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# **SPECIFICATIONS**

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## **1. INTRODUCTION**

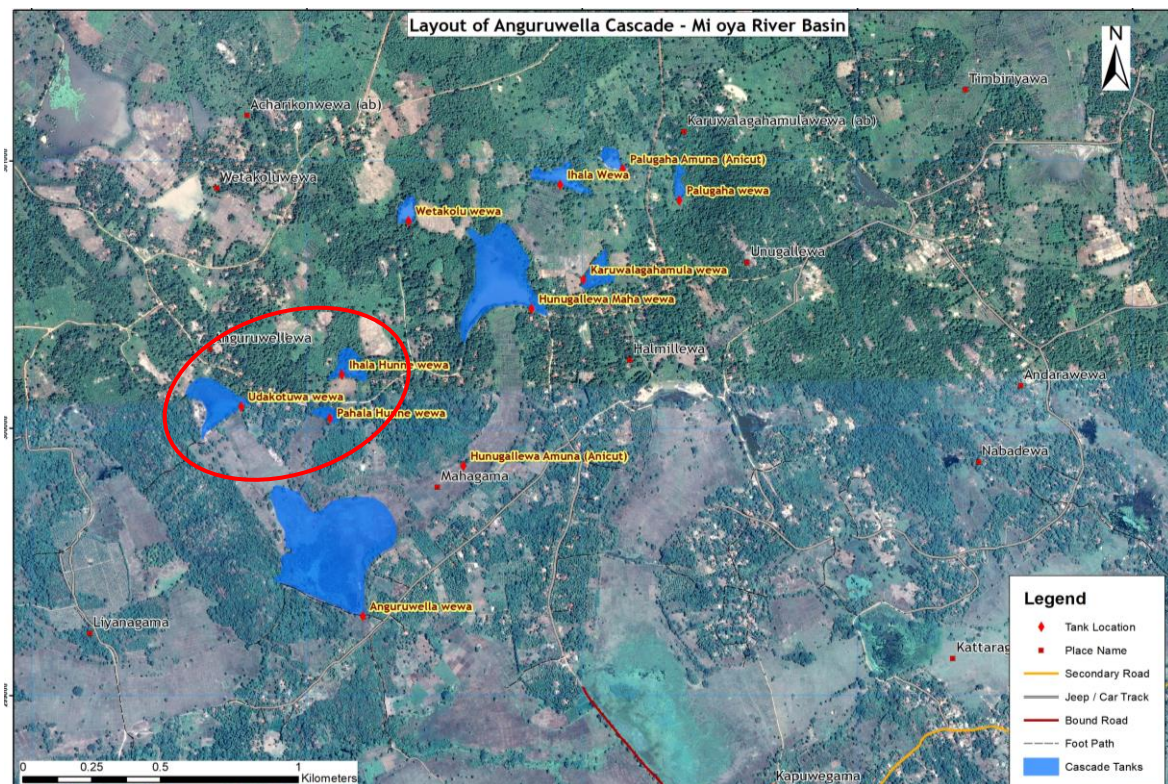
The Government of Sