this sub-head, the provisions have been made to cover the cost of civil and electrical works of pump house viz. sump, pump house, delivery main, delivery cistern etc. The detailed cost estimate is furnished in **Annexure 13.1.4 (Reaches I & III)**.

**M - Plantation: Rs. 50 lakh**

Provision is made towards plantation in the periphery of lifting arrangement in third reach. The details are given at **Annexure: 13.1.4 (Reach-III)**.

**O - Miscellaneous: Rs. 4897 lakh**

Provision has been made to cover the capital cost of electrification, water supply purification and distribution arrangements, fire fighting equipment, telephones, wireless sets, equipment for quality control and field labs, and R & M of above equipments / infrastructural facilities, inspection vehicles, etc. The details of the cost are furnished in **Annexure 13.1.4 (Reach-III)**.

**P - Maintenance: Rs. 9884 lakh**

Provisions have been made under this sub-head to cover the cost of maintenance of all works during the construction period. A provision of 1% of the cost of Pump house civil & electrical works has been made. The details are given at **Annexure 13.1.4 (Reaches –I & III)**.

**Y - Losses on Stock and Unforeseen Items: Rs. 2184 lakh**

Provision under this sub-head has been made at 0.25% of the cost of I- Works (excluding A – Preliminary & P – Maintenance). The details are given at **Annexure 13.1.4 (Reach-I)**.

The total cost of I Works of Unit - IV: Lifting arrangements works out to Rs. **1024547** lakh.

**II - Establishment: Rs. 64666 lakh**

The link project is planned to be completed in a period of 5 years. Provision towards establishment charges has been made @ 6% on weighted average basis (considering 10% of civil works & 0.5% of electrical works). The details are given at **Annexure 13.1.4 (Reaches –I & III)**.

**III - Ordinary tools and plant: Rs. 6466 lakh**

Provision has been made under this head @ 0.6 % on weighted average basis (considering 1% of civil works & 0.5% of electrical works) towards the cost of ordinary tools and plant viz. survey instruments, camp equipment, inspection vehicles and other small tools and plant. This provision is distinct from the Q-special tools and plant. The details are given at **Annexure 13.1.4 (Reaches –I & III)**.

**IV – Suspense: NIL**

It is assumed that all the outstanding suspense accounts would be cleared by adjustment to appropriate heads on completion of the project. As such, no provision has been kept under this head.

**V - Receipt and Recoveries: NIL**

Under this sub-head, the estimated recoveries are considered as nil.

**B - Indirect charges: Rs. 10246 lakh**

Provision for audit and account charges are covered under ‘Indirect Charges’ at the following rates:

Audit and Account charges at 1% of I-Works. The details are given at **Annexure 13.1.4 (Reaches –I & III)**

Thus, the total cost of lifting arrangements (Unit-IV) works out to **Rs. 1105926 lakh.**

### **13.1.5 Unit -V: Onfarm development Rs. 16911 lakh**

Provision for expenditure towards command area development such as OFD works, drains, underground pipelines etc is made. The survey, planning and designing of OFD is considered at Rs. 1400/ha and land levelling is considered at Rs. 2333/ha.

The cost of command area development for the culturable command area of 453017 ha (80000 ha- Reach I; 168017 ha- Reach II; 205000 ha- Reach III) works out to Rs. 15817 lakh at 2020-21 price level (Rs. 2986 lakh – Reach I; Rs. 6272 lakh – Reach II; Rs. 7653 lakh – Reach III).