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"Restoration and Regradation of Giruthumal river in Madurai, Sivagangai, Virudhunagar and Ramanathapuram district."

INTRODUCTORY:

The Gundar river takes rise from the eastern slope of Varusanadu Hills at an altitude of 1273m near Kottaimalai of Saptur reserve forest on the eastern slopes of Western Ghats in Madurai District and runs southeast for a distance of 150 km and finally empties into Gulf of Mannar at about 6 km of south east of Sayalkudi of Ramanathapuram District. The Gundar river basin is located between latitude 9^0 05' N to 10^0 03' N and longitude 77^0 35' E to 78^0 35' E having an area of 569023 Sq.Km and is surrounded by Vaigai Basin on the South, Vaigai Basin on the West and North and Gulf of Mannar / Bay of Bengal on the east.

The Gundar Basin has been divided into 9 sub basins and Girudhumal is one of the sub basin. **As per mythology, the historical town of Madurai was located on the banks of the ever flowing Gridhumal river.** The river Gridhumal originates from the field water drainage of Thuvariman and Madakulam Tanks near Madurai city in Thiruppurankunram Block and of Madurai district. It runs to a length of about 86 KMs in Madurai South, Thiruppuvanam, Thiruchuli & Kamuthi Taluks. This river receives this drainage from the city through Avaniapuram and Chinthamani Supply channel running in the middle of the city. The surplus of Konthagai tanks also reaches Gridhumal river.

The Girudhumal Sub basin is located between latitude $9^0$25'00" N to $9^0$50'00" N and longitude $78^0$05'00" E to $78^0$25'00" E and is surrounded by Vaigai river on the North and Kanal Odai Sub basin on South. Girudhumal Sub basin area is 566.851 Sq.Km with a plain area. The taluks covered in the sub basin are Madurai South, Thiruppuvanam, Kariapatti, Thiruchuli, Paramakudi, Kamuthi taluks of Madurai, Sivagangai, Virudhunagar and Ramanathapuram District respectively. It receives an annual average rainfall of 739mm, with its major share during North-East Monsoon.

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The tributary Gridhumal runs through Narikudi, Veeracholan and crosses the Raghunatha Cauvery at Pakkuvetti village in Kamuthi taluk and joins the river Malattar. There are seven anicuts constructed across this river, which feed 73 tanks through several chain of tanks. The river Malattar feeds 54 tanks in Lower Gundar Basin.

Details of Ayacut

There is no direct ayacut from anicuts and reservoir in Gridhumal Sub basin. The system and Non system tanks in Gridhumal sub basin are given below.

Sl. No.	District	System		Non-system	
		Nos	Ayacut in Ha.	Nos	Ayacut in Ha.
1.	Madurai	9	982.27	8	982.42
2.	Sivagangai	22	6161.99	24	3146.23
3.	Virudhunagar	--	--	41	5042.14
4	Ramnad	--	--	12	1000.46
		31	**7144.26**	**85**	**10171.25**

ANICUTS IN GIRUDHAMAL

The following anicuts are located in the sub basin

1 Ambalathadi anicut

2 Odathur anicut

3 Kattanur anicut

4 Athikulam anicut

5 Nallukuruchi anicut

6 Abiramam anicut

7 Ambalathadi new anicut (Under progress in IAMWARM phase 3)

The total ayacut area under the sub-basin: 17315.51 Ha

Though the total registered ayacut under PWD control is 17315.51 Ha, average cultivation is only in **11809.35 Ha** leaving a gap of **5506.16Ha** which is approximately 32 % of designed irrigation extent. The gap area is to be bridged by the execution of

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IAMWARM Project Phase III, under which rehabilitation works for 113 tanks are under progress.

Water Potential

Surface water potential	46.76 Mcum	1651.56 Mcft
Ground water potential	87.25 Mcum	3081.67 Mcft
Total	**134.01 Mcum**	**4733.23 Mcft**

In Gridhumal River Irrigation is carried out through supply channels with open off-takes at various places and also from seven anicuts. The Gridhumal river irrigates an extent of 17315.51 Hec.

The river below Gridhumal namely Malattar irrigates an extent of 8890 acres through 54 tanks in Lower Gundar sub basin.

ISSUES AILING IN THE BASIN

Non availability of water

The water resource of this basin is reeling under severe drought due to the failure of successive monsoons and is further deprived of its water resources to greater extent by the abundant growth of Juliflora.

"Pheratophybes" are plants that send their roots down to the water table or the capillary fringe just above the water table which provides a ready supply of water. They are water loving plants that grow mainly along stream courses. There they are able to get lasting supply of water. One of the dominant species responsible for most of the heavy use of water is Prosopis Juliflora which occurs in valley bottom, tank beds, vacant lands and along streams.

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Prospis Juliflora plants are multi-stemmed shrubby bushes growing from 3m to 15m tall. Juliflora has been know to sent its roots 10,20 or even 30 m to water. Their roots lift water much higher than it can be lifted by capillary action of the soil. They are forming dense, impenetrable thickets combined with large thorns. They also reduces the productivity of pastoral country by takng over grass lands and using water resources. These plants have no fodder value.

Consumption of jungle trees by animals

Other nuisances include damage to animal hooves from thorns and poisoning of livestock which consume excessier amount of seed pods. It is reported tha consumption of water by adense growth of (Mesquite) Prospis juliflor is about to 2 to 5 acre feet derived from ground water, surface water and precipitation. Most of the tank beds in the sub basin are covered with Juliflora growth.

PRESENT STATUS OF THE RIVER:

The entire length of about 20 KM of its passage in and around the Madurai City and Sub-urban area were functioning as a domestic drainage carrier .

Now a quantity of 1000 cusecs flood water of Vaigai river is being diverted through the Flood Carrrier Head Sluice above the Virahanur regulator to this Gridhumal.

The Girdhumal feeds 73 Nos. of Tanks which has a total capacity of 1583 Mcft and also it feeds 54 tanks of Lower Gundar Basin with an ayacut of 8890 Acres.

The entire length of the river below the urban area, from 20th KM of the river up to 86.56 KM, the confluence point into Regunatha Cauvery is fully covered with thick Juliflora Jungle growth and the bed level of the river varies drastically due to sand mining and shoal formation. The river to its entire length except at anicut sites could not be identified due to jungle growth and without banks.

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Due to the above mentioned facts the river at present lost its original course and the tanks fed by the river could not receive water. All the tanks under Gridhumal are rehabilitated under IAMWARM Project phase III. To effectively utilize the flood water it is quite essential to improve and modernize the Gridhumal river.

The link canal with head sluice was loacated at right bank of viagai river and upstream of Virahanur regulator for diverting vaigai flood water to Giruthumal river. This head sluice and link canal was designed to divert 1000 cusec of flood water. At present 678 cusecs of flood water only realized due to insufficient driving head.

DETAILS OF PROPOSALS FOR IMPROVING THE IRRIGATION:

To restore and to re-grade the river for improving the inflow to tanks the following items of works are proposed.

1. Improving the effiency of the link channel

There is a link canal of length 9600m existing at LS560m above the Viraganur regulator across vagai river to divert flood water from Vagai river to Girudamal river. It was originally designed to carry 1000 cusecs. Due to insufficient driving head at present only 678cusecs were realized. Hence it is proposed to increase the no. of existing vents of link canal head sluice from 5 to 7 there by achieving the designed discharge of 1000cusecs. It is also proposed to increase the canal efficiency by lining with in-situ cement concrete of grade M-15 for a length of 5490m from the commencing point and stone pitching for a length of 110 m from the end of lined portion and side slopes are also proposed to increased from 1V :1 H to 1V :1.5 H . Apart from this desilting the canal for a length of 4000m is also proposed. When the driving head is increased it can result in flooding of fields adjacent to Vagai river. Hence it is necessary to raise the existing bund level to M F L of Virahanur regulator for a length of 2km on left side and 1 Km on Right side and regradation of vaigai river bed for a distance of about 1.10 km upstream of virahanur regulator and this is also included. The necessary designs have been obtained from Superintending Engineer, Designs circle office, Chennai.

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2.0 Bed re-gradation and bund formation.

Due to the abundant growth of Juiliflora (Prosopis) over the entire length and breadth of river and due to the degradation of the bed, the water could not reach the tail end. To effecitively utilize the water it is proposed to regrade the river bed by excavating the river bed using earth moving machineries and forming the hearting zone of earthern bund on eitherside of the river by the excavated earth. Excessive surplus excavated earth was proposed to be dumped in the spoil bank. Casing layer of suitable earth for bund formation, from borrow areas with a lead of 5 Km is proposed to be conveyed and compacted using power roller.

3.0 Construction of Anicuts at open off take points across Gridhumal river

It is proposed to construct 4 nos. of anicuts at the following open off- take points across Gridhumal river.

1. Sangankulam open off take
2. Varisaiyur open off take
3. Keelaparithiyur open off take
4. Kallikulam open off take

The irrigation is being practiced through open off take by the farmers. Since the commandability is not achieved, they are in defunct condition. The head causing flow through open off take are meagre. Now it is proposed to construct anicuts to restore the bed level of the river as well as to feed water through the head sluices.

4. Construction of protection walls:

It is proposed to construct protection walls along the bunds at the vulnerable points where the width of the river is narrow . The protection walls are proposed in cement concrete M15 grade using graded metal necessarytransition arrangements and bank connections were also provided with core walls in M15 Grade concrete. The details of protection walls and bank connection walls were designed by CE,DRC&S and communicated Vide Lr No: 299CE(D)/SE(D)/AEE X/F563/2012/ Dt: 27.12.12.

5. Fixing boundary stones including sureveying and leveling operations:

Boundary stones are proposed to be fixed along the boundaries of the river. Surveying and leveling operations are proposed to fix the boundary of the river.

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6. Creation of alternate water source to Girudhumal river

The three vaigai fed tanks namely Kondagai, Piramanur and Palayanur are situated between Girudamal and Vagai river and downstream of link canal from Vagai. The surplus of above tanks goes to Girudhumal river. As alternate sources to Girudhumal the following are details

- It is proposed to draw surplus water for a discharge of 430 cusecs and 415 cusecs respectively by repairing scour vent in Kondagai tank and Providing new scour vent in Palayanur tank.

All the necessary designs were obtained from Superintending Engineer, Designs circle office, Chennai.

7.0 INITIAL INVESTIGATIONS CARRIED OUT

Longitudinal and cross sectional plan at 100m intervals for the entire reach of 66.56Km are taken and based on that cross section of the river for various reaches were worked out by the designs wing and accordingly detailed estimate was prepared. Detailed drawings are enclosed.

Designs and drawing for increasing the no. of vents from 5 to 7 for the Link canal Head sluice was obtained from the designs wing accordingly the estimate was prepared.

It is proposed to improve the link canal by lining the bed and sides of canal for which the design was prepared by the designs wing based on that detailed estimate was prepared.

It is proposed to construct 5No. of anicuts at the following off-take points 1.Sankankulam 2. Varisayur 3.Keelaparithiyur 4.T.Punavasal 5.Kallikulam for which the detailed estimates were prepared based on the designs and drawings of the design wing.

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The location for providing protection walls were identified properly and the cost estimate was arrived based on the designed drawings of the designs wing.

It is clearly stated that the proposal does not involve any encroachment and no land acquisition is needed.

The following components are proposed in this Proposal

1. Lining of Girudhumal Link Canal by cement concrete lining.
2. Construction of Scour vents to the Palayanur Weir.
3. Construction of Additional vents to the head sluice of Girudhumal link canal.
4. Repair works to Scour sluice of Konthagai tank.
5. Repairs to Silaman Head Sluice in Girudhumal link canal.
6. Repairs to Melavellore Dividing dam.
7. Improvement to existing Flood Banks of Vaigai river.
8. Bed regradation and bund formation in Girudhumal river ls 0 m to 66.56 m.
9. Repairs to exsisting anicuts
10. Construction of anicuts at open off-take points across Girudhumal river
11. Construction of protection walls at vulnerable locations.

IMPROVEMENTS EXPECTED

At present the are 113 tanks situated along the basin. About 20 system tanks receive water only up to Kattanur anicut and because of the highly uneven river reach encroached with thick jungles, the water could not reach the remaining tanks. With the improvement proposed it is possible to cover the balance tanks numbering about 93 numbers.

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Due to the above mentioned facts river lost its original course and the tanks fed by river could not receive water. All the tanks under this basin are being rehabilitated under IAMWARM phaseIII project. As the river course condition is very bad, the tanks under renovation will not get water. Hence for proper inflow in the above tanks under rehabilitation, the present project is planned and once completed the tanks will become effective.

This Proposal is prepared based on the current schedule of rates for the year 2012 -13 and the total cost works out to.Rs.7367.00 Lakhs

Under IAMWARM Project the following packages are proposed.

Sl. No.	**PACKAGE NOS.**	**NAME OF THE PACKAGE**	**PACKAGE AMOUNT IN LAKHS**
1.	01/IAMWARM/WRD/ GML - River/ Works/V/ 2012 – 2013	Restoration and Regradation of Girudhumal river by construction of Additional vents to the link canal, Lining the Girudhumal Link Canal and Providing Scour vent to Palayanur tank weir to divert the Vaigai Flood water to the Girudhumal river in sivagangai district	**1367.00**
2.	02/IAMWARM/WRD/ GML - River/ Works/V/ 2012 – 2013	Restoration and regradation of Girudhumal river from Ambalathadi new anicut to Kattanur anicut LS 0 to 19400m in Madurai south taluk of Madurai district, Thirupuvanam Taluk of Sivagangai district and Thiruchuli Taluk of Virudhunagar District.	**2400.00**
3.	03/IAMWARM/WRD/ GML - River/ Works/V/ 2012 – 2013	Restoration and regradation of Girudhumal river from Kattanur anicut to Nallukuruchi anicut LS 19400 to 38500m in Thiruchuli Taluk of Virudhunagar District.	**1700.00**
4.	04/IAMWARM/WRD/ GML - River/ Works/V/ 2012 – 2013	Restoration and regradation of Girudhumal river from Nallukuruchi anicut to Regunathacauvery confluence Point LS 38500 to 66560m in Thiruchuli Taluk of Virudhunagar District and Kamuthi Taluk of Ramanathapuram District.	**1900.00**
		Sub Total	**7367**
		Environmental Cell	**Nil**

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		Ground Water	**Nil**
		Grand Total	**7367.00**

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Restoration and Regradation of Giruthumal river in Madurai, Sivagangai, Virudhunagar and Ramanathapuram district

WRO COST TABLE

Sl. No	Description of work	Quantity	Amount in Lakhs	Remarks
a.	Earth Work Excavation in River Course	4012200 M^3	1496.67	
b.	Earth Work for Bund Formation	1284835 M^3	1209.90	
c.	Protection wall	1370 M	2228.59	
a.	Boundary Stone	1340 Nos	9.07	
b.	Head Sluice Repairs	4 Nos	112.28	
c.	Canal Lining	5600 M	1048.65	
a.	Scour Sluice	1 Nos	28.89	
b.	Repairs to Anicuts	3 Nos	79.66	
c.	Construction of Drop	2 Nos	86.84	
a.	Construction of New Anicut	4 Nos	840.90	
	Sub Total		**7141.45**	
	LS Provisions			
m.	Provisions for labour welfare fund, PS charges, contingencies, Advertisement charges, Documentation Charges, Name board, Photographic charges at 2.80%		**225.55**	
	Total		**7367.00**	

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Restoration and Regradation of Girudhumal river by construction of Additional vents to the link canal, Lining the Girudhumal Link Canal and Providing Scour vent to Palayanur tank weir to divert the Vaigai Flood water to the Girudhumal river in sivagangai district

PACKAGE- 01 / IAMWARM / WRD / GML-River / Works / V / 2012-2013
WRO COST TABLE

Sl. No	Description of work	Quantity	Amount in Lakhs	Remarks
I. Tank Component				
a.	Embankment improvements	269500Cum	139.58	
b.	Head sluice repair	4 Nos	112.28	
c.	Canal lining	5600m	1048.65	
d.	Scour sluice	1 No	28.89	
	Sub Total		**1329.40**	
	LS Provisions			
	Provisions for labour welfare fund, PS charges, contingencies, Advertisement charges, Documentation Charges, Name board, Photographic charges at 2.80%		**37.60**	
	Total		**1367.00**	

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Restoration and regradation of Girudhumal river from Ambalathadi new anicut to Kattanur anicut LS 0 to 19400m in Madurai south taluk of Madurai district, Thirupuvanam Taluk of Sivagangai district and Thiruchuli Taluk of Virudhunagar District.

PACKAGE- 02 / IAMWARM / WRD / GML-River / Works / V / 2012-2013
WRO COST TABLE

Sl. No	Description of work	Quantity	Amount in Lakhs	Remarks
I. Tank Component				
a.	Earth Work Excavation in River Course	865900Cum	324.90	
b.	Earth Work for Bund Formation	363235 Cum	237.62	
c.	Protection Wall	920m	1509.43	
d.	Boundary Stone	388 Nos	2.63	
e.	Repairs to Odathur Anicut	1 No	5.00	
f.	Construction of New Anicut (Shankankulam) @ L.S 13100m	1 No	221.87	
g.	Gravel Toping	17100 Cum	22.62	
	Sub Total		**2324.07**	
	LS Provisions			
	Provisions for labour welfare fund, PS charges, contingencies, Advertisement charges, Documentation Charges, Name board, Photographic charges at 2.80%		**75.93**	
	Total		**2400.00**	

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Restoration and regradation of Girudhumal river from Kattanur anicut to Nallukuruchi anicut LS 19400 to 38500m in Thiruchuli Taluk of Virudhunagar District

PACKAGE- 03 / IAMWARM / WRD / GML-River / Works / V / 2012-2013
WRO COST TABLE

Sl. No	Description of work	Quantity	Amount in Lakhs	Remarks
I. Tank Component				
a.	**Earth Work Excavation in River Course**	971000Cum	364.00	
b.	**Earth Work for Bund Formation**	310000 Cum	279.84	
c.	**Protection Wall**	450m	719.16	
d.	**Boundary Stone**	382 Nos	2.58	
e.	**Repairs to Athikulam Anicut**	1 No	5.50	
f.	**Construction of Drop at LS 26100m**	1 No	43.42	
	Construction of New Anicut to feed Varisaiyur Tank @ L.S 34930	1 No	210.22	
g.	**Gravel Toping**	16900 Cum	22.35	
	Sub Total		**1647.07**	
	LS Provisions			
	Provisions for labour welfare fund, PS charges, contingencies, Advertisement charges, Documentation Charges, Name board, Photographic charges at 2.80%		**52.93**	
	Total		**1700.00**	

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Restoration and regradation of Girudhumal river from Nallukuruchi anicut to Regunathacauvery confluence Point LS 38500 to 66560m in Thiruchuli Taluk of Virudhunagar District and Kamuthi Taluk of Ramanathapuram District.

PACKAGE- 04 / IAMWARM / WRD / GML-River / Works / V / 2012-2013
WRO COST TABLE

Sl. No	Description of work	Quantity	Amount in Lakhs	Remarks
I. Tank Component				
a.	Earth Work Excavation in River Course	2042800Cum	764.30	
b.	Earth Work for Bund Formation	574600 Cum	518.69	
c.	Boundary Stone	570 Nos	3.86	
d.	Repairs to Nallukurichi Anicut	1 No	69.16	
e.	Construction of Drop at LS 38600m	1 No	43.42	
f.	Construction of New Anicut @ LS 44080m to feed keelaparithiyur tank and Anicut @ LS 48850m to Feed Kallikulam tank.	2 Nos	408.81	
g.	Gravel Toping	24700 Cum	32.67	
	Sub Total		**1840.91**	
	LS Provisions			
	Provisions for labour welfare fund, PS charges, contingencies, Advertisement charges, Documentation Charges, Name board, Photographic charges at 2.80%		**59.09**	
	Total		**1900.00**	

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RESTORATION AND REGRADATION OF GIRIDHUMAL RIVER IN MADURAI, SIVAGANGAI, VIRUTHU NAGAR AND RAMANATHAPURAM DISTRICTS.

Sl No	Package No	Earth Work Excavation in River Course		Earth Work for Bund Formation		Protection wall		Boundary Stone		Head Sluice Repairs		Canal Lining		Scour Sluice		Repairs to Anicuts		Construction of Drop		Construction of New Anicut		**Sub Total**	**LS Provisions**	**Total**
		Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt	Qty	Amt		-	
1	Package No - I	132500	43.47	137000	96.11					4	112	5600	1048.65	1	28.89							1329.4	37.6	1367
2	Package No – II	865900	324.9	263235	260.24	920	1509.43	388	2.63							1	5			1	221.87	2324.07	75.93	2400
3	Package No - III	971000	364	3140000	302.19	450	719.16	382	2.58							1	5.5	1	43.42	1	210.22	1647.07	52.93	1700
4	Package No - IV	2042800	764.3	574600	551.36			570	3.86							1	69.16	1	43.42	2	408.81	1840.91	59.09	1900
	Total	4012200	1496.67	**1284835**	**1209.9**	**1370**	**2228.59**	**1340**	**9.07**	**4**	**112**	**5600**	**1081.09**	**1**	**28.89**	**3**	**79.66**	**2**	**86.84**	**4**	**840.9**	**7141.45**	**225.55**	**7367**

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Restoration and Regradation of Girudhumal river by construction of Additional vents to the link canal, Lining the Girudhumal Link Canal and Providing Scour vent to Palayanur tank weir to divert the Vaigai Flood water to the Girudhumal river in sivagangai district

PACKAGE- 01 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of materials

Sl.No	Description	Qty	Unit	Cement in mt	Sand in m^3	20mm Jelly in M3	40mm Jelly in M3	Rough stone	Gravel Filling	Steel	PVC Pipe 150mm dia`
1	M.10 Using 40mm HGB	40	M^3	9	18		36				
2	M.15 Using 20mm	11559	M^3	3621	5029	10058					
3	M.15 Using 60 % of 40mm & 40 % of 20 mm	1195	M^3	387	538	430	645				
4	M.20 Using 20mm	80	M^3	35	36	72					
5	R.C.C M20 using 20mm	55	M^3	24	25						
6	Fabrication of steel	65	Qtl							65	
7	Rough Stone Dry Packing	565	Cum					565			
8	Gravel filling	26390	Cum						26390		
9	PVC Pipe 150mm dia	25700	m								25700
	Total			**4075**	**5645**	**10560**	**681**	**565**	**26390**	**65**	**25700**

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Restoration and regradation of Girudhumal river from Ambalathadi new anicut to Kattanur anicut LS 0 to 19400m in Madurai south taluk of Madurai district, Thirupuvanam Taluk of Sivagangai district and Thiruchuli Taluk of Virudhunagar District.

PACKAGE- 02 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of materials

Sl.No	Description	Qty	Unit	Cement in mt	Sand in m^3	20mm Jelly in M3	40mm Jelly in M3	Rough stone	Gravel Filling	Steel
1	M.10 Using 40mm HGB	139	M^3	30	63		125			
2	M.15 Using 20mm	368	M^3	119	166	331				
3	M.15 Using 60 % of 40mm & 40 % of 20 mm	46685	M^3	15126	21008	16807	25210			
4	M.20 Using 20mm	536	M^3	232	241	482				
5	Plastering 1:4	50	Sqm	0.0004	1.10					
6	Fabrication	948	Qtl							948
7	Random Rubble 1:4	100	M^3	0.0122	14			100		
8	Rough Stone Dry Packing	2007	Cum						2007	
	Toal			**15507**	**21492**	**17620**	**25335**	**100**	**2007**	**948**

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Restoration and regradation of Girudhumal river from Kattanur anicut to Nallukuruchi anicut LS 19400 to 38500m in Thiruchuli Taluk of Virudhunagar District

PACKAGE- 03 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of materials

Sl.No	Description	Qty	Unit	Cement in mt	Sand in m^3	20mm Jelly in M3	40mm Jelly in M3	Rough stone	Gravel Filling	Steel
1	M.10 Using 40mm HGB	144	M^3	31	65		130			
2	M.10 Using 60 % of 40mm & 40 % of 20 mm	1740	M^3	376	783	626	940			
3	M.15 Using 20mm	1890	M^3	61236	851	1701				
4	M.15 Using 40mm	1260	M^3	40824	567		1134			
5	M.15 Using 60 % of 40mm & 40 % of 20 mm	21079	M^3	6830	9486	7588	11383			
6	M.20 Using 20mm	487	M^3	210	219	438				
7	M.25 Using 20mm	65	M^3	30	29	59				
8	Fabrication	615	Qtl							615
9	Rough Stone Dry Packing	1747	Cum						1747	
	Toal			**109537**	**11999**	**10413**	**13586**	**0**	**0**	**615**

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Restoration and regradation of Girudhumal river from Nallukuruchi anicut to Regunathacauvery confluence Point LS 38500 to 66560m in Thiruchuli Taluk of Virudhunagar District and Kamuthi Taluk of Ramanathapuram District.

PACKAGE- 04 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of materials

Sl.No	Description	Qty	Unit	Cement in mt	Sand in m^3	20mm Jelly in M3	40mm Jelly in M3	Rough stone	Steel
1	M.10 Using 40mm HGB	382	M^3	83	172		344		
2	M.15 Using 20mm	3480	M^3	112752	1566	3132			
3	M.15 Using 40mm	1543	M^3	49993	694		1389		
4	M.15 Using 60 % of 40mm & 40 % of 20 mm	3287	M^3	1065	1479	1183	1775		
5	M.20 Using 20mm	357	M^3	154	161	321			
6	M.25 Using 20mm	130	M^3	60	59	117			
7	Fabrication	**433**	Qtl						433
8	Rough Stone Dry Packing	2580	Cum					2580	
	Toal			**164107**	**4131**	**4754**	**3507**	**2580**	**433**

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Name of work :- Restoration and regradation of Girudhumal river by Construction of Additional Vents to the Link Canal , Lining the Girudhumal Link Canal and providing scour vents to the Konthagai tank weir and Palayanur tank Weir to divert the Vaigai Flood water to the Girudhumal river in Sivagangai District
Package no :- 01/IAMWARM/WRD/GML - River/ Works/V/ 2012 – 2013.

Requirment of Construction Equipments

Sl.No	Equipment	Numbers
1	Hydraulic Excavator (±0.90Cu.m)	8
2	Tippers/Lorries(8/10Tonne)	25
3	Power Rollers/Vibratory Power Rollers (including 2 power rollers of (± 0.90m width)	4
4	Water tankers (Truck mounted water tankers of ±10000 Litres)	4
5	Pneumatic Tampers/Earth Rammers (for compaction of earth fill adjoining the new concrete irrigation sluices to be constructed)	3
6	Air Compressors (±300cfm)	2
7	Plate Vibrators for compaction of sub grade and of bed bar concrete lining	3
8	Dozer (D6 or equivalent)	6
9	Mechanical Concrete mixers 14/10 cft, 10/7 cft	5
10	Concrete vibrators	7
11	Paver for bed and sides	2
12	Batching plant 12 – 15 m3/ Hour	1
13	Generator 45 KVA	2
14	Transit miller	4

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Restoration and regradation of Girudhumal river from Ambalathadi new anicut to Kattanur anicut LS 0 to 19400m in Madurai south taluk of Madurai district, Thirupuvanam Taluk of Sivagangai district and Thiruchuli Taluk of Virudhunagar District.

PACKAGE- 02 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of Construction Equipments

Sl.No	Equipment	Numbers
1	Hydraulic Excavator (±0.90Cu.m)	10
2	Tippers/Lorries(8/10Tonne)	30
3	Power Rollers/Vibratory Power Rollers (including 2 power rollers of (± 0.90m width)	5
4	Water tankers (Truck mounted water tankers of ±10000 Litres)	10
5	Pneumatic Tampers/Earth Rammers (for compaction of earth fill adjoining the new concrete irrigation sluices to be constructed)	5
6	Air Compressors (±300cfm)	2
7	Plate Vibrators for compaction of sub grade and of bed bar concrete lining	5
8	Dozer (D6 or equivalent)	15
9	Mechanical Concrete mixers 14/10 cft, 10/7 cft	2
10	Concrete vibrators	1
11	Transit mixer	3
12	Concrete vibrators	13

`

Restoration and regradation of Girudhumal river from Kattanur anicut to Nallukuruchi anicut LS 19400 to 38500m in Thiruchuli Taluk of Virudhunagar District

PACKAGE- 03 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of Construction Equipments

Sl.No	Equipment	Numbers
1	Hydraulic Excavator (±0.90Cu.m)	10
2	Tippers/Lorries(8/10Tonne)	30
3	Power Rollers/Vibratory Power Rollers (including 2 power rollers of (± 0.90m width)	5
4	Water tankers (Truck mounted water tankers of ±10000 Litres)	10
5	Pneumatic Tampers/Earth Rammers (for compaction of earth fill adjoining the new concrete irrigation sluices to be constructed)	5
6	Air Compressors (±300cfm)	2
7	Plate Vibrators for compaction of sub grade and of bed bar concrete lining	5
8	Dozer (D6 or equivalent)	12
9	Mechanical Concrete mixers 14/10 cft, 10/7 cft	2
10	Concrete vibrators	15
11	Batching plant	1
12	Transit miller	3

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storation and regradation of Girudhumal river from Nallukuruchi anicut to Regunathacauvery confluence Point LS 38500 to 66560m in Thiruchuli Taluk of Virudhunagar District and Kamuthi Taluk of Ramanathapuram District.

PACKAGE- 04 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Requirment of Construction Equipments

Sl.No	Equipment	Numbers
1	Hydraulic Excavator (±0.90Cu.m)	10
2	Tippers/Lorries(8/10Tonne)	30
3	Power Rollers/Vibratory Power Rollers (including 2 power rollers of (± 0.90m width)	5
4	Water tankers (Truck mounted water tankers of ±10000 Litres)	10
5	Pneumatic Tampers/Earth Rammers (for compaction of earth fill adjoining the new concrete irrigation sluices to be constructed)	5
6	Air Compressors (±300cfm)	2
7	Plate Vibrators for compaction of sub grade and of bed bar concrete lining	5
8	Dozer (D6 or equivalent)	15
9	Mechanical Concrete mixers 14/10 cft, 10/7 cft	5
10	Concrete vibrators	20
11	Batching plant	1
12	Transit miller	3

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Restoration and Regradation of Girudhumal river by construction of Additional vents to the link canal, Lining the Girudhumal Link Canal and Providing Sco
Vaigai Flood water to the Girudhumal river in sivagangai district

PACKAGE- 01 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Construction methodology

Sl No	Description of Item	Working Months														
		Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	
								Rainy Season								
	Earth work excavation															
1	Bund formation	10000	21600	21600	21600	21600	21600				21600	21600	21600	21600	21600	
2	Foundation	4200	4200	4200	4200	4200	4200				4200	4200	4200	4200	4500	
	Concrete															
3	M.10 using 40mm			20	20											
5	M15 using 60% 40mm and 40% of 20mm				200	200	200				200	200	195			

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4	M 15 grade using 20mm		900	900	900	900	900				900	900	400	900	1000	
6	M 20 grade using 20mm			10	10	20	10				10	10	10			
7	R.C.C M 20 using 20mm													20	20	
8	Steel fabrication						10				20	10	10	15		
9	Rough stone														65	
10	Gravel filling	2000	2000	2000	2000	2300	2500				2500	2500	2500	2000	1000	
11	PVC pipe 150mm dia		2000	2000	2000	2000	2000				2000	2000	2000	2000	2000	

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Restoration and regradation of Girudhumal river from Ambalathadi new anicut to Kattanur anicut LS 0 to 19400m in Madurai south taluk of Madurai district and Thiruchuli Taluk of Virudhunagar District.

PACKAGE- 02 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Construction methodology

Sl No	Description of Item	Working Months													
		Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-1
								Rainy Season							
	Earth work excavation														
1	Bund	6000	6000	11000	14500	14500	14500				13500	20000	25000	25000	25000
2	Channel	21705	21705	39793	52455	52455	52455				48837	72500	72500	80000	80000
3	Foundation	1179	1179	2161	2848	2848	2848				2652	2848	3143	3143	3143
	Concrete														
4	M.10 using 40mm	50	50	39											
5	M 15 grade using 20mm	100	100	100	68										

`

6	M15 using 60% 40mm and 40% of 20mm	1000	3000	3000	3000	3000	3000				3000	3000	4000	4000	4000
7	M 20 grade using 20mm	16	16	29	38	38	38				35	38	42	52	52
8	Plastering	---	---	3	4	4	4				4	5	5	5	5
9	RR in CM 1:4	---	---	10	10	10	10				20	10	10	10	10

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Restoration and regradation of Girudhumal river from Kattanur anicut to Nallukuruchi anicut LS 19400 to 38500m in Thiruchuli Taluk of Virudhunagar Distr

PACKAGE- 03 / IAMWARM / WRD / GML-River / Works / V / 2012-2013

Construction methodology

Sl No	Description of Item	Working Months													
		Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14
								Rainy Season							
	Earth work excavation														
1	Bund	10000	10000	20000	20000	20000	20000				25000	25000	30000	30000	20000
2	River	31730	31730	58171	76680	76680	76680					76680	84613	84613	84423
3	Foundation	468	468	859	1132	1132	1132					1280	1450	1450	1450
	Concrete														
4	M.10 using 40mm	---	---	50	50	44									
5	M 15 grade using 20mm	---	---	500	500	500	390								
6	M15 Using 40mm	---	---	68	89	126	126					100	120	120	120
7	M10 Using 60% of 40mm and 40% 20mm	---	---	123	174	144	123					140	140	150	150

`

8	M15 Using 60% of 40mm and 40% 20mm	---	---	1000	1000	1500	1500					2000	2500	2500	2000
9	M 20 grade using 20mm	---	---	26	48	48	34					40	45	45	45
10	M 25 grade using 20mm	---	---	5	7	5	5					6	6	6	6
11	Rough Stone Dry Packing	---	---	---	109	154	154					175	175	175	175

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Construction methodology

Sl No	Description of Item	Working Months														
		Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun
								Rainy Season								
	Earth work excavation															
1	Bund	25000	25000	40000	40000	40000	40000				30000	40000	40000	40000	40000	40
2	River	75000	75000	120000	150000	150000	150000				150000	150000	150000	170000	150000	150
3	Foundation	285	285	523	690	690	690				350	350	800	800	900	8
	Concrete															
4	M.10 using 40mm	---	---	47	57	41	41				10	20	30	30	30	3
5	M 15 grade using 20mm	---	---	280	369	369	369				100	100	300	300	200	2
6	M15 Using 40mm	---	---	100	100	100	100				100	100	100	100	100	1
7	M15 Using 60% of 40mm and 40% 20mm	---	---	365	600	300	300				300	200	200	200	200	2
8	M 20 grade using 20mm	---	---	19	40	40	20				20	18	30	30	30	3
9	M 25 grade using 20mm	---	---	15	10	10	10				10	10	10	10	10	1
10	Rough Stone Dry Packing	---	---	---	274	200	200				200	200	200	200	200	2

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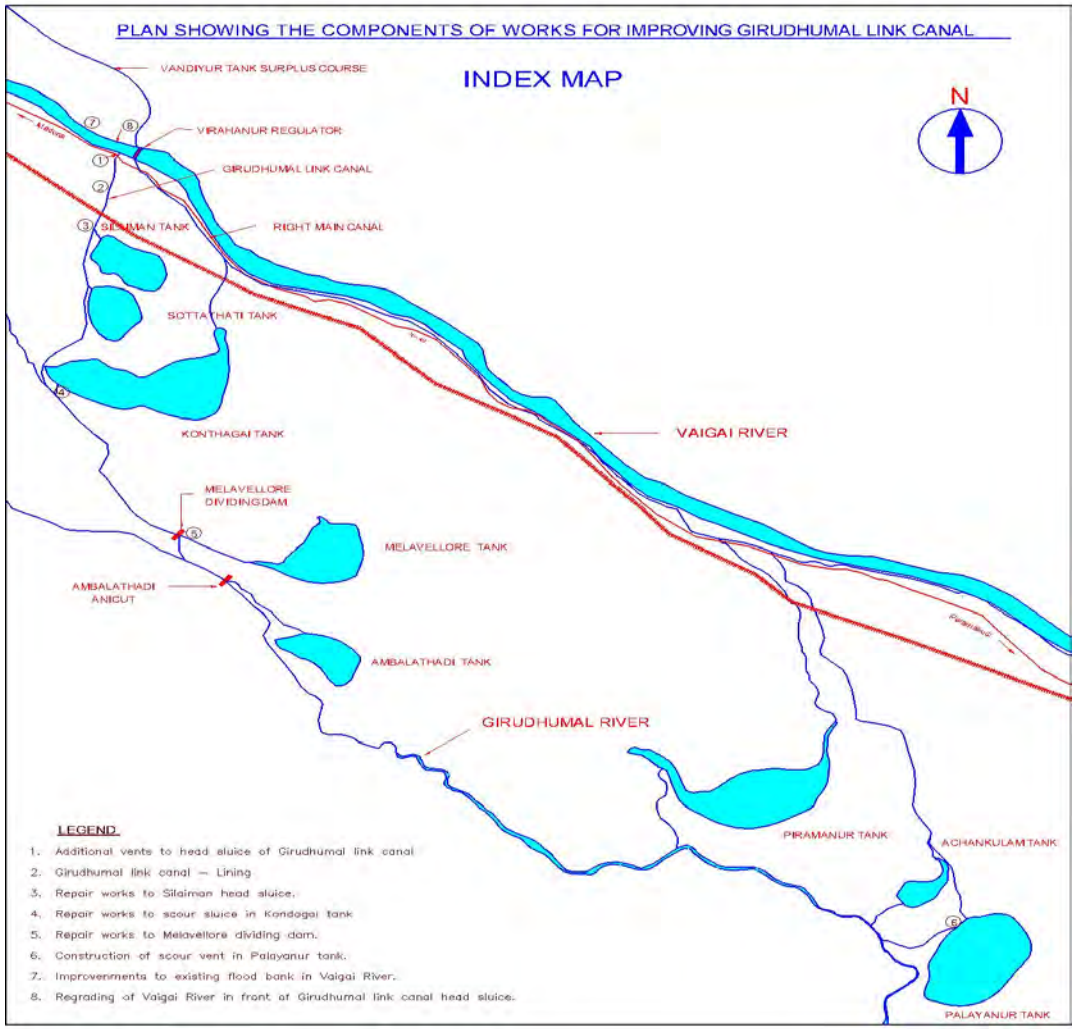
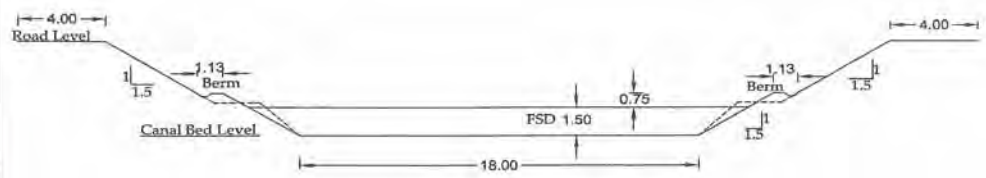
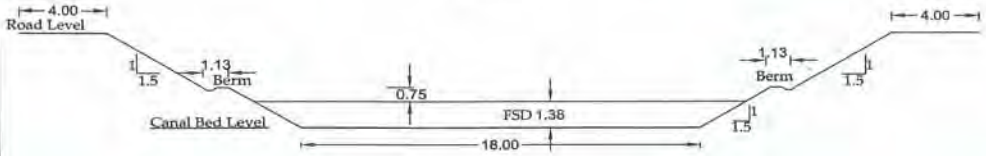
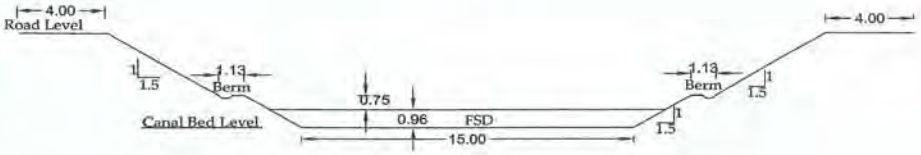

PLAN SHOWING THE COMPONENTS OF WORKS FOR IMPROVING GIRUDHUMAL LINK CANAL
INDEX MAP
N
VANDIYUR TANK SURPLUS COURSE
VIRAHANUR REGULATOR
GIRUDHUMAL LINK CANAL
SILAIMAN TANK
RIGHT MAIN CANAL
SOTTATHATI TANK
KONTHAGAI TANK
VAIGAI RIVER
MELAVELLORE DIVIDING DAM
MELAVELLORE TANK
AMBALATHADI ANICUT
AMBALATHADI TANK
GIRUDHUMAL RIVER
PIRAMANUR TANK
ACHANKULAM TANK
PALAYANUR TANK
LEGEND
1. Additional vents to head sluice of Girudhumal link canal
2. Girudhumal link canal — Lining
3. Repair works to Silaiman head sluice.
4. Repair works to scour sluice in Kondagai tank
5. Repair works to Melavellore dividing dam.
6. Construction of scour vent in Palayanur tank.
7. Improvements to existing flood bank in Vaigai River.
8. Regrading of Vaigai River in front of Girudhumal link canal head sluice.



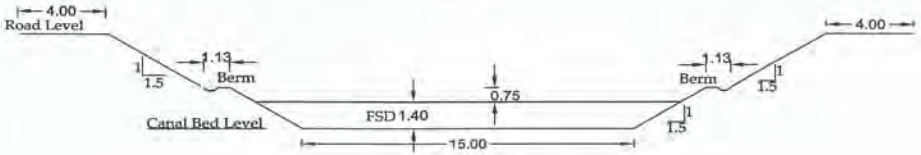
Reach I



Reach II



Reach III



Reach IV

Hydraulic Particulars :

1.	Design Discharge	1000 cusecs or 28.32 cumecs			
2.	Free Board	0.75 m			
3.	Berm Width	1.13 m			
4.	Side Slope	1.5 H : 1 V			
		Reach I (LS 0 to 4060m)	Reach II (LS 4060m to 5490m)	Reach III (LS 5490m to 5600m)	Reach IV (LS 5600m to 9600m)
5.	Bed Width	18m	18m	15m	15m
6.	Bed Level	+119.500 m	+118.570 / +117.570 m	+117.140 m	+116.830 m
7.	Bed Fall	1 in 4500	1 in 3325	1 in 355	1 in 1265
8.	Full Supply Depth	1.50m	1.380m	0.96m	1.40m
9.	Length of Canal	4060m	1430m	110m	4000m
10.	Lining	PCC M15 Cast in situ	PCC M15 Cast in situ	Stone Pitched	Unlined

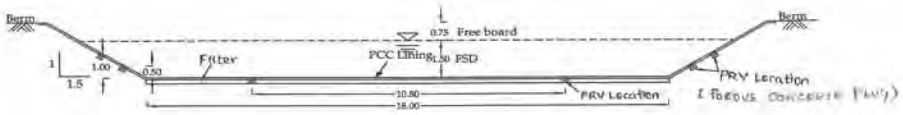
Note :

1. All dimensions are in metre unless otherwise specified.
2. This series of drawings should be supercede the series of drawings with this office Drg. No. 272/ 2012 to Drg. No. 275/ 2012 and Drg. No. 307 2012 to Drg. No.308/ 2012.
3. This drawing should be read along with the Drg.No.416/ 2013 to Drg. No. 419 / 2013

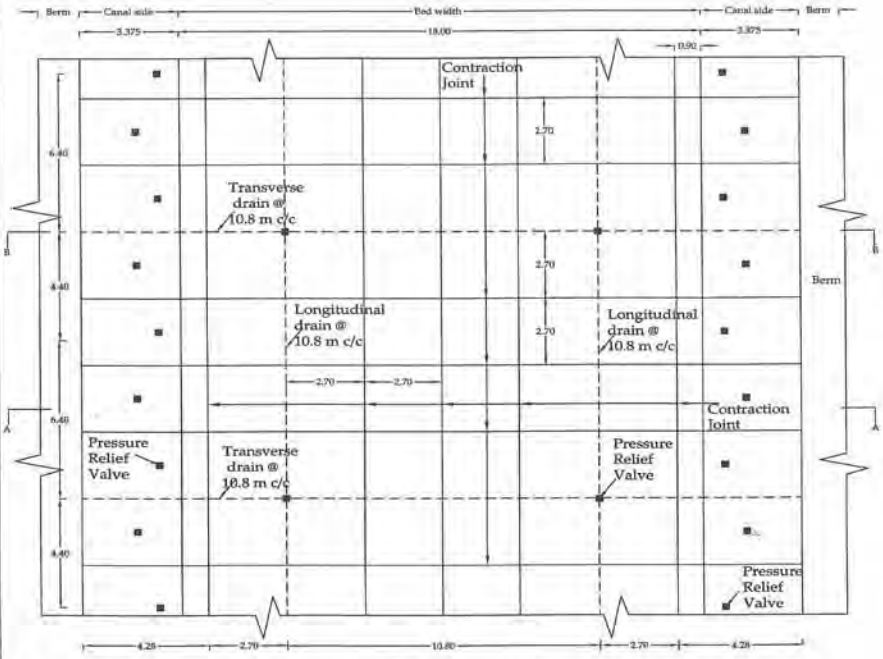
Sheet No. 1 / 4

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

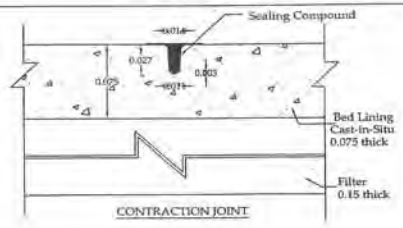
Designed & Drawn by Er. M.A. Saleena, AE	10/1/2013	Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts – Improvements to Girudhamal Link canal (Revised Design II)
Checked by Er. C. Sumathi, AEE	10/01/2013	
Verified by Er. K. Padmanabhan, EE (D)	10/1/13	
Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K.S.K Thulasiram, SE (D)	06/1/13	Typical Cross Section of Link Canal from LS 0m to LS 9600m
Approved by Er.S. Anbazhagan, CE (DR&CS)	10.1.13	Region: Madurai Region Circle:Lower Vaigai Basin Circle, Sivagangai
Drg. No. 416/ 2013	Scale 1 : 200	Approved by CE (DR&CS) in Lr. No. 19 CE / SE(D) / AEE VII/ F. 563-1/ 2012 dated. 10 . 01 . 2013



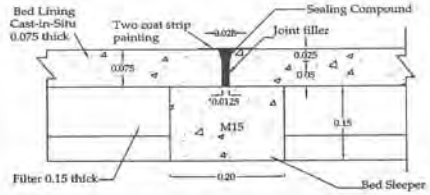
ELEVATION



PLAN



CONTRACTION JOINT



EXPANSION JOINT @ INTERSECTION OF EVERY CROSS MASONRY STRUCTURES

Note :

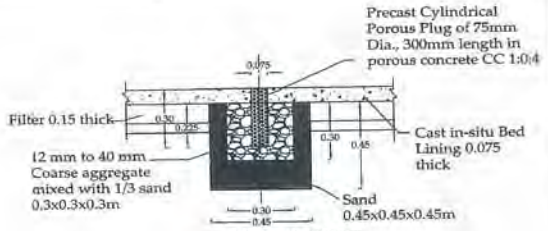
1. Joints should be filled with the mixer of Bitumen(grade 85/25 heated at a temperature of 375° F.) - 55%, sand (Finness Modulus 1 to 1.5)- 43% and Asbestos powder (white)- 2% or any IS approved sealing compound.
2. All dimensions are in metre unless otherwise specified.
3. This series of drawings should be supercede the series of drawings with this office Drg. No. 272 2012 to Drg. No. 275/ 2012 and Drg. No.305/ 2012 to Drg. No. 308 2012.
4. This drawing should be read along with the Drg.No.416/ 2013 to Drg. No. 419 / 2013.

Sheet No. 2 / 4

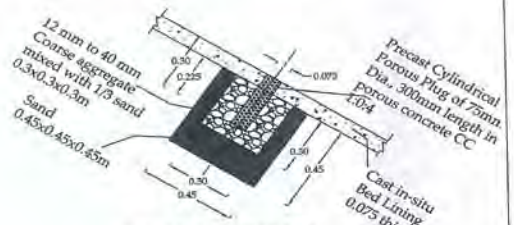
Government of Tamilnadu Public Works Department Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005.		
Designed & Drawn by Er. M.A. Saleena, AE	10/1/2013	Name of work :
Checked by Er. C. Sumathi, AEE	10/01/2013	Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Improvements to Girudhamal Link canal (Revised Design II)
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	10/1/13	
Recommended by Er. K.S.K.Thulasiram, SE (D)	10/1/13	Typical Plan of Link Canal, details of Expansion and Contraction joints
Approved by Er.S. Anbazhagan, CE (DR&CS)	10.1.13	Region: Madurai Region Circle : Lower Vaigai Basin Circle, Sivagangai
Drg. No. 417 / 2013	Not to Scale	Approved by CE (DR&CS) in Lr. No. 19 CE / SE(D) / AEE VII / F.563-1 / 2012 dated 10 . 01 . 2013

General Notes:

1. The design have been done based on IS 10430-2000, IS 4558-1995, IS 3873 - 1993, IS 5256 - 1992, IS 13143 - 1991 and IS 3370(Part 1)-2009.
2. The Superintending Engineer, PWD, Lower Vaigai Basin Circle, WRO, Sivagangai vide Lr.No. 356m/DB/D03/F220/2012 dated 16.10.2012 has requested to increase the efficiency of the existing Girudhamal link canal.
3. Based on the details furnished by the Superintending Engineer, PWD, Lower Vaigai Basin Circle, WRO, Sivagangai vide Lr.No. 356m/DB/D03/F220/2012 dated 16.10.2012 and the Executive Engineer, PWD, Saruganiyar Basin Division, WRO, Sivagangai vide Lr.No DB/2012/ dated.29.10.2012, the design has been formulated and approved by Chief Engineer(DR &CS) in Lr No: 264CE / SE(D)/ AEE VII / F.563-1 / 2012/ dt 16.11.2012.
4. As per the suggestions of Mr. R.K. Malhotra, Word Bank Consultant during the Preliminary meeting of the committee for "Assessment of left out works in IAMWARM sub basins" on 19.11.2012 the the design was revised and approved by Chief Engineer(DR &CS) in Lr No: 280CE / SE(D)/ AEE VII / F.563-1 / 2012/ dt 10.12.2012. Now it is also revised based on the suggestions of Mr. R.K. Malhotra, Word Bank Consultant during the meeting of the committee for "Assessment of left out works in IAMWARM sub basins" on 10.01.2013
5. The link canal has been designed for a Full Supply Discharge of 1000 cusecs (28.32 cumecs) .
6. As per the particulars furnished by the Executive Engineer, PWD, Saruganiyar Basin Division, WRO, Sivagangai it is assumed that the subgrade of the existing canal is made up of silt and clay having permeability between 10-4cm/sec to 10-6 cm/sec.
7. The design has been made on the assumption that the soil is of non expansive type. Before the execution , the swell pressure of the sample should be tested and if the swell pressure is found to be greater than 5t/m², the revised design should be obtained from this office.
8. The entire length of the existing link canal is in cutting as the existing ground level is above the bed level of the canal.
9. The side slope of the existing link canal has to be increased to 1V:1.5H from 1V:1H.
10. Free board of 0.75m is proposed.
11. It should be ensured that the relative density of sub grade at canal bottom and sides as 95% and 90% respectively.
12. Lining of canal is proposed with PCC M15 cast in situ from LS 0 to 4060m (Reach I) & LS 4060m to 5490m (Reach II) and with stone pitching from LS 5490m to LS 5600m (Reach III)
13. Concrete pavers is recommended for in situ lining.
14. Laying of insitu concrete lining should be done as per IS 3873-1993
15. It is suggested to provide two rows of longitudinal drains along the length of the canal at a spacing of 10.8m c/c and also transverse drains at every 10.8m
16. The drainage arrangements should be provided as per IS 4558:1995.
17. The longitudinal drains should be interconnected with the transverse drains.
18. The arrangement of Pressure Relief Valves are shown in the drawing.
19. Suitable transitions has to be provided between Reach II and Reach III where the bed width changes from 18m to 15m.
20. Expansion joints should be provided at intersection of every cross masonry structures along the length of the canal.
21. Contraction joints should be provided at 2.7mm c/c in both direction.
22. In no case the flow in the channel should not overtop the free board.
23. All dimensions are in metre unless otherwise specified.
24. This series of drawings should be supercede the series of drawings with this office Drg. No. 272/ 2012 to Drg. No. 275/ 2012 and Drg. No. 305/ 2012 to Drg. No. 309/ 2012.
25. This drawing should be read along with the Drg.No.416 / 2013 to Drg. No. 419 / 2013.



PRESSURE RELIEF VALVE (at canal bed)

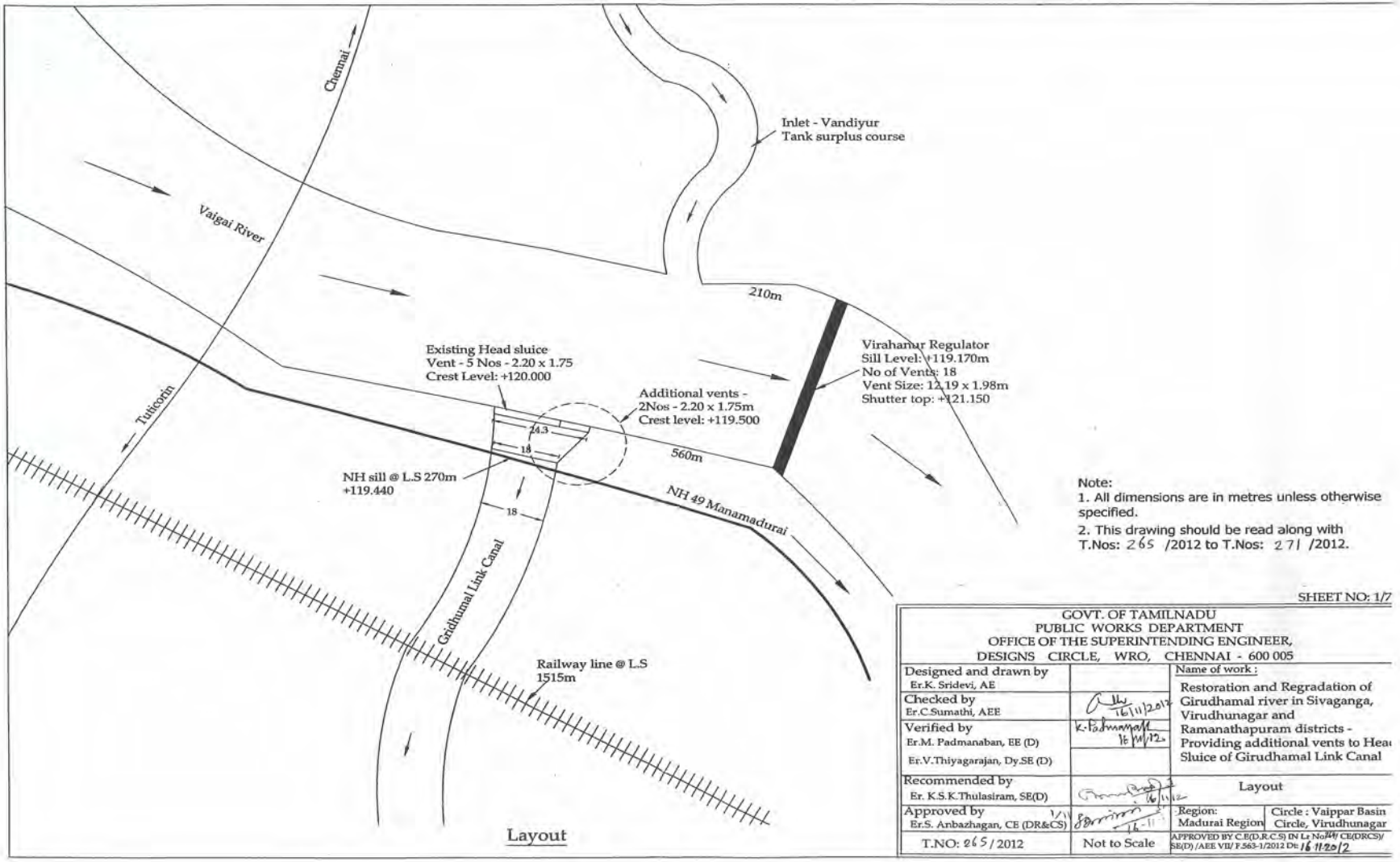


PRESSURE RELIEF VALVE (on side slope)

Sheet No. 4 / 4

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

Designed & Drawn by Er. M.A. Saleena, AE	10/1/2013	Name of work : Restoration and Regradation of Girudhamal river in Sivagangai, Virudhunagar and Ramanathapuram Districts - Improvements of Girudhamal Link canal. (Revised Design II)
Checked by Er. C. Sumathi, AEE	10/1/2013	
Verified by Er. K. Padmanabhan, EE (D)	10/1/13	
Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K.S.K Thulasiram, SE (D)		General Notes & Details of Pressur Relief Valves.
Approved by Er.S. Anbazhagan, CE (DR&CS)	10.1.13	Region: Madurai Region Circle: Lower Vaigai Basin Circle, Sivagangai
Drg. No. 419/ 2013	Not to Scale	Approved by CE (DR&CS) in Lr. No. 19 CE/ SE(D) / AEE VII / F.563-1/ 2012 dated 10.01.2013

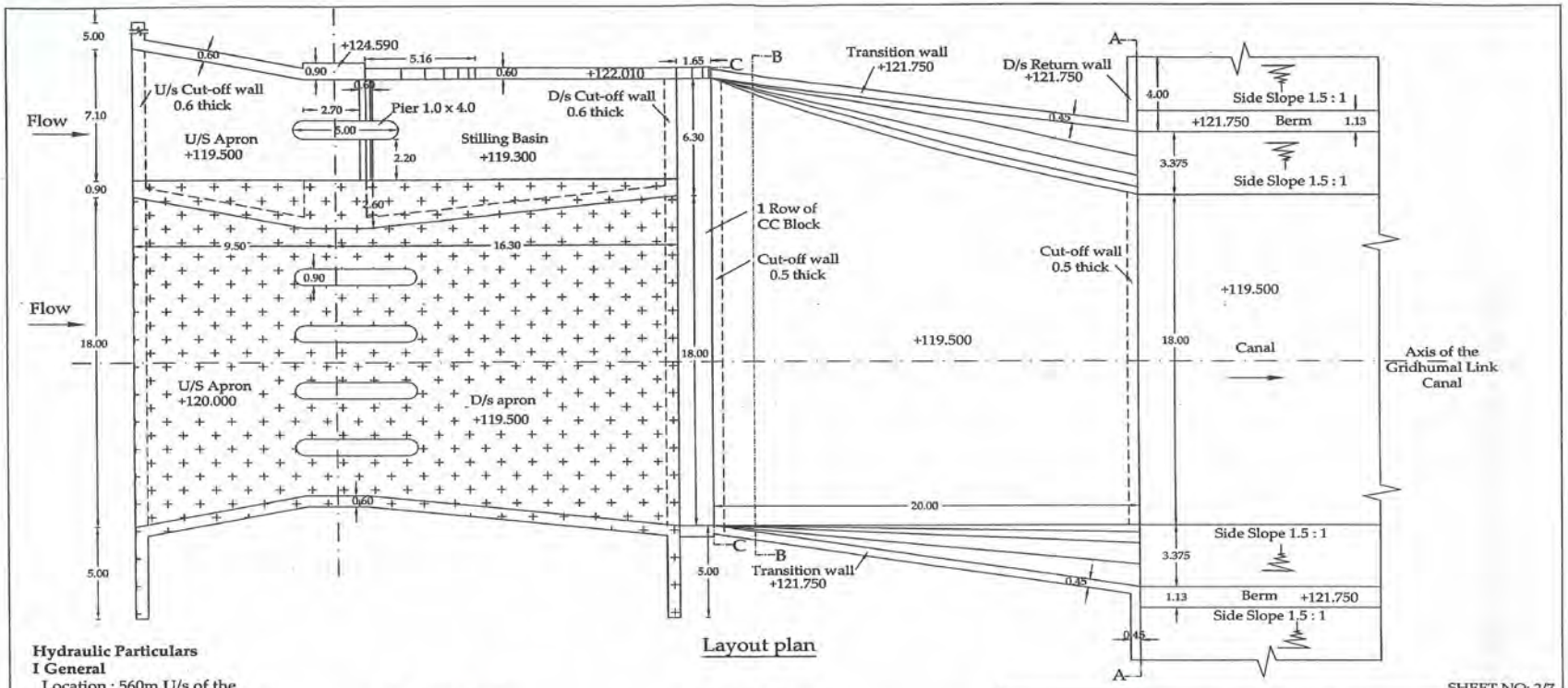


Note:
1. All dimensions are in metres unless otherwise specified.
2. This drawing should be read along with T.Nos: 265 /2012 to T.Nos: 271 /2012.

SHEET NO: 1/7

GOVT. OF TAMILNADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed and drawn by Er.K. Sridevi, AE		Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Hea Sluice of Girudhamal Link Canal
Checked by Er.C.Sumathi, AEE	16/11/2012	
Verified by Er.M. Padmanaban, EE (D) Er.V.Thiyagarajan, Dy.SE (D)	K. Padmanaban 16/11/12	
Recommended by Er. K.S.K.Thulasiram, SE(D)	16/11/12	Layout
Approved by Er.S. Anbazhagan, CE (DR&CS)	16-11	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
T.NO: 265/2012	Not to Scale	APPROVED BY C.E(D.R.C.S) IN Lr No.749/ CE(DRCS)/ SE(D) /AEE VII/ F.563-1/2012 Dt: 16.11.2012



Layout plan

SHEET NO: 2/7

Hydraulic Particulars

I General

Location : 560m U/s of the Virahanur Regulator

Maximum flood discharge	: 1000 Cusecs or 28.32 Cumecs
Maximum Flood level	: +121.150m
Rear water level	: +121.010m
D/s Bed level	: +119.500m

II Existing Gridhumal Link Canal
(At L.S 0m - After Improvement)

Design Discharge	1000 cusecs or 28.32 cumecs
Bed Width	18.00 m
Side slope	1.5 H : 1V
Bed Level	+119.500m
Bed Fall	1 in 4500
Full Supply Depth	1.50 m
Free Board	0.75 m

III. Head Sluice

a. Existing vents

Crest level	: +120.000m
Number of vents	: 5
Size of vents	: 2.20 X 1.75 m
Size of Pier	: 0.90 X 4.85 m
Discharge	: 678 Cusecs or 19.20 Cumecs
Stilling Basin level	: +119.500m
U/s Floor level	: +120.000 m
Top of Pier	: +124.390m

b. Additional vents

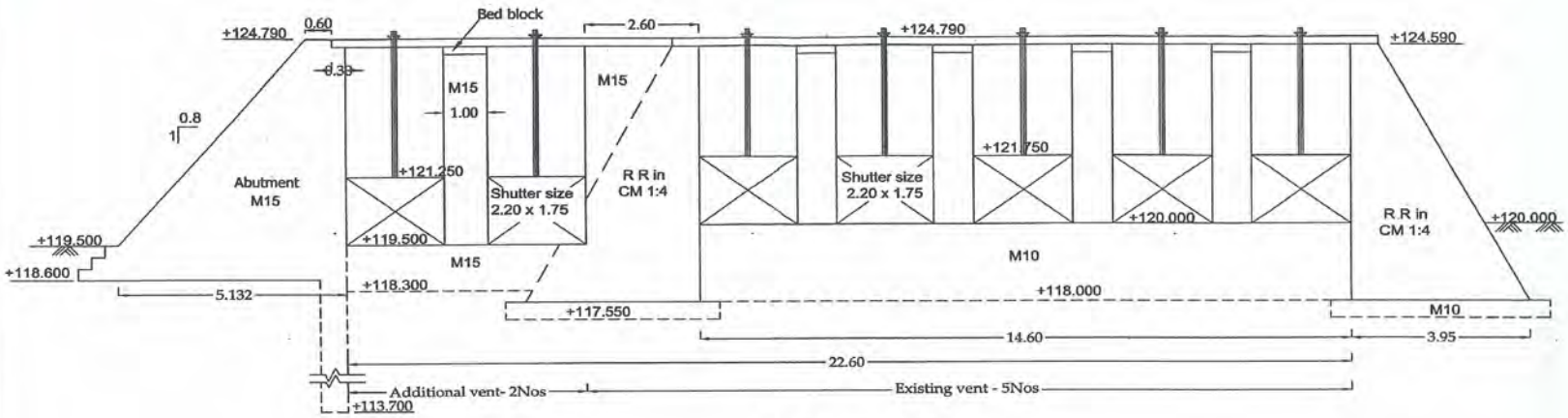
Crest level	: +119.500m
Number of vents	: 2
Size of vents	: 2.20 X 1.75 m
Size of Pier	: 1.00 X 4.00 m
Discharge	: 395 Cusecs or 11.20 Cumecs
Stilling Basin level	: +119.300 m
U/s Floor level	: +119.500 m
Top of Pier	: +124.390 m

Note:

1. All the dimensions are in metres unless otherwise specified
2. This drawing should be read along with T.Nos: 265 /2012 to T.Nos: 271 /2012.

GOVT. OF TAMILNADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed and drawn by Er.M.A.Saleena, AE		Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Head Sluice of Girudhamal Link Canal
Checked by Er.C.Sumathi, AEE	16/11/2012	
Verified by Er.M. Padmanaban, EE (D) Er.V.Thiyagarajan, Dy.SE (D)	16/11/12	
Recommended by Er. K.S.K.Thulasiram, SE(D)		Layout plan
Approved by Er.S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region / Circle : Vaippar Basin Circle, Virudhunagar
T.NO: 266 / 2012	SCALE 1:200	APPROVED BY C.E(D.R.C.S) IN Lr No.344 CE(DRCS)/ SE(D) /AEE VII/ F.563-1/2012 Dt: 16-11-12



FRONT ELEVATION

SHEET NO: 3/7

Hydraulic particulars:

Head Sluice

a. Existing vents

Crest level	: +120.000m
Number of vents	: 5
Size of vents	: 2.20 X 1.75 m
Size of Pier	: 0.90 X 4.85 m
Discharge	: 678 Cusecs or 19.20 Cumecs

b. Additional vents

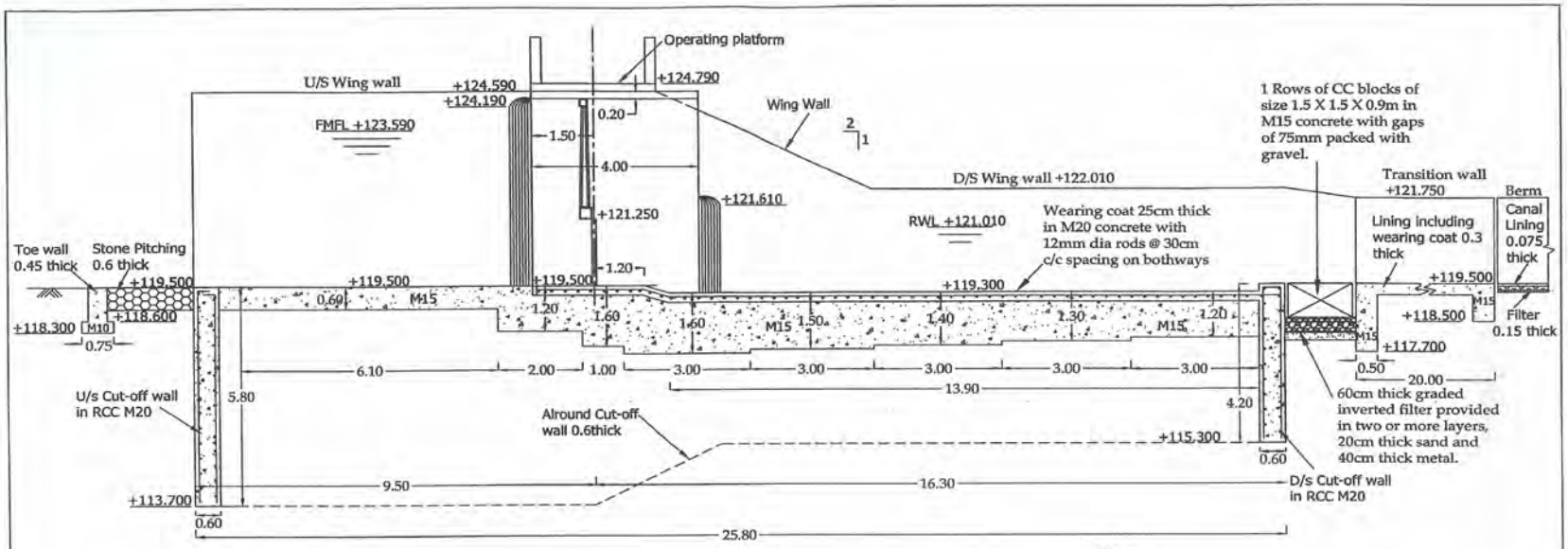
Crest level	: +119.500m
Number of vents	: 2
Size of vents	: 2.20 X 1.75 m
Size of Pier	: 1.00 X 4.00 m
Discharge	: 395 Cusecs or 11.20 Cumecs

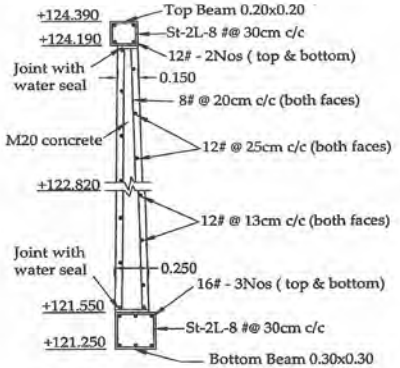
Note:

1. All dimensions are in metres unless otherwise specified.
2. This drawing should be read along with T. Nos. 265/2012 to T. No. 271/2012

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

Designed & Drawn by Er. K. Sridevi, AE		Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Head Sluice of Girudhamal Link Canal
Checked by Er. C. Sumathi, AEE	16/11/2012	
Verified by Er. K. Padmanabhan, EE (D)	16/11/12	
Er. V. Thiyagarajan, Dy. SE (D)		Designed drawing of : Longitudinal section of additional vents
Recommended by Er. K.S.K.Thulasiram, SE (D)	16/11/12	
Approved by Er.S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region Circle : Lower Vaigai Basin Circle, Sivagangai
Drg. No. 267 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 264 CE / SE(D) / AEE VII / F. 563 -1 / 2012 dated 16 . 11 . 2012





Cross Sectionof Breast Wall
(Not to scale)

LONGITUDINAL SECTION OF HEAD SLUICE (Additional vents)

Hydraulic particulars:

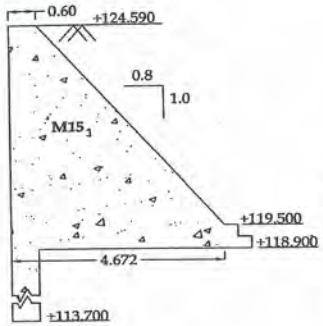
1.Discharge through Scour vent-		10.20 Cumecs or 395 Cusecs
2. Crest level	-	+ 119.500 m
3.No of vents	-	2 Nos
4.Size of vents	-	2.2 x 1.75 m
5.Front Maximum Water Level	-	+ 123.590 m
6. Head over crest	-	4.09 m
7.Rear Water Level	-	+ 121.010 m
8. Upstream bed level	-	+ 119.500 m
9. Downstream bed level	-	+ 119.500 m
10.Stilling basin level	-	+ 119.300 m
11.Depth of Upstream cut off	-	5.80 m
12.Depth of downstream cut off-		4.20 m
13.Length of stilling basin	-	13.90 m

Note:
1. All the dimensions are in metres unless otherwise specified
2. This drawing should be read along with T.Nos: 265/2012 to T.Nos: 278 /2012.

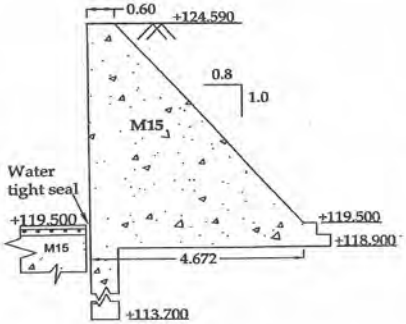
SHEET NO: 4/7

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

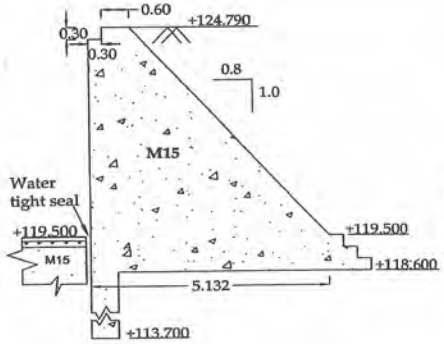
Designed & Drawn by Er. M. A. Saleena, AE		Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Head Sluice of Girudhamal Link Canal
Checked by Er. C. Sumathi, AEE	16/11/2012	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 16/11/12	
Recommended by Er. K.S.K.Thulasiram, SE (D)	16/11	Longitudinal section of additional vents
Approved by Er.S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region Circle : Lower Vaigai Basin Circle, Sivagangai
T. No. 268 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 264 CE / SE(D) / AEE VII / F. 563 -1 / 2012 dated 16 . 11 . 2012



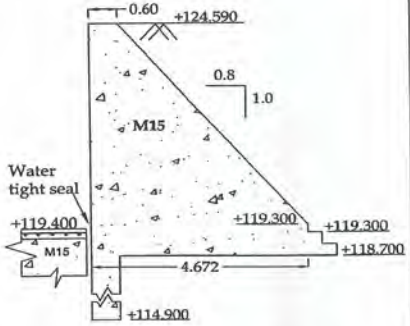
U/s Return Wall



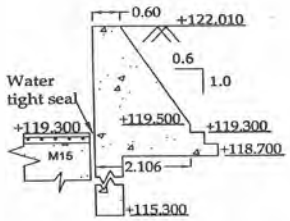
U/s Wing Wall



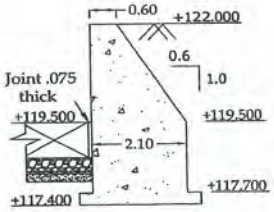
Abutment



D/s Wing Wall (at start)



D/s Wing Wall (Basin)



D/s Wing Wall (End of basin)

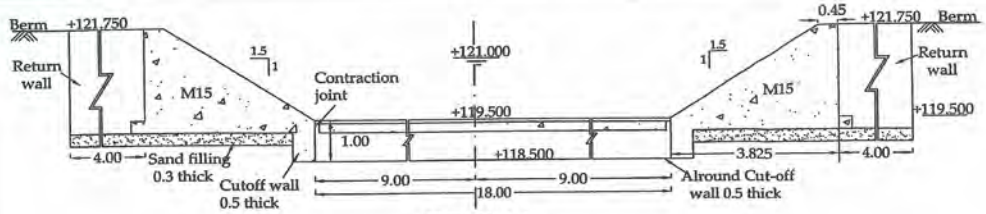
Note:

1. All the dimensions are in metres unless otherwise specified
2. This drawing should be read along with T.Nos: 265/2012 to T.Nos: 271 /2012.

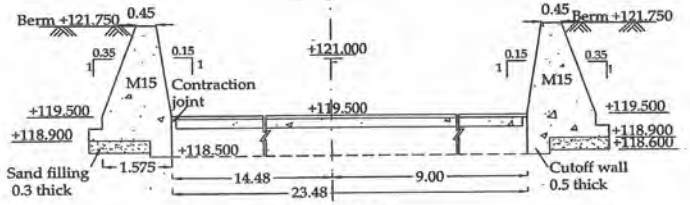
SHEET NO: 5/7

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

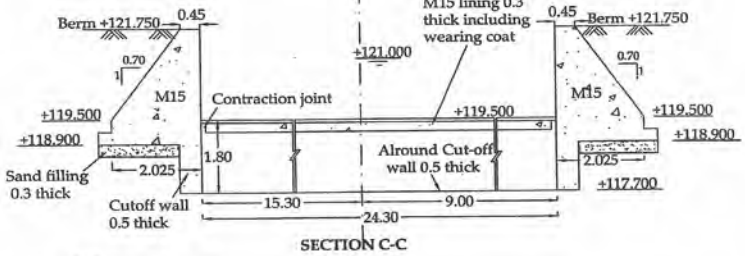
Designed & Drawn by Er. M. A. Saleena,		Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Head Sluice of Girudhamal Link Canal
Checked by Er. C. Sumathi,	16/11/2012	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 16/11/12	
Recommended by Er. K.S.K.Thulasiram, SE (D)		Cross section of Abutment and wing walls
Approved by Er.S. Anbazhagan, CE (DR&CS)		Region: Madurai Region Circle : Lower Vaigai Basin Circle, Sivagangai
Drg. No. 269 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 264 CE / SE(D) / AEE VII / F563-1 / 2012 dated 16 . 11 . 2012



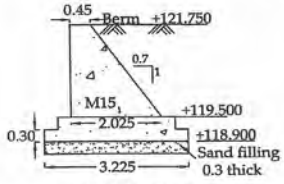
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D - D

Contraction (Exit) transition

A - A	: End of transition
B - B	: 2m from the entry point
C - C	: Entry point
D - D	: Return wall

Exit Contraction transition
Top of transition wall +121.750m

Distance from entry into transition in m	Side slope		Bedwidth in m
	Front : 1	Rear : 1	
0	0	0.7	24.30
2	0.15	0.35	23.48
4	0.30	0	22.71
6	0.45	0	21.99
8	0.60	0	21.32
10	0.75	0	20.68
12	0.90	0	20.08
14	1.05	0	19.52
16	1.20	0	18.98
18	1.35	0	18.48
20	1.50	0	18.00

Note:
1. All the dimensions are in metres unless otherwise specified
2. This drawing should be read along with T.Nos: 265 /2012 to T.Nos: 271 /2012.

SHEET NO: 6/7

GOVT. OF TAMILNADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed & Drawn by Er. K. Sridevi, AE		Name of work :
Checked by Er.C.Sumathi, AEE	7.6.12	Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Head Sluice of Girudhamal Link Canal
Verified by Er. K. Padmanabhan, EE (D)	K. Padmanabhan 7.6.12	
Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K. S.K.Thulasiram, SE (D)		Section of Transition walls
Approved by Er.S. Anbazhagan, CE (DR&CS)		Region: Madurai Region / Circle : Lower Vaigai Basin Circle, Sivagangai
T.NO:28/ 2012	SCALE 1:100	Approved by CE (DR&CS) in Lr. No.264/CE/ SE(D) / AEE VII / F.563-1/ 2012 dated 16.11.2012

NOTES:

1. The analysis has been made based on IS 6966(PartI)–1989, IS11130–1984, IS6531–1984, IS12720–2004, IS 3370(Part 2)–2009, IS 456–2000 and CBIP publication No:179.

2. The Superintending Engineer, PWD, Lower Vaigai Basin Circle, WRO,Sivagangai vide Lr.No. 356m/DB/D03/F220/2012 dated 16.10.2012 has requested to provide additional vents to the existing Head Sluice of Girudhamal link canal.

3. Based on the details furnished by the Superintending Engineer, PWD,Lower Vaigai Basin Circle, WRO, Sivagangai vide Lr.No:356m/DB/D03/F220/2012 dated 16.10.2012 and the Executive Engineer, PWD, Saruganiyar Basin Division, WRO, Sivagangai vide Lr.No DB/2012/ dated.29.10.2012, the design has been formulated.

4. The additional vents – 2Nos has been designed for a maximum flood discharge of 395 cusecs or 11.20 cumecs with the overall discharge of 1000 cusecs or 28.32 cumecs.

5. The additional vents are proposed at the left side of the exisiting vents by converting the leftside abutment as pier and the leftside wing wall as divide wall as shown in the drawing.

6. The parameters of backfill material such as saturated unit weight and angle of internal friction have been assumed as 2t/cum and 22° respectively. Hence the soil of suitable type shall be used as backfill material.

7. The maximum stress below the abutment is 21.67t/m². In the absence of bore hole details the foundation for abutment are proposed at a minimum depth of 0.9m below the protected bed. However during execution the bearing capacity shall be checked and ensured. The foundation shall be taken still lower if the sufficient bearing capacity is not available at the proposed level

8. The pier,abutment, wings walls, transition walls and return walls are proposed in PCC in M15. Surface reinforcement at the rate of 2.5 kg/m2 shall be provided in the abutment, wing walls, transition walls and returns in each direction ie. both horizontally and vertically. Spacing of such bars shall not exceed 200mm.

9. The bottom of the Downstream cutoff should not be keyed into the impervious layer as it will block the uplift pressure. If impervious layer is met with at the bottom of cutoff, suitable filter arrangements should be provided around the cutoff.

10. Necessary transitions may be provided at the downstream of stilling basin to negotiate the bed width and the side slope of canal as shown in the drawing.

11. All round cutoff is proposed below the transition walls for a thickness of 0.5m.

12. Transverse contraction joints with PVC water stops shall be provided at the locations separating the canal floor from the transition walls.

13. Weep holes with necessary filter arrangements should be provided in the abutment, upstream and downstream wingwalls and transition walls above the MWL and RWL respectively.

14. Minimum cover for wearing coat and other reinforcements shall be provided as 10cm and 5cm respectively.

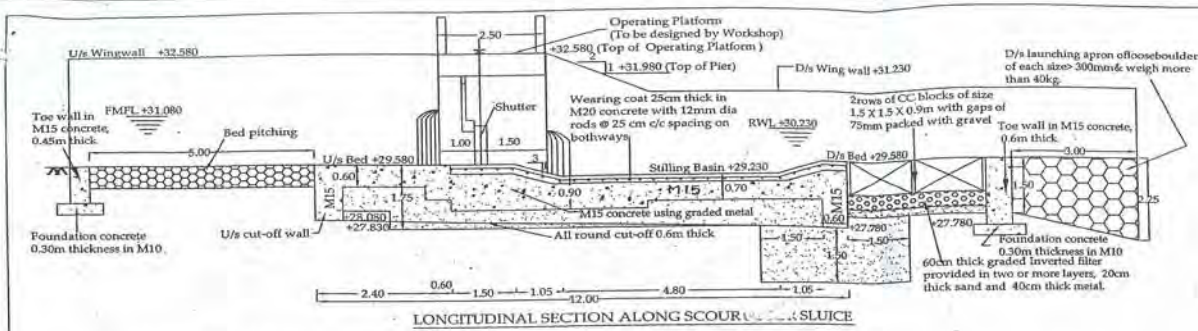
15. The pier should be constructed monolithically with the apron floor.

16. This sheet should be read along with the series T.No. 265/2012 to T.No. 271 /2012

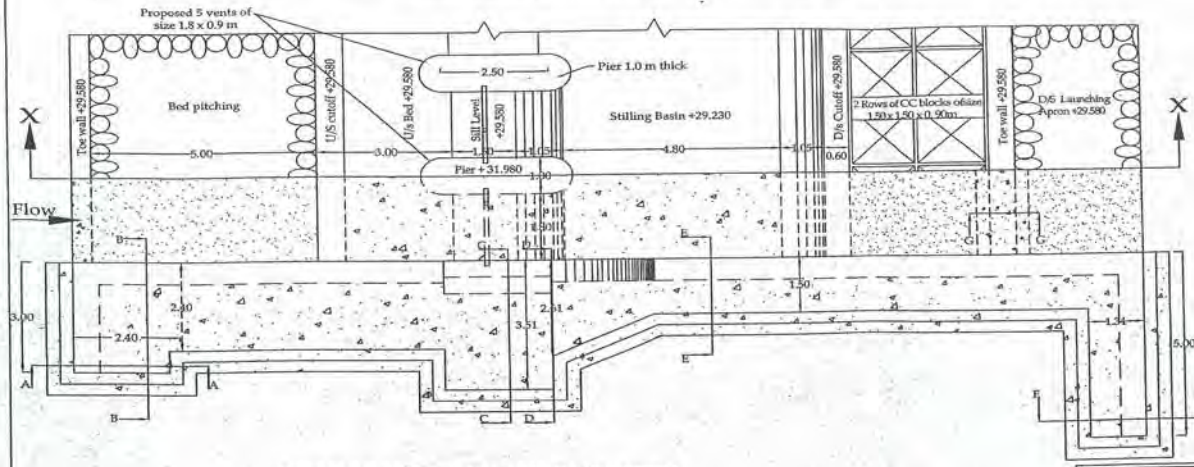
SHEET NO: 7/7

GOVT. OF TAMILNADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed & Drawn by Er. K. Sridevi, AE		Name of work : Restoration and Regradation of Girudhamal river in Sivaganga, Virudhunagar and Ramanathapuram districts - Providing additional vents to Head Sluice of Girudhamal Link Canal
Checked by Er.C.Sumathi, AEE	16/11/2012	
Verified by Er. K. Padmanabhan, EE (D)	16/11/12	
Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K. S.K.Thulasiram, SE (D)	16/11	General Notes
Approved by Er.S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region / Circle : Lower Vaigai Basin Circle, Sivagangai
T.NO:271/ 2012	Not to Scale	Approved by CE (DR&CS) in Lr. No.264/ CE/ SE(D) / AEE VII / F.563-1/ 2012 dated 16.11.2012



LONGITUDINAL SECTION ALONG SCOUR [illegible] SLUICE



HALF PLAN AT TOP AND HALF PLAN AT BOTTOM

Hydraulic Particulars :

SCOUR VENT

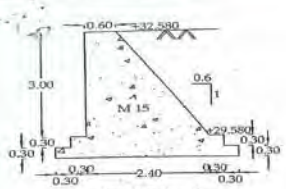
1.	Max. Flood Discharge through the scour vent	11.751cumecs or 415 cusecs
2.	No of Scour vents	5 nos
3.	Size of Scour vents	1.8 X 0.9m
4.	TBL of Tank	+32.580m
5.	Max. Water Level of Tank	+31.080m
6.	Rear Water Level of Sluice	+30.230 m
7.	Sill Level of Sluice	+29.580 m
8.	U/s Bed Level	+29.580 m
9.	D/s Bed Level	+29.580 m
10.	Stilling Basin Level	+29.230 m
11.	Length of Stilling Basin	4.80 m
12.	Total Floor Length	12.00 m

Note :
1. All dimensions are in metres unless otherwise mentioned.
2. This drawing should be read along with the series T. No.309/2012 to T. No.311/2012.

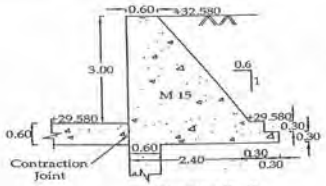
Sheet No. 1 / 3

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

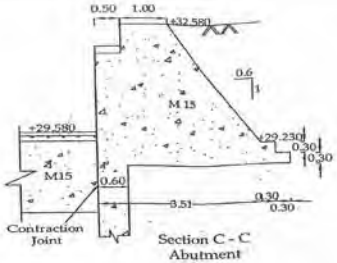
Designed & Drawn by Er. K.Bhuvaneswari, AE - IV	12/12/12	Name of work : Construction of Scour Sluice for Palayanur Tank to Link Giruthumal River in Sivagangai District.
Checked by Er. P.Sasikala, AEE (VIII)	12/12/12	
Verified by Er. K. Padmanabhan, EE (D)	13/12/12	
Er. V. Thiyagarajan, Dy. SE (D)	13/12/12	
Recommended by Er. K.S.K.Thulasiram, SE (D)	24/12/12	Designed drawing of : Plan and Cross Section of Scour Sluice
Approved by Er. S. Anbazhagan, CE (DR&CS)	7/1/13	Region: Madurai Circle: Lower Vaigai Basin Circle, Sivagangai
Drg. No.309/2012	Scale 1 : 100	Approved by CE (DR&CS) In Lr. No. 3955 / SE(D) /



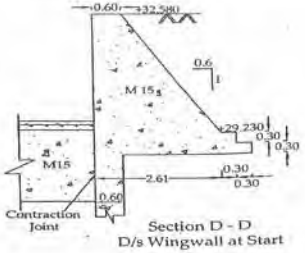
Section A - A
U/s Return Wall



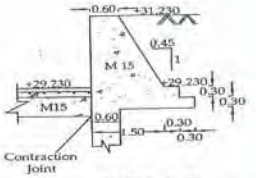
Section B - B
U/s Wing Wall



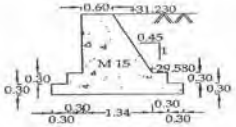
Section C - C
Abutment



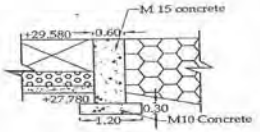
Section D - D
D/s Wingwall at Start



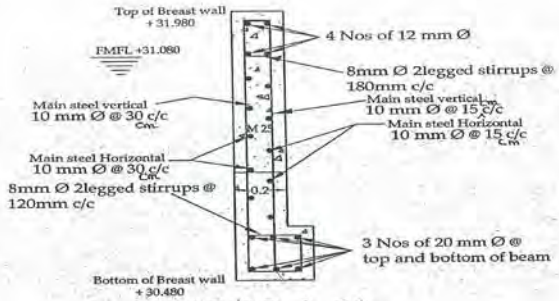
Section E - E
D/s Wingwall at End & Basin



Section F - F
D/s Return Wall



Section G - G
D/s Toe Wall between CC
Blocks and Launching Apron



SCALE 1:20

Cross section of Breast wall for scour sluice

Details of Breast wall:

Concrete	: M25
Top Beam	: 0.20m x 0.20m
Bottom beam	: 0.30m x 0.30m

Note :
1. All dimensions are in metres unless otherwise mentioned.
2. This drawing should be read along with the series T. No. 369/2012 to T. No.374 /2012

Sheet No. 2 / 3

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. K.Bhuvaneswari, AE - IV	13/12/12	Name of work :
Checked by Er. P.Sasikala, AEE (VIII)	13/12/12	Construction of Scour Sluice for Palayanur Tank to Link Girudhumal River in Sivagangai District.
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabh 13.12.12 13/12/12	
Recommended by Er. K.S.K.Thulasiram, SE (D)	13/12/12	Designed drawing of : Cross Section of Abutment, Wing walls, Returns and Toe walls
Approved by Er. S. Anbazhagan, CE (DR&CS)	14/12/12	Region: Madurai Circle:Lower Vaigai Basin Circle,Sivagangai
Drg. No.370 / 2012.	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No.258 CE / SE(D) / AEE VIII / F547 / 2012 dated 14-12-12

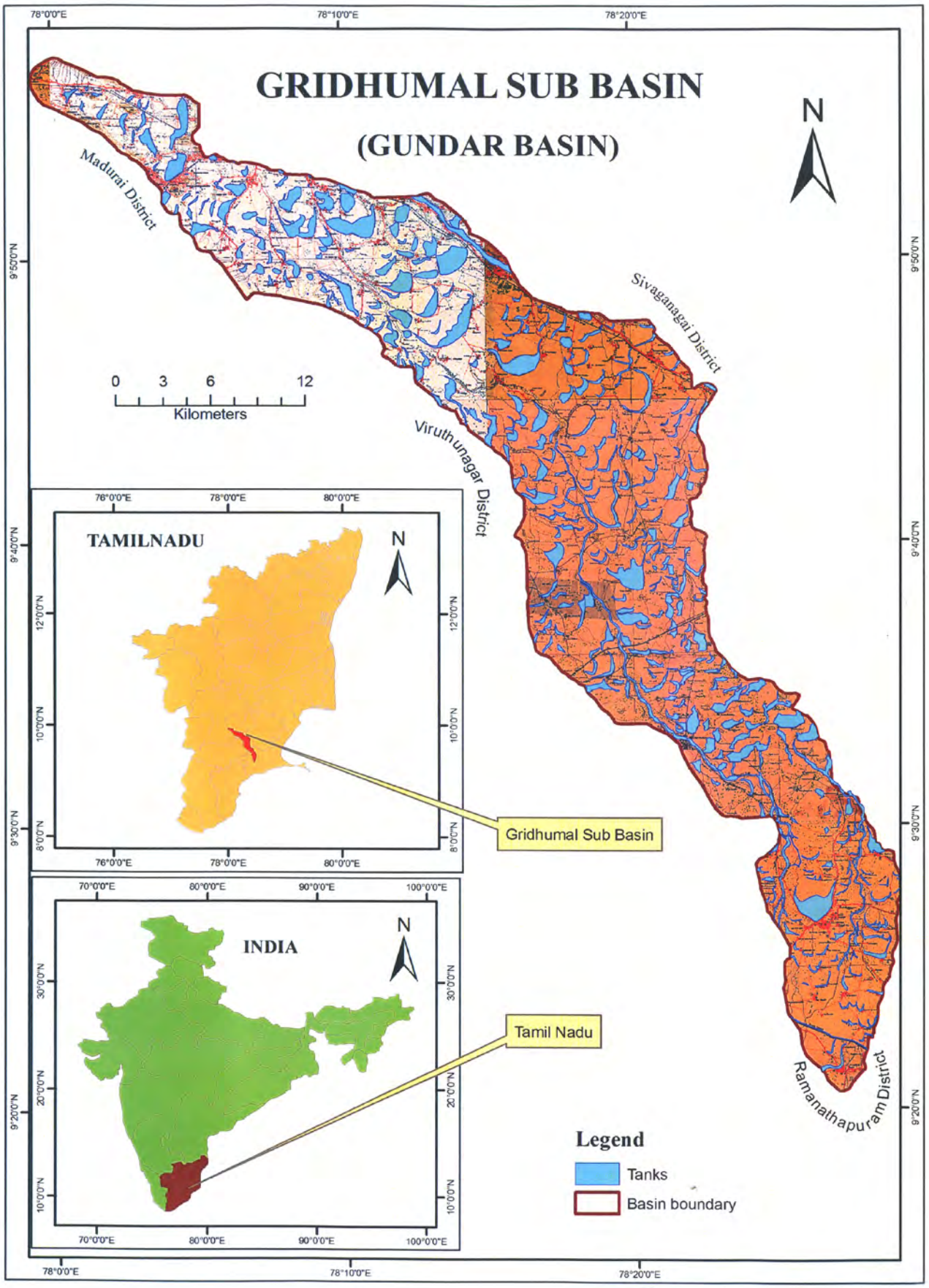
OTES:

1. The analysis has been made based on IS 6966-1989, IS 12720-1993, IS 3370, IS 456 -2000 and IS 1893 - 2000.
2. The design has been formulated based on the particulars furnished by the EE, PWD, Saruganiyar Basin Division, Sivagangai, in Lr. No. DB/ 2002/ Dt: 29.10.2012.
3. The scour sluice has been designed for a maximum flood discharge of 415 cusecs or 11.75 cumecs, as requested by the EE, PWD, Saruganiyar Basin Division, Sivagangai.
4. The parameters of backfill material such as saturated unit weight and angle of internal friction have been assumed as 2t/cum and 30° respectively.
5. The depth of footing for abutment and wingwalls proposed below the sill levels are tentative and may be suitably modified according to the site conditions.
6. The proposed lengths of upstream and downstream returns are tentative and may be modified to suit the site conditions.
7. The apron floor,body wall, pier, abutment, wing walls and returns are proposed in M15 concrete using graded metal.
8. Surface reinforcement at the rate of 2.5Kg/m2 shall be provided in the abutment, wing wall, returns and pier in each direction ie both horizontally and vertically. Spacing of such bars shall not exceed 200mm.
9. The bottom of the D/S cutoff should not be keyed into the impervious layer as it will block the release of uplift pressure. As per the trial pit particulars furnished clayey strata starts from 0.15m below ground level and exists upto a depth of 1.85m below that. Hence sand filling for a depth of 0.5m is proposed below the floor replacing the existing clayey soil at the bottom of apron.
10. Weep holes with necessary filter arrangements should be provided in the upstream and downstream wingwalls above the FMWL and RWL respectively.
11. The maximum stress developed at the sill level of the abutment is 15.61t/sq.m. The SBC of the foundation media should be checked before taking up the work.
12. The design for the operating platform and the structural details of the shutters are to be finalised by P.W.W.S.
13. The top of operating platform has been fixed as +32.580m(TBL of tank) and the top of pier is fixed as +31.980m assuming that the depth of beam over the bed block is 0.6m. However it may vary as per the design obtained from P.W.W.S.
14. The pier should be constructed monolithic with the apron floor.

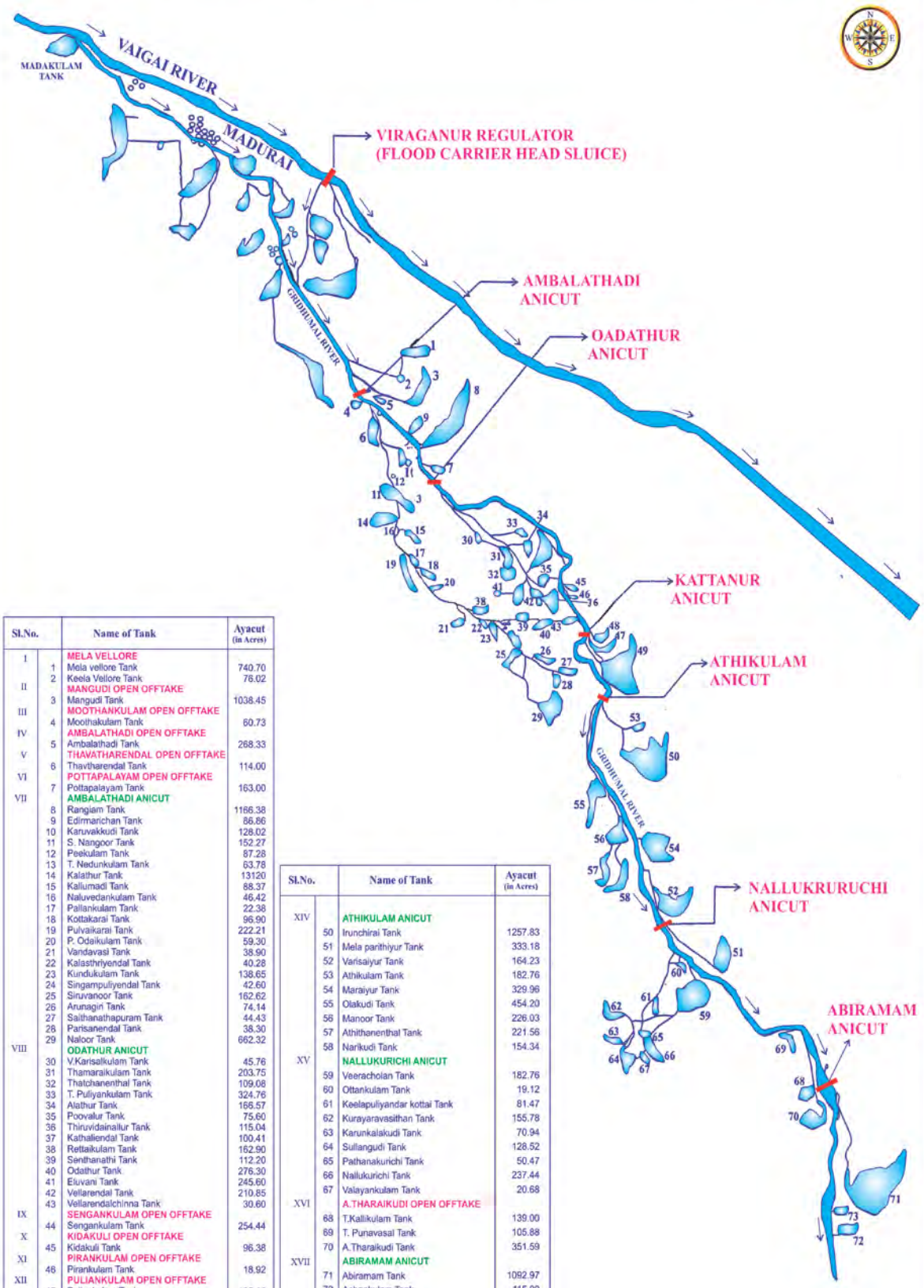
This sheet has to be read with the series of drawings from T No.309/2012 to T No.311/2012

Sheet No. 3 / 3

Government of Tamilnadu Public Works Department Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005			
Designed & Drawn by Er. K.Bhuvaneswari, AE - IV	12-12-12	Name of work :	
Checked by Er. P.Sasikala, AEE (VIII)	13/12/12	Construction of Scour Sluice for Palayanur Tank to Link Girudhumal River in Sivagangai District.	
Verified by Er. K. Padmanabhan, EE (D)	K. Padmanabhan 13/12/12		
Er. V. Thiyagarajan, Dy. SE (D)	13/12/12		
Recommended by Er. K.S.K.Thulasiram, SE (D)	14/12/12	Designed drawing of : GENERAL NOTES	
Approved by Er. S. Anbazhagan, CE (DR&CS)	14.12.12	Region: Madurai	Circle:Lower Vaigai Basin Circle,Sivagangai
Drg. No. 311 / 2012.		Approved by CE (DR&CS) in Lr. No.298/CE / SE(D) / AEE VIII / F298/2012 dated 14-12-12	


GRIDHUMAL SUB BASIN
(GUNDAR BASIN)
N
Madurai District
Sivaganagai District
Viruthunagar District
Ramanathapuram District
0 3 6 12
Kilometers
TAMILNADU
Gridhumal Sub Basin
INDIA
Tamil Nadu
Legend
Tanks
Basin boundary
78°0'0"E
78°10'0"E
78°20'0"E
9°50'0"N
9°40'0"N
9°30'0"N
9°20'0"N
76°0'0"E
80°0'0"E
12°0'0"N
10°0'0"N
8°0'0"N
70°0'0"E
90°0'0"E
100°0'0"E
30°0'0"N
20°0'0"N

PLAN SHOWING THE TANKS FED BY GRIDHUMAL RIVER

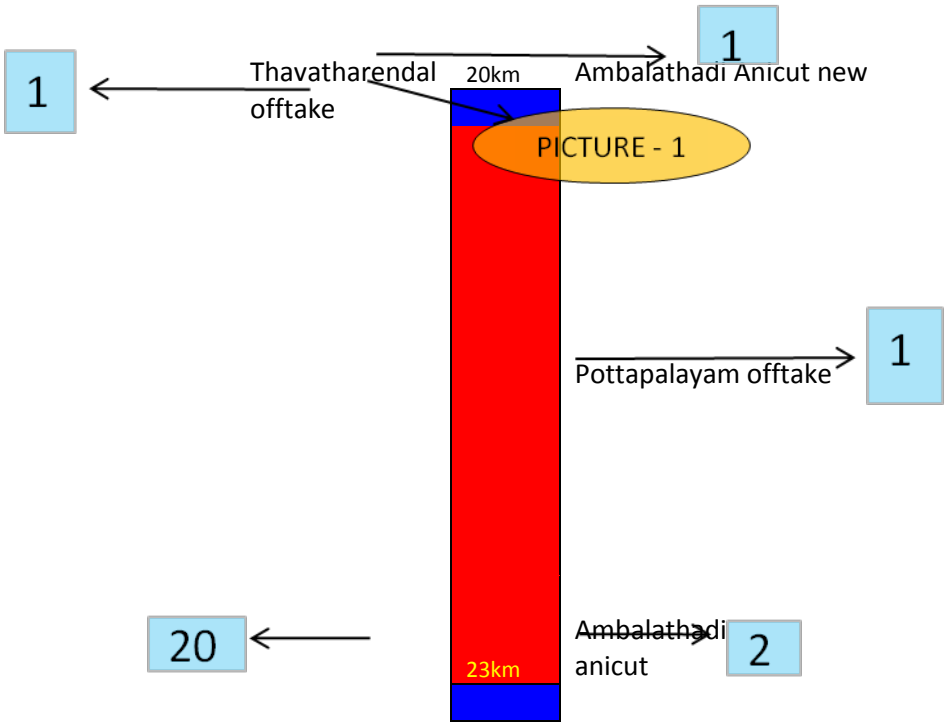


Sl.No.		Name of Tank	Ayacut (in Acres)
I		MELA VELLORE	
	1	Mela vellore Tank	740.70
	2	Keela Vellore Tank	76.02
II		MANGUDI OPEN OFFTAKE	
	3	Mangudi Tank	1038.45
III		MOOTHAKULAM OPEN OFFTAKE	
	4	Moothakulam Tank	60.73
IV		AMBALATHADI OPEN OFFTAKE	
	5	Ambalathadi Tank	268.33
V		THAVATHARENDAL OPEN OFFTAKE	
	6	Thavtharendal Tank	114.00
VI		POTTAPALAYAM OPEN OFFTAKE	
	7	Pottapalayam Tank	163.00
VII		AMBALATHADI ANICUT	
	8	Rangiam Tank	1166.38
	9	Edirmarichan Tank	86.86
	10	Karuvakkudi Tank	128.02
	11	S. Nangoor Tank	152.27
	12	Peekulam Tank	87.28
	13	T. Nedunkulam Tank	63.78
	14	Kalathur Tank	1312.0
	15	Kallumadi Tank	88.37
	16	Naluvedankulam Tank	46.42
	17	Pallankulam Tank	22.38
	18	Kottakarai Tank	96.90
	19	Pulvaikarai Tank	222.21
	20	P. Odaikulam Tank	59.30
	21	Vandavasi Tank	38.90
	22	Kalasthriyendal Tank	40.28
	23	Kundukulam Tank	138.65
	24	Singampuliyendal Tank	42.60
	25	Siruvanoor Tank	162.62
	26	Arunagiri Tank	74.14
	27	Saithanathapuram Tank	44.43
	28	Parisanendal Tank	38.30
	29	Naloor Tank	662.32
VIII		ODATHUR ANICUT	
	30	V.Karisalkulam Tank	45.76
	31	Thamaraikulam Tank	203.75
	32	Thatchanenthal Tank	109.08
	33	T. Puliyankulam Tank	324.76
	34	Alathur Tank	166.57
	35	Poovalur Tank	75.60
	36	Thiruvidainallur Tank	115.04
	37	Kathaliendal Tank	100.41
	38	Rettaikulam Tank	162.90
	39	Senthanathi Tank	112.20
	40	Odathur Tank	276.30
	41	Eluvani Tank	245.60
	42	Vellarendal Tank	210.85
	43	Vellarendalchinna Tank	30.60
IX		SENGANKULAM OPEN OFFTAKE	
	44	Sengankulam Tank	254.44
X		KIDAKULI OPEN OFFTAKE	
	45	Kidakuli Tank	96.38
XI		PIRANKULAM OPEN OFFTAKE	
	46	Pirankulam Tank	18.92
XII		PULIANKULAM OPEN OFFTAKE	
	47	Puliankulam Tank	105.10
	48	Villakkanenthal Tank	103.26
XIII		KATTANUR ANICUT	
	49	Kattanur Tank	3300.44

Sl.No.		Name of Tank	Ayacut (in Acres)
XIV		ATHIKULAM ANICUT	
	50	Irunchirai Tank	1257.83
	51	Mela parithiyur Tank	333.18
	52	Varisaiyur Tank	164.23
	53	Athikulam Tank	182.76
	54	Maraiyur Tank	329.96
	55	Olakudi Tank	454.20
	56	Manoor Tank	226.03
	57	Athithanenthal Tank	221.56
	58	Narikudi Tank	154.34
XV		NALLUKURICHI ANICUT	
	59	Veeracholan Tank	182.76
	60	Ottankulam Tank	19.12
	61	Keelapuliyandar kottai Tank	81.47
	62	Kurayaravasithan Tank	155.78
	63	Karunkalakudi Tank	70.94
	64	Sullangudi Tank	128.52
	65	Pathanakurichi Tank	50.47
	66	Nallukurichi Tank	237.44
	67	Valayankulam Tank	20.68
XVI		A.THARAIKUDI OPEN OFFTAKE	
	68	T.Kallikulam Tank	139.00
	69	T. Punavasal Tank	105.88
	70	A.Tharaikudi Tank	351.59
XVII		ABIRAMAM ANICUT	
	71	Abiramam Tank	1092.97
	72	Achankulam Tank	115.00
	73	Muthathipuram Tank	104.53
			18295.04

GRIDHUMAL RIVER - FLOW DIAGRAM

(AMBALATHADI NEW ANICUT TO AMBALATHADI OLD ANICUT)



RMC

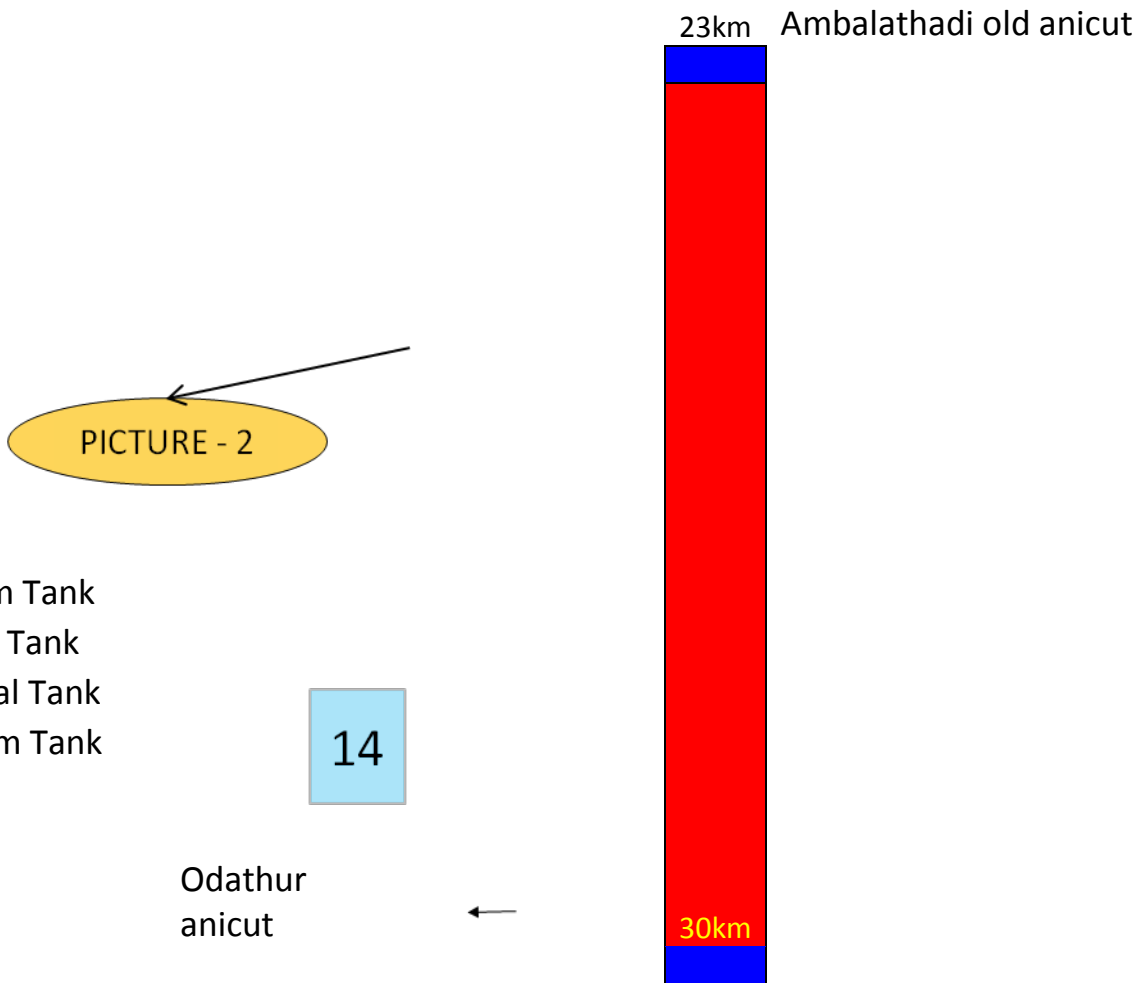
1 Karuvakudi Tank
2 S.Nangoor Tank
3 Peekulam Tank
4 T.Nedunkulam Tank
5 Kalathur Tank
6 Kallumadi Tank
7 Naluvedankulam Tank
8 Pallankulam Tank
9 Kottakarai tank
10 Pulvaikarai Tank
11 P. Odaikulam Tank
12 Vandavasi Tank
13 Kalasthriyendal Tank
14 Kundukulam Tank
15 Singampuliyendal Tank
16 Siruvanoor Tank
17 Arunagiri Tank
18 Saithanathapuram
19 Parisanendal Tank
20 Naloor Tank

LMC

1 Rangiam Tank
2 Ethirmarichan Tank

GRIDHUMAL RIVER - FLOW DIAGRAM

(AMBALATHADI OLD ANICUT TO ODATHUR ANICUT)

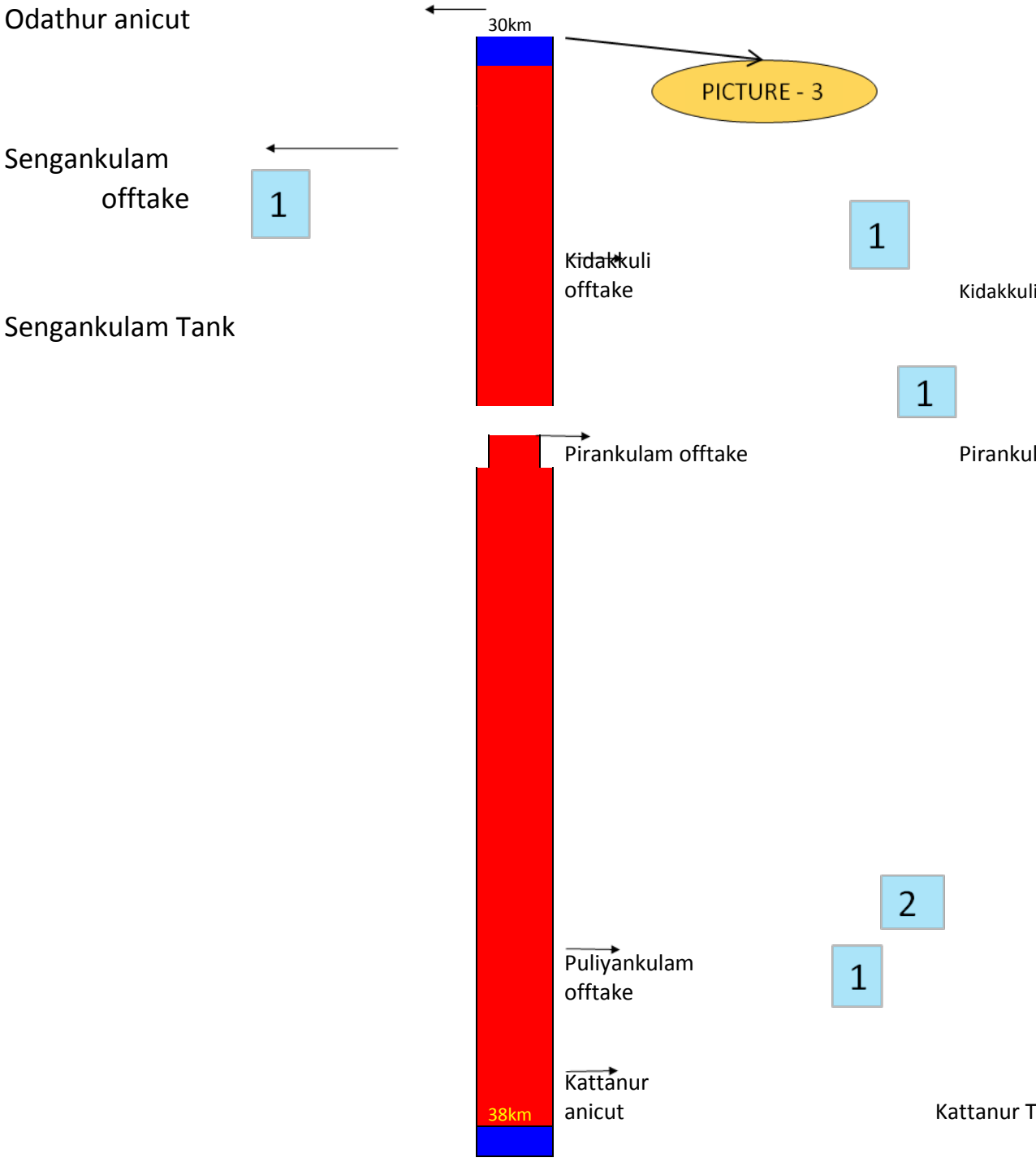


1 V. Karisalkulam Tank
2 Tamaraikulam Tank
3 Thatchanenthal Tank
4 T. Puliyankulam Tank
5 Alathur Tank
6 Poovalur
7 Thiruvidainallur Tank
8 Kathaliendal tank
9 Rettaikulam Tank
10 Senthanathi Tank
11 Odathur Tank
12 Eluvani Tank
13 Vellarendal Tank
14 Vellarendachinna Tank

`

GRIDHUMAL RIVER - FLOW DIAGRAM

(ODATHUR ANICUT TO KATTANUR ANICUT)



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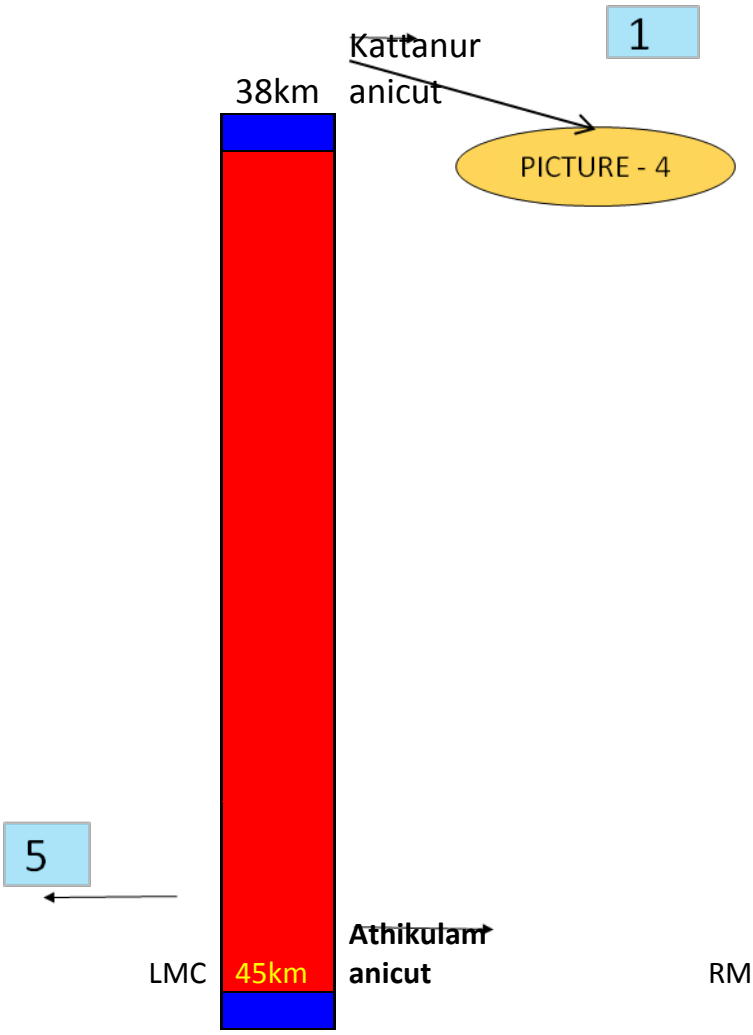
GRIDHUMAL RIVER - FLOW DIAGRAM

(KATTANUR ANICUT TO ATHIKULAM ANICUT)

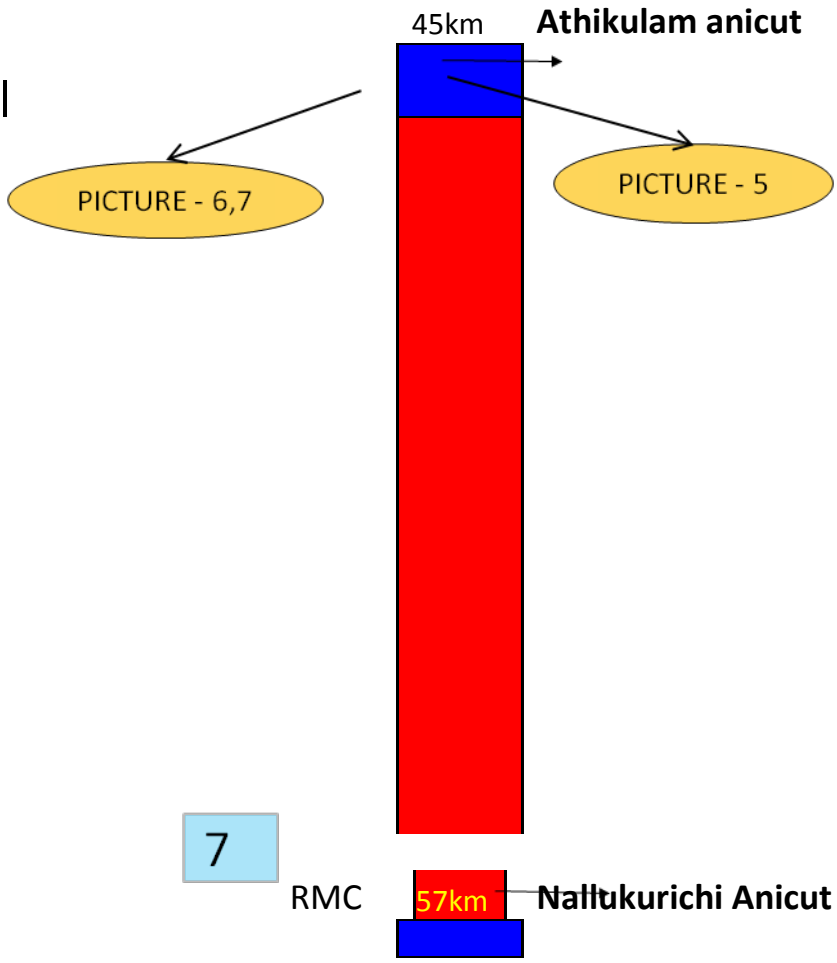


1 Kattanur Tank

1 Irunchirai Tank
2 Varisaiyur Tank
3 Athikulam Tank
4 Maraiyur Tank
5 Melaparithiyur Tank

1 Olakudy Tank
2 Manoor Tank
3 Athithanendal Tan
4 Narikudy Tank

GRIDHUMAL RIVER - FLOW DIAGRAM
(ATHIKULAM ANICUT TO NALLUKURICHI ANICUT)



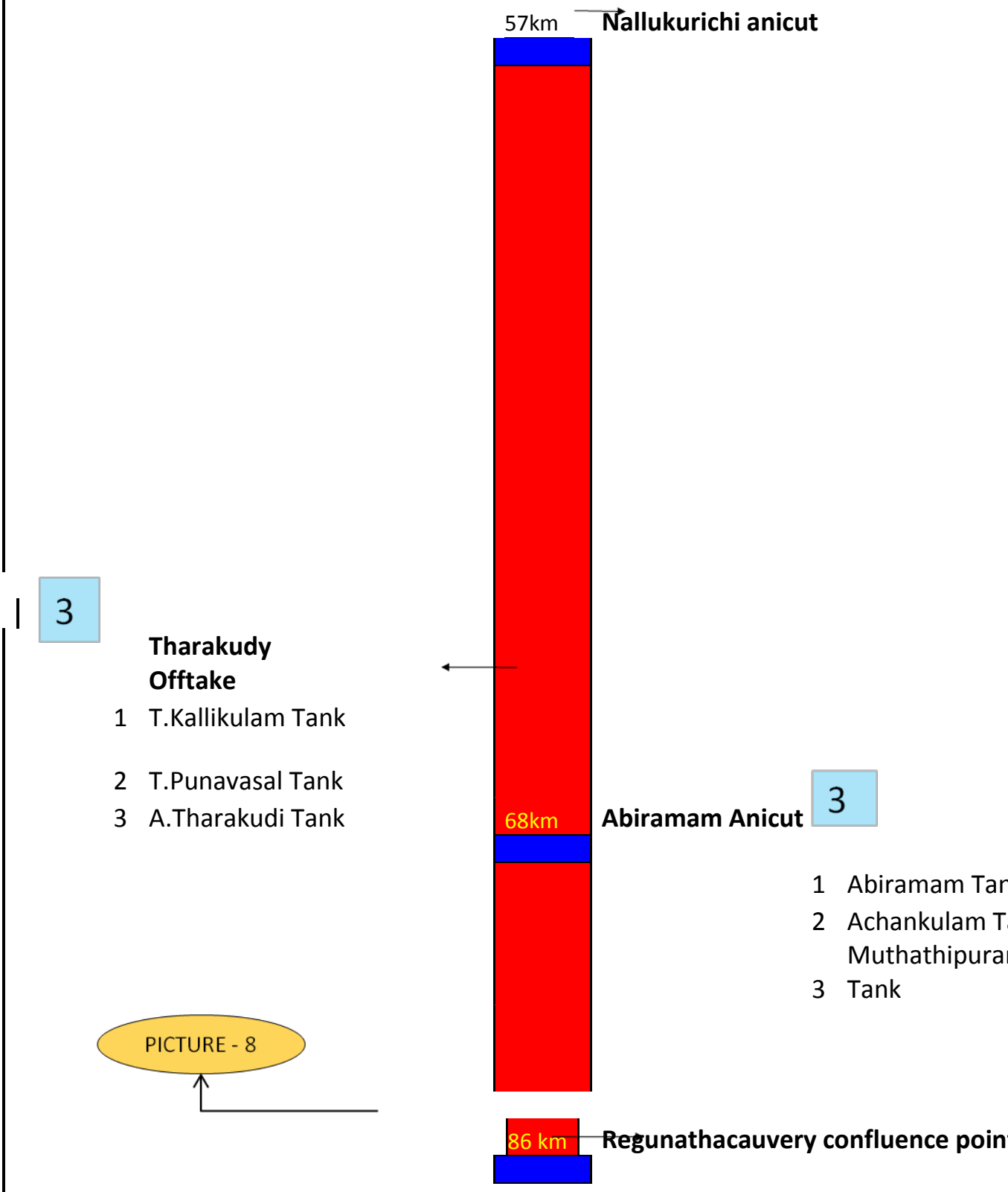
Ottankulam

1 Tank
2 Keelapuliyandar Kottai Tank
3 Karunkalakudy Tank
4 Sullangudi Tank
5 Pathanakurichi Tank
6 Nallukurichi Tank
7 Valayankulam Tank

1 Veeracholan Tank

GRIDHUMAL RIVER - FLOW DIAGRAM

(NALLUKURICHI ANICUT TO ABIRAMAM ANICUT UPTO REGUNATHACAUVERY CONFLUENCE POINT)



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PICTURE -1

AMBALATHADI ANICUT (NEW) - D/S

`

PICTURE -2

GRIDHUMAL RIVER NEAR KARUVAKKUDI BRIDGE- U/S

GRIDHUMAL RIVER NEAR KARUVAKKUDI BRIDGE- D/S

`

PICTURE - 3

GRIDHUMAL RIVER – ODATHUR ANICUT –

KATTANUR ANICUT-

PICTURE - 4

`

PICTURE - 5

ATHIKULAM ANICUT- U/S

ATHIKULAM ANICUT- D/S

`

PICTURE - 6

CAUSEWAY NEAR ULUTHIMADAI – U/S

CAUSEWAY NEAR ULUTHIMADAI – D/S

`

PICTURE - 7

CAUSEWAY NEAR ULUTHIMADAI

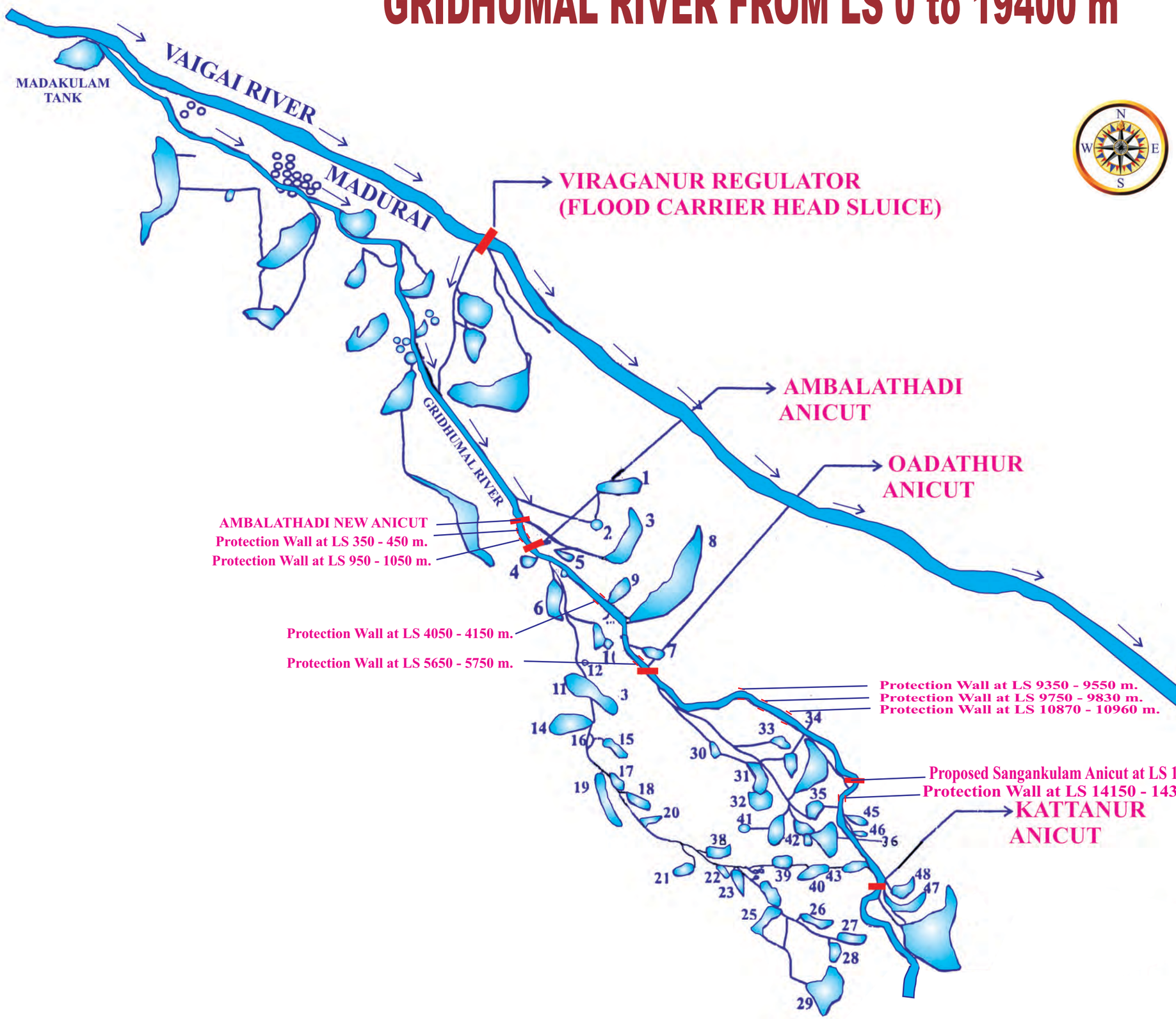
`

PICTURE - 8

GIRUDHUMAL INLET IN REGUNATHACAUVERY CHANNEL

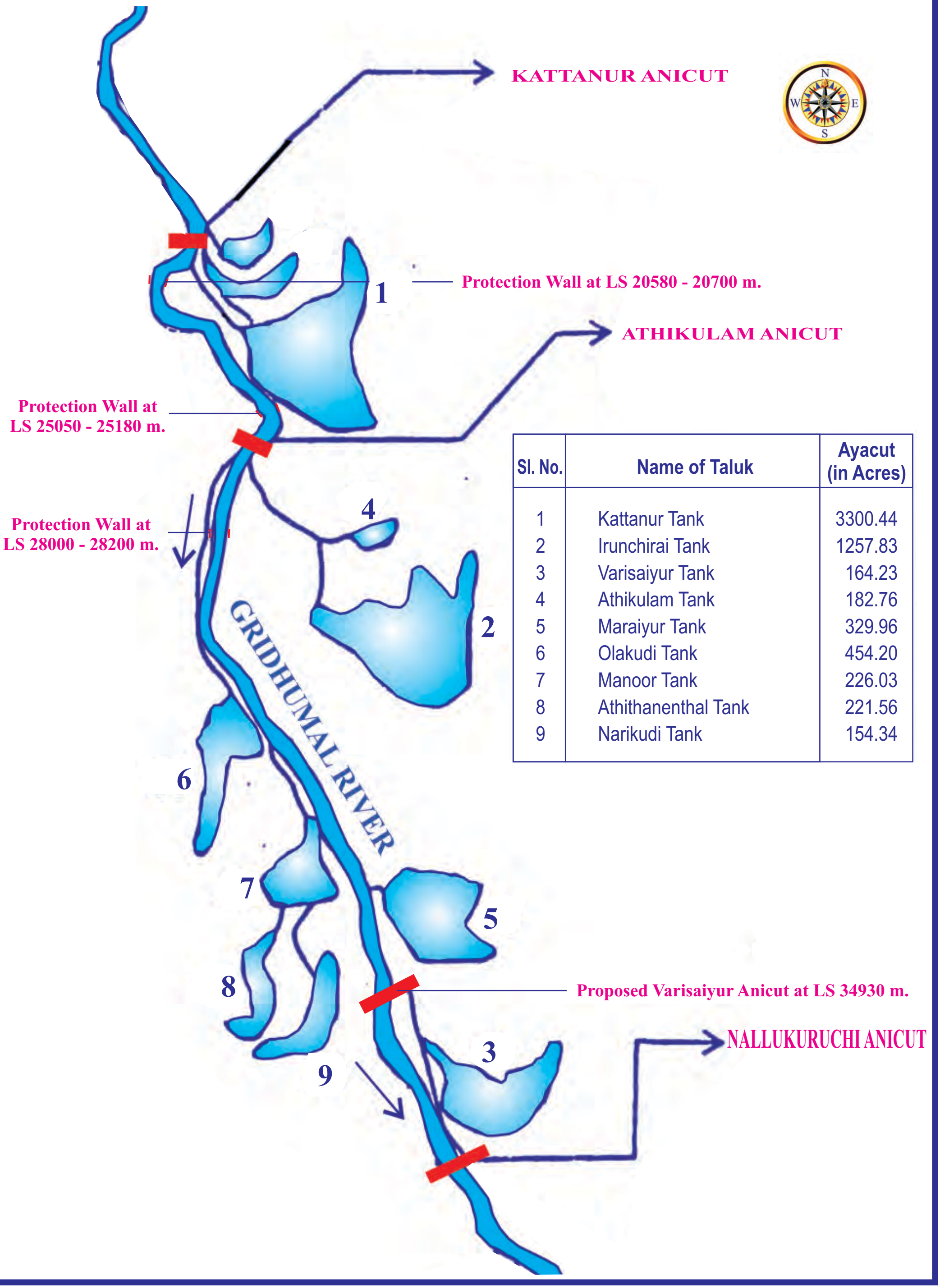
GIRUDHUMAL OUTLET IN REGUNATHACAUVERY CHANNEL

GRIDHUMAL RIVER FROM LS 0 to 19400 m



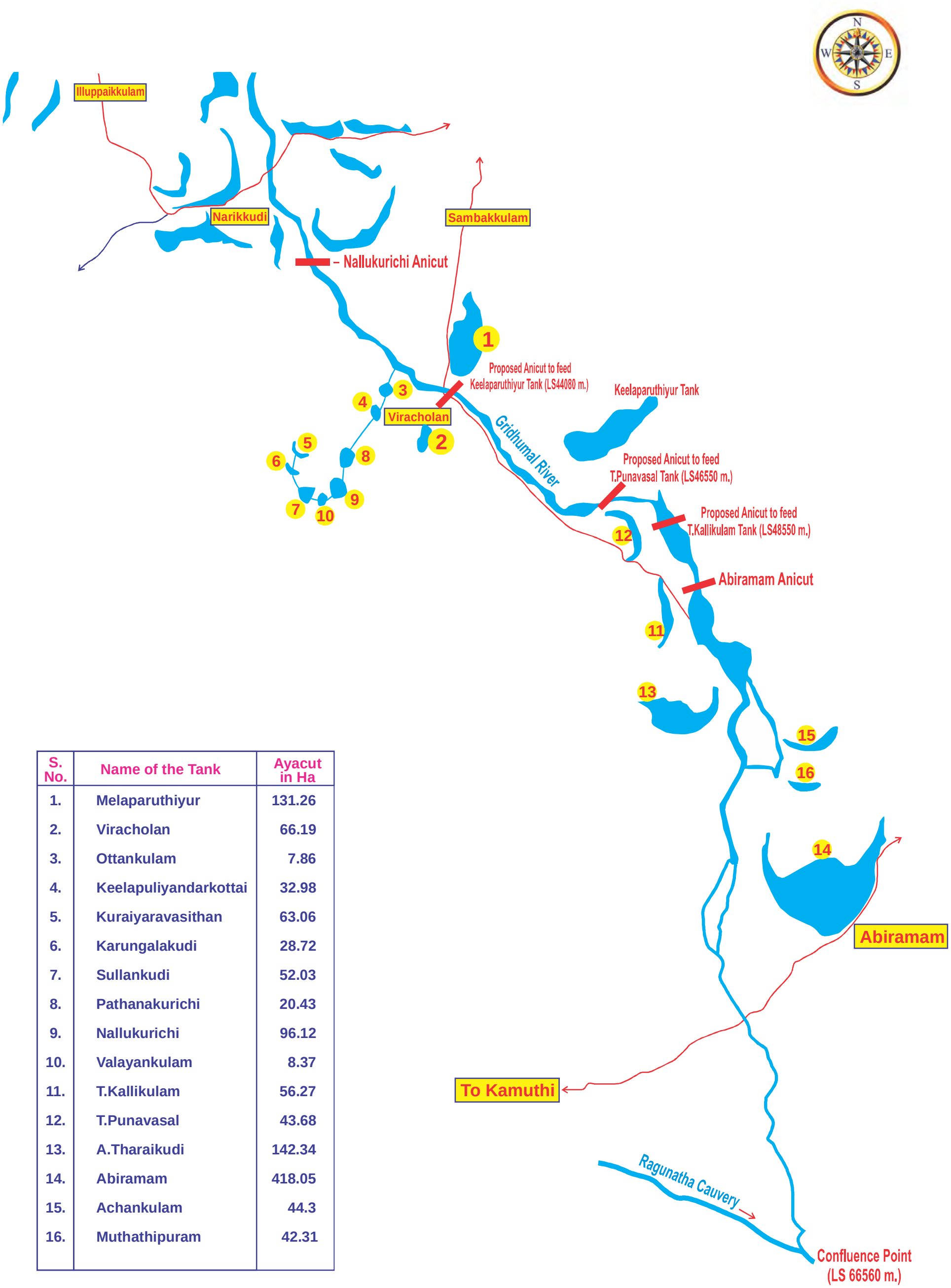
Sl.No.	Name of Tank	Ayacut (in Acres)
1	Mela Vellore Tank	740.70
2	Keela Vellore Tank	76.02
3	Mangudi Tank	1038.45
4	Moothakulam Tank	60.73
5	Ambalathadi Tank	268.33
6	Thavtharendal Tank	114.00
7	Pottapalayam Tank	163.00
8	Rangiam tank	1166.38
9	Edirmarichan tank	86.86
10	Karuvakkudi Tank	128.02
11	S.Nangoor Tank	152.27
12	Peekulam Tank	87.28
13	T.Nedunkulam Tank	63.78
14	Kalathur tank	13120
15	Kallumadi Tank	88.37
16	Naluvedankulam Tank	46.42
17	Pallankulam Tank	22.38
18	Kottakarai Tank	96.90
19	Pulvaikarai Tank	222.21
20	P.Odaikulam Tank	59.30
21	Vandavasi Tank	38.90
22	Kalasthriyendal Tank	40.28
23	Kundukulam Tank	138.65
24	Singampuliyendal Tank	42.60
25	Siruvanoor Tank	162.62
26	Arunagiri Tank	74.14
27	Saithanathapuram Tank	44.43
28	Parisanendal Tank	38.30
29	Naloor Tank	662.32
30	V.Karisalkulam Tank	45.76
31	Thamaraikulam Tank	203.75
32	Thatchanenthal Tank	109.08
33	T.Puliyankulam Tank	324.76
34	Alathur Tank	166.57
35	Poovalur Tank	75.60
36	Thiruvidanallur Tank	115.04
37	Kathaliendal Tank	100.41
38	Rettaikulam Tank	162.90
39	Senthanathi Tank	112.20
40	Odathur Tank	276.30
41	Eluvani Tank	245.60
42	Vellarendal Tank	210.85
43	Vellarendalchinna Tank	30.60
44	Sengankulam Tank	254.44
45	Kidakuli Tank	96.38
46	Pirankulam Tank	18.92
47	Puliankulam Tank	105.10
48	Villakkanenthal Tank	103.26

GRIDHUMAL RIVER FROM LS 19400 to 38500 m



Sl. No.	Name of Taluk	Ayacut (in Acres)
1	Kattanur Tank	3300.44
2	Irunchirai Tank	1257.83
3	Varisaiyur Tank	164.23
4	Athikulam Tank	182.76
5	Maraiyur Tank	329.96
6	Olakudi Tank	454.20
7	Manoor Tank	226.03
8	Athithanenthal Tank	221.56
9	Narikudi Tank	154.34

GRIDHUMAL RIVER FROM LS 38500 to 66560 m



S. No.	Name of the Tank	Ayacut in Ha
1.	Melaparuthiyur	131.26
2.	Viracholan	66.19
3.	Ottankulam	7.86
4.	Keelapuliyandarkottai	32.98
5.	Kuraiyaravasithan	63.06
6.	Karungalakudi	28.72
7.	Sullankudi	52.03
8.	Pathanakurichi	20.43
9.	Nallukurichi	96.12
10.	Valayankulam	8.37
11.	T.Kallikulam	56.27
12.	T.Punavasal	43.68
13.	A.Tharaikudi	142.34
14.	Abiramam	418.05
15.	Achankulam	44.3
16.	Muthathipuram	42.31

PUBLIC WORKS DEPARTMENT
WATER RESOURCES ORGANSATION

From
Er. S.Anbazhagan, B.E.,
Chief Engineer,
DR&CS,
Chepauk, Chennai-600 005.

To
The Chief Engineer, PWD
Madurai Region, WRO,
Madurai -1

Lr.No. 299 CE(D)/SE(D) / AEE X / F 563 / 2012, dated 27.12.2012

Sir,

Sub: Restoration and Regradation of Gridhumal River in Sivagangai , Virudhunagar and Ramanathapuram Districts – Regradation of river – Revised cross section of formation of banks, protection wall and bank connections - Approved drawings communicated – regarding.

Ref:
1. EIC, WRO, Ch - 05 Lr no IAMWARM/Gridhumal river Regradation/2012 dt:20.09.2012 addressed to the CE, Madurai Region with copy to this office.
2. SE(D) Inspection Notes Lr. No. 167 / AEE VII/ F 595 / dt 17.10.2012
3. SE, Vaippar Basin Circle, Virdhunagar Lr.No. 330 A/ M AE1/C-201/ Gridhumal / 2012 dt:15.10.12, received on 2.11.12.
4. CE, DR&CS, WRO lr.no.261 A/ AEE X / F563/ 2012 dated 12.11.2012
5. EE, Special Project Division, Madurai lr.no. EE/ IAMWARM/ GML/ 2012 DT. 07.12.2012

With regard to the restoration and regradation of the Gridhumal river in Sivagangai, Virudhunagar and Ramanathapuram districts, the design for the regradation of the Gridhumal river from New Ambalathadi anicut to the confluence with Reghunathacauvery and protection wall were formulated, as per the directions given by the World bank Consultant Thiru. R.K.Malhotra and the copy of the approved drawings communicated vide letter 4th cited. Since the soil parameters were not received from the Superintending Engineer, PWD, Vaippar Basin Circle, WRO, Virudhunagar, the soil parameters were assumed for the design.

Also during his visit from November 19-21, 2012, the World Bank Consultant had directed to provide necessary bank connections along the reaches of the Gridhamal river.

Further, in the reference 5th cited, the EE, Special Project Division, Madurai have furnished the above particulars, based on which the design has been revised and the revised drawings for

(5)

the banks, protection wall and the bank connections have been prepared and the copy of the approved drawings for the same is enclosed herewith for adoption.

Encl: Drawing – 4 Nos.

Sd/---dt.27.12.12
Chief Engineer, PWD,
DR&CS, WRO,
Chepauk, Chennai – 5.

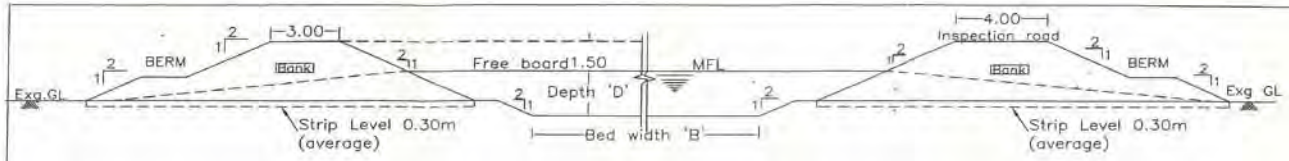
Copy submitted to the Engineer-in-Chief, WRO, Chepauk, Chennai-5

Copy with enclosure to:

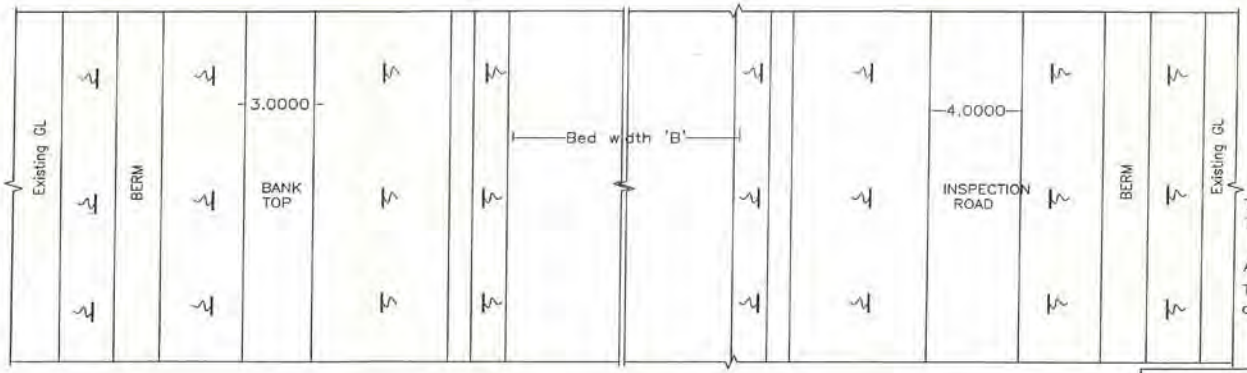
The Superintending Engineer, PWD, Vaippar Basin Circle, WRO, Virudhunagar
The Executive Engineer, PWD, Upper Vaippar Basin Division, WRO, Rajapalayam
The Executive Engineer, PWD, Vaippar Basin Division, WRO, Virudhunagar
The Executive Engineer, PWD, Gundar Basin Division, WRO, Madurai
The Executive Engineer, PWD, Special Project Division, WRO, Madurai
The Executive Engineer, PWD, Special Project Division, WRO, Virudhunagar

The Superintending Engineer, PWD, Designs Circle, WRO, Chepauk, Chennai- 05.
The Chief Engineer, DRCS – office file.

27/12/12
for Chief Engineer, PWD,
DR&CS, WRO,
27/12/12 Chepauk, Chennai – 5.



TYPICAL CROSS SECTION



PLAN OF RIVER AT ANY LS PARTIALLY IN CUTTING AND PARTIALLY IN FILLING

This drawing supercedes the series of drawings from T No.253/2012 to T No 254/2012

All dimension are in 'm' unless or otherwise specified.

This drawing should be read with the series of drawings T No. 335/2012 to T No 338/2012

Sheet No 1/4

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.V.Arivazhagan AE		Name of work : RESTORATION AND REGRADATION OF GRIDHUMAL RIVER IN SIVAGANGAI, VIRUDHUNAGAR AND RAMANATHAPURAM DISTRICTS
Drawn by Er. S.Suganya AE	27/12/12	
Checked by Er.E.Seena Divakaran AEE	27/12/12	
Verified by Er.K.Padmanabhan EE(D)	27/12/12	Designed drawing of : TYPICAL CROSS SECTION OF RIVER
Recommended by Er.K.S.K.Thulasiram, SE(D)	27/12/12	
Approved by Er.S.Anbazhagan,CE,(DR&CS)	27/12	Region: Madurai / Circle: Periyar Vaigai Basin Circle
T.NO: 335 /2012	SCALE 1:200	APPROVED in C.E.(D.R.C.S) Lr NO.295/CE/SE(D) / AEE / F563/2012/ DATED 27-12-2012

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Sl.No.	REACH			BED LEVEL AT START OF REACH 'm'	BED LEVEL AT END OF REACH 'm'	SLOPE 1 IN	DESIGNED BED WIDTH 'B'	DISCHARGE in Cumecs	DEPTH OF FLOW 'D' in 'm'	INSPECTION ROAD		SPOIL BANK		REMARKS
	From		To							MINIMUM TOP WIDTH	MINIMUM BERM WIDTH	MINIMUM TOP WIDTH	MINIMUM BERM WIDTH	
1	0 Km	to	1.86 Km	101.105	106.370	680	20	3600	1.986	4.00	--	3.00	--	
2	1.86 Km	to	6.90 Km	106.370	99.450	728	30	4660	1.884	4.00	--	3.00	--	Upto second Bridge
3	6.90 Km	to	9.10 Km	99.450	95.070	650	45	5880	1.656	4.00	--	3.00	--	
4	9.10 Km	to	13.10 km	95.070	89.500	700	45	5880	1.690 – upto LS 11100m 1.690 to 2.180 – from LS 11100 to 13100m	4.00	--	3.00	--	Sangankulam anicut
5	13.10 Km	to	14.50 Km	88.500	86.775	820	50	6880	1.832	4.00	--	3.00	--	
6	14.50 Km	to	16.50 Km	86.775	85.080	1150	45	8270	2.417	4.00	--	3.00	--	
7	16.50 Km	to	17.00 km	85.080		950	45	8270	2.267	4.00	--	3.00	--	
8	17.00 km	to	18.00 km			950	45	8270	2.267	4.00	2.00	3.00	2.00	
9	18.00 km	to	19.40 Km		82.015	950	45	8270	2.267	4.00	--	3.00	--	
8	19.40 Km	to	26.10 Km	82.015	73.275	780	60	9620	1.981	4.00	--	3.00	--	
9	26.10 Km	to	26.60 Km	72.475	71.860	813	65	9620	1.913	4.00	--	3.00	--	Drop@ 26.10km of ht.0.80m
10	26.70 Km	to	28.255 Km	71.860	67.175	330	65	9620	1.463	4.00	--	3.00	--	
11	28.255 Km	to	30.70 Km	67.175	64.850	1100	75	9620	1.925	4.00	--	3.00	--	
12	30.70 Km	to	32.15 km	64.850	63.560	1100	90	10650	1.837	4.00	--	3.00	--	
13	32.15 Km	to	34.93 Km	63.560	60.500	900	90	10650	2.750	4.00	2.00	4.00	2.00	Varisaiyur anicut
14	34.93 Km	to	36.70 Km	60.300	59.700	2950	90	11300	2.565	4.00	2.00	3.00	2.00	
15	36.70 Km	to	38.50 Km	59.700	56.400	545	90	11300	1.543	4.00	--	3.00	--	
16	38.50 Km	to	43.225 km	54.900	50.9650	1200	60	11300	2.476	4.00	2.00	3.00	2.00	Drop at 38.60km of ht.1.50m
17	43.225 Km	to	44.08 Km	50.965	50.000	884	60	11300	2.476 @ d/s of Veerachoian causeway & 2.980 @ u/s of Keelaparuthiyur anicut	4.00	2.00	4.00	2.00	Keela– paruthiyur anicut
18	44.08 Km	to	44.70 Km	49.900	49.385	1200	60	11300	2.476	4.00	2.00	4.00	2.00	
19	44.70 Km	to	48.85 km	49.385	47.2000	1900	60	12530	2.850	4.00	3.00	4.00	3.00	Kallikulam Anicut
	48.85 km		52.40 Km	46.200	43.710	1425	60	12530	2.790	4.00	2.00	4.00	2.00	
20	52.40 Km	to	53.07 Km	43.710	42.890	817	90	12530	1.852	4.00	--	3.00	--	
21	53.07 Km	to	56.60 Km	42.890	38.960	900	120	13030	1.646	4.00	--	3.00	--	
22	56.60 Km	to	58.15 Km	38.960	36.930	763	120	13530	1.602	4.00	--	3.00	--	
23	58.15 Km	to	59.30 Km	36.930	35.475	790	110	14030	1.742	4.00	--	3.00	--	
24	59.30 Km	to	60.50 Km	35.475	34.190	933	110	14530	1.831	4.00	--	3.00	--	upto Causeway
25	60.50 Km	to	61.00 Km	34.190	33.660	943	110	14530	1.875	4.00	--	3.00	--	
26	61.00 Km	to	63.70 Km	33.660	31.000	1015	70	15030	2.551	4.00	2.00	4.00	2.00	
27	63.70 Km	to	65.00 Km	31.000	30.000	1300	75	15030	2.741	4.00	2.00	4.00	2.00	
28	65.00 Km	to	66.58 Km	30.000	28.000	780	60	16040	2.681	4.00	2.00	4.00	2.00	

60.500
/2200 → 2.405

This drawing supercedes the series of drawing from T.No. 253 /2012 to T.No. 254/2012

This drawing should be read with the series of drawings T No.335/2012 to T No 338/2012

Sheet No 2/4

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by
Er.V.Arivazhagan AE

Drawn by
Er.S.Suganya AE

Checked by
Er.E.Seena Divakaran AEE

Verified by
Er.K.Padmanabhan EE(D)

Recommended by
Er.K.S.K.Thulasiram, SE(D)

Approved by
Er.S.Anbazhagan,CE,(DR/sCS)

T.NO: 336/2012

Name of work :
RESTORATION AND REGRADATION OF GRIDHUMAL RIVER IN SIVAGANGAI, VIRUDHUNAGAR AND RAMANATHAPURAM DISTRICTS

Designed drawing of :
HYDRAULIC PARTICULARS – FORMATION OF BANK FOR RESTORATION OF GRIDHAMAL RIVER

Region: Madurai

Circle: Periyar Vaigai Basin Circle

APPROVED in C.E.(D.R.C.S) Lr NO.SE/SE(D)/EE(D)/ AEE X / 1563/2012/ DATED.7.12.2012

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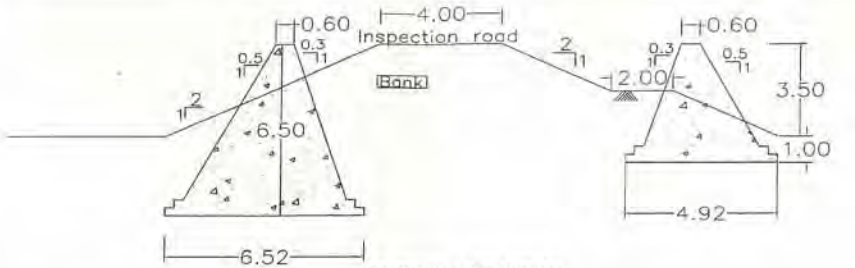
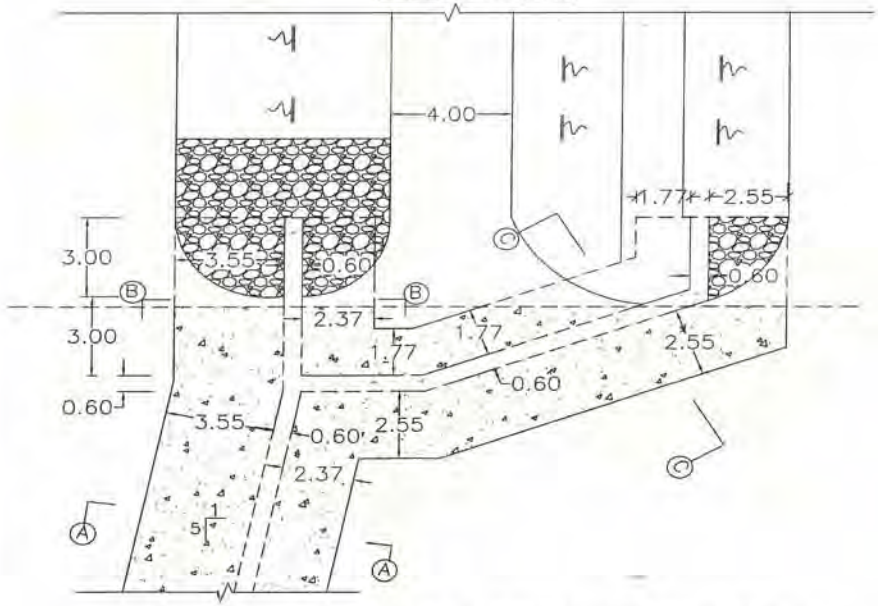
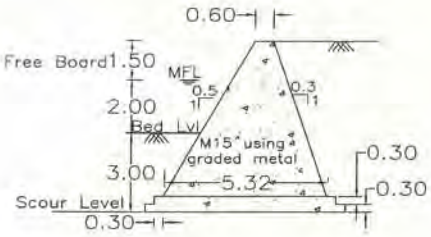


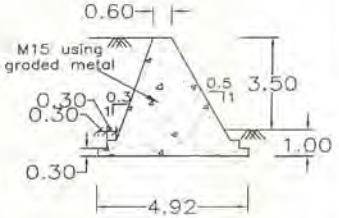
SECTIONAL ELEVATION



HALF PLAN AT TOP & HALF PLAN AT BOTTOM



SECTION AT A–A & B–B



SECTION AT C–C

This drawing supercedes the series of drawing from T.No. 253 /2012 to T.No. 254/2012

All dimensions are in 'm' unless or otherwise specified.

This drawing should be read with the series of drawings T No. 337 /2012 to T No 338 /2012

Sheet No 3/4

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.V.Arivazhagan AE		Name of work : RESTORATION AND REGRADATION OF GRIDHUMAL RIVER IN SIVAGANGAI, VIRUDHUNAGAR AND RAMANATHAPURAM DISTRICTS
Drawn by Er.S.Suganya AE		
Checked by Er.E.Seena Divakaran AEE	27/11/12	
Verified by Er.K.Padmanabhan EE(D)	K. Padmanabhan 27/11/12	Designed drawing of : TYPICAL SECTION OF BANK CONNECTIONS
Recommended by Er.K.S.K.Thulasiram, SE(D)	27/11/12	Region: Madurai / Circle: Periyar Vaigai Basin Circle
Approved by Er.S.Anbazhagan,CE,(DR&CS)	27/11/12	APPROVED in C.E.(D.R.C.S) Lr NO.299CE/SE(D)/AEE X/ F583/2012/ DATED 27 .12 .2012
T.NO: 337 /2012	SCALE 1: 150	

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NOTES

1. The design is based on the particulars furnished by the Superintending Engineer, PWD, Vaippar Basin Circle, WRO during the inspection of site by the Superintending Engineer, Designs Circle, WRO on 5.10.2012 and in letter no. 330A /M/ AE I/ C-201/ Gridhumal/ 2012 dated 15.10.2012 and in EE, Special Project Division, Madurai lr.no. EE/ IAMWARM/ GML/ 2012 DT.07.12.2012.
2. As the river do not have definite cross section and banks in most of the reaches, it is necessary to form the river section including the embankment. A typical river section including the embankment is furnished based on the guidelines stipulated in IS 12094 :2000.
3. A statement showing the proposed bed width, depth of flow, bed slope etc. has been prepared reachwise, based on the details furinished by the Superintending Engineer, Vaippar Basin Circle, WRO and appended in Sheet no. ½.
4. The top level of embankment in each reach shall be arrived at to suit the site conditions. The bank level at the upstream of the proposed Sangankulam, Varisaiyur, Keelaparithiyur and T.Kallilukam anicuts are taken care of in this design. In addition the height of banks on the upstream of all existing anicuts shall be above the respective front MFL.
5. The design bed width is adopted based on an average value in that reach as per FMB. As far as possible the bed width shall be increased to the maximum possible in each reach. In the locations where the bed width available is less than the designed bed width, retaining walls shall be constructed.
6. The bed slope has been arrived based on the sill levels of the structures existing in each reach.
7. The bed shall be regraded to the arrived slope in each reach. However the sill levels at the control structures such as bridges, culverts shall be maintained and minor adjustment of slope shall be made.
8. In reaches where the bed slope is found to be steeper, resulting creation of velocity higher than the permissible value, drops have been proposed (i.e LS 26.10 km and at LS 38.60 Km) in order to protect the structure due to scouring.
9. The bed levels at the upstream and downstream of various structures shall be maintained by providing required protective measures.

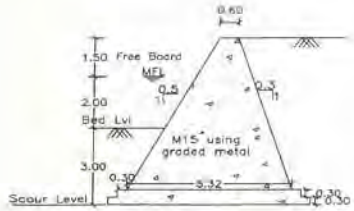
FORMATION OF FLOOD BANKS

10. The existing side slopes of the river shall be trimmed to a slope not steeper than 2:1, beyond which the banks shall be provided as shown.
11. For the hydraulic gradient line to have adequate cover in the downstream side (country side) of the banks, HGL with a gradient of 1 in 5 has been computed based on the type of soil reported (SC-CL) in the respective reaches for the bank and the top width of banks along with berms if necessary, so that the HGL never intersect the outside (country side) slope of bank above ground level and a cover of minimum 0.6m is available on the HG line.
    However the soil classification NP-SM (Non-Plastic – Sandy silt) is not suitable for formation of bund. So it is recommended that in such reaches a soil with following parameter should be used by conveyance if needed :
    - Soil type – SC, SM & CL
    - Clay content – 20-25 %
    - Optimum Moisture Content – 1.76 – 2.00 gm/cc

    For other reaches also, a clay content of 20-25% should be ensured.
    Berm, wherever recommended, should be formed 0.30m below the Full supply Depth.
12. At the top of banks suitable camber may be given to drain the water into the river.
13. When the embankment is formed the top soil at existing ground level may be stripped for a depth of 0.30 m.
14. The banks shall be formed in layers by suitable compaction methods at 95% optimum moisture content.

PROTECTIVE WALLS

15. Walls may be provided in locations where the available width is less and sufficient space is not available to accommodate the banks to the designed section.
16. (i) During execution the section of the wall shall be adopted to suit the site condition. If major variation is noticed in the value of 'q' and depth of flow 'D' and in the classification of sub-soil, the same may be referred to the Designs Circle for evolving suitable section.
    (ii) Surface reinforcement on all exposed surfaces shall be provided in each direction, ie. both horizontally and vertically, with 8mm dia bars, the spacing of which shall not exceed 200 mm.
17. Provisions shall be made in the banks and retaining walls for inlets and proper bank connections shall be made wherever necessary.
18. Proper transition in the banks and walls may be provided at reaches where the bed width changes drastically.
19. The escape weir for Sangankulam tank is proposed on the right bank in the reach immediately below LS 13100m. The bund has to be protected at this reach, from the surplus flow of this escape weir.



Typical Section of Retaining wall

This drawing supercedes the series of drawings from T No. 253/2012 to T No 254/2012

All dimensions are in 'm' unless or otherwise specified.

This drawing should be read with the series of drawings T No. 335/2012 to T No 338/2012

Sheet No 4/4

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.V.Arivazhagan AE		Name of work : RESTORATION AND REGRADATION OF GRIDHUMAL RIVER IN SIVAGANGAI, VIRUDHUNAGAR AND RAMANATHAPURAM DISTRICTS
Drawn by Er.S.Suganya AE		
Checked by Er.E.Seena Divakaran AEE		
Verified by Er.K.Padmanabhan EE(D)		Designed drawing of : GENERAL NOTES & TYPICAL SECTION OF RETAINING WALL
Recommended by Er.K.S.K.Thulasiram, SE(D)		
Approved by Er.S.Anbazhagan,CE,(DR&CS)		Region: Madurai / Circle: Periyar Vaigai Basin Circle
T.NO: 338/2012	SCALE 1:150	APPROVED in C.E.(D.R.C.S) Lr NO.2192/E/SE(D) / AEE X/ F383/2012/ DATED 27-12-2012

20/4

Public Works Department
Water Resources Organisation

From
Er.S. Anbazhagan, B.E.,
Chief Engineer, PWD
Design Research and Construction Support, WRO,
Chennai 600 005.

To
The Chief Engineer, PWD,
Madurai Region, WRO,
Madurai.

Lr.No: 265 CE / AEE XI / F 563 / 2012 dated 16 .11.2012

Sir,

Sub: Restoration and Regradation of Gridhumal river in Sivagangai, Virudhunagar and Ramanathapuram districts - Construction of an anicut across Gridhumal river to feed Sankankulam tank in Piramanur village of Manamadurai taluk in Sivagangai district– Design and Drawing of Anicut submitted for approval – reg.

Ref : 1.EIC Lr. No. IAMWARM/Gridhumal river Regradation/2012 dt. 20.09.2012. addressed to the Chief Engineer, Madurai Region with copy to this office.

2.S.E., PWD, Vaippar Basin Circle, WRO, Virudhunagar lr. No. 330A/M/ AEI/C-201/Gridhumal/2012/ dt. 15.10.12.

3.SE(D) Inspection notes Lr. No. / AEE VIII/F 595/ dt. 17.10.2012.

The Engineer-in-Chief in his letter cited has communicated a copy of the comments of Thiru. R.K. Malhotra, Consultant, World Bank, regarding the proposal for "Restoration and Regradatrion of Gridhumal river in Sivagangai, Virudhunagar and Ramanathapuram districts". As per his comments the following are to be designed by Chief Engineer, DR&CS.

1.The proposed river section including the embankments to be formed on the banks.

2.Provision of additional spillway at the head regulator of Link Canal and improvements to link canal.

3.The proposed check dams at of take points along the Gridhumal river.

Accordingly the site was inspected by the Superintending Engineer (Designs) on 5.10.2012 along with SE Vaippar Basin Circle. The detailed project report was received from the SE, Vaippar Basin Circle vide reference 2nd cited. The various components as proposed by the SE Vaippar Basin Circle are as follows

1.Section for Gridhumal river from Ambalathadi new anicut to tail end of Gridhumal.

13

2.Anicut across Gridhumal river to feed Sankankulam tank @ LS 13100m

3.Anicut across Gridhumal riover to feed Keelaparithiyur tak @ LS 44100m

4.Protection wall for the narrow portion.

Based on the particulars received the bedslope, bed width, cross section and discharge of the Gridhumal river for various reaches was arrived and communicated to the field engineers. Accordingly the hydraulic particulars of the anicut across Gridhumal river to feed Sankankulam tank @ LS 13100m was arrived as

Bed slope	:	1 in 820
Bed width	:	80m
Maximum discharge	:	6880 cusecs

MAXIMUM FLOOD DISCHARGE

The maximum flood discharge of the anicut has been arrived as 6880 Cusecs and the same is taken as design flood of the anicut.

COMPUTATION OF REAR WATER LEVEL

From the L.S. of the river furnished, the bed slope of the river is computed as 1 in 820. The R.W.L. is computed for the regraded section of the river adopting this bed slope and works out to be +90.36m.

LAYOUT

It is proposed to provide 4 Nos. of scour vents (2 Nos. on either sides of anicut) of size 1.50 x 1.30m with sill level of +89.20m with a discharging capacity of 30.74 cumecs under maximum flood condition. Therefore, the anicut is proposed for a length of 70.00 m to dispose of the balance discharge. The total length of the structure considered for design in between the abutments is 80m.

CREST LEVEL OF ANICUT

The crest level has been fixed at +90.50m. The average bed level of the river at the proposed site location is +89.50. Hence, the height of the anicut is 1.00m.

COMPUTATION OF FRONT MAXIMUM WATER LEVEL

The front MWL for the above arrangements to dispose the design flood, adopting broad crested weir formula (having a C_d value of 0.577 for free weir condition), for the anicut is computed as +91.68m, with a head over crest of 1.18m.

DESIGN OF ANICUT PORTION

STABILITY OF BODY WALL

A broad crested weir having a top width of 1.00m, with vertical upstream face and downstream slope of 0.6:1 is proposed for the body wall portion. The stability of the body wall is checked for the following loading conditions,

1. Empty condition.
2. Water at MWL, and maximum tail water with uplift.
3. Water at crest level with full uplift, no tail water.

The stresses developed at the bottom of the body wall are computed and tabulated below.

Sl.No	Description	Stress in t/m^2	
		Maximum	**Minimum**
1.	Empty condition	2.96	0.94
2.	Water at MWL and maximum tail water	1.46	0.14
3.	Water at crest level with full uplift and no tail water	1.57	1.33

DESIGN OF PERMEABLE FOUNDATION

Permeable foundation is proposed for the anicut. The apron floor is designed for the following flow conditions.

1. Subsurface flow condition
2. Surface flow condition

The thickness of the floor is arrived based on Khosla's theory for the subsurface flow condition adopting an exit gradient of 1 in 5. The energy dissipation arrangements such as basin level, basin length are arrived for the surface flow conditions. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete.

The salient features of the anicut are

Maximum Flood Discharge	:	**194.82 Cumecs or 6880 Cusecs**
Crest Level	:	+ 90.50m
Head over crest	:	1.18m

Front Maximum Water Level	:	+91.68m
Rear Maximum Water Level	:	+90.36m
Upstream bed level	:	+89.50m
Downstream bed level	:	+88.50m
Length of anicut	:	**70.0m**
Height of anicut	:	1.00m
Top width	:	1.00 m
Upstream slope	:	vertical
Downstream slope	:	0.6 : 1
Total length of floor	:	**14.00m**
Depth of upstream cutoff	:	3.3m
Depth of downstream cutoff	:	2.30m
Thickness of floor at toe	:	0.80m
Thickness of floor at end	:	1.00m
Length of stilling basin	:	**8.02m**
Stilling Basin Level	:	+88.20m

Downstream Protection works

Beyond the stilling basin 3 rows of CC blocks of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness are proposed. It is proposed to have a launching apron for a length of 6m having inner and outer thickness of 1.20m and 1.80m respectively.

DESIGN OF SCOUR VENT PORTION

Computation of linear waterway

It is proposed to provide 4 vents of size 1.50 x 1.30m (2 nos. on each sides) to discharge 30.74 Cumecs or 1085.57 cusecs (i.e., 15.77% of the Maximum Flood Discharge) with sill level at +89.20m.

Design of permeable foundation

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The salient features of the scour vent are as follows.

Discharge through scour vent	:	**30.74 Cumecs or 1085.57 Cusecs**
Sill level	:	+89.20m
No. of vents	:	4 Nos.
Size of vent	:	1.50 x 1.30m
Total length of floor	:	**22.00m**
Upstream Bed Level	:	+89.20m
Downstream Bed level	:	+88.50m
Depth of upstream cutoff	:	3.00m
Depth of downstream cutoff	:	2.30m
Thickness of floor at toe	:	1.40m
Thickness of floor at end	:	1.00m
Stilling basin level	:	+87.70m
Length of stilling basin	:	**10.25m**

Downstream Protection works

Beyond the stilling basin 3 rows of CC blocks of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness are proposed. It is proposed to have a launching apron for a length of 6m having inner and outer thickness of 1.20m and 1.80m respectively.

DESIGN OF PIER

The top of the pier is kept as +92.80 m. The height of the pier from the sill level is 3.60m. The stability of the pier is checked for the following conditions.

Condition1: All shutters are in closed condition

Condition2: All shutters are in fully opened condition

Condition3: When one shutter closed and the adjacent being in opened condition.

It is suggested to provide a thickness of 1.0m and a length of 3.00m for the pier. The stresses developed due to the various forces involved at the four corners of the pier are computed for all the loading conditions and are summarized below.

Sl.No	Condition	Stresses in t/m²			
		Corner A	Corner B	Corner C	Corner D
1	All shutters are in closed condition.	17.46	7.124	7.124	17.46
2	All shutters are in fully opened condition.	0.093	11.688	17.962	5.569
3	When one shutter closed and the adjacent being in opened condition	3.24	12.70	13.359	4.697

The pier is proposed in M15 concrete. Surface reinforcement at the rate of 2.5kg/m^2 shall be provided in each direction. ie both horizontally and vertically. Spacing of such bars shall not exceed 200m.

DESIGN OF DIVIDE WALL

It is suggested to provide divide walls both at upstream and downstream side in between the scour vents and anicut portion. The proposed top levels of upstream and downstream divide wall are fixed as +90.50m. The divide walls are designed based on IS 12720 – 1993. The proposed thickness of the upstream and downstream divide walls are 0.45m and 0.60m respectively. The divide walls are proposed in M25 concrete. Necessary reinforcements in Fe415 are proposed for the moments developed.

DESIGN OF ABUTMENT AND WING WALLS

The left and right abutments are designed for the earth pressure caused due to the backfill material. The top of operating platform is proposed at +92.80m. The parameters of the backfill material such as saturated unit weight and angle of internal friction have been assumed as 2.0t/m^3 and 30^0 respectively. Necessary wing walls have also been designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is 19.61t/m^2. The abutments and wing walls are proposed in M15 concrete using graded metal. It is suggested to provide surface reinforcement at the rate of 2.5 kg/m2 in the abutment wing walls and return walls at the water face in each direction. ie. both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

DESIGN OF CANAL HEAD SLUICE

Computation of linear waterway

It is proposed to provide 3 vents of size 1.00 x 0.50m to draw the required discharge of 1.70 Cumecs or 60 Cusecs, with sill level at +89.80m.

Design of permeable foundation:

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The salient features of the Head Sluice are as follows

Discharge through Head Sluice vent	:	1.70 Cumecs or 60.00 Cusecs
Sill level	:	+89.80m
FSL in channel	:	+89.74m
No. of vents	:	3 Nos.
Size of vent	:	1.00 x 0.50m
Total length of floor	:	**14.50m**
Upstream Bed Level	:	+89.20m
Downstream Bed Level	:	+89.20m
Depth of upstream cutoff	:	2.00m
Depth of downstream cutoff	:	2.0m
Thickness of floor at toe	:	1.20m
Thickness of floor at end	:	1.00m
Stilling basin level	:	+88.80m
Length of stilling basin	:	**5.80m**

Design of breast wall

Since the computed FMFL of +91.68m is higher than the top of shutter +90.45, breast wall is proposed in the sluice vent. Necessary top and bottom beams are proposed in the breast wall. The thickness of the proposed breast wall is 0.20m. The sizes of top and bottom beams are 0.2m x 0.20m and 0.25m x 0.25m respectively. The breast wall and beams are proposed in M25 concrete.

Downstream Protection works

Beyond the stilling basin 1 row of CC block of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness is proposed. It is proposed to have a launching apron for a length of 2.0m having inner and outer thickness of 0.80m and 1.20m respectively.

DESIGN OF PIER

The top of the pier is kept as +92.80 m. The height of the pier from the sill level is 3.00m. The stability of the pier is checked for the following conditions.

Condition1: All shutters are in closed condition

Condition2: All shutters are in fully opened condition

Condition3: When one shutter closed and the adjacent being in opened condition.

It is suggested to provide a thickness of 0.90m and a length of 2.50m for the pier. The stresses developed due to the various forces involved at the four corners of the pier are computed for all the loading conditions and are summarized below.

Sl.No	Condition	Stresses in t/m^2			
		Corner A	Corner B	Corner C	Corner D
1	All shutters are in closed condition.	19.409	1.976	1.976	19.409
2	All shutters are in fully opened condition.	3.706	6.498	13.89	10.936
3	When one shutter closed and the adjacent being in opened condition	12.446	4.568	4.778	12.818

The pier is proposed in M15 concrete. Surface reinforcement at the rate of $2.5kg/m^2$ shall be provided in each direction. ie both horizontally and vertically. Spacing of such bars shall not exceed 200m.

Design of Abutment and Wing Walls

The left and right abutments are designed for the earth pressure caused due to the backfill material. The top of operating platform is proposed at +92.80m and thus the top of the abutment is proposed at +92.80m. The parameters of the backfill material such as saturated unit weight and angle of internal friction have been assumed as $2.0t/m^3$ and 30^0 respectively. Necessary wing walls are also designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is 15.20t/m^2. The abutments and wing walls are proposed in M15 concrete using graded metal. It is suggested to provide surface reinforcement at the rate of 2.5 kg/m2 in the abutment wing walls and return walls at the water face in each direction. ie. both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

The following points should be considered before taking up the work.

1) The bottom of the D/s cut off wall shall not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements have to be provided around the cutoff wall.

2) Weep holes with necessary filter arrangements shall be provided at the upstream and downstream wing walls above the M.W.L. and R.W.L. respectively.

3) The depth of footing for abutment and wing walls proposed below the sill level is as per the details furnished.

4) Surface reinforcement at the rate of 2.5 kg/m^2 shall be provided in the abutment and wing walls at the water face in each direction. ie. Both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

5) Suitable Flood banks should be formed on the upstream and downstream side allowing a minimum free board of 1.0m above the water surface elevation as per the design given for Gridhumal river section.

6) The pier should be constructed monolithic with the apron floor.

Copies of the approved drawings of components of the anicut are sent herewith for necessary action.

Enclosure: Drawings - 8 Nos

-sd-
Chief Engineer,PWD,
DR&CS, WRO,
Chennai -600 005.

Copy to the Superintending Engineer, PWD, Designs Circle, WRO, Chennai 5.

Enclosure: Plan-8 Nos

Copy to the Superintending Engineer, PWD, Vaippar Basin Circle, Virudhunagar

Enclosure: Plan-8 Nos

Copy to the Executive Engineer, PWD, Special Project Division, WRO, Madurai.

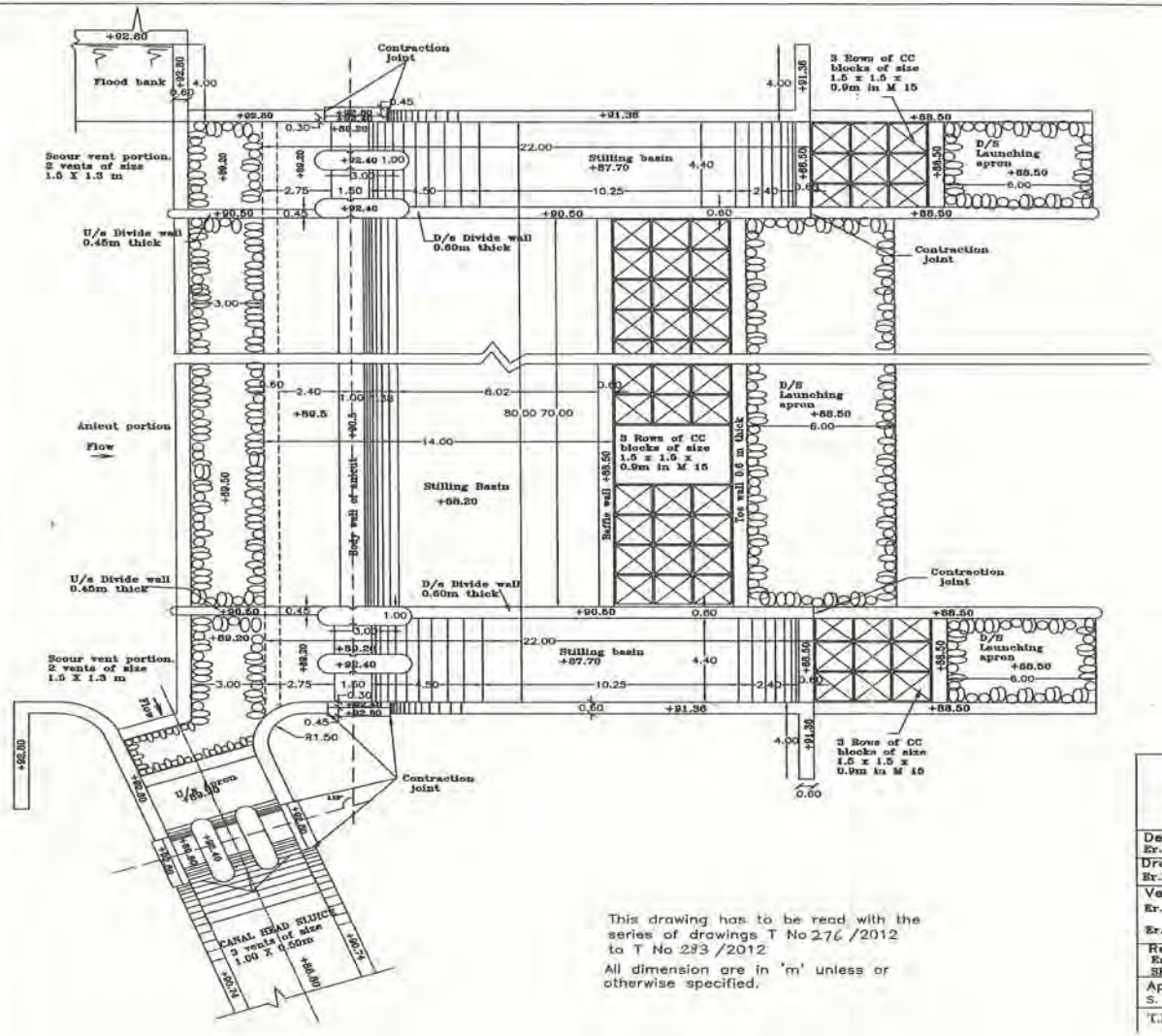
Enclosure: Plan-8 Nos

Spare copy to CE, DR&CS office file with enclosure.

Enclosure: Plan-8 Nos

16/11/12

for Chief Engineer,PWD,
DR&CS, WRO,
Chennai -600 005.



This drawing has to be read with the series of drawings T No 276 /2012 to T No 283 /2012

All dimension are in 'm' unless or otherwise specified.

HYDRAULIC PARTICULARS

1. Maximum Flood Discharge	:194.82 cumecs (6880 c/s)
2. F.M.F.L.	:+91.68m
3. R.W.L.	:+90.36m
4. Total width of river	:80m

ANICUT

1. Crest level	:+90.50m
2. Length of anicut	:70m
3. Discharge over anicut	:164.28 cumecs (5802 c/s)
4. U/S Bed Level	:+89.50m
5. D/S Bed Level	:+88.50m
6. D/S Basin Level	:+88.20m
7. Length of Stilling basin	: 8.02m
8. Total floor length	: 14.00m

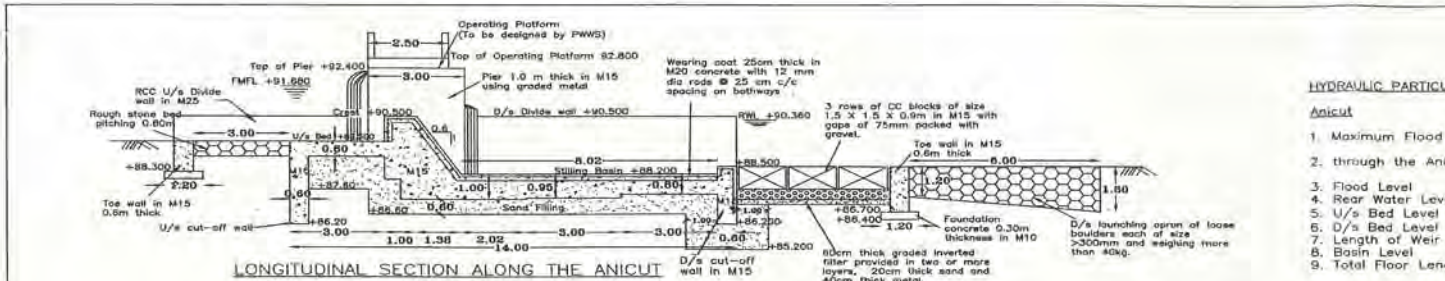
SCOUR VENT

1. Discharge through scour vent	: 30.74 cumecs (1085.57 c/s)
2. No. of scour vents	: 4 nos
3. Size of scour vents	: 1.5X1.3m
4. Sill level	: +89.20m
5. U/S Bed Level	: +89.20m
6. D/S Bed Level	: +88.50m
7. D/S Basin Level	: +87.70m
8. Length of Stilling basin	: 10.25m
9. Total floor length	: 22.00m

Sheet No 1/8

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er. R.N.Surekha, AEE (XI)		Name of work :
Drawn by Er.R.N.Surekha, AEE(XI)		CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Verified by Er. K.Padmanabhan, EE(D)		
Er. V.Thiyagarajan,DySE(D)		Designed drawing of:
Recommended by Er. K.S.K.Thulasiram, SE(D)		LAYOUT PLAN
Approved by S. Anbazhagan C.E (DR&CS)		Region: Madurai / Circle: Vaippar Basin Circle, Virudhunagar.
T.NO: 271/2012	SCALE 1:200	APPROVED in C.E.(D.R.C.S) Lr NO.245 CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 1½ .11.12

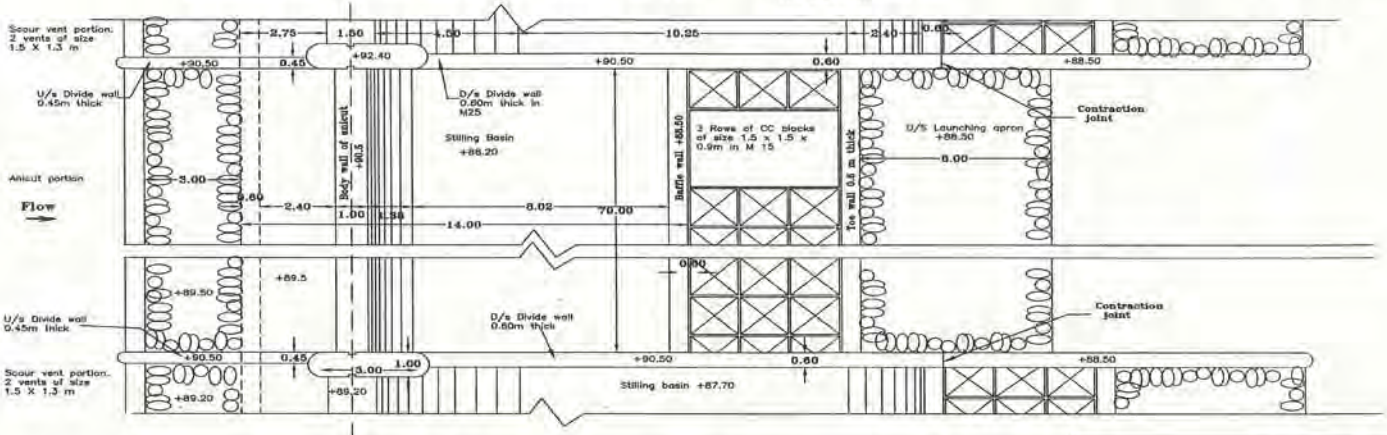


LONGITUDINAL SECTION ALONG THE ANICUT

HYDRAULIC PARTICULARS :

Anicut

1.	Maximum Flood Discharge	194.82 cumecs or 6880 cusecs
2.	through the Anicut	164.28cumecs or 5802 cusecs
3.	Flood Level	+91.680 m
4.	Rear Water Level	+90.360m
5.	U/s Bed Level	+89.500 m
6.	D/s Bed Level	+88.500 m
7.	Length of Weir	70 m
8.	Basin Level	+88.200 m
9.	Total Floor Length	14.00m



HALF PLAN AT TOP AND HALF PLAN AT BOTTOM

Sheet No 2/8

Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the series T.No. 277 / 2012 to T.No. 283 / 2012.

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.R.N.Surekha, AEE XI		Name Of Work
Drawn by Er.K.Bhuvaneswari,AE IV		CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Checked by Er.R.N.Surekha, AEE XI		
Verified by Er.K.Padmanaban ,EE(D) Er.V.Thiyagarajan,DY.SE(D)		Designed Drawing of
Recommended by Er.K.S.K. Thulasiram, SE(D)		Plan and Cross Section of Anicut
Approved by S. Anbazhagan C.E (DR&CS)		Region: Madurai Region / Circle: Vaippar Basin Circle, Virudhunagar.
T.NO: 277 / 2012	SCALE 1:150	Approved by CE (DR&CS) in Lr No: 215 CE (DR&CS) /SE(D) / AEE XI /F. 563/ 2012 dated : 11.12.12

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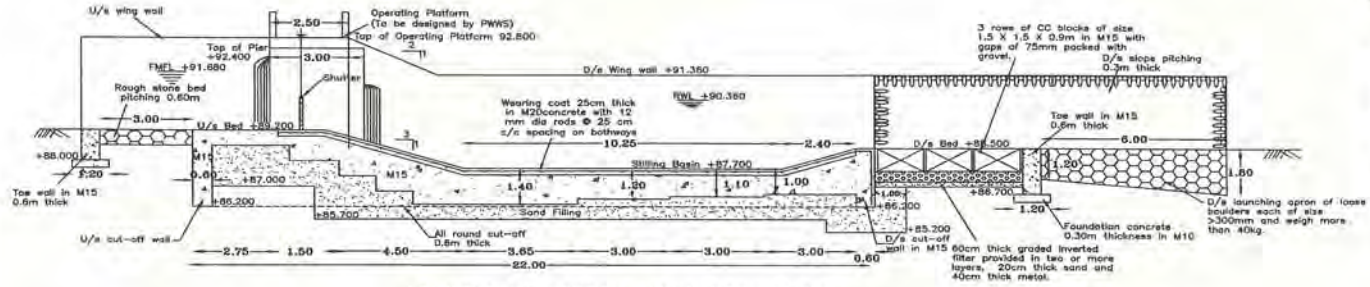
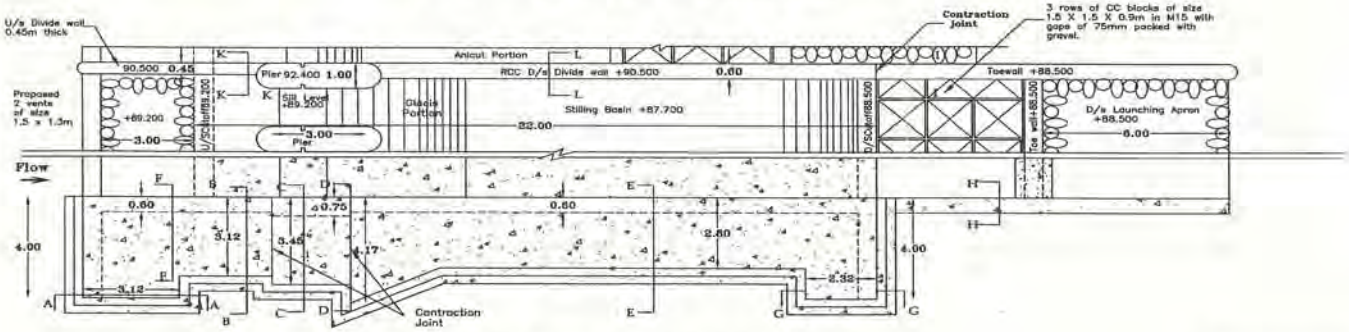


LONGITUDINAL SECTION ALONG SCOUR VENT



HALF PLAN AT TOP AND HALF PLAN AT BOTTOM

HYDRAULIC PARTICULARS :

Scour Vent

1. Maximum Flood Discharge	1948.28cumecs or 6880 cusecs
2. Discharge through vents	30.74cumecs or 1085.57cusecs
3. Front Maximum Flood Level	+91.680 m
4. Rear Water Level	+90.360m
5. Sill Level	+89.200 m
6. Number of vents	4nos, 2nos on either side.
7. Size of vent	1.5 m x 1.3 m
8. U/s Bed Level	+89.200m
9. D/s Bed Level	+88.500m
10. Stilling Basin Level	+87.700m
11. Top of Pier	+92.400m
12. Total Length of Floor	22.00m

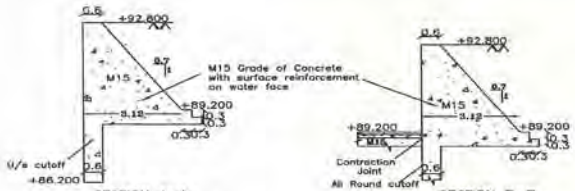
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the series T.No. 278 / 2012 to T.No. 283 / 2012.

Sheet No 3/8

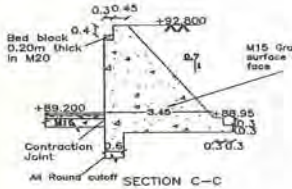
GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.R.N.Surekha, AEE XI		Name Of Work
Drawn by Er.K.Bhuvaneswari,AE IV		CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Checked by Er.R.N.Surekha, AEE XI		
Verified by Er.K.Padmanaban ,EE(D)		
Er.V.Thiyagarajan,DY.SE(D)		Designed Drawing of
Recommended by Er.K.S.K. Thulasiram, SE(D)		Plan and Cross Section of Scour Vent
Approved by S. Anbazhagan C.E (DR&CS)		Region: MaduraiRegion / Circle:Vaippar Basin Circle, Virudhunagar.
T.NO: 278 / 2012	SCALE 1:150	Approved by CE(DR&CS) in Lr No:25 CE (DR&CS)/ SE(D) / AEE XI /F. 563/ 2012 dated :14.11.12

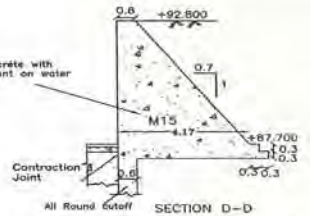


SECTION A–A
U/S RETURN WALL

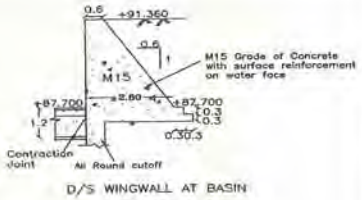
SECTION B–B
U/S WING WALL



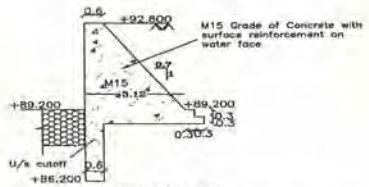
SECTION C–C
ABUTMENT



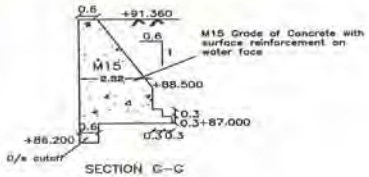
SECTION D–D
D/S WINGWALL AT START



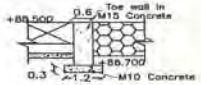
D/S WINGWALL AT BASIN
SECTION E–E



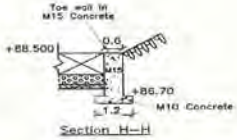
SECTION F–F
U/S WINGWALL AT ROUGH STONE PORTION



SECTION G–G
D/S RETURN WALL



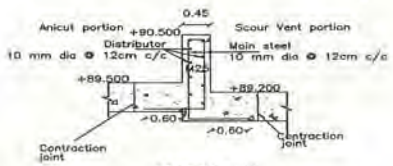
TOE WALL BEYOND DIVIDE WALL
SECTION I–I



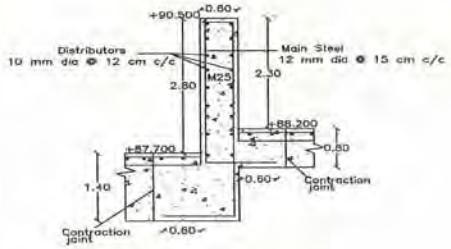
Section H–H

Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the series T.No. 279 / 2012 to T.No. 283 / 2012.



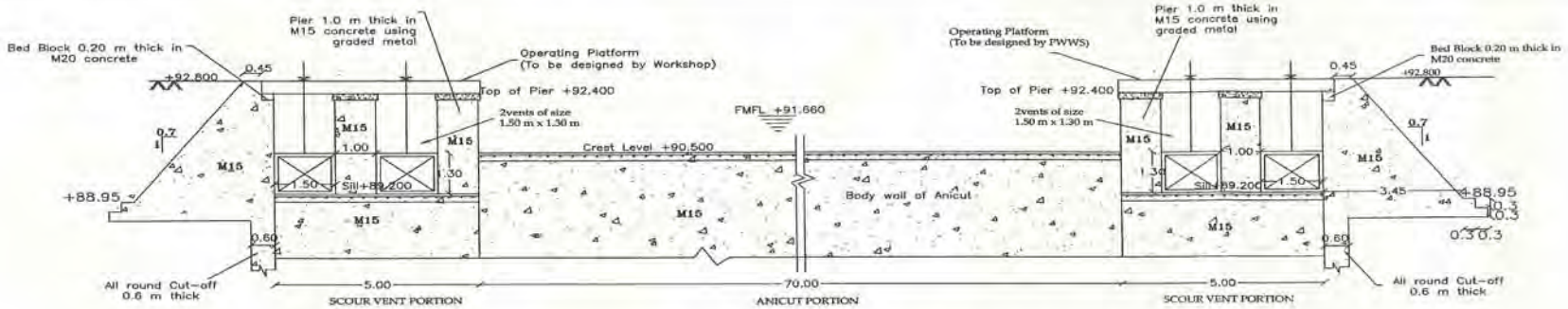
SECTION K–K
U/S DIVIDE WALL
SCALE 1:50



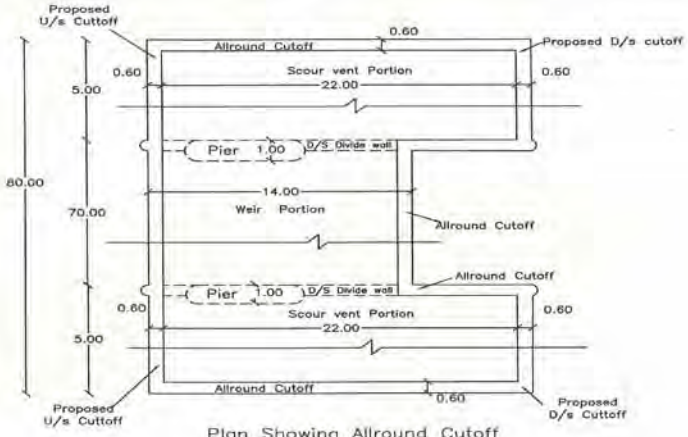
SECTION L–L
C/s of D/s Divide wall
scale 1 in 50

Sheet No 4/9

GOVERNMENT OF TAMIL NADU PUBLIC WORKS DEPARTMENT OFFICE OF THE SUPERINTENDING ENGINEER, PWD, DESIGNS CIRCLE, WRO, CHENNAI - 600 005		
Designed by Er.R.N.Surekha, AEE XI	15/11/12	Name Of Work
Drawn by Er.K.Bhuvaneswari,AE IV		CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Checked by Er.R.N.Surekha, AEE XI	15/11/12	
Verified by Er.K. Padmanabhan, EE (D) Er.V. Thiyagarajan, DSE	16/11/12	Designed Drawing of Cross section Of Abutment,Wing Walls,Returns,Toe wall,U/s &D/S Divide walls.
Recommended by Er.K.S.K. Thulasiram, SE(D)		Region: MaduraiRegion Circle:Vaippar Basin Circle, Virudhunagar.
Approved by S. Anbazhagan C.E (DR&CS)		Approved by CE (DR&CS)in Lr No: /CE (DR&CS) /SE(D) / AEE XI /F.563/ 2012 dated 16.11.12.
T.NO: 279 / 2012	SCALE 1:150	



Sectional Elevation along the Axis of Anicut
(Upstream View)



Plan Showing Allround Cutoff
Not to scale

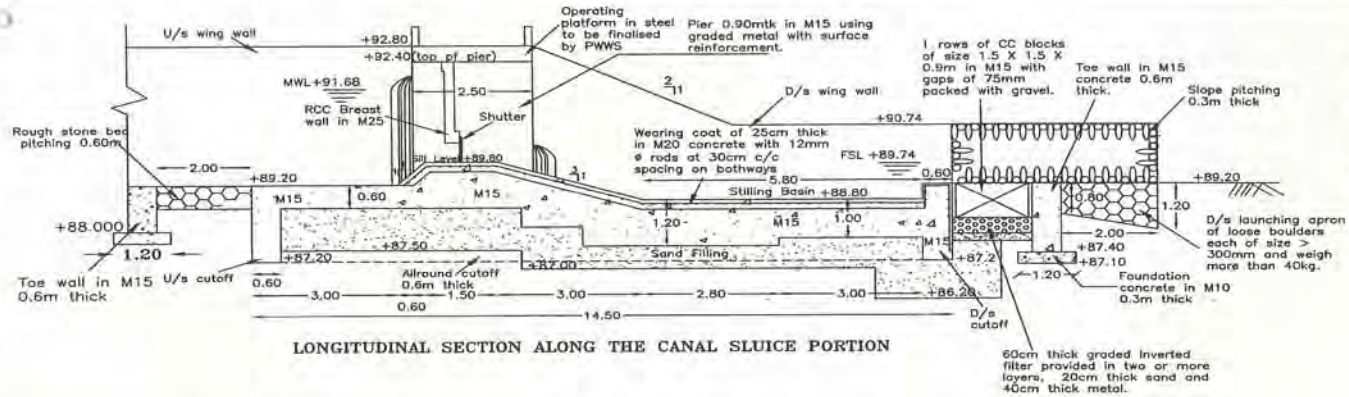
This drawing should be read with the series of drawings T No. 280/2012 to T No 283 /2012.

All dimensions are in 'm' unless or otherwise specified.

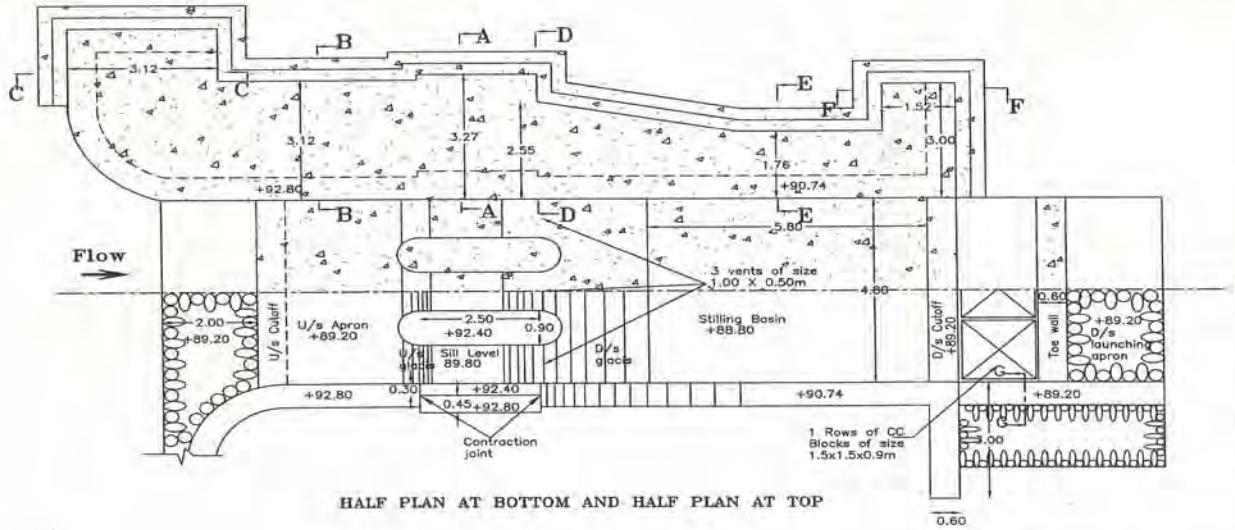
Sheet No 5/8

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.R.N.Surekha, AEE XI		Name of work : CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Drawn by Er.K.Bhuvaneswari A.E IV		
Checked by Er.R.N.Surekha, AEE XI		
Verified by Er.K.Padmanaban EE (D)		Designed drawing of: Sectional Elevation
Er.V.Thiyagarajan DSE (D)		
Recommended by Er.K.S.K. Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)		Region: Madurai — Circle: Vaippar Basin Circle, Madurai.
T.NO: 280 /2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr NO. 215 CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 18.11.12



LONGITUDINAL SECTION ALONG THE CANAL SLUICE PORTION



HALF PLAN AT BOTTOM AND HALF PLAN AT TOP

HYDRAULIC PARTICULARS

1. Discharge through canal sluice	:	1.70 cumecs or 60 c/s.
2. Sill level	:	+89.80m
3. No. of vents.	:	3Nos.
4. Size of vents	:	1.00m x 0.50m
5. FSL of canal	:	+89.74m
6. U/S Bed Level	:	+89.20m
7.D/S Bed Level	:	+89.20m
8.D/S Basin Level	:	+88.80m
9.Length of stilling basin	:	5.80m
10.Total floor length	:	14.50m

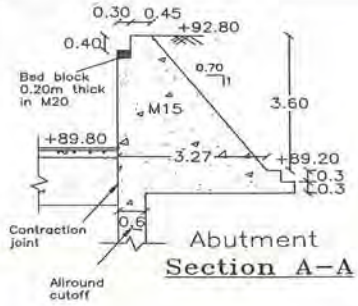
This drawing has to be read with the series of drawings T No 281 /2012 to T No 283 /2012

All dimension are in 'm' unless or otherwise specified.

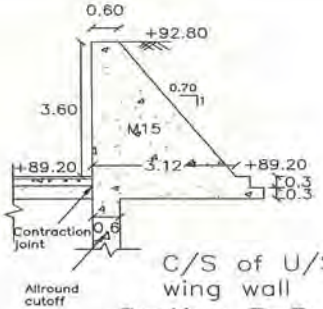
Sheet No 6/8

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD, DESIGNS CIRCLE, WRO, CHENNAI - 600 005

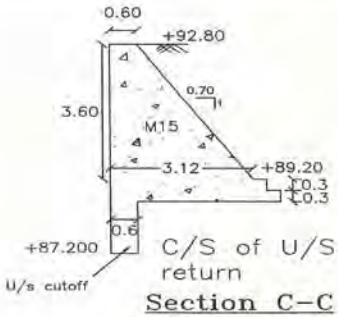
Designed by Er. R.N.Surekha, AEE (XI)		Name of work : CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Drawn by Er.R.N.Surekha, AEE(XI)		
Verified by Er. K.Padmanabhan, EE(D)		Designed drawing of: PLAN & CROSS SECTION OF CANAL SLUICE
Er. V.Thiyagarajan,DySE(D)		
Recommended by Er. K.S.K.Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)		Region: Madurai. Circle:Vaippar Basin Circle, Madurai.
T.NO: 281/2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr No. 46 CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 11.11.12



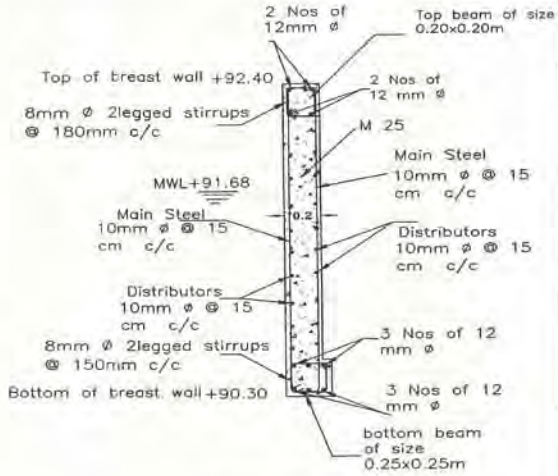
Abutment
Section A–A



C/S of U/S wing wall
Section B–B

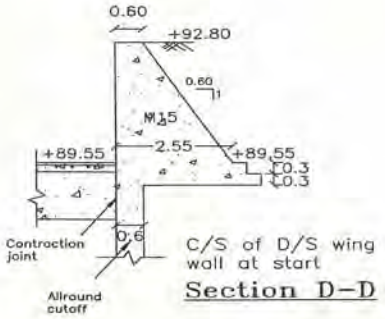


C/S of U/S return
Section C–C

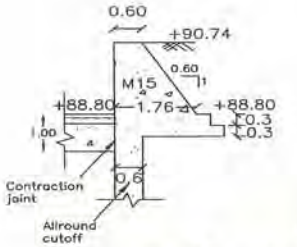


Cross section of Breast wall for canal sluice

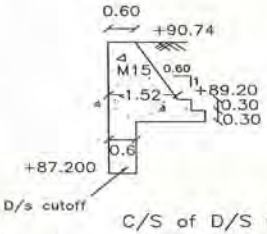
Notes: The top and bottom beams should be embedded into the pier for a depth of 0.3m on both sides.



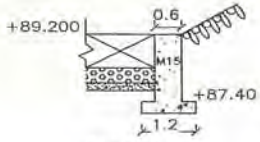
C/S of D/S wing wall at start
Section D–D



C/S of D/S wing wall at Basin
Section E–E



C/S of D/S return
Section F–F



Section G–G

This drawing has to be read with the series of drawings T No 282/2012 to T No 283/2012

All dimension are in 'm' unless or otherwise specified.

Sheet No 7/8

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er. R.N.Surekha, AEE (XI)		Name of work : CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKANKULAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Drawn by Er.R.N.Surekha, AEE(XI)		
Verified by Er. K.Padmanabhan, EE(D)		
Er. V.Thiyagarajan,DySE(D)		Designed drawing of: PLAN & CROSS SECTION OF CANAL SLUICE
Recommended by Er. K.S.K.Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E. (DR&CS)		Region: Madurai. Circle: Vaippar Basin Circle, Madurai.
T.NO.282/2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr NO. 265 CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 16.11.12

NOTES:

1.The analysis has been made based on IS 6512–1984,IS 6966–1989,IS 12720–1993, IS 6531–1994, IS 13551–1992. IS 11130 – 1984 and IS 1893 – 2002.

2. The design has been formulated based on the particulars furnished by the SE, PWD, Vaippar Basin Circle, Virudhunagar, in Lr. No. 330A/M/ AE I/ C 201/Gridhumal/ Dt.15.10.12.

3. The anicut has been designed for a maximum flood discharge of 6880 cusecs.

4. The parameters of backfill material such as saturated unit weight and angle of internal friction have been assumed as 2t/cum and 30° respectively.

5. The depth of footing for abutment and wingwalls proposed below the sill levels are tentative and may be suitably modified according to the site conditions.

6. The proposed lengths of upstream and downstream returns are tentative and may be modified to suit the site conditions.

7. The apron floor,body wall, pier, abutment, wing walls and returns are proposed in M15 concrete using graded metal.

8. Surface reinforcement at the rate of 2.5Kg/m2 shall be provided in the abutment, wing wall, returns and pier in each direction ie both horizontally and vertically. Spacing of such bars shall not exceed 200mm.

9. Weep holes with necessary filter arrangements should be provided in the upstream and downstream wingwalls above the FMWL and RWL respectively.

10. Suitable Flood banks should be formed on the upstream and dowstream side allowing a minimum free board of 1.0m above the water surface elevation.

11. The maximum stress developed at the sill level of the downstream wing wall of anicut is 19.61t/sq.m. The SBC of the foundation media should be checked before taking up the work.

12. The downstream protection works should be maintained periodically for effective functioning of the anicut.

13. The design for the operating platform and the structural details of the shutters are to be finalised by P.W.W.S.

14. The top of operating platform has been tentatively fixed as +92.80m assuming that the depth of beam and the thickness of chequered plates over the bed block is 0.40m. However it may vary as per the design obtained from P.W.W.S.

15. The scour vents shall be in fully opened condition during floods.

16. The pier should be constructed monolithic with the apron floor.

17. Transverse contraction joints with PVC water stops shall be provided in the anicut portion at every 25m interval and at the locations specified in the drawing.

18. U/s divide wall may be constructed for a length as shown in the drawing.

19. D/s divide wall is to be constructed monolithic with the D/s apron floor upto the end of stilling basin of scour vent portion.

20. A clear cover of 75mm shall be provided for the reinforcement provided in the stilling basin portion of anicut, scour vent and canal sluice.

21. The bed level of river, at the D/S of the anicut portion should be regraded from the proposed bed level of +88.50 m to a slope of 1 in 820 for the river width of 80m atleast for a distance of 500m.

22.The bed level of the river at the scour vent portion shall be maintained at a level of +89.20m so as to enable effective flow through scour vent.

23.The canal sluice has been designed for a discharge of 60 cusecs.

24. The top and bottom beams of breast wall in canal sluice should be embedded into the pier for a depth of 0.3m on both sides.

25. Necessary transitions shall be made at the end of the canal sluice portion to negotiate the width of the canal sluice with the bed width of the canal.

This drawing has to be read with the series of drawings T No 283/2012 to T No 283 /2012

Sheet No 8/8

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Tr. V.M.Varakkan, AEE (TE)		Name of work : CONSTRUCTION OF ANICUT ACROSS GIRUDHUMAL RIVER TO FEED SANKAMEELAM TANK IN PIRAMANUR VILLAGE OF MANAMADURAI TALUK IN SIVAGANGAI DISTRICT
Drawn by Tr.V.M.Varakkan, AEE(TE)		
Verified by Tr. K.Pandianachiban, EE(TE)		
Tr. V.Thiyagarajan, DyEE(TE)		Designed drawing of: GENERAL NOTES
Recommended by Tr. K.S.V.Thilakvasuk, SE(TE)		
Approved by S. Arockiaraja C.E (I/c)		Region: Madurai. Circle:Vaippar Basin Circle, Madurai.
T.No 283 /2012	SCALE 1:100	APPROVED by C.E.(D.R.C.S) Lr No. 7.E(DE/DEE) / ES(D)/ ME XI/F 563/2012 / Dt:30.11.12

Public Works Department
Water Resources Organisation

From
Er.S. Anbazhagan, B.E.,
Chief Engineer, PWD
Design Research and Construction Support, WRO,
Chennai 600 005.

To
The Chief Engineer, PWD,
Madurai Region, WRO,
Thallakulam,
Madurai - 625 002.

Lr. No. 266 CE / SE (D) / AEE III / F 563 / 2012 dated 16.11.2012

Sir,

Sub: Restoration and Regradation of Gridhumal river in Sivagangai, Virudhunagar and Ramanathapuram districts - Construction of an anicut across Gridhumal river to feed Keelaparithiyur tank at LS 44080m- Design and Drawing of Anicut and Headsluice - Copy of approved drawings - communicated - regarding.

Ref : 1.EIC Lr. No. IAMWARM/Gridhumal river Regradation/2012 dt. 20.09.2012. addressed to the Chief Engineer, Madurai Region with copy to this office.

2.S.E., PWD, Vaippar Basin Circle, WRO, Virudhunagar lr. No. 330A/M/ AEI/C-201/Gridhumal/2012/ dt. 15.10.12.

3.SE(D) Inspection notes Lr. No. / AEE VIII/F 595/ dt. 17.10.2012.

The Engineer-in-Chief in his letter cited has communicated a copy of the comments of Thiru. R.K. Malhotra, Consultant, World Bank regarding the proposal for "Restoration and Re-gradation of Girdhumal river in Sivagangai, Virudhunagar and Ramanathapuram districts". As per his comments the following are to be designed by Chief Engineer, DR&CS.

1.The proposed river section including the embankments to be formed on the banks.

2.Provision of additional spillway at the head regulator of Link Canal and improvements to Link canal.

3.The proposed check dams at off take points along the Gridhumal river.

Accordingly the site was inspected by the Superintending Engineer (Designs) on 5.10.2012 along with the SE, Vaippar Basin Circle, Virudhunagar. The detailed project report was received from the SE, Vaippar Basin Circle vide reference 2nd cited. The various components as proposed by the SE Vaippar Basin Circle are as follows

1.Section for Gridhumal river from Ambalathadi new anicut to tail end of Gridhumal.

2.Anicut across Gridhumal river to feed Sankankulam tank @ LS 13100m

3.Anicut across Gridhumal river to feed Keelaparithiyur tank @ LS 44080m

4.Protection wall for the narrow portion.

Based on the particulars received the bedslope, bed width, cross section and discharge of the Gridhumal river for various reaches was arrived and communicated to the field engineers. Accordingly the hydraulic particulars of the anicut across Gridhumal river to feed Keelaparithiyur tank @ LS 44080m was arrived as

Bed slope	:	1 in 1200
Bed width	:	60m
Maximum discharge	:	11300 cusecs

MAXIMUM FLOOD DISCHARGE

The maximum flood discharge of the anicut has been arrived as 11300 Cusecs and the same is taken as design flood of the anicut.

COMPUTATION OF REAR WATER LEVEL

From the L.S. of the river furnished, the bed slope of the river is computed as 1 in 1200. The R.W.L. is computed for the regraded section of the river adopting this bed slope and works out to be +52.40m.

LAYOUT

It is proposed to provide 4 Nos. of scour vents (2 Nos. on either sides of anicut) of size 1.20 x 0.60m with sill level of +50.00m with a discharging capacity of 34.34 cumecs under maximum flood condition. Therefore, the anicut is proposed for a length of 51.60 m to dispose of the balance discharge. The total length of the structure considered for design in between the abutments is 60m.

CREST LEVEL OF ANICUT

The crest level has been fixed at +50.60m. The average bed level of the river at the proposed site location is +50.00m. Hence, the height of the anicut is 0.60m.

COMPUTATION OF FRONT MAXIMUM WATER LEVEL

The front MWL for the above arrangements to dispose the design flood, adopting narrow crested weir formula (having a C_d value of 0.625 for free weir condition), for the anicut is computed as +52.97m, with a head over crest of 2.37m.

DESIGN OF ANICUT PORTION

STABILITY OF BODY WALL

A broad crested weir having a top width of 1.20m, with vertical upstream face and downstream slope of 0.75:1 is proposed for the body wall portion. The stability of the body wall is checked for the following loading conditions,

1. Empty condition.
2. Water at MWL, and maximum tail water with uplift.
3. Water at crest level with full uplift, no tail water.

The stresses developed at the bottom of the body wall are computed and tabulated below:

Sl.No	Description	Stress in t/m^2	
		Maximum	Minimum
1.	Empty condition	1.72	0.76
2.	Water at MWL and maximum tail water	0.43	0.01
3.	Water at crest level with full uplift and no tail water	1.043	0.845

DESIGN OF PERMEABLE FOUNDATION

Permeable foundation is proposed for the anicut. The apron floor is designed for the following flow conditions.

1. Subsurface flow condition
2. Surface flow condition

The thickness of the floor is arrived based on Khosla's theory for the subsurface flow condition adopting an exit gradient of 1 in 5. The energy dissipation arrangements such as basin level, basin length are arrived for the surface flow conditions. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete.

The salient features of the anicut are

Maximum Flood Discharge	:	**319.977 Cumecs or 11300 Cusecs**
Crest Level	:	+ 50.60m
Head over crest	:	2.37m
Front Maximum Water Level	:	+52.97m
Rear Maximum Water Level	:	+52.40m
Upstream bed level	:	+50.00m
Downstream bed level	:	+49.90m
Length of anicut	:	**51.60m**
Height of anicut	:	0.60m
Top width	:	1.20 m
Upstream slope	:	vertical
Downstream slope	:	0.75 : 1
Total length of floor	:	**15.00m**
Depth of upstream cutoff	:	1.6m
Depth of downstream cutoff	:	2.80m
Thickness of floor at toe	:	0.60m
Thickness of floor at end	:	0.90m
Length of stilling basin	:	**9.17m**
Stilling Basin Level	:	+49.50m

DESIGN OF SCOUR VENT PORTION

Computation of linear waterway

It is proposed to provide 4 vents of size 1.20 x 0.60m (2 nos. on each sides) to discharge 34.34 Cumecs or 1212.72 cusecs (i.e., 10.732% of the Maximum Flood Discharge) with sill level at +50.00m.

Design of permeable foundation

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The salient features of the scour vent are as follows.

Discharge through scour vent	:	**34.34 Cumecs or 1212.72 Cusecs**
Sill level	:	+50.00m
No. of vents	:	4 Nos.
Size of vent	:	1.20 x 0.60m
Total length of floor	:	**15.00m**
Upstream Bed Level	:	+50.00m
Downstream Bed level	:	+49.90m
Depth of upstream cutoff	:	1.60m
Depth of downstream cutoff	:	2.80m
Thickness of floor at toe	:	1.10m
Thickness of floor at end	:	0.60m
Stilling basin level	:	+49.50m
Length of stilling basin	:	**9.00m**

PROTECTION WORKS :

Upstream Protection works

It is proposed to have a bed pitching of 0.60 m thickness for a length of 3 m in the upstream side.

Downstream Protection works

Beyond the stilling basin 5 rows of CC blocks of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness are proposed. It is proposed to have a launching apron for a length of 8m having inner and outer thickness of 1.40m and 2.10m respectively.

DESIGN OF PIER

The top of the pier is kept as +53.97 m. The height of the pier from the sill level is 3.97m. The stability of the pier is checked for the following conditions.

Condition1: All shutters are in closed condition

Condition2: All shutters are in fully opened condition

Condition3: When one shutter closed and the adjacent being in opened condition.

It is suggested to provide a thickness of 0.90m and a length of 3.00m for the pier. The stresses developed due to the various forces involved at the four corners of the pier are computed for all the loading conditions and are summarized below.

Sl. No.	Condition	Stresses in t/m^2			
		Corner A	Corner B	Corner C	Corner D
1	All shutters are in closed condition.	8.847	16.156	16.156	8.847
2	All shutters are in fully opened condition.	0.218	15.025	20.015	5.208
3	When one shutter closed and the adjacent being in opened condition	-0.833	17.87	18.561	1.672

The pier is proposed in M15 concrete. Surface reinforcement at the rate of $2.5kg/m^2$ shall be provided in each direction. ie both horizontally and vertically. Spacing of such bars shall not exceed 200m.

DESIGN OF ABUTMENT AND WING WALLS

The left and right abutments are designed for the earth pressure caused due to the backfill material. The top of operating platform is proposed at +53.97m. The parameters of the backfill material such as saturated unit weight and angle of internal friction have been assumed as $2.0t/m^3$ and 30^0 respectively. Necessary wing walls have also been designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is $20.537t/m^2$. The abutments and wing walls are proposed in M15 concrete using graded metal. It is suggested to provide surface reinforcement at the rate of 2.5 kg/m2 in the abutment wing walls and return walls at the water face in each direction. ie. both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

DESIGN OF CANAL HEAD SLUICE

Computation of linear waterway

It is proposed to provide 4 vents of size 0.90 x 0.40m to draw the required discharge of 1.70 Cumecs or 60 Cusecs, with sill level at +50.20m.

Design of permeable foundation:

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The salient features of the Head Sluice are as follows

Discharge through Head Sluice vent	:	1.70 Cumecs or 60.00 Cusecs
Sill level	:	+50.20m
FSL in channel	:	+50.40m
No. of vents	:	4 Nos.
Size of vent	:	0.90 x 0.40m
Total length of floor	:	**15.00m**
Upstream Bed Level	:	+50.00m
Downstream Bed Level	:	+49.87m
Depth of upstream cutoff	:	1.60m
Depth of downstream cutoff	:	2.80m
Thickness of floor at toe	:	1.60m
Thickness of floor at end	:	1.20m
Stilling basin level	:	+49.57m
Length of stilling basin	:	**9.31m**

Design of breast wall

Since the computed FMFL of +52.97m is higher than the top of shutter +50.75, breast wall is proposed in the sluice vent. Necessary top and bottom beams are proposed in the breast wall. The thickness of the proposed breast wall is 0.15m. The size of bottom beam is 0.25m x 0.25m. The breast wall and beams are proposed in M25 concrete.

Upstream Protection works

It is proposed to have a bed pitching of 0.60 m thickness for a length of 3 m in the upstream side.

Downstream Protection works

Beyond the stilling basin 1 row of CC block of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness is proposed. It is proposed to have a launching apron for a length of 1.50m having inner and outer thickness of 0.70m and 1.10m respectively.

DESIGN OF PIER

The top of the pier is kept as +53.47 m. The height of the pier from the sill level is 3.47m. The stability of the pier is checked for the following conditions.

Condition1: All shutters are in closed condition

Condition2: All shutters are in fully opened condition

Condition3: When one shutter closed and the adjacent being in opened condition.

It is suggested to provide a thickness of 0.90m and a length of 3.00m for the pier. The stresses developed due to the various forces involved at the four corners of the pier are computed for all the loading conditions and are summarized below.

Sl. No.	Condition	Stresses in t/m^2			
		Corner A	Corner B	Corner C	Corner D
1	All shutters are in closed condition.	7.544	9.225	9.225	7.544
2	All shutters are in fully opened condition.	12.846	0.878	5.890	17.858
3	When one shutter closed and the adjacent being in opened condition	11.944	6.079	4.421	10.286

The pier is proposed in M15 concrete. Surface reinforcement at the rate of $2.5kg/m^2$ shall be provided in each direction. ie both horizontally and vertically. Spacing of such bars shall not exceed 200m.

Design of Abutment and Wing Walls

The left and right abutments are designed for the earth pressure caused due to the backfill material. The top of operating platform is proposed at +53.97m and thus the top of the abutment is proposed at +53.97m. The parameters of the backfill material such as saturated unit weight and angle of internal friction have been assumed as $2.0t/m^3$ and 30^0 respectively. Necessary wing walls are also designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is $15.87t/m^2$. The abutments and wing walls are proposed in M15 concrete using graded metal. It is suggested to provide surface reinforcement at the rate of 2.5 kg/m2 in the abutment wing walls and return walls at the water face in each direction. ie. both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

following points should be considered before taking up the work.

1) The bottom of the D/s cut off wall shall not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements have to be provided around the cutoff wall.
2) Weep holes with necessary filter arrangements shall be provided at the upstream and downstream wing walls above the M.W.L. and R.W.L. respectively.
3) The depth of footing for abutment and wing walls proposed below the sill level is as per the details furnished.

4) Surface reinforcement at the rate of 2.5 kg/m^2 shall be provided in the abutment and wing walls at the water face in each direction. ie. Both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.
5) Suitable Flood banks should be formed on the upstream and downstream side allowing a minimum free board of 1.0m above the water surface elevation.
6) The pier should be constructed monolithic with the apron floor.

Copy of approved drawings of the anicut and head sluice are enclosed for adoption.

Encl: Drawings – 9 Nos (Drawing Nos. 284 / 2012 to 292 / 2012)

Sd /- 16.11.2012
Chief Engineer, PWD,
DR&CS, WRO, Chennai - 5.

Copy to the Superintending Engineer, PWD, Vaippar Basin Circle, WRO, Virudhunagar for information along with the enclosures.

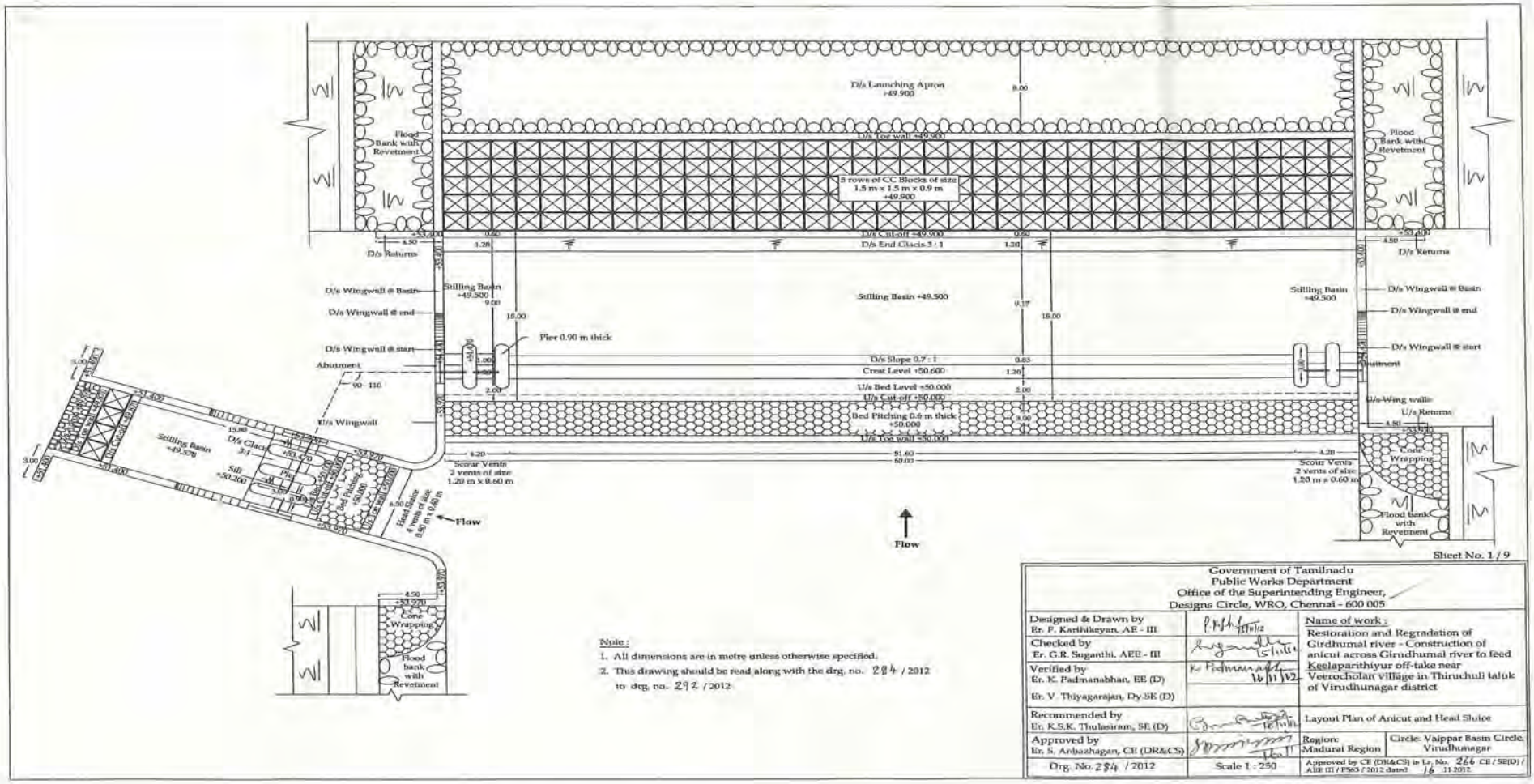
Copy to the Superintending Engineer, PWD, Designs Circle, WRO, Chennai-5 along with the enclosures.

Copy to the Executive Engineer, PWD, Special Project Division, WRO, Madurai along with the enclosures.

Spare copy to CE, DR&CS office file along with the enclosures.

Spare copy to AEE III along with the enclosures.

16/11/12
for Chief Engineer, PWD,
DR&CS, WRO, Chennai - 5.
16/11/12

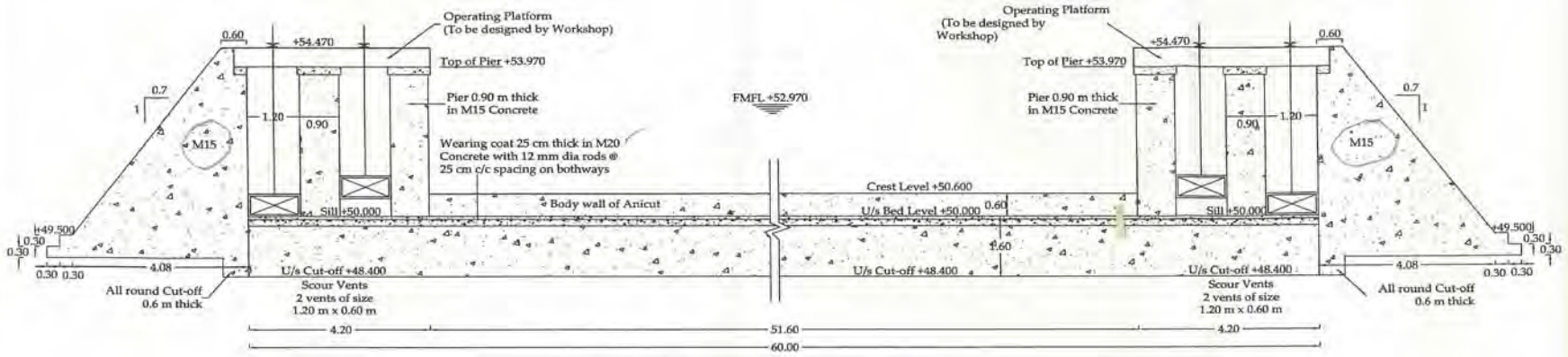


Sheet No. 1 / 9

Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

Government of Tamilnadu Public Works Department Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005		
Designed & Drawn by Er. P. Karthikeyan, AE - III		Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III		
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy.SE (D)		
Recommended by Er. K.S.K. Thulasiram, SE (D)		Layout Plan of Anicut and Head Sluice
Approved by Er. S. Arbazhagan, CE (DR&CS)	Region: Madurai Region	Circle: Vaippar Basin Circle, Virudhunagar
Drg. No. 284 / 2012	Scale 1 : 250	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / 1563 / 2012 dated 16.11.2012



Sectional Elevation of Anicut (Upstream View)

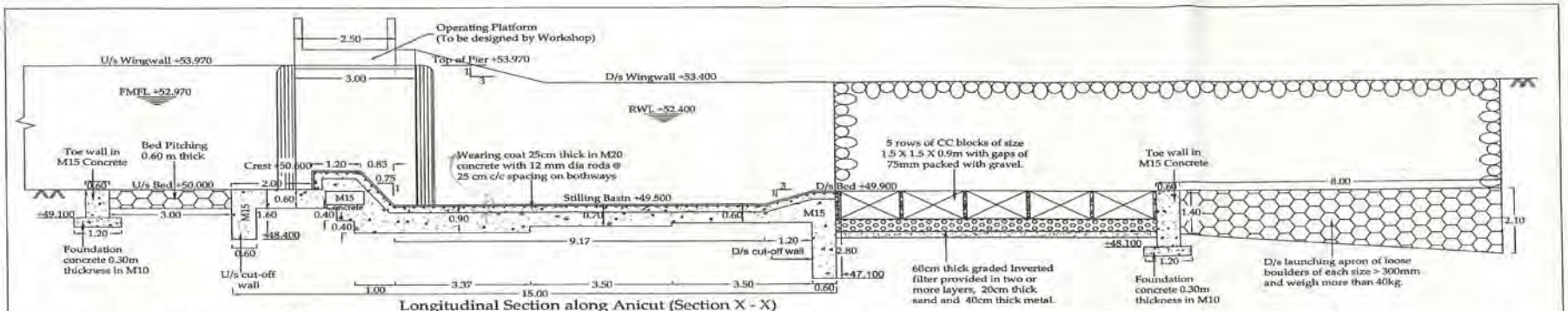
Sheet No. 2 / 9

Note :

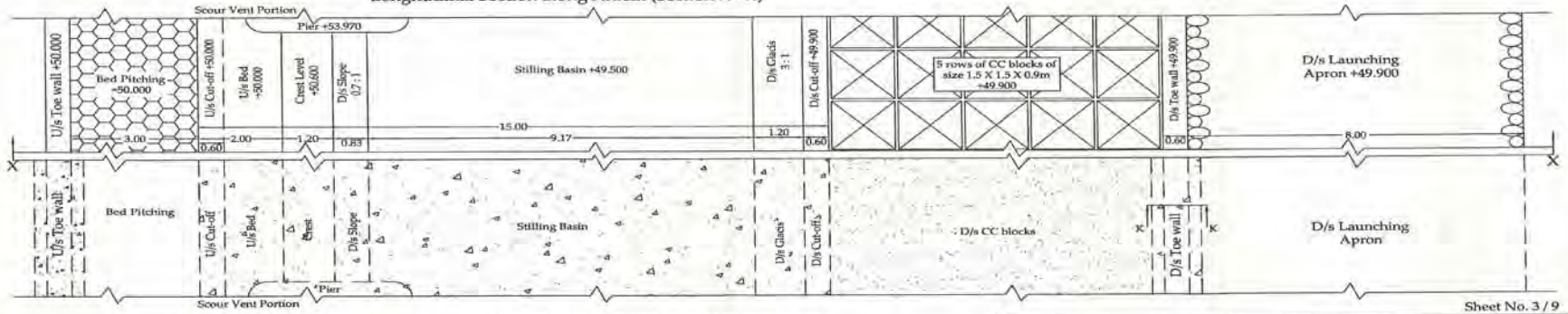
1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. P. Karthikeyan, AE - III	P.Kpl 13/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III	13/11/12	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K-Padmanabhan 16/11/12	
Recommended by Er. K.S.K. Thulasiram, SE (D)	16/11/12	Sectional Elevation of Anicut
Approved by Er. S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 285 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / FS63 / 2012 dated 16 .11.2012



Longitudinal Section along Anicut (Section X - X)



Half Plan at Top and Half Plan at Bottom

Sheet No. 3 / 9

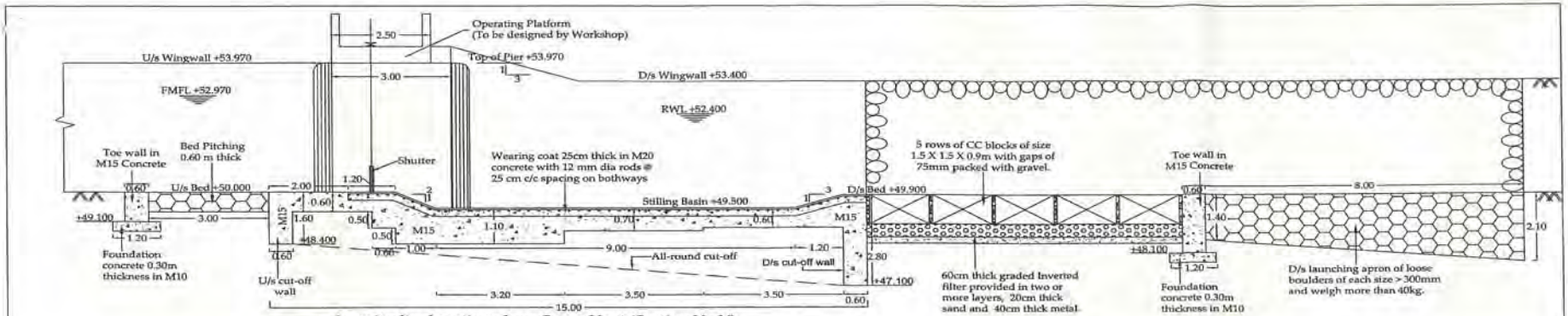
Hydraulic Particulars :			
1. Maximum Flood Discharge	319.98 cumecs or 11,300 cusecs	6. Head Over Crest	2.37 m
2. Weir Discharge	286.62 cumecs or 10,122 cusecs	7. U/s Bed Level	+50.000 m
3. Front Maximum Flood Level	+52.970 m	8. D/s Bed Level	+49.900 m
4. Rear Water Level	+52.400 m	9. Length of Weir	51.60 m
5. Crest Level	+50.600 m	10. Stilling Basin Level	+49.500 m
		11. Total Floor length	15.0 m

Note :

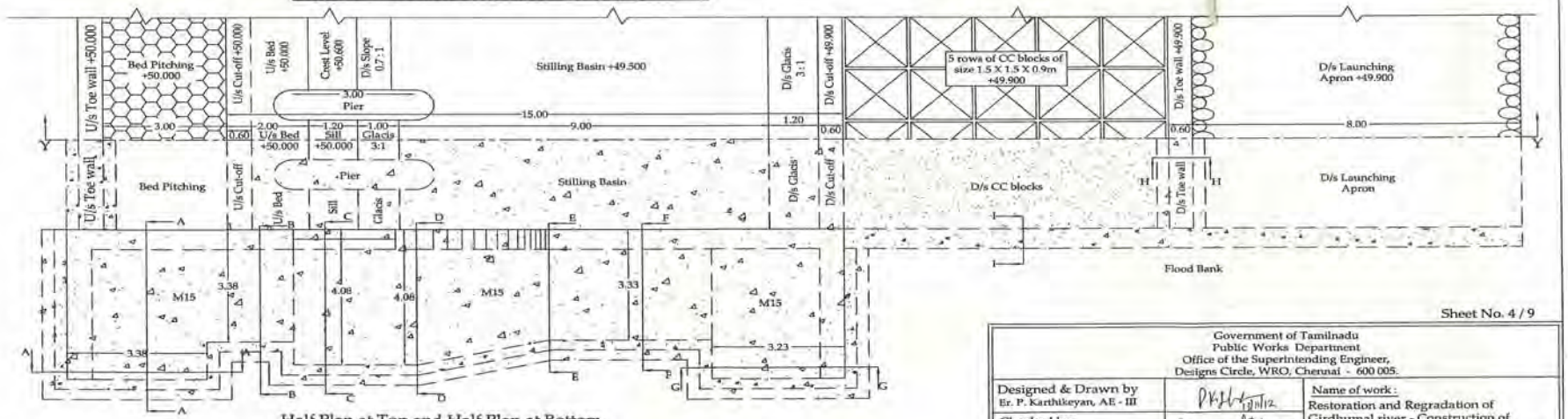
1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

Government of Tamilnadu - Public Works Department
Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005.

Designed & Drawn by Er. P. Karthikeyan, AE - III	P.K. 13/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III	15/11/12	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 16/11/12	
Recommended by Er. K.S.K. Thulasiram, SE (D)	16/11/12	Plan and Cross Section of Anicut
Approved by Er. S. Anbazhagan, CE (DR&CS)	17.11.	Region: Madurai Region Circle: Vaippar Basin Circle Virudhunagar
Drg. No. 286 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / F563 / 2012 dated 16.11.2012



Longitudinal section along Scour Vent (Section Y - Y)



Half Plan at Top and Half Plan at Bottom

Sheet No. 4 / 9

Hydraulic Particulars :			
1. Maximum Flood Discharge	319.98 cumecs or 11,300 cusecs	6. Number of Vents	4 nos. (2 on each side)
2. Weir Discharge	34.34 cumecs or 1212.72 cusecs	7. Size of vents	1.20 m x 0.60 m
3. Front Maximum Flood Level	+52.970 m	8. U/s Bed Level	+50.000 m
4. Rear Water Level	+52.400 m	9. D/s Bed Level	+49.900 m
5. Sill Level	+50.000 m	10. Stilling Basin Level	+49.500 m
		11. Total Floor length	15.0 m

Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

Designed & Drawn by Er. P. Karthikeyan, AE - III	PK 13/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III	15/11/12	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 16/11/12	
Recommended by Er. K.S.K. Thulasiram, SE (D)	16/11/12	Plan and Cross Section of Scour Vent
Approved by Er. S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region Circle: Vaippar Basin Circle, Virudhunagar
Drg. No. 287/ 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / F563 / 2012 dated 16.11.2012

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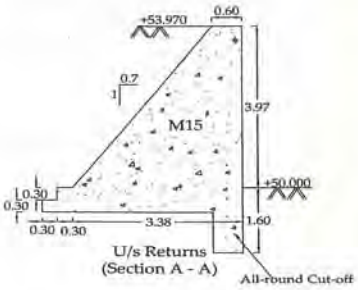
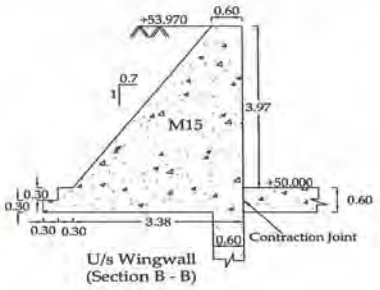
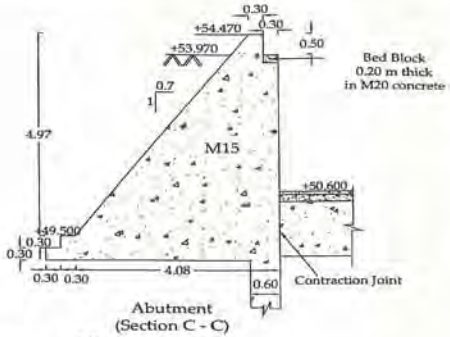


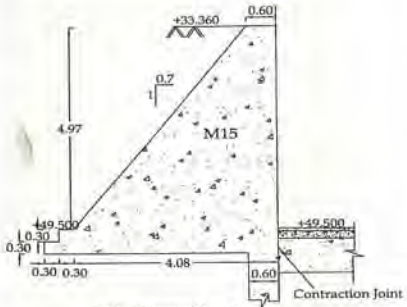
U/s Returns
(Section A - A)



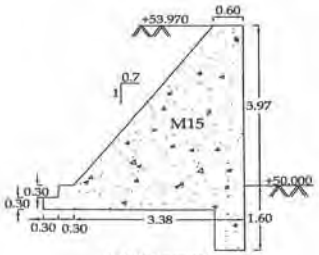
U/s Wingwall
(Section B - B)



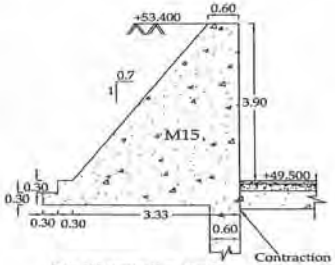
Abutment
(Section C - C)



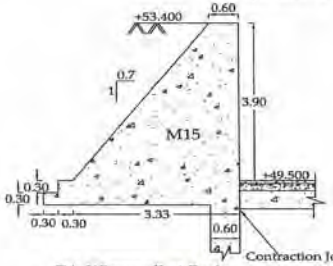
D/s Wingwall at Start
(Section D - D)



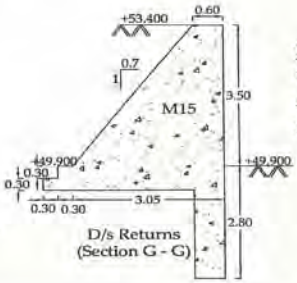
U/s Wingwall
beyond apron floor
(Section A - A)



D/s Wingwall at End
(Section E - E)



D/s Wingwall at Basin
(Section F - F)

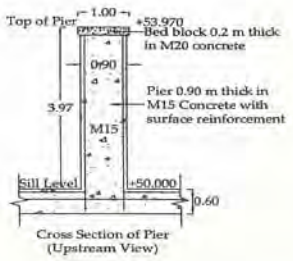


D/s Returns
(Section G - G)

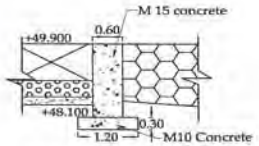
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

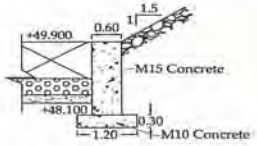
Sheet No. 5 / 9



Cross Section of Pier
(Upstream View)



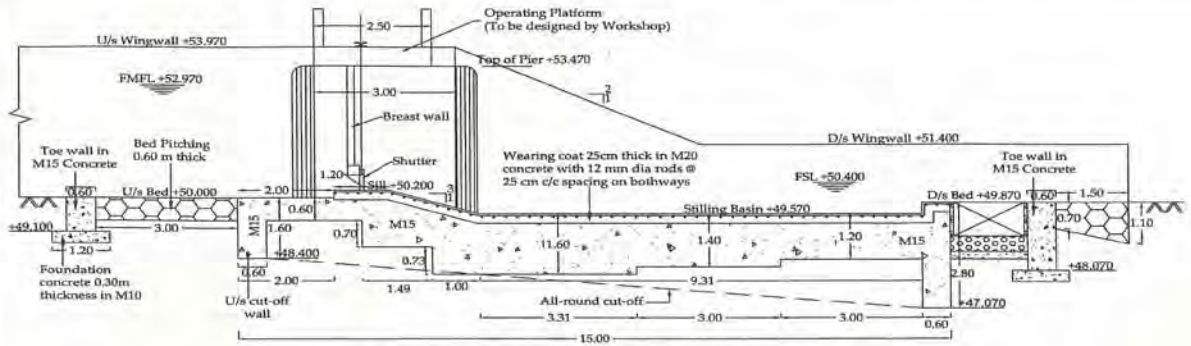
D/s Toe Wall between CC Blocks
and Launching Apron
(Section H - H)



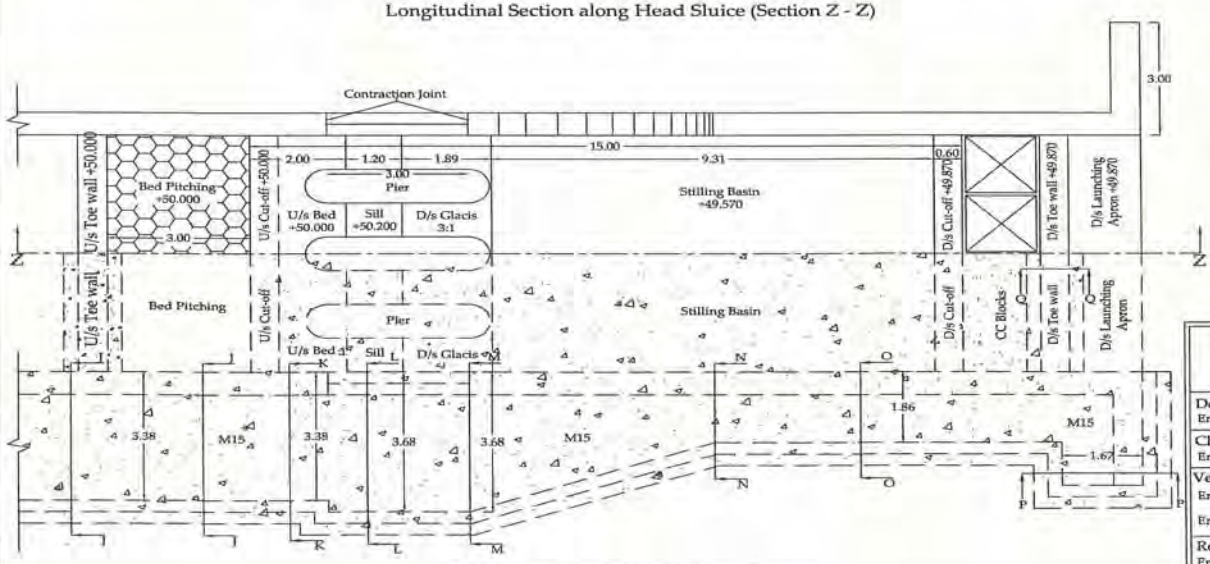
Toe Wall beyond Returns
(Section I - I)

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. P. Karthikeyan, AE - III	P. Karthikeyan 15/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III	G.R. Suganthi 15/11/12	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 16/11/12	
Recommended by Er. K.S.K. Thulasiram, SE (D)	K.S.K. Thulasiram 16/11/12	Cross Section of Abutment, Wing walls, Returns, Toe walls and Pier for Anicut
Approved by Er. S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 288 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / F563 / 2012 dated 16.11.2012



Longitudinal Section along Head Sluice (Section Z - Z)



Half Plan at Top and Half Plan at Bottom

Hydraulic Particulars :

1.	Design Discharge	1.70 cumecs or 60 cusecs
2.	Front Max. Water Level	+52.970 m
3.	Full Supply Level	+50.400 m
4.	Number of Vents	4 nos.
5.	Size of Vents	0.90 m x 0.40 m
6.	Sill Level	+50.200 m
7.	U/s Bed Level	+50.000 m
8.	D/s Bed Level	+49.870 m
9.	Stilling Basin Level	+49.570 m
10.	Length of Stilling Basin	9.31 m
11.	Total Floor Length	15 m

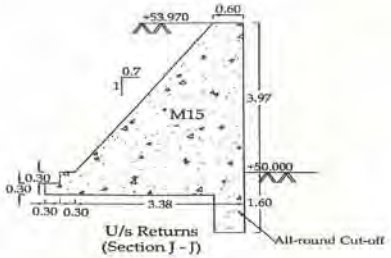
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

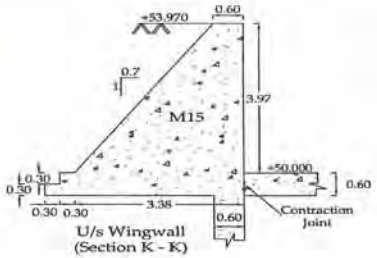
Sheet No. 6 / 9

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

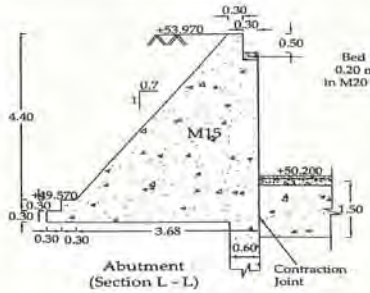
Designed & Drawn by Er. P. Karthikeyan, AE - III	P. Karthikeyan 15.11.12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III	15/11/12	
Verified by Er. K. Padmanabhan, BE (D)	K. Padmanabhan 16/11/12	
Er. V. Thiyagarajan, Dy.SE (D)		
Recommended by Er. K.S.K. Thulasiram, SE (D)	16.11.12	Plan and Cross Section of Head Sluice
Approved by Er. S. Anbazhagan, CE (DR&CS)	16/11	Region: Madurai Region Circle: Vaippar Basin Circle Virudhunagar
Drg. No. 287 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / F563 / 2012 dated 16.11.2012



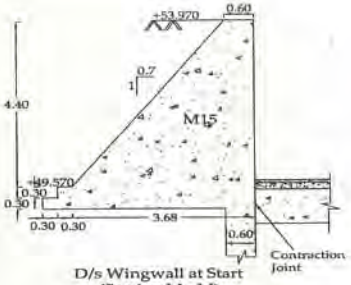
U/s Returns
(Section J - J)



U/s Wingwall
(Section K - K)

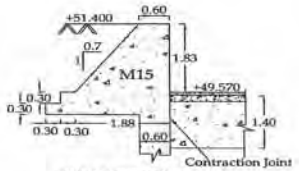


Abutment
(Section L - L)

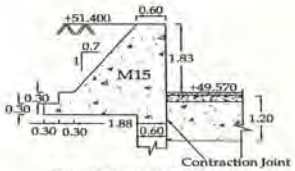


D/s Wingwall at Start
(Section M - M)

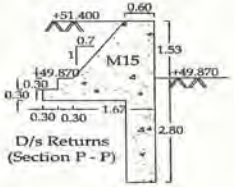
U/s Wingwall
beyond apron floor
(Section J - J)



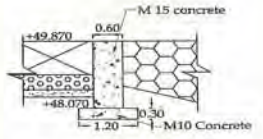
D/s Wingwall at End
(Section N - N)



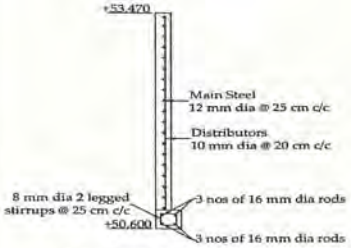
D/s Wingwall at Basin
(Section O - O)



D/s Returns
(Section P - P)

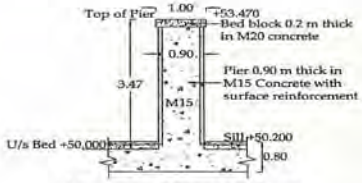


D/s Toe Wall between CC
Blocks and Launching Apron
(Section Q - Q)



C/s of Breast wall for Head Sluice
Scale : 1 in 50

Beam at Bottom	0.25 x 0.25 m
Thickness of slab	0.15 m
Grade of Concrete	M 20



Cross Section of Pier for Head Sluice
(Upstream View)

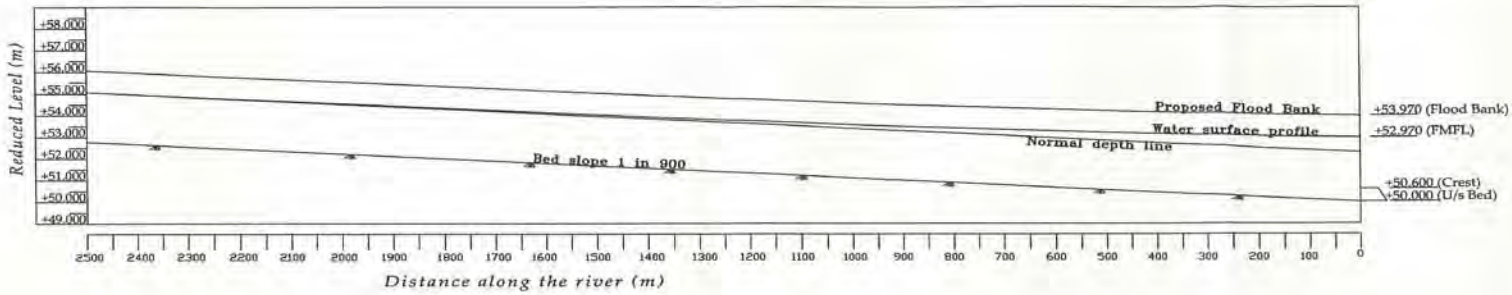
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

Sheet No. 7 / 9

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. P. Karthikeyan, AE - III	P Karthi 13/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G.R. Suganthi, AEE - III	15/11/12	
Verified by Er. K. Padmanabhan, EE (D)	K - Padmanabhan 16/11/12	
Er. V. Thiyagarajan, Dy. SE (D)		Cross Section of Abutment, Wing walls, Returns, Toe walls, Pier and Breast wall for Head Sluice
Recommended by Er. K.S.K. Thulasiram, SE (D)	21/11/12	
Approved by Er. S. Anbazhagan, CE (DR&CS)	21/11/12	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 290 / 2012	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 266 CE / SE(D) / AEE III / F563 / 2012 dated 16 .11.2012



Distance from axis of dam	Water Surface Elevation	Proposed Flood Bank Level
0	52.970	53.970
250	53.080	54.080
500	53.220	54.220
750	53.380	54.380
1000	53.570	54.570
1250	53.790	54.790
1500	54.030	55.030
1750	54.290	55.290
2000	54.550	55.550
2250	54.810	55.810
2500	55.070	56.070

Note:

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 284 / 2012 to drg. no. 292 / 2012

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

Designed & Drawn by Er. P. Karthikeyan, AE-III	15/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district
Checked by Er. G. R. Suganthi, AEE-III	15/11/12	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 16/11/12	
Recommended by Er. K.S.K. Thulasiram, SE (D)	16/11/12	Back water profile
Approved by Er. S. Anbazhagan, CE (DR&CS)	16.11.12	Region: Madurai Region Circle : Vaippar Basin Circle Virudhunagar
Drg. No. 291 / 2012	Scale : 1 in 10000 (X-axis) 1 in 200 (Y-axis)	Approved by CE (DR&CS) in Lr. No. 246 CE / SE(D) / AEE III / F 563 / 2012 dated 16.11.2012

General Notes:

I. Anicut

1. The analysis has been made based on IS 6512-1984, IS 6966-1989, IS 12720-1993, IS 6531-1994, IS 1893-2002, IS 3370 - 2009 and IRC 6-2000.
2. The design has been formulated based on the particulars furnished by the the Superintending Engineer, PWD, Vaippar Basin Circle, WRO, Virudhunagar in Lr. No. 330A / M / AE1 / C-201/ Gridhumal / 2012 dated 15.10.2012.
3. The anicut has been designed for a maximum flood discharge of 11,300 cusecs (320 cumecs).
4. The parameters of backfill material such as saturated unit weight and angle of internal friction have been assumed as 2 t/cu.m. and 22° respectively. Hence suitable backfill material may be used accordingly.
5. The depth of footing for abutment and wingwalls proposed below the sill levels are tentative and may be suitably modified according to the site conditions.
6. The proposed lengths of upstream and downstream returns are tentative and may be modified to suit the site conditions.
7. The apron floor, body wall, cut-off walls, pier, abutment, wingwalls and returns are proposed in M15 grade of concrete.
8. Surface reinforcement at the rate of 2.5 kg/sq.m. shall be provided in the pier, abutment, wing walls and returns at water face in each direction i.e., both horizontally and vertically. Spacing of such bars shall not exceed 200mm.
9. The bottom of the D/s cutoff should not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements should be provided around the cutoff.
10. Weep holes with necessary filter arrangements should be provided in the upstream and downstream wingwalls above the FMWL and RWL respectively.
11. Suitable Flood banks should be formed allowing a minimum free board of 1.0m above the water surface elevation in the upstream side as given in the tabulation in sheet no. 8 / 9 and above RWL in the downstream side.
12. The maximum stress developed at the bottom of the D/s Wing wall @ start i.e., @ +49.500 m level is 205.68 kN/sq.m. The SBC of the foundation media should be checked before taking up the work.
13. The proposed downstream protection works should be maintained periodically for effective functioning of the anicut.
14. The design for the operating platform and the structural details of the shutters are to be finalised by the Public Works Workshop.
15. The top of operating platform has been tentatively fixed as +54.470 m assuming that the depth of beam and the thickness of chequered plates over the bed block is 0.50 m. However it may vary as per the design obtained from P.W.W.S. If there is any major variation, it shall be referred to Designs Circle for revision.
16. The Pier should be constructed monolithic with apron floor.
17. Transverse contraction joints with PVC water stops shall be provided along the entire cross section of the anicut at one location i.e., at the centre of anicut length and at the locations specified in the drawing separating the apron floor from the wing walls and abutment.
18. The bed level of the river at the D/s of the anicut should be regraded from the proposed D/s bed level of +49.900 m to a slope of 1 in 1200 for a width of 60 m atleast for a distance of 500 m.
19. The scour vents should be in fully opened condition during floods.
20. A clear cover of 75 mm shall be provided for the reinforcement provided in the stilling basin portion.
21. The structure is designed as Permeable foundation. During execution, if impervious strata found, the Design Circle shall be referred for revised design.

II. Head Sluice

1. The Head sluice has been designed for a discharge of 60 cusecs (1.70 cumecs).
2. Four number of vents of size 0.90 m x 0.40 m is proposed for the head sluice portion.
3. The energy dissipation arrangements for the head sluice portion have been designed for a discharge of 60 cusecs. Therefore the vent opening should be so adjusted to maintain the discharge of 60 cusecs in the canal by keeping the Full Supply Depth (FSD) of 0.53 m at Maximum Flood Condition.
4. Necessary transition may be provided at the end of the head sluice portion to negotiate the bed width of canal and the side slope.
5. The bottom of the D/s cutoff should not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements should be provided around the cutoff.
6. Weep holes with necessary filter arrangements should be provided in the upstream and downstream wingwalls above the FMWL and FSL respectively.
7. The proposed downstream protection works should be maintained periodically for effective functioning of the head sluice.
8. The proposed lengths of upstream and downsteam returns are tentative and may be modified to suit the site conditions.
9. The maximum stress developed at the bottom of the U/s Wing wall i.e., @ +49.570 m level is 179.82 kN/sq.m. The SBC of the foundation media should be checked before taking up the work.
10. The Pier should be constructed monolithic with the apron floor.
11. The Top and bottom beam of breast wall shall be embedded into the pier for a depth of 0.30 m on both sides.
12. The top of operating platform has been tentatively fixed as +53.970 m assuming that the depth of beam and the thickness of chequered plates over the bed block is 0.50 m. However it may vary as per the design obtained from Public Works Workshop. If there is any major variation it shall be referred to Designs Circle for revision.
13. This sheet should be read along with the Drg. no. 284 / 2012 to Drg. no. 292/ 2012.

Sheet No. 9 / 9

Government of Tamilnadu Public Works Department Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005.			
Designed & Drawn by Er. P. Karthikeyan, AE - III	15/11/12	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Keelaparithiyur off-take near Veerocholan village in Thiruchuli taluk of Virudhunagar district	
Checked by Er. G.R. Suganthi, AEE - III	15/11/12		
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy.SE (D)	16/11/12		
Recommended by Er. K.S.K. Thulasiram, SE (D)		General Notes	
Approved by Er. S. Anbazhagan, CE (DR&CS)	16-11-12	Region: Madurai Region	Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 292 / 2012		Approved by CE (DR&CS) in Lr No. 268 CE / SE(D) / AEE III / F563 / 2012 dated 16.11.2012	

DESIGN OF PERMEABLE FOUNDATION

Permeable foundation is proposed for the anicut. The apron floor is designed for the following flow conditions.

1. Subsurface flow condition

2. Surface flow condition

The thickness of the floor is arrived based on Khosla's theory for the subsurface flow condition adopting an exit gradient of 1 in 6. The energy dissipation arrangements such as basin level, basin length are arrived for the surface flow conditions. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete.

The salient features of the anicut are

Maximum Flood Discharge	:	**301.572 Cumecs or 10650 Cusecs**
Crest Level	:	+ 61.400m
Head over crest	:	2.18m
Front Maximum Water Level	:	+63.580m
Rear Maximum Water Level	:	+63.060m
Upstream bed level	:	+60.500m
Downstream bed level	:	+60.500m
Length of anicut	:	**70.0m**
Height of anicut	:	0.90m
Top width	:	1.50 m
Upstream slope	:	0.1 : 1
Downstream slope	:	0.30 : 1
Total length of floor	:	**12.50m**
Depth of upstream cutoff	:	1.65m
Depth of downstream cutoff	:	1.91m
Thickness of floor at toe	:	1.00m
Thickness of floor at end	:	0.60m

Length of stilling basin	:	**7.95m**
Stilling Basin Level	:	+60.200m

Downstream Protection works

Beyond the stilling basin 4 rows of CC blocks of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness are proposed. It is proposed to have a launching apron for a length of 8m having inner and outer thickness of 1.45m and 2.20m respectively.

DESIGN OF SCOUR VENT PORTION

Computation of linear waterway

It is proposed to provide 6 vents of size 1.80 x 0.90m (3 nos. on each sides) to discharge 19.31Cumecs or 681.93cusecs (i.e., 6.4% of the Maximum Flood Discharge) with sill level at +60.500 m.

Design of permeable foundation

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The salient features of the scour vent are as follows.

Discharge through scour vent	:	**19.31 Cumecs or 681.93 Cusecs**
Sill level	:	+47.20m
No. of vents	:	6 Nos.
Size of vent	:	1.80 x 0.90m
Total length of floor	:	**12.50 m**
Upstream Bed Level	:	+60.500m
Downstream Bed level	:	+60.500m
Depth of upstream cutoff	:	1.65m
Depth of downstream cutoff	:	1.91m
Thickness of floor at toe	:	0.70m
Thickness of floor at end	:	0.60m
Stilling basin level	:	+60.200m

Length of stilling basin	:	**5.85**

Downstream Protection works

Beyond the stilling basin 4 rows of CC blocks of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness are proposed. It is proposed to have a launching apron for a length of 8m having inner and outer thickness of 1.45m and 2.20m respectively.

DESIGN OF PIER

The top of the pier is kept as +64.180m. The height of the pier from the sill level is 3.68m. The stability of the pier is checked for the following conditions.

Condition1: All shutters are in closed condition

Condition2: All shutters are in fully opened condition

Condition3: When one shutter closed and the adjacent being in opened condition.

It is suggested to provide a thickness of 1.0m and a length of 2.50 m for the pier. The stresses developed due to the various forces involved at the four corners of the pier are computed for all the loading conditions and are summarized below.

Sl.No	**Condition**	**Stresses in t/m^2**			
		Corner A	Corner B	Corner C	Corner D
1	All shutters are in closed condition.	14.042	3.096	3.096	14.042
2	All shutters are in fully opened condition.	1.463	3.39	10.936	8.745
3	When one shutter closed and the adjacent being in opened condition	6.72	4.969	5.192	7.207

The pier is proposed in M15 concrete. Surface reinforcement with 8mm dia bars shall be provided in each direction, ie both horizontally and vertically. Spacing of such bars shall not exceed 200m.

DESIGN OF ABUTMENT AND WING WALLS

The left and right abutments are designed for the earth pressure caused due to the backfill material. The top of operating platform is proposed at +64.580m. The parameters of the backfill material such as saturated unit weight and angle of internal

friction have been assumed as 2.0t/m^3 and 30^0 respectively. Necessary wing walls have also been designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is 17.30 t/m^2. The abutments and wing walls are proposed in M15 concrete using graded metal. It is suggested to provide surface reinforcement at the rate of 2.5 kg/m2 in the abutment wing walls and return walls at the water face in each direction. ie. both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

DESIGN OF CANAL HEAD SLUICE

Computation of linear waterway

It is proposed to provide 2 vents of size 1.30 x 0.60m to draw the required discharge of 2.294 Cumecs or 81 Cusecs, with sill level at +60.800m.

Design of permeable foundation:

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The salient features of the Head Sluice are as follows

Discharge through Head Sluice vent	:	2.294 Cumecs or 81 Cusecs
Sill level	:	+60.800m
FSL in channel	:	+61.07
No. of vents	:	2Nos.
Size of vent	:	1.30x0.60 m
Total length of floor	:	**15.50m**
Upstream Bed Level	:	+60.500m
Downstream Bed Level	:	+60.570m
Depth of upstream cutoff	:	1.65m
Depth of downstream cutoff	:	3.50m
Thickness of floor at toe	:	1.60m
Thickness of floor at end	:	1.30m
Stilling basin level	:	+59.87
Length of stilling basin	:	**7.31m**

Design of breast wall

Since the computed FMFL of +63.580m is higher than the top of shutter +61.550, breast wall is proposed in the sluice vent. Necessary top and bottom beams are proposed in the breast wall. The thickness of the proposed breast wall is 0.20m. The sizes of top and bottom beams are 0.2m x 0.20m and 0.25m x 0.25m respectively. The breast wall and beams are proposed in M25 concrete.

Downstream Protection works

Beyond the stilling basin 1 row of CC block of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness is proposed. It is proposed to have a launching apron for a length of 3.0m having inner and outer thickness of 1.20m and 1.90m respectively.

Design of Abutment and Wing Walls

The left and right abutments are designed for the earth pressure caused due to the backfill material. The top of operating platform is proposed at +64.580m and thus the top of the abutment is proposed at +64.580m. The parameters of the backfill material such as saturated unit weight and angle of internal friction have been assumed as $2.0t/m^3$ and 30^0 respectively. Necessary wing walls are also designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is 17.22 t/m^2. The abutments and wing walls are proposed in M15 concrete using graded metal. It is suggested to provide surface reinforcement with 8mm dia bars in the abutment wing walls and return walls at the water face in each direction. ie. both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

The following points should be considered before taking up the work.

1) The bottom of the D/s cut off wall shall not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements have to be provided around the cutoff wall.
2) Weep holes with necessary filter arrangements shall be provided at the upstream and downstream wing walls above the M.W.L. and R.W.L. respectively.
3) The depth of footing for abutment and wing walls proposed below the sill level is as per the details furnished.

4) Surface reinforcement with 8mm dia bars shall be provided in the abutment and wing walls at the water face in each direction. ie. Both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

5) Suitable Flood banks should be formed on the upstream and downstream side allowing a minimum free board of 1.0m above the water surface elevation.

6) The pier should be constructed monolithic with the apron floor.

Copies of the approved drawings of components of the anicut are sent herewith for necessary action.

Enclosure: Drawings - 9 Nos

[Sd----------]
Chief Engineer, PWD,
DR&CS, WRO,
Chennai -600 005.

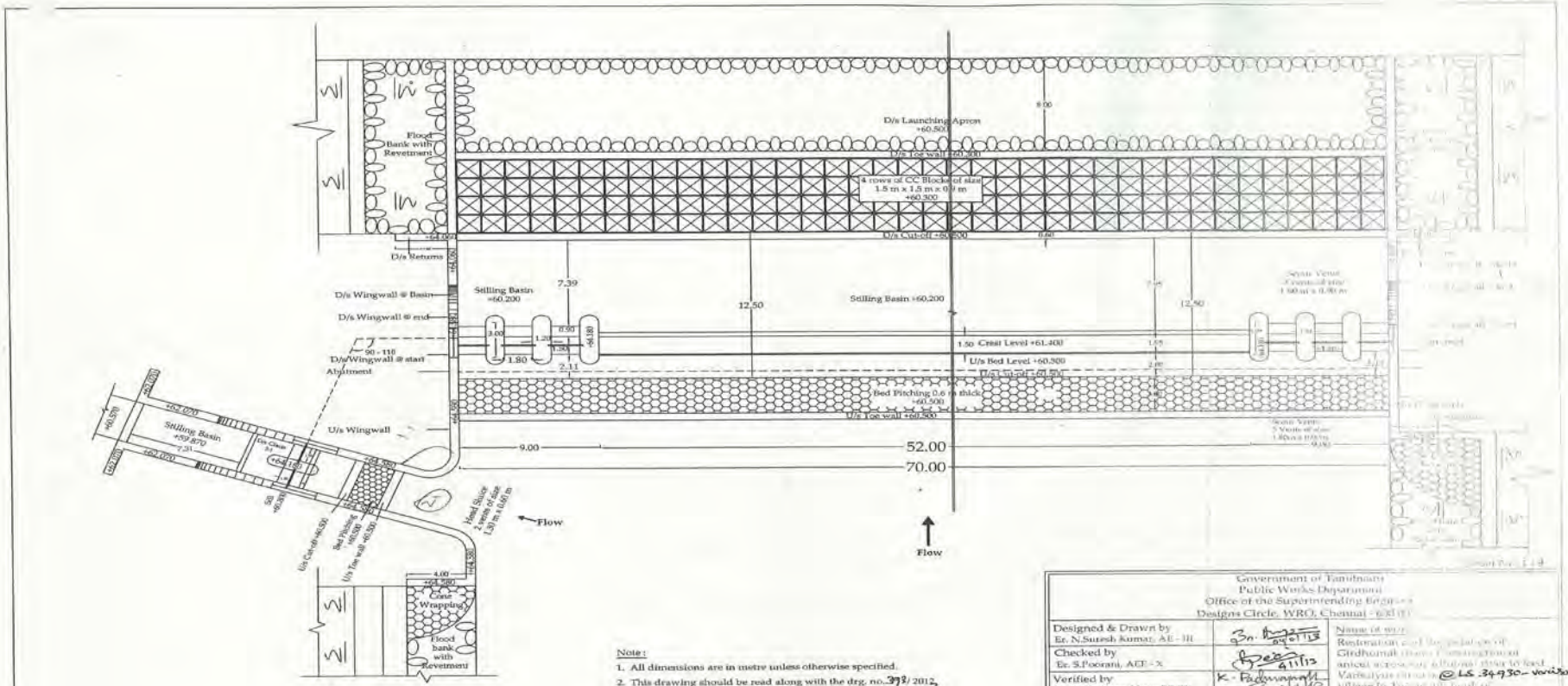
Copy to the Superintending Engineer, PWD, Designs Circle, WRO, Chennai 5.
Enclosure: Plan-9 Nos

Copy to the Superintending Engineer, PWD, Vaippar Basin Circle, Virudhunagar
Enclosure: Plan-9 Nos

Copy to the Executive Engineer, PWD, Special Project Division, WRO, Madurai.
Enclosure: Plan-9 Nos

Spare copy to CE, DR&CS office file with enclosure.
Enclosure: Plan-9 Nos

7/1/13
for Chief Engineer,PWD,
DR&CS, WRO,
Chennai -600 005.

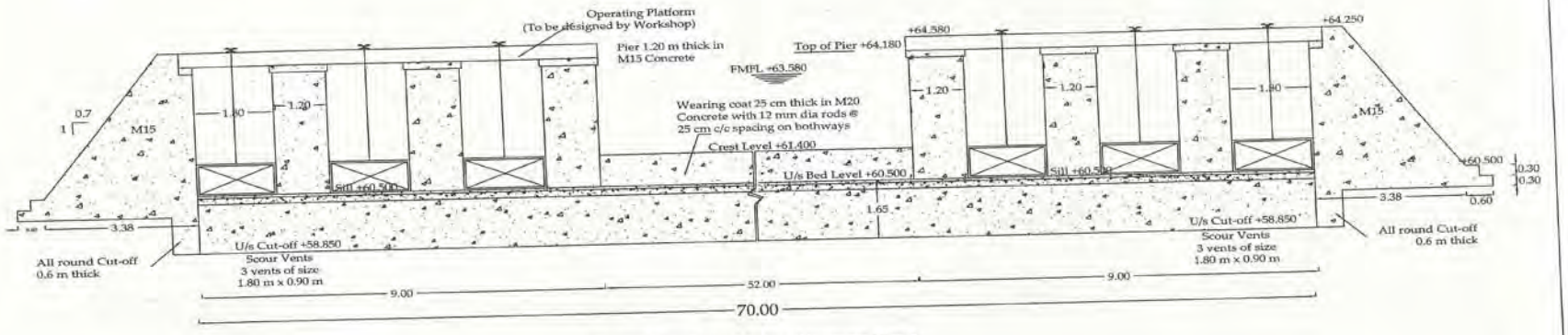


Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 392/2013 to drg. no. 401/2013

Government of Tamilnadu Public Works Department Office of the Superintending Engineer Design Circle, WRO, Chennai - 600 032		
Designed & Drawn by Er. N.Suresh Kumar, AE - III		Name of work : Restoration and Improvement of Girdhamali (Down) Distributary and its Feed channel at R.D.0 to 9500 m in Vanniyar Eri in Ward No.[illegible] Villages in Dindigul (Dt) Dindigul (Dt)
Checked by Er. S.Poorani, ACE - X		
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy.SE (D)	K. Padmanabhan 4/1/13	
Recommended by Er. K.S.K. Thalasiram, SE (D)		Layout Plan of Head sluice and Cane Sluice
Approved by Er. S. Anbazhagan, CE (DRS&CS)	4.1.13	Region : Madurai Region
Drg. No. 393/2013	SCALE 1 : 250	

Name of work : Restoration and Improvement of Girdhamali (Down) Distributary and its Feed channel at R.D.0 to 9500 m in Vanniyar Eri in Ward No.[illegible] Villages in Dindigul (Dt) Dindigul (Dt) @ LS 39-30 - varisaiyur



Sectional Elevation of Anicut (Upstream View)

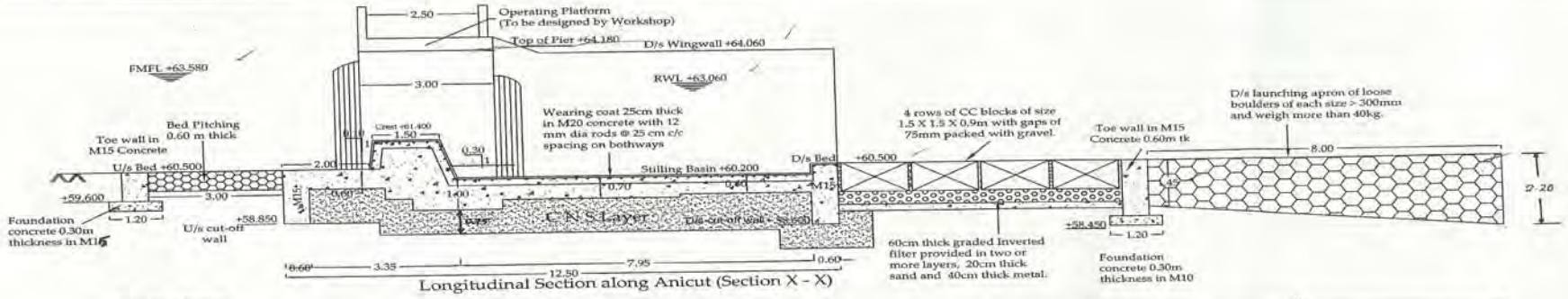
Sheet No. 2 / 9

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. N.SURESH KUMAR, AE - X	04/01/13	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X	4/1/13	
Verified by Er. K. Padmanabhan, EE (D)	4/1/13	
Er. V. Thiyagarajan, Dy. SE (D)		Sectional Elevation of Anicut
Recommended by Er. K.S.K. Thulasiram, SE (D)	4/1/13	
Approved by Er. S. Anbazhagan, CE (DR&CS)	4.1.13	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 374/2013	SCALE 1:100	Approved by CE (DR&CS) in Lr. No. 14 CE / SE(D) / AEE X / F 563 / 2012 dated 4.01.2013

Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 373/2013 to drg. no 401 / 2013



Sheet No. 3 / 9

Hydraulic Particulars :

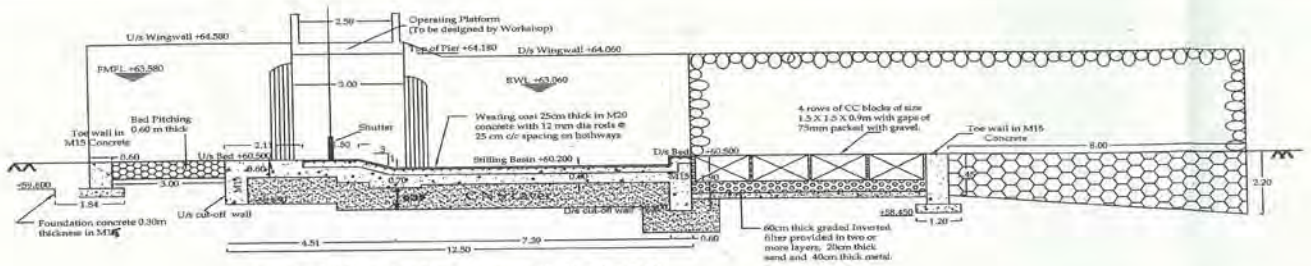
1.	Maximum Flood Discharge	301.572 cumecs or 10,650 cusecs	
2.	Weir Discharge	282.26 cumecs or 9968 cusecs	
3.	Front Maximum Flood Level	+63.580 m	
4.	Rear Water Level	+63.060 m	
5.	Crest Level	+61.400 m	
6.	Head Over Crest	2.18 m	
7.	U/s Bed Level	+60.500 m	
8.	D/s Bed Level	+60.500 m	
9.	Length of Weir	52.00 m	
10.	Stilling Basin Level	+60.200 m	
11.	Total Floor length	12.50 m	

Note :

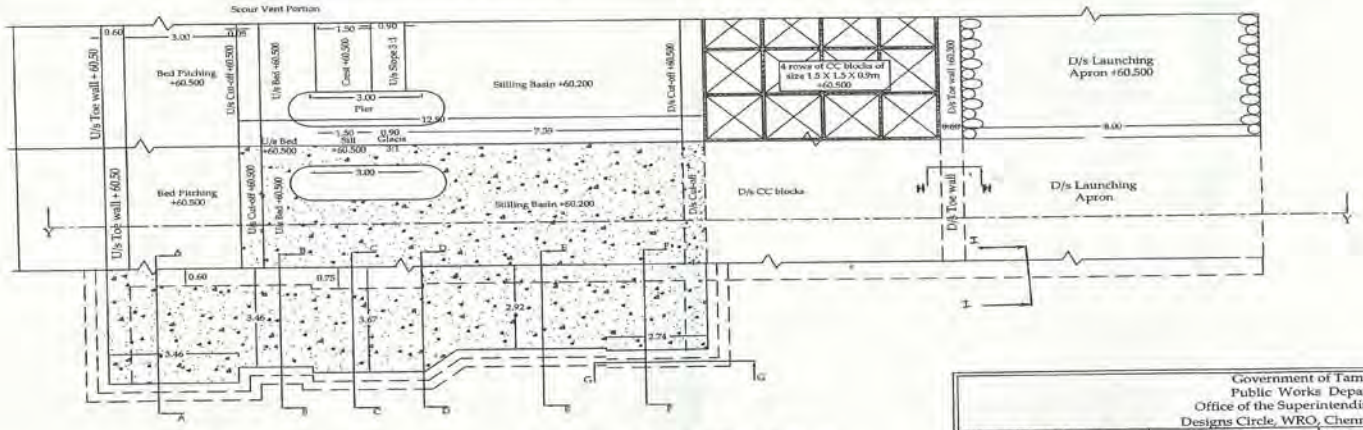
1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 373 / 2013 to drg. no. 401 / 2013

Government of Tamilnadu - Public Works Department
Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005.

Designed & Drawn by Er. N.SURESH KUMAR, AE - X	04/01/13	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X.	4/1/13	
Verified by Er. K. Padmanabhan, EE (D)	4/1/13	
Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K.S.K. Thulasiram, SE (D)	4/1/13	Plan and Cross Section of Anicut
Approved by Er. S. Anbazhagan, CE (DR&CS)	Er. 1-1-13	Region: Madurai Region Circle: Vaippar Basin Circle, Virudhunagar
Drg. No. 375 / 2013	Scale 1 : 100	Approved by CE (DR&CS) in Lr. No. 14 CE / SE(D) / AEE X / F 563 / 2012 dated 04.01.2013



Longitudinal Section along Scour vent (Section Y-Y)



Half Plan at Top and Half Plan at Bottom

Sheet No. 4/9

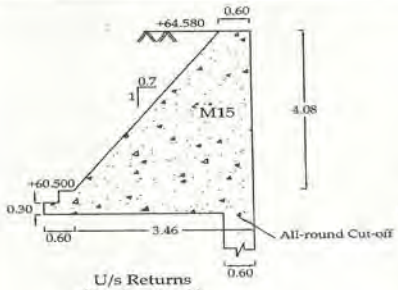
Hydraulic Particulars :			
1. Maximum Flood Discharge	301.572 cumecs or 10650 cusecs	6. Number of Vents	6 nos. (3 on each side)
2. Scour vent Discharge	19.31 cumecs or 681.933 cusecs	7. Size of vents	1.80 m x 0.90 m
3. Front Maximum Flood Level	+63.580 m	8. U/s Bed Level	+60.5000 m
4. Rear Water Level	+63.060 m	9. D/s Bed Level	+60.500 m
5. Sill Level	+60.500 m	10. Stilling Basin Level	+60.200 m
		11. Total Floor length	12.50 m

Note :

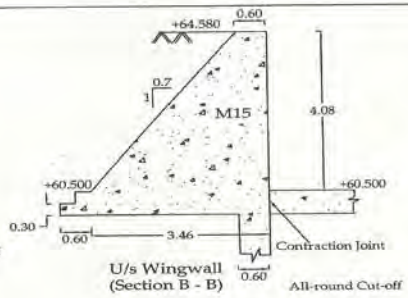
1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 873/2013 to drg. no. 401/2013

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

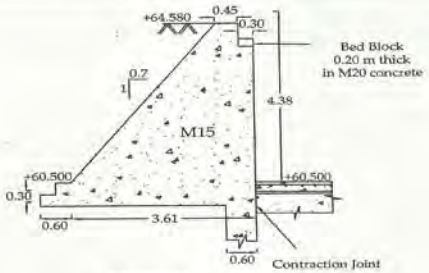
Designed & Drawn by Er. N.SURESH KUMAR, AE - X	04/01/13	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X	4/1/13	
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)	K. Padmanabhan 4/1/13	
Recommended by Er. K.S.K. Thulasiram, SE (D)	4/1/13	Plan and Cross Section of Scour Vent
Approved by Er. S. Anbazhagan, CE (DR&CS)	4.1.13	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 396/2013	SCALE 1:100	Approved by CE (DR&CS) in Lr. No. 1409/SE(D)/AEE/F 563/2012 dated 04.01.2013



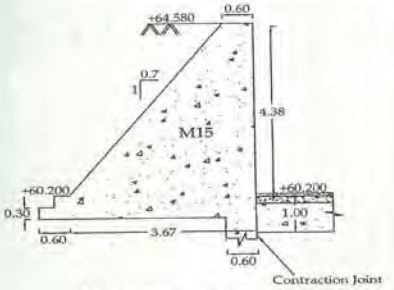
U/s Returns
(Section A - A)



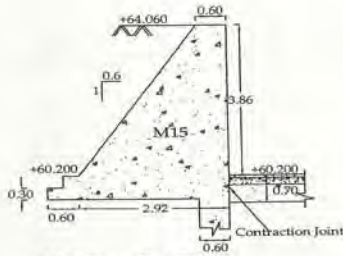
U/s Wingwall
(Section B - B)



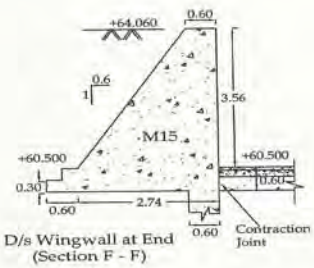
Abutment
(Section C - C)



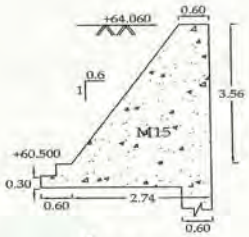
D/s Wingwall at Start
(Section D - D)



D/s Wingwall at Basin
(Section E - E)



D/s Wingwall at End
(Section F - F)

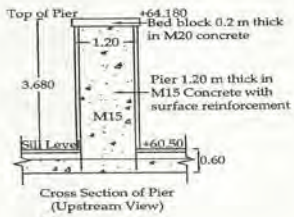


D/s Returns
(Section G - G)

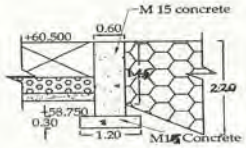
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no.393/2013 to drg. no.404/2013

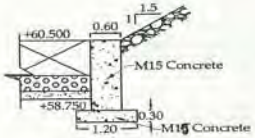
Sheet No. 5 / 9



Cross Section of Pier
(Upstream View)

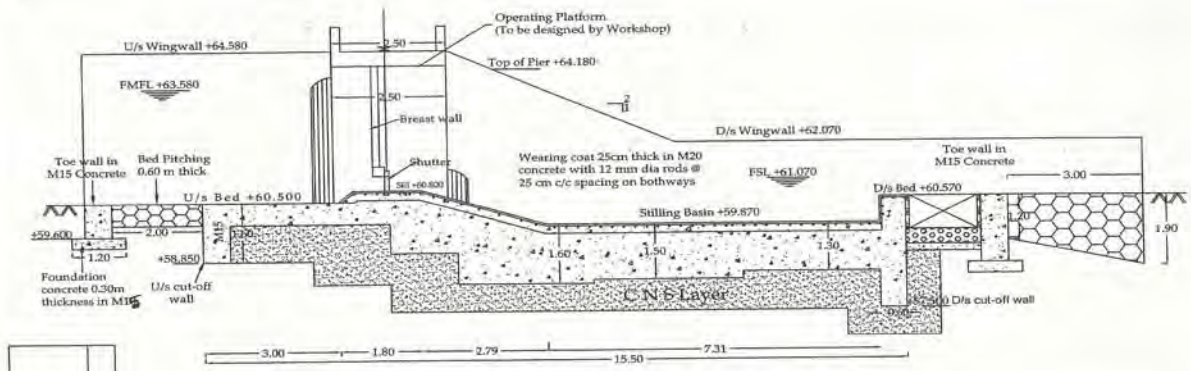


D/s Toe Wall between CC Blocks
and Launching Apron
(Section H - H)

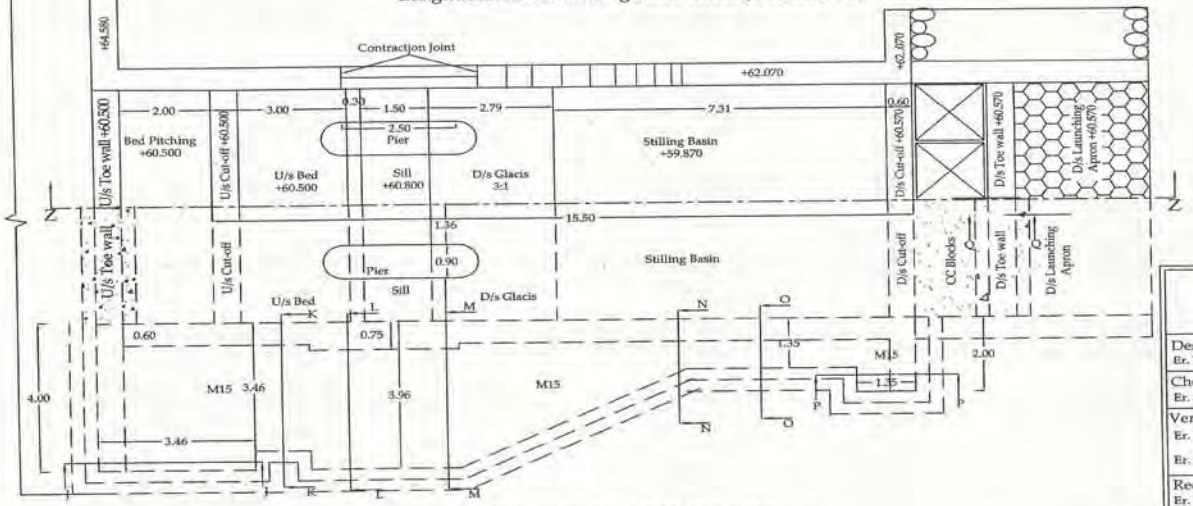


Toe Wall beyond Returns
(Section I - I)

Government of Tamilnadu Public Works Department Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005		
Designed & Drawn by Er. N.SURESH KUMAR, AE - X		Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X		
Verified by Er. K. Padmanabhan, EE (D) Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K.S.K. Thulasiram, SE (D)		Cross Section of Abutment, Wing walls, Returns, Toe walls and Pier for Anicut
Approved by Er. S. Anbazhagan, CE (DR&CS)		Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 397/2013	SCALE 1:100	Approved by CE (DR&CS) in Lr. No. 14CE / SE(D) / AEE / F. 563 / 2012 dated 04.01.2013



Longitudinal Section along Head Sluice (Section Z - Z)



Half Plan at Top and Half Plan at Bottom

Hydraulic Particulars :

1.	Design Discharge	2.29 cumecs or 81 cusecs
2.	Front Max. Water Level	+63.580 m
3.	Full Supply Level	+61.070 m
4.	Number of Vents	2 nos.
5.	Size of Vents	1.30 m x 0.60 m
6.	Sill Level	+60.800 m
7.	U/s Bed Level	+60.500 m
8.	D/s Bed Level	+60.570 m
9.	Stilling Basin Level	+59.870 m
10.	Length of Stilling Basin	7.31 m
11.	Total Floor Length	15.50 m

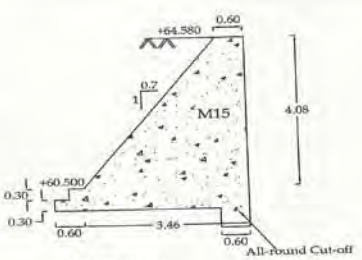
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no.393/2013 to drg. no.491/2013

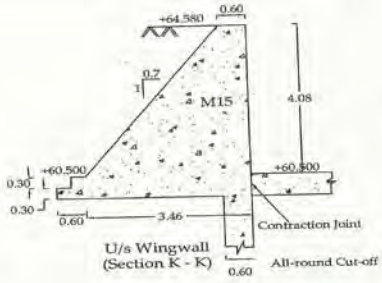
Sheet No. 6 / 9

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005.

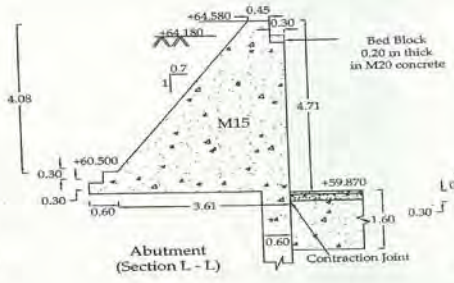
Designed & Drawn by Er. N.Suresh kumar, AE - X		Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed [illegible] off-take near [illegible] in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. Poorani, AEE - X		
Verified by Er. K. Padmanabhan, EE (D)	K. Padmanabhan	
Er. V. Thiyagarajan, Dy.SE (D)		
Recommended by Er. K.S.K. Thulasiram, SE (D)		Plan and Cross Section of Head Sluice
Approved by Er. S. Anbazhagan, CE (DR&CS)		Region: Madurai Region / Circle: Vaippar Basin Circle Virudhunagar
Drg. No. 393/2013	1: 100	Approved by CE (DR&CS) in Lr. No. 14 CE / SE(D) / AEE X / F 563 / 2012 dated 24.01.2013



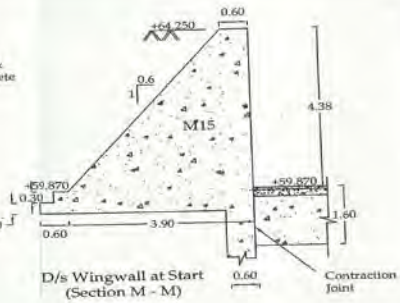
U/s Returns
(Section J - J)



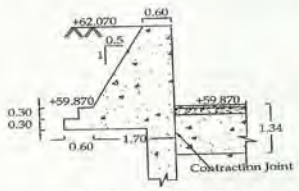
U/s Wingwall
(Section K - K)



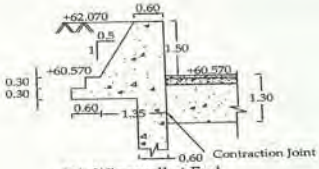
Abutment
(Section L - L)



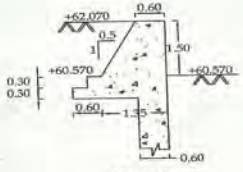
D/s Wingwall at Start
(Section M - M)



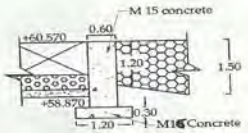
D/s Wingwall at Basin
(Section N - N)



D/s Wingwall at End
(Section O - O)

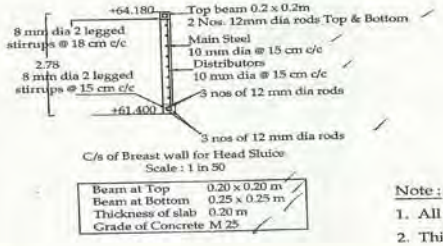


D/s Returns
(Section P - P)



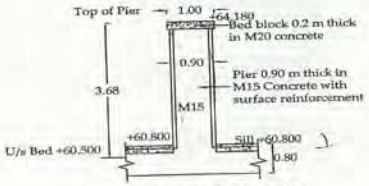
D/s Toe Wall between CC
Blocks and Launching Apron
(Section Q - Q)

Sheet No. 7 / 9



C/s of Breast wall for Head Sluice
Scale : 1 in 50

Beam at Top	0.20 x 0.20 m
Beam at Bottom	0.25 x 0.25 m
Thickness of slab	0.20 m
Grade of Concrete	M 25



Cross Section of Pier for Head Sluice
(Upstream View)

Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the drg. no. 393 / 2013 to drg. no. 401 / 2013

Government of Tamilnadu Public Works Department Office of the Superintending Engineer, Designs Circle, WRO, Chennai - 600 005		
Designed & Drawn by Er. N.SURESH KUMAR, AE - X	04/01/13	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur village in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X	4/1/13	
Verified by Er. K. Padmanabhan, EE (D)	K. Padmanabhan 4/1/13	
Er. V. Thiyagarajan, Dy. SE (D)	4/1/13	
Recommended by Er. K.S.K. Thulasiram, SE (D)	4/1/13	Cross Section of Abutment, Wing walls, Returns, Toe walls, Pier and Breast wall for Head Sluice
Approved by Er. S. Anbazhagan, CE (DR&CS)	4.1.13	Region: Madurai Region Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 394/2013	SCALE 1 : 100	Approved by CE (DR&CS) in Lr. No. 117 CE / SE(D) / AEE X / F 563 / 2012 dated 04.01.2013

General Notes:

I. Anicut

1. The analysis has been made based on IS 6512-1984, IS 6966-1989, IS 12720-1993, IS 6531-1994, IS 1893-2002, IS 3370 - 2009 and IRC 6-2000.
2. The design has been formulated based on the particulars furnished by the Executive Engineer, Special Project Division, Madurai through E mail dated 27.11.12 & 14.12.2012 respectively.
3. The anicut has been designed for a maximum flood discharge of 10,650 cusecs.
4. The length of the anicut between abuments is taken as 70 m whereas the width of river as per design commun icated vide T.O. lr.no.299CE/SE(D)/AEE X/F-563/dt.27.12.12. Hence the actual width of river during execution may be verified and the design of the anicut may be modified by referring to this office.
5. The parameters of backfill material such as saturated unit weight and angle of internal friction have been assumed as 2 t/cu.m. and 30° respectively. Hence suitable backfill material may be used accordingly.
6. The depth of footing for abutment and wingwalls proposed below the sill levels are tentative and may be suitably modified according to the site conditions.
7. The proposed lengths of upstream and downstream returns are tentative and may be modified to suit the site conditions.
8. The apron floor, body wall, cut-off walls, pier, abutment, wingwalls and returns are proposed in M15 grade of concrete.
9. Surface reinforcement at the rate of 2.5 kg/sq.m. shall be provided in the pier, abutment, wing walls and returns at water face in each direction i.e., both horizontally and vertically. Spacing of such bars shall not exceed 200mm.
10. The bottom of the D/s cutoff should not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements should be provided around the cutoff.
11. Weep holes with necessary filter arrangements should be provided in the upstream and downstream wingwalls above the FMWL and RWL respectively.
12. Suitable Flood banks should be formed allowing a minimum free board of 1.0m above the water surface elevation in the both upstream and downstream side.
13. The maximum stress developed at the sill level of the abutment of anicut 16.63 t/sq.m. The SBC of the foundation media should be checked before taking up the work.
14. The proposed downstream protection works should be maintained periodically for effective functioning of the anicut.
15. The design for the operating platform and the structural details of the shutters are to be finalised by the Public Works Workshop.
16. The top of operating platform has been tentatively fixed as +64.580 m assuming that the depth of beam and the thickness of chequered plates over the bed block is 0.40 m. However it may vary as per the design obtained from P.W.W.S. If there is any major variation, it shall be referred to Designs Circle for revision.
17. The Pier should be constructed monolithic with apron floor.
18. Transverse contraction joints with PVC water stops shall be provided in the anicut portion at every 25m interval at the locations specified in the drawing.
19. The bed level of the river at the D/s of the anicut and scour vent portions should be regraded from the proposed bed level of +60.500 m to a slope of 1 in 2200 for a width of 70 m atleast for a distance of 500 m.
20. The scour vents should be in fully opened condition during floods.
21. A clear cover of 75 mm shall be provided for the reinforcement provided in the stilling basin portion.
22. The structure is designed as Permeable foundation. During execution, if impervious strata found, the Design Circle shall be referred for revised design.
23. In general design the Girudhmal river, the downstram bed level of the Varisaiyur anicut is taken as 60.50 instead of 60.30 communicted early vide T.O.lr.no.299CE/SE(D)/AEE X/F-563/2012/dt.27.12.12.. Hence the FSD changed from 2.60m to 2.56m
24. Assuming that the swell pressure is 50KN/Sqm. CNS Layer for the depth of 75cm is provided below the apron floor. Check the swell pressure before execution and depth of CNS layer to be provided as per Clause 4.2.5. of IS 9451:1994.

II. Head Sluice

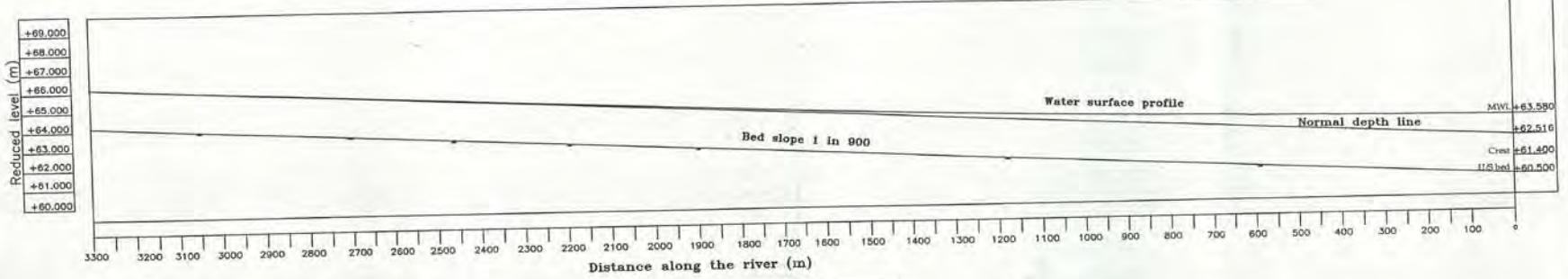
1. The Head sluice has been designed for a discharge of 81 cusecs (2.29 cumecs)
2. The Canal bed width is 4.50m with a slpe of 1:1 and the bed fall is 1 in 600
3. Four number of vents of size 1.30 m x 0.60 m is proposed for the head sluice portion.
4. The energy dissipation arrangements for the head sluice portion have been designed for a discharge of 81 cusecs. Therefore the vent opening should be so adjusted to maintain the discharge of 81 cusecs in the canal by keeping the Full Supply Depth (FSD) of 0.50 m at Maximum Flood Condition.
5. Necessary transition may be provided at the end of the head sluice portion to negotiate the bed width of canal and the side slope.
6. The bottom of the D/s cutoff should not be keyed into the impervious layer as it will block the release of uplift pressure. If impervious layer is met with at the bottom of D/s cutoff, suitable filter arrangements should be provided around the cutoff.
7. Assuming that the swell pressure is 50KN/Sqm. CNS Layer for the depth of 75cm is provided below the apron floor. Check the swell pressure before execution and depth of CNS layer to be provided as per Clause 4.2.5. of IS 9451:1994.

This drawing should be read alongwith the drawings 373/2013 to 401/2013

Sheet No. 8 / 9

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. N.SURESH KUMAR, AE - X	30/01/13	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X	4/1/13	
Verified by Er. K. Padmanabhan, EE (D)	K. Padmanabhan 4/1/13	
Er. V. Thiyagarajan, Dy. SE (D)		General Notes
Recommended by Er. K.S.K. Thulasiram, SE (D)	4/1/13	
Approved by Er. S. Anbazhagan, CE (DR&CS)	4-1-13	Region: Madurai Region; Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 400/ 2013	Not to scale	Approved by CE (DR&CS) in Lr. No. 14 CE / SE(D) / AEE X/F. 563 / 2012 dated 04.01.2013



Distance from axis of Bed Dam in m	Water surface elevation in m	Proposed flood bank level in m
0	63.580	64.580
60	53.590	64.590
110	63.600	64.600
170	63.620	64.620
230	63.640	64.640
290	63.650	64.650
350	63.670	64.670
415	63.690	64.690
480	63.715	64.715
550	63.740	64.740
620	63.770	64.770
690	63.800	64.800

Distance from axis of Bed Dam in m	Water surface elevation in m	Proposed flood bank level in m
770	63.835	64.835
850	63.880	64.880
940	63.925	64.925
1035	63.980	64.980
1140	64.050	65.050
1260	64.135	65.135
1400	64.245	65.245
1600	64.400	65.400
1860	64.650	65.650
2440	65.240	66.240
3300	66.180	67.180

Note:
1. All dimensions are in metres unless otherwise specified
2. This drawing should be read along with T.No.s 393/2012 to 401/2012.

Sheet No. 9/9

Government of Tamilnadu
Public Works Department
Office of the Superintending Engineer,
Designs Circle, WRO, Chennai - 600 005

Designed & Drawn by Er. N.SURESH KUMAR, AE - X	04/01/13	Name of work : Restoration and Regradation of Girdhumal river - Construction of anicut across Girudhumal river to feed Varisaiyur off-take near Varisaiyur in Thiruchuli taluk of Virudhunagar district
Checked by Er. S. POORANI, AEE - X	4/1/13	
Verified by Er. K. Padmanabhan, EE (D)	K. Padmanabhan	
Er. V. Thiyagarajan, Dy. SE (D)		
Recommended by Er. K.S.K. Thulasiram, SE (D)	4/1/13	Back Water Profile
Approved by Er. S. Anbazhagan, CE (DR&CS)	4-1-13	Region: Madurai Region; Circle : Vaippar Basin Circle, Virudhunagar
Drg. No. 401/2013	SCALE 1:10000 (1-cm) 1:100 (1-cm)	Approved by CE (DR&CS) in Lr. No. AEE 58/01/AEE /F 565 /2013 dated 04.01.2013

Public Works Department
Water Resources Organisation

From
Er.S. Anbazhagan, B.E.,
Chief Engineer, PWD
Design Research and Construction
Support, WRO,
Chennai 600 005.

To
The Chief Engineer, PWD,
Madurai Region, WRO,
Madurai.

Lr.No: CE / AEE X / F -563 / 2012 dated 04.01.2013

Sir,

Sub: Restoration and Regradation of Gridhumal river in Sivagangai, Virudhunagar an Ramanathapuram districts - Construction of Anicut across Giruthumal river to fee Kallikulam tank near Kallikulam village of Kamuthi Taluk in Ramnad District Approved design and drawings of Anicut communicated – reg.

Ref : 1.G.O.Ms.No.269 PW(WR1)/dt.23.11.12.

2.Minutes of the Preliminary meeting of the Committee for "Assessment of le out works in IAMWARM sub basins on 26.11.12

3.EE, Spl. Pro. Divn. Madurai mail dt.26.11.12 & 14.12.12

The Engineer-in-Chief has communicated a copy of minutes in the reference 2 cited wherein the design and drawings of 3 anicuts namely Varisiyur, T.Punavasal an Kallikulam prepared by the Chief Engineer, Madurai Region should be vetted by the C DR&CS.

Accordingly, spot levels of the proposed alignment site and the supply channel ar trial pit details have been received vide reference 2nd cited.

Based on the particulars received, various components of the anicut acros Gridhumal river to feed Kallikulam tank @ LS 48850 m was arrived as follows

Bed slope	:	1 in 1425
Bed width	:	60m
Maximum discharge	:	12530 cusecs

MAXIMUM FLOOD DISCHARGE

The maximum flood discharge of the anicut has been arrived as 12530 Cusecs ar the same is taken as design flood of the anicut.

COMPUTATION OF REAR WATER LEVEL

From the L.S. of the river furnished, the bed slope of the river is computed as 1 1425. The R.W.L. is computed for the regraded section of the river adopting this b slope and works out to be +49.000m.

LAYOUT

It is proposed to provide 6 Nos. of scour vents (3 Nos. on either sides of anicu of size 1.50 x 0.90 m with sill level of +47.20 m with a discharging capacity of 25.8 cumecs under maximum flood condition. Therefore, the anicut is proposed for a length 45.00 m to dispose of the balance discharge. The total length of the structure considere for design in between the abutments is 60m.

CREST LEVEL OF ANICUT

The crest level has been fixed at +48.10 m. The average bed level of the river the proposed site location is +47.20m. Hence, the height of the anicut is 0.90m.

COMPUTATION OF FRONT MAXIMUM WATER LEVEL

The front MWL for the above arrangements to dispose the design flood, adoptir narrow crested weir formula (i.e., $Q = C_d L H^{3/2}$ having a C_d value of 0.625 for submerged condition), f the anicut is computed as +50.35m, with a head over crest of 2.25m.

DESIGN OF ANICUT PORTION

STABILITY OF BODY WALL

A narrow crested weir having a top width of 1.20m, with upstream slope of 0.1 and downstream slope of 0.75:1 is proposed for the body wall portion. The stability the body wall is checked for the following loading conditions,

1. Empty condition.
2. Water at MWL, and maximum tail water with uplift.
3. Water at crest level with full uplift, no tail water.

The stresses developed at the bottom of the body wall are computed and tabulate below.

Sl.No	Description	Stress in t/m²	
		Maximum	Minimum
1.	Empty condition	2.45	1.03
2.	Water at MWL and maximum tail water	0.11	0.04
3.	Water at crest level with full uplift and no tail	1.45	1.17

DESIGN OF PERMEABLE FOUNDATION

Permeable foundation is proposed for the anicut. The apron floor is designed f the following flow conditions.

1. Subsurface flow condition
2. Surface flow condition

The thickness of the floor is arrived based on Khosla's theory for the subsurfac flow condition adopting an exit gradient of 1 in 6. The energy dissipation arrangement such as basin level, basin length are arrived for the surface flow conditions. The apro floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm proposed in the stilling basin portion in M20 concrete.

The salient features of the anicut are

Maximum Flood Discharge	:	**354.87 Cumecs or 12530 Cusecs**
Crest Level	:	+ 48.100m
Head over crest	:	2.25m
Front Maximum Water Level	:	+50.350m
Rear Maximum Water Level	:	+49.000m
Upstream bed level	:	+47.200m
Downstream bed level	:	+46.200m
Length of anicut	:	**60.0m**
Height of anicut	:	0.90m
Top width	:	1.20 m
Upstream slope	:	0.1 : 1
Downstream slope	:	0.75 : 1
Total length of floor	:	**19.00m**
Depth of upstream cutoff	:	2.00m
Depth of downstream cutoff	:	2.75m
Thickness of floor at toe	:	1.60m
Thickness of floor at end	:	0.90m

Length of stilling basin	:	**13.31m**
Stilling Basin Level	:	+45.700m

Downstream Protection works

Beyond the stilling basin 5 rows of CC blocks of size 1.5x1.5x0.9m in M15 concrete over an inverted filter of 60cm thickness are proposed. It is proposed to have a launching apron for a length of 10m having inner and outer thickness of 1.60m and 2.40m respectively.

DESIGN OF SCOUR VENT PORTION

Computation of linear waterway

It is proposed to provide 6 vents of size 1.50 x 0.90m (3 nos. on each sides) to discharge 25.87 Cumecs or 913.65 cusecs (i.e., 7.3% of the Maximum Flood Discharge) with sill level at +47.20 m.

Design of permeable foundation

The apron floor is designed similar to the anicut portion. The apron floor and cut off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in the stilling basin portion in M20 concrete

The sallent features of the scour vent are as follows.

Discharge through scour vent	:	**25.87 Cumecs or 913.65 Cusecs**
Sill level	:	+47.20m
No. of vents	:	6 Nos.
Size of vent	:	1.50 x 0.90m
Total length of floor	:	**19.00 m**
Upstream Bed Level	:	+47.200m
Downstream Bed level	:	+46.200m
Depth of upstream cutoff	:	2.00m
Depth of downstream cutoff	:	2.75m
Thickness of floor at toe	:	1.20m
Thickness of floor at end	:	0.80m
Stilling basin level	:	+45.900m

Length of stilling basin	:	**9.35**

Downstream Protection works

Beyond the stilling basin 5 rows of CC blocks of size 1.5x1.5x0.9m in concrete over an inverted filter of 60cm thickness are proposed. It is proposed to l a launching apron for a length of 10m having inner and outer thickness of 1.60m 2.40m respectively.

DESIGN OF PIER

The top of the pier is kept as +50.95 m. The height of the pier from the sill is 3.75m. The stability of the pier is checked for the following conditions.

Condition1: All shutters are in closed condition

Condition2: All shutters are in fully opened condition

Condition3: When one shutter closed and the adjacent being in opened condition.

It is suggested to provide a thickness of 1.0m and a length of 2.50 m for the The stresses developed due to the various forces involved at the four corners of the are computed for all the loading conditions and are summarized below.

Sl.No	**Condition**	**Stresses in t/m^2**			
		Corner A	Corner B	Corner C	Corner D
1	All shutters are in closed condition.	16.514	1.081	1.081	16.514
2	All shutters are in fully opened condition.	1.658	3.173	11.887	9.360
3	When one shutter closed and the adjacent being in opened condition	7.586	2.663	3.805	9.740

The pier is proposed in M15 concrete. Surface reinforcement with 8mm dian bars shall be provided in each direction. ie both horizontally and vertically. Spacir such bars shall not exceed 200m.

DESIGN OF DIVIDE WALL

It is suggested to provide divide wall at downstream side only in betweer scour vents and anicut portion. The proposed top levels of upstream and downstr divide wall are fixed as +48.10 m. The divide walls are designed based on IS 127 1993. The proposed thickness of the downstream divide wall is 0.60m. The divide w

proposed in M25 concrete. Necessary reinforcements in Fe415 are proposed for moments developed.

DESIGN OF ABUTMENT AND WING WALLS

The left and right abutments are designed for the earth pressure caused due the backfill material. The top of operating platform is proposed at +51.350m. parameters of the backfill material such as saturated unit weight and angle of inter friction have been assumed as $2.0t/m^3$ and 30^0 respectively. Necessary wing walls h also been designed at the upstream and downstream sides.

The maximum stress developed at the sill level of the abutment is 19.19 t/ The abutments and wing walls are proposed in M15 concrete using graded metal. I suggested to provide surface reinforcement with 8mm diameter bars in the abutm wing walls and return walls at the water face in each direction. ie. both horizontally vertically. Spacing of such bars shall not exceed 200 mm.

DESIGN OF CANAL HEAD SLUICE

Computation of linear waterway

It is proposed to provide 1 vent of size 0.70 x 0.60m to draw the requi discharge of 0.595 Cumecs or 21 Cusecs, with sill level at +47.500m.

Design of permeable foundation:

The apron floor is designed similar to the anicut portion. The apron floor and off are proposed in M15 concrete. Wearing coat to a thickness of 25cm is proposed in stilling basin portion in M20 concrete

The salient features of the Head Sluice are as follows

Discharge through Head Sluice vent	:	0.595 Cumecs or 21 Cusecs
Sill level	:	+47.500m
FSL in channel	:	+47.740m
No. of vents	:	1No.
Size of vent	:	0.70x0.60 m
Total length of floor	:	**16.00m**
Upstream Bed Level	:	+47.200m
Downstream Bed Level	:	+47.500m

Depth of upstream cutoff	:	1.65m
Depth of downstream cutoff	:	3.10m
Thickness of floor at toe	:	1.80m
Thickness of floor at end	:	1.50m
Stilling basin level	:	+46.500m
Length of stilling basin	:	**7.66m**

Design of breast wall

Since the computed FMFL of +5.350m is higher than the top of shutter +48.25 breast wall is proposed in the sluice vent. Necessary top and bottom beams a proposed in the breast wall. The thickness of the proposed breast wall is 0.20m. T sizes of top and bottom beams are 0.2m x 0.20m and 0.25m x 0.25m respectively. T breast wall and beams are proposed in M25 concrete.

Downstream Protection works

Beyond the stilling basin 2 rows of CC block of size 1.5x1.5x0.9m in M15 concre over an inverted filter of 60cm thickness is proposed. It is proposed to have a launchi apron for a length of 3.0m having inner and outer thickness of 1.90m and 2.90 respectively.

the bottom of D/s cutoff, suitable filter arrangements have to be provided around the cutoff wall.

2) Weep holes with necessary filter arrangements shall be provided at the upstream and downstream wing walls above the M.W.L. and R.W.L. respectively.

3) The depth of footing for abutment and wing walls proposed below the sill level is as per the details furnished.

4) Surface reinforcement with 8mm diameter bars shall be provided in the abutment and wing walls at the water face in each direction. ie. Both horizontally and vertically. Spacing of such bars shall not exceed 200 mm.

5) Suitable Flood banks should be formed on the upstream and downstream side allowing a minimum free board of 1.0m above the water surface elevation.

6) The pier should be constructed monolithic with the apron floor.

Copies of the approved drawings of components of the anicut are sent herewith for necessary action.

Enclosure: Drawings - 9 Nos

-sd-
Chief Engineer,PWD,
DR&CS, WRO,
Chennai -600 005

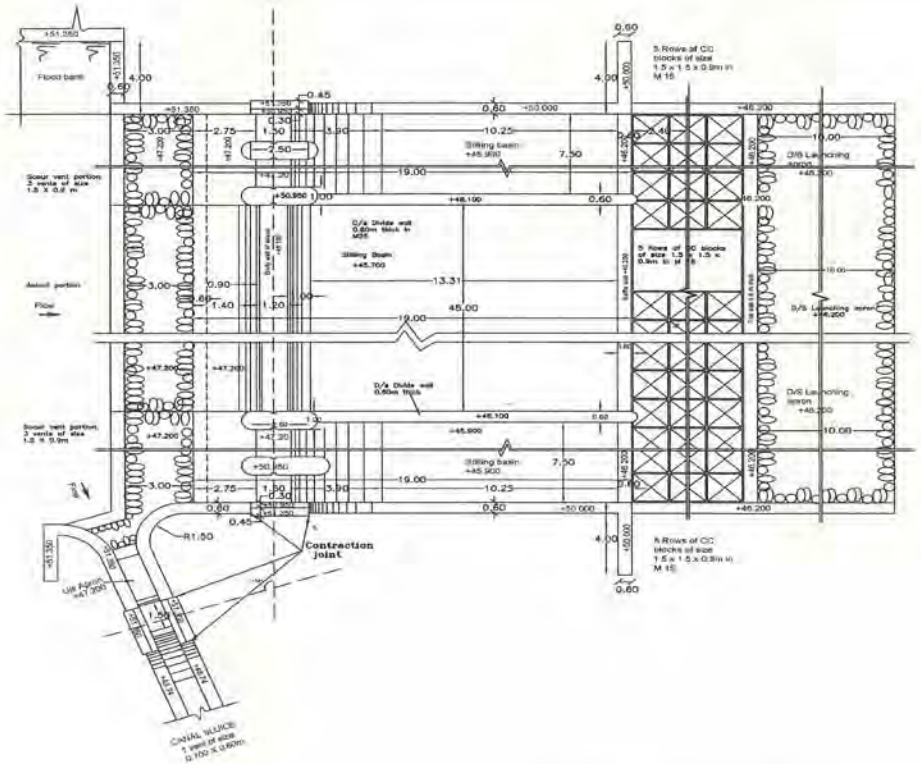
Copy to the Superintending Engineer, PWD, Designs Circle, WRO, Chennai 5.
Enclosure: Plan- 9 Nos

Copy to the Superintending Engineer, PWD, Vaippar Basin Circle, Virudhunagar
Enclosure: Plan- 9 Nos

Copy to the Executive Engineer, PWD, Special Project Division, WRO, Madurai.
Enclosure: Plan- 9 Nos

Spare copy to CE, DR&CS office file with enclosure.
Enclosure: Plan- 9 Nos

for Chief Engineer,PWD,
DR&CS, WRO,
Chennai -600 005.



HYDRAULIC PARTICULARS

1. Maximum Flood Discharge	:12530 cusecs (354.81 cumecs)
2. F.M.F.L.	:+51.35m
3. R.W.L.	:+49.00m
4. Total width of river	:60m

ANICUT

1. Crest level	:+48.100m
2. Length of anicut	:45m
3. Discharge over anicut	:328.939 cumecs (11616.464 c/s)
4. U/S Bed Level	:+47.200m
5. D/S Bed Level	:+46.200m
6. D/S Basin Level	:+45.700m
7. Length of Stilling basin	: 13.31m
8. Total floor length	:19.00m

SCOUR VENT

1. Discharge through scour vent	:25.871 cumecs (913.650 c/s)
2. No. of scour vents	: 6 nos
3. Size of scour vents	: 1.5X0.9m
4. Sill level	:+47.20m
5. U/S Bed Level	:+47.20m
6. D/S Bed Level	:+46.20m
7. D/S Basin Level	:+45.90m
8. Length of Stilling basin	: 10.25m
9. Total floor length	: 19.00m

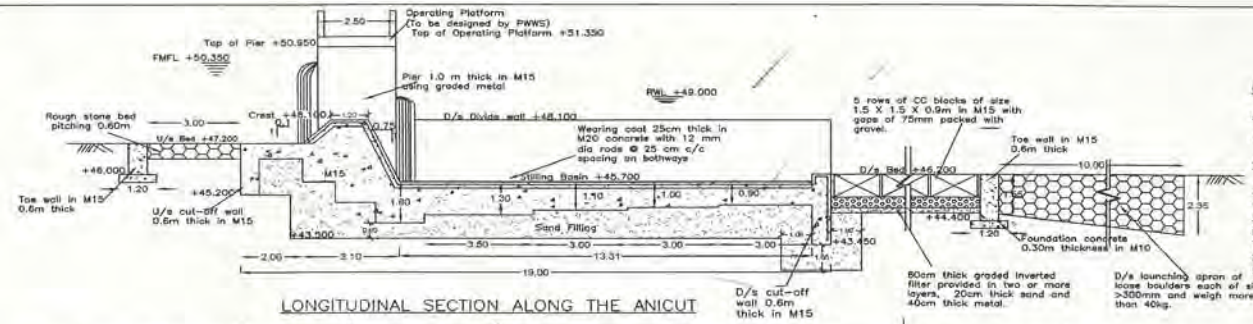
Sheet No 1/9

This drawing has to be read with the series of drawings T No 372/2012 to T No 380/2012

All dimension are in 'm' unless or otherwise specified.

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er. S.Poorni, AEE	31/12	Name of work : RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRCUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE IN LS 48550 KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya, AE	31/12	
Verified by Er. K.Padmanabhan, EE(D)	3/1/13	
Er. V.Thiyagarajan,DySE(D)		Designed drawing of: LAYOUT PLAN
Recommended by Er. K.S.K.Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)	4.1	Region: Madurai / Circle: Vaippar Basin Circle, Virudhunagar
T.NO: 372/2012	SCALE 1:200	APPROVED in C.E.(D.R.C.S) Lr NO. 874-CE/SE(D) / EE(D)/ AEE XI/F 583/2012 / DATED 4.02.13

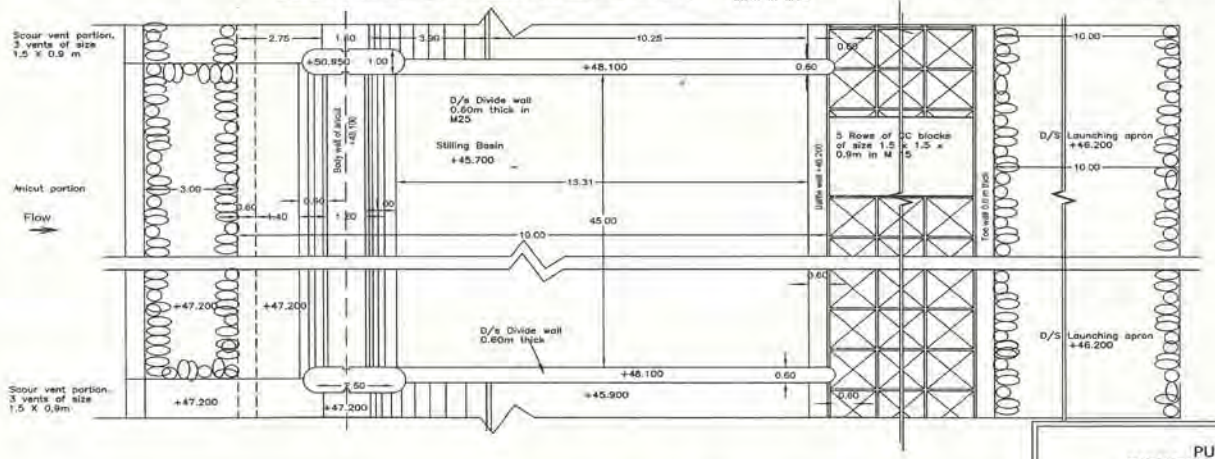


LONGITUDINAL SECTION ALONG THE ANICUT

HYDRAULIC PARTICULARS :

Anicut

1. Maximum Flood Discharge	354.81 cumecs or 12530 cusecs
2. through the Anicut	328.939cumecs or 11617 cusecs
3. MWL	+50.350 m
4. Rear Water Level	+49.000m
5. U/s Bed Level	+47.200 m
6. D/s Bed Level	+46.200 m
7. Length of Weir	45.00 m
8. Basin Level	+45.700 m
9. Total Floor Length	19.00m



HALF PLAN AT TOP AND HALF PLAN AT BOTTOM

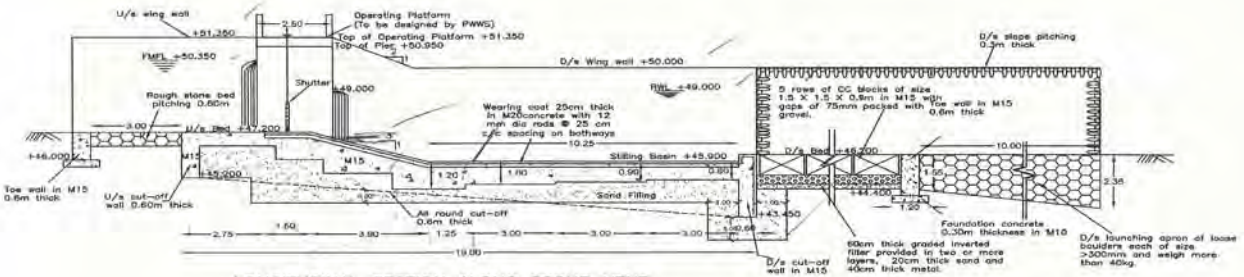
Sheet No. 2/9

Note :

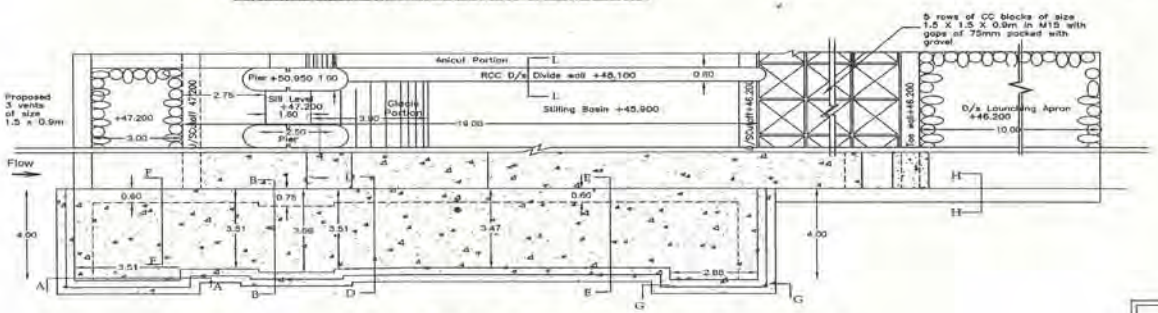
1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the series T.No. 372/ 2012 to T.No. 380 / 2012.

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.S.Poorni A.E.E	31/12/12	Name Of Work: RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRCUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE @ LS 48850 km KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E	31/12/12	
Checked by Er.S.Poorni A.E.E	31/12/12	
Verified by Er.K. Padmanabhan, EE (D)	K. Padmanabhan 31/12	Designed Drawing of Plan and Cross Section of Anicut
Er.V. Thiyagarajan, DSE		
Recommended by Er.K.S.K. Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)		Region: MaduraiRegion; Circle:Vaippar Basin Circle, Virudhunagar.
T.NO: 373 / 2012	SCALE 1:150	Approved by CE (DR&CS)in Lr No: 04 CE (DR&CS) /SE(D) / AEE X /F. 563/ 2012 dated 04.1.13



LONGITUDINAL SECTION ALONG SCOUR VENT



HALF PLAN AT TOP AND HALF PLAN AT BOTTOM

HYDRAULIC PARTICULARS :

Scour Vent

1.	Maximum Flood Discharge	354.81cumecs or 12530 cusecs
2.	Discharge through vents	25.871cumecs or 913.65 cusecs
3.	Front Maximum Flood Level	+50.350 m
4.	Rear Water Level	+49.000m
5.	Sill Level	+47.200 m
6.	Number of vents	6nos. 3nos on either side.
7.	Size of vent	1.5 m x 0.9m
8.	U/s Bed Level	+47.200m
9.	D/s Bed Level	+46.200m
10.	Stilling Basin Level	+45.900m
11.	Top of Pier	+50.950m
12.	Total Length of Floor	19.00m

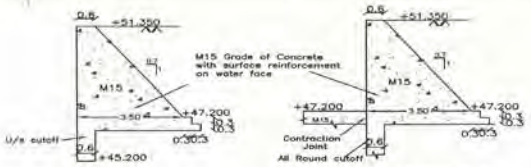
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the series T.No. 372 / 2012 to T.No. 380 / 2012.

Sheet No. 3/9

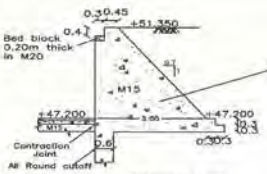
GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.S.Poorni A.E.E		Name of work: RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE @ LS 48/Scour A-7 KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E		
Checked by Er.S.Poorni A.E.E		
Verified by Er.K. Padmanabhan, EE (D)	3/1/13	Designed drawing of: Plan and Cross Section of Scour vent
Er.V. Thiyagarajan, DSE		
Recommended by Er.K.S.K.Thulasiram, SE(D)		Region: Madurai Region / Circle: Vaippar Basin Circle, Virudhunagar.
Approved by Er.S.Anbazhagan, CE (DR&CS)	4.1.13	
T.NO: 378 / 2012	SCALE 1:150	APPROVED in C.E.(D.R.C.S) Lr NO. 04 CE / F- 563 / ACE x/ SE(D) / DATED 04.01.13

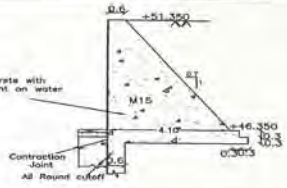


SECTION A–A
U/S RETURN WALL

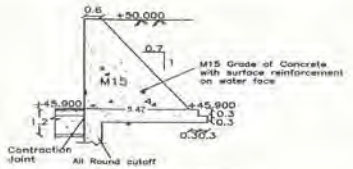
SECTION B–B
U/S WING WALL



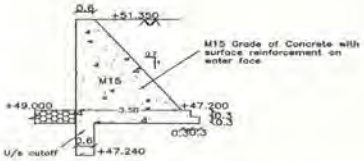
SECTION C–C
ABUTMENT



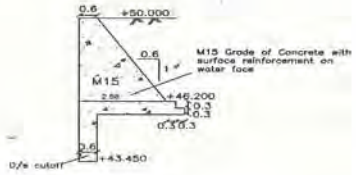
SECTION D–D
D/S WINGWALL AT START



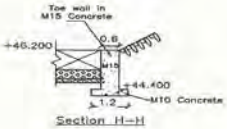
D/S WINGWALL AT BASIN
SECTION E–E



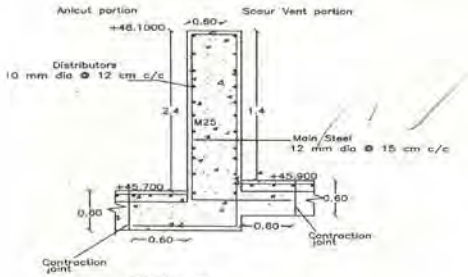
SECTION F–F
U/S WINGWALL AT ROUGH STONE PORTION



SECTION G–G
D/S RETURN WALL



Section H–H



SECTION L–L
C/s of D/s Divide wall
scale 1 in 50

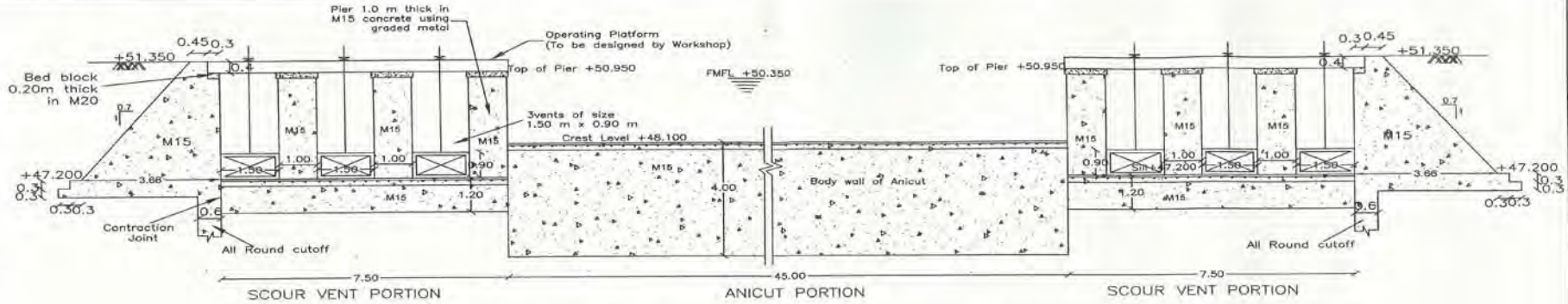
Note :

1. All dimensions are in metre unless otherwise specified.
2. This drawing should be read along with the series T.No. 372 / 2012 to T.No. 380 / 2012.

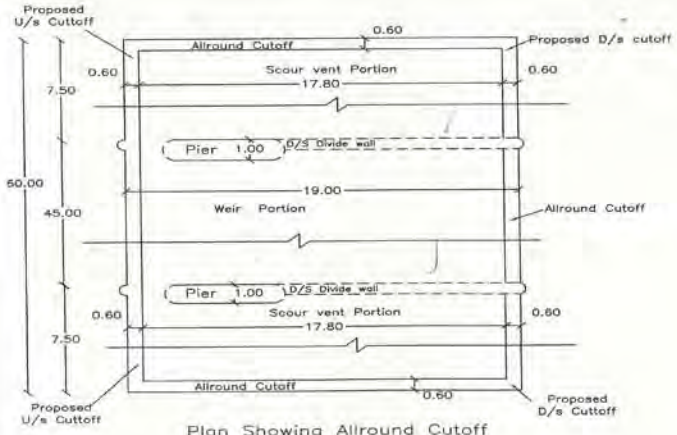
Sheet No 4/9

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.S.Poorni A.E.E	3/11/2012	Name Of Work: RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRCUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE C- LS 4.85 c.m KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E		
Checked by Er.S.Poorni A.E.E	3/11/2012	
Verified by Er.K. Padmanabhan, EE (D)	3/11/12	Designed Drawing of Cross section Of Abutment,Wing Walls,Returns,Toe wall,U/s &D/S Divide walls.
Er.V. Thiyagarajan, DSE		
Recommended by Er.K.S.K. Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)		Region: Madurai Region. Circle:Vaippar Basin Circle, Virudhunagar.
T.NO: 375/ 2012	SCALE 1:150	Approved by CE (DR&CS)in Lr No: EE (DR&CS) /SE(D) / AEE X /F. 563/ 2012 dated



Sectional Elevation along the Axis of Anicut
(Upstream View)



Plan Showing Allround Cutoff
Not to scale

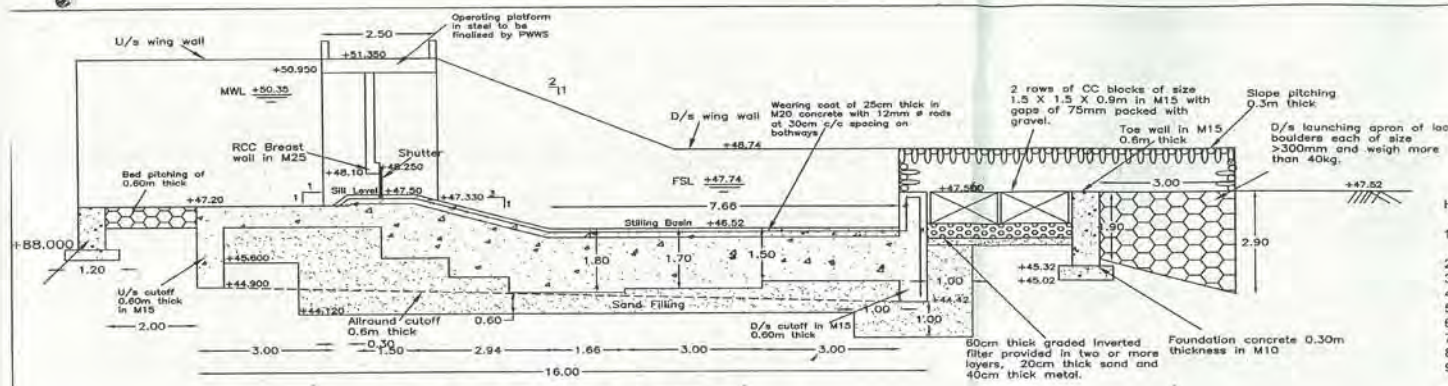
This drawing should be read with the series of drawings T No. 372/2012 to T No 380/2012.

All dimensions are in 'm' unless or otherwise specified.

Sheet No 5/9

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

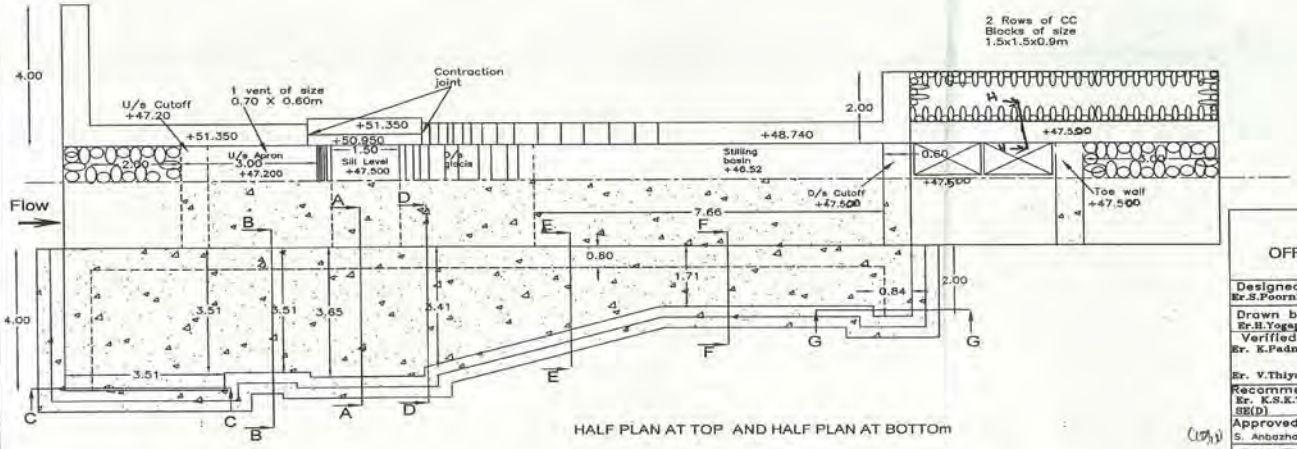
Designed by Er.Poorni A.E.E	31/12/12	Name of work : RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRCUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE @ LS 4.885cm KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E	31/12/12	Designed drawing of: Sectional Elevation and Plan showing allround cutoff wall
Checked by Er.Poorni A.E.E	31/12/12	
Verified by Er.K.Padmanaban EE (D)	3/1/13	
Er.V.Thiyagarajan DSE (D)		
Recommended by Er.K.S.K. Thulasiram, SE(D)		Region: Madurai. / Circle: Vaippar Basin Circle, Madurai.
Approved by S. Anbazhagan C.E (DR&CS)	9.1.13	
T.NO: 376 /2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr NO. 84 CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 04.01.13



LONGITUDINAL SECTION ALONG THE CANAL SLUICE PORTION

HYDRAULIC PARTICULARS

1. Discharge through canal sluice	:	0.594 cumecs or 21 c/s.
2. Sill level	:	+47.500m
3. No. of vents.	:	1No.
4. Size of vents	:	0.70m x 0.60m
5. FSL of canal	:	+47.74m
6. U/S Bed Level	:	+47.20m
7.D/S Bed Level	:	+47.500m
8.D/S Basin Level	:	+46.520m
9.Length of stilling basin	:	7.66m
10.Total floor length	:	16.00m



HALF PLAN AT TOP AND HALF PLAN AT BOTTOm

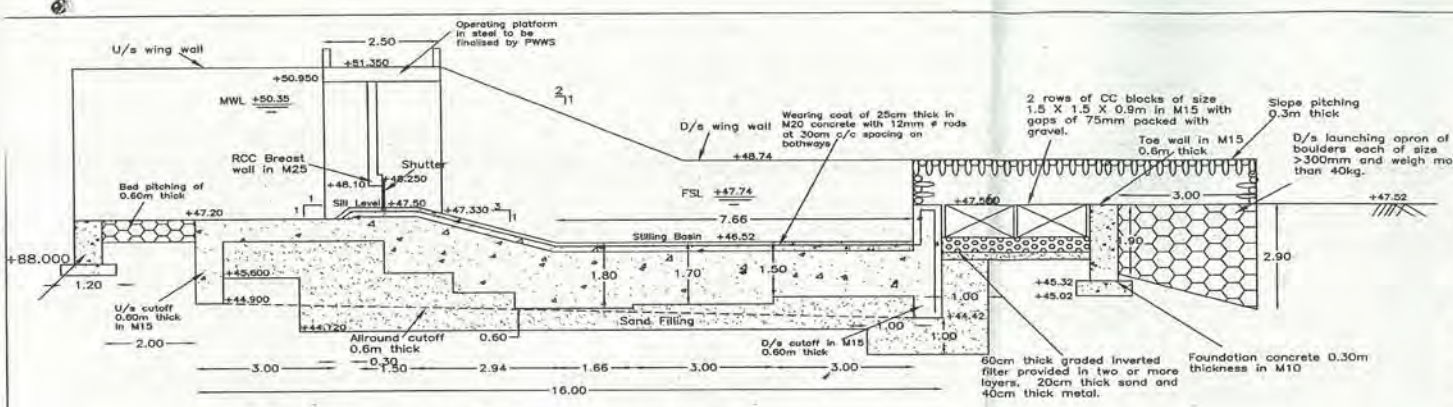
This drawing has to be read with the series of drawings T No 372/2012 to T No 380/2012

All dimension are in 'm' unless or otherwise specified.

Sheet No 6/9

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

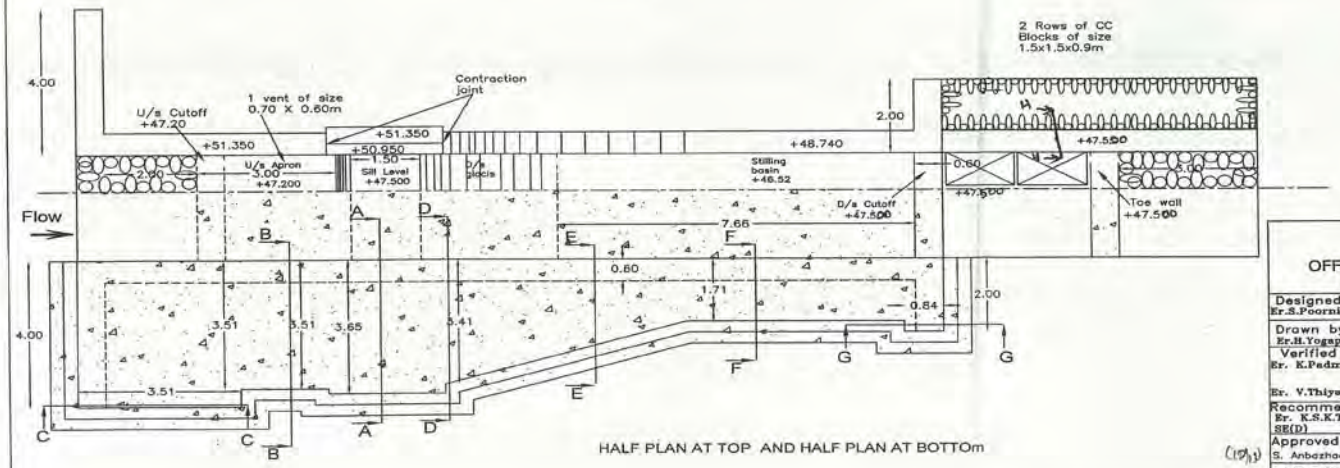
Designed by Er.S.Poorni, AEE		Name of work : RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE @ LS 4850m in KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya, AE		
Verified by Er. K.Padmanabhan, EE(D)		
Er. V.Thiyagarajan.DySE(D)		Designed drawing of: PLAN & CROSS SECTION OF CANAL SLUICE
Recommended by Er. K.S.K.Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)		Region: Vaippar Basin Circle, Madurai. / Circle: Madurai.
T.NO: 374/2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr No. 07 CE/SE(D) / EE(D)/ AEE X/F 563/2012 / DATED 04.02.13



LONGITUDINAL SECTION ALONG THE CANAL SLUICE PORTION

HYDRAULIC PARTICULARS

1. Discharge through canal sluice	:	0.594 cumecs or 21 c/s.
2. Sill level	:	+47.500m
3. No. of vents.	:	1No.
4. Size of vents	:	0.70m x 0.60m
5. FSL of canal	:	+47.74m
6. U/S Bed Level	:	+47.20m
7.D/S Bed Level	:	+47.500m
8.D/S Basin Level	:	+46.520m
9.Length of stilling basin	:	7.66m
10.Total floor length	:	16.00m



HALF PLAN AT TOP AND HALF PLAN AT BOTTOm

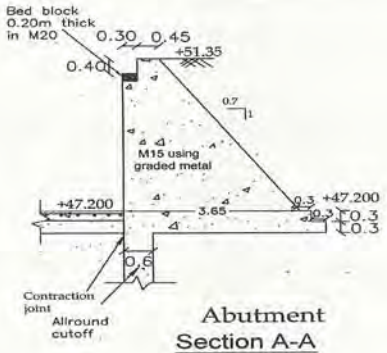
This drawing has to be read with the series of drawings T No 372/2012 to T No 380/2012

All dimension are in 'm' unless or otherwise specified.

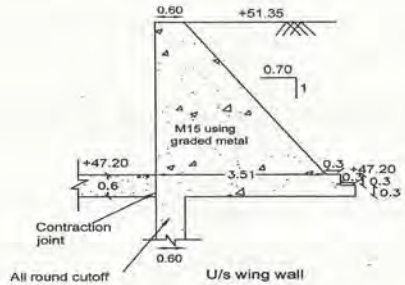
Sheet No 6/9

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

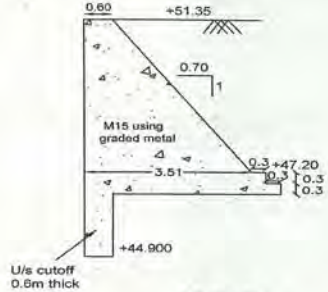
Designed by Er.S.Poorni, AEE		Name of work : RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRCUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE @ LS 4885m & KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya, AE		
Verified by Er. K.Padmanabhan, EE(D)		
Er. V.Thiyagarajan,DySE(D)		Designed drawing of: PLAN & CROSS SECTION OF CANAL SLUICE
Recommended by Er. K.S.K.Thulasiram, SE(D)		
Approved by S. Anbazhagan C.E (DR&CS)		Region: Madurai. / Circle:Vaippar Basin Circle, Madurai.
T.NO: 372/2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr NO. DF CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 04.12



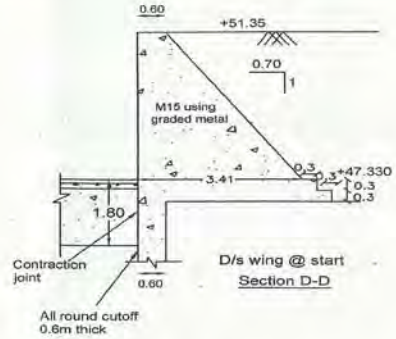
Abutment
Section A-A



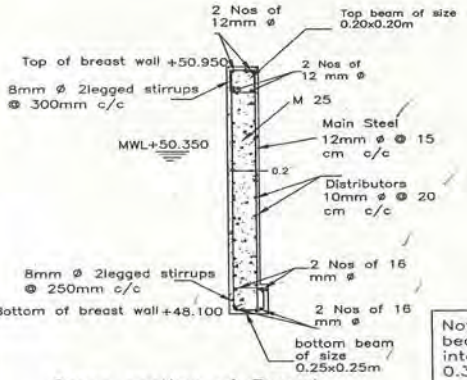
U/s wing wall
Section B-B



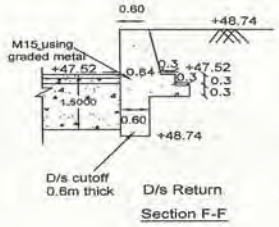
U/s Return
Section C-C



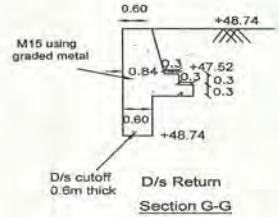
D/s wing @ start
Section D-D



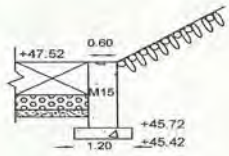
Cross section of Breast
wall for canal sluice
(Not to Scale)



D/s Return
Section F-F

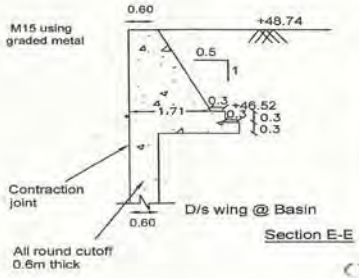


D/s Return
Section G-G



Section H-H

Notes: The top and bottom beams should be embedded into the pier for a depth of 0.3m on both sides.



D/s wing @ Basin
Section E-E

This drawing has to be read with the series of drawings from T No 372/2012 to T No 380/2012

All dimension are in 'm' unless or otherwise specified.

Sheet No 7/9

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.S.Poorni A.E.E	31/12/12	Name of work : RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRCUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE (2) LS 4585 m in KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E	31/12/12	
Checked by Er.S.Poorni A.E.E	31/12/12	
Verified by Er.K.Padmanaban EE (D)	K. Padmanaban 3/1/13	Designed drawing of: Cross section Of Abutment,Wing Walls,Returns,Toe wall, Breast wall of canal sluice.
Er.V.Thiyagarajan DSE (D)	3/1/13	
Recommended by Er.K.S.K. Thulasiram, SE(D)	3/1/13	Region: Madurai. / Circle:Vaippar Basin Circle, Madurai.
Approved by S. Anbazhagan C.E (DR&CS)	4/1/13	
T.NO: 377 /2012	SCALE 1:100	APPROVED in C.E.(D.R.C.S) Lr NO. 04-CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 04.01.13

NOTES:

1.The analysis has been made based on IS 6512–1984,IS 6966–1989,IS 12720–1993, IS 6531–1994, IS 13551–1992. IS 11130 – 1984 and IS 1893 – 2002.

2. The design has been formulated based on the particulars furnished by the EE, Special project division, Madurai, through e–mail Dated 27.11.12 and 14.12.12 respectively.

3. The anicut has been designed for a maximum flood discharge of 12530 cusecs.

4. The parameters of backfill material such as saturated unit weight and angle of internal friction have been assumed as 2t/cum and 30° respectively.

5. The depth of footing for abutment and wingwalls proposed below the sill levels are tentative and may be suitably modified according to the site conditions.

6. The proposed lengths of upstream and downstream returns are tentative and may be modified to suit the site conditions.

7. The apron floor,body wall, pier, abutment, wing walls and returns are proposed in M15 concrete using graded metal.

8. Surface reinforcement at the rate of 2.5Kg/m2 shall be provided in the abutment, wing wall, returns and pier in each direction ie both horizontally and vertically. Spacing of such bars shall not exceed 200mm.

9. Weep holes with necessary filter arrangements should be provided in the upstream and downstream wingwalls above the FMWL and RWL respectively.

10. Suitable Flood banks should be formed on the upstream and dowstream side allowing a minimum free board of 1.0m above the water surface elevation.

11. The maximum stress developed at the sill level of the downstream wing wall of anicut is 19.19/sq.m. The SBC of the foundation media should be checked before taking up the work.

12. The downstream protection works should be maintained periodically for effective functioning of the anicut.

13. The design for the operating platform and the structural details of the shutters are to be finalised by P.W.W.S.

14. The top of operating platform has been tentatively fixed as +51.350m assuming that the depth of beam and the thickness of chequered plates over the bed block is 0.40m. However it may vary as per the design obtained from P.W.W.S.

15. The scour vents shall be in fully opened condition during floods.

16. The pier should be constructed monolithic with the apron floor.

17. Transverse contraction joints with PVC water stops shall be provided in the anicut portion at every 25m interval and at the locations specified in the drawing.

18. D/s divide wall is to be constructed monolithic with the D/s apron floor upto the end of stilling basin of scour vent portion.

19. A clear cover of 75mm shall be provided for the reinforcement provided in the stilling basin portion of anicut, scour vent and canal sluice.

20. The bed level of river, at the D/S of the anicut portion should be regraded for the proposed bed level of +46.20m to a slope of 1 in 1425 for the river width of 60m atleast for a distance of 500m.

21.The canal sluice has been designed for a discharge of 21 cusecs.

22. The top and bottom beams of breast wall in canal sluice should be embedded into the pier for a depth of 0.3m on both sides.

23. Necessary transitions shall be made at the end of the canal sluice portion to negotiate the width of the canal sluice with the bed width of the canal.

24. The bed level of the canal at the offtake has been redesigned at +47.500m.The canal for supply channel is designed for bed width of 6.00m, side slope 1:1 with a bed slope of 1 in 1000. The canal [illegible] may be regraded acordingly upto mouth into the tank.

Sheet No 8/9

This drawing has to be read with the series of drawings T No 378/2012 to T No 389/2012

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.S.Poorni A.E.E	31/12/12	Name Of Work RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE @ 1.54.685cm KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E		
Checked by Er.S.Poorni A.E.E	31/12/12	
Verified by Er.K. Padmanabhan, EE (D)	3/1/13	Designed Drawing of
Er.V. Thiyagarajan, DSE		General notes
Recommended by Er.K.S.K. Thulasiram, SE(D)	4/1/13	
Approved by S. Anbazhagan C.E (DR&CS)	4-1	Region: MaduraiRegion / Circle:Vaippar Basin Circle, Virudhunagar.
T.NO: 379/ 2012	SCALE 1:150	Approved by CE (DR&CS)in Lr No: 99CE (DR&CS) /SE(D) / AEE X /F. 563/ 2012 dated 4.1.13

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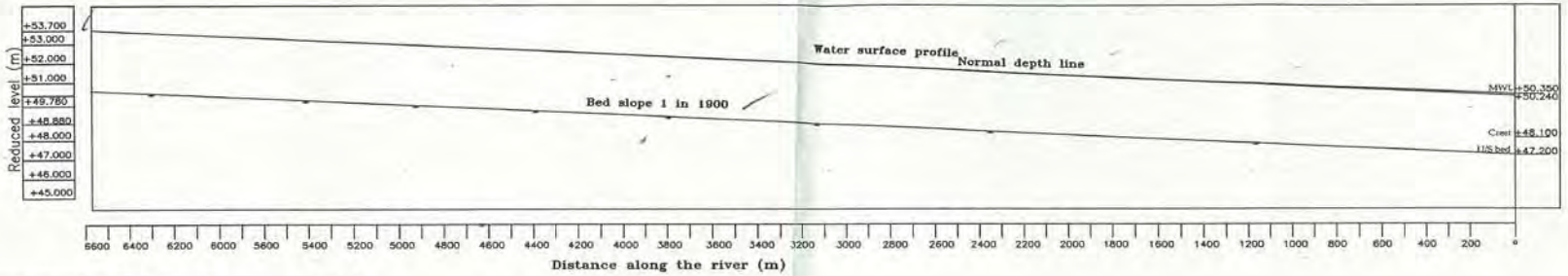

Distance from axis of Bed Dam in m	Water surface elevation in m	Proposed flood bank level in m
0	50.350	51.350
160	50.425	51.425
330	50.500	51.500
520	50.600	51.600
740	50.700	51.700
980	50.820	51.820
1270	50.960	51.960
1620	51.130	52.130
2060	51.350	52.350
2670	51.665	52.665
3680	52.190	53.190
6570	53.700	54.700

Note:
1. All dimensions are in metres unless otherwise specified
2. This drawing should be read along with T.No.s 372/2012 to 380/2012.

Sheet No. 9/9

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARTMENT
OFFICE OF THE SUPERINTENDING ENGINEER, PWD,
DESIGNS CIRCLE, WRO, CHENNAI - 600 005

Designed by Er.S.Poorni A.E.E	31/12/12	Name of work : RESTORATION AND REGRADATION OF GRIDHMAL RIVER – CONSTRUCTION OF ANICUT ACROSS GRIDHMAL RIVER TO FEED KALLIKULAM OFFTAKE – LS 4885 cm in KALLIKULAM VILLAGE OF KAMUTHI TALUK IN RAMNAD DISTRICT
Drawn by Er.H.Yogapriya A.E	31/12/12	
Checked by Er.S.Poorni A.E.E	31/12/12	
Verified by Er.K.Padmanaban EE (D)	K.Padmanaban 31/12/12	Designed drawing of: BACK WATER PROFILE
Er.V.Thiyagarajan DSE (D)		
Recommended by Er.K.S.K. Thulasiram SE(D)		Region: Madurai. Circle: Vaippar Basin Circle, Madurai.
Approved by S. Anbazhagan C.E (DR&CS)	4.1.13	
T.NO: 380/2012	SCALE 1:20000 (V) 1:100 (V-mm)	APPROVED in C.E.(D.R.C.S) Lr NO. PD/CE/SE(D) / EE(D)/ AEE XI/F 563/2012 / DATED 4.1.13

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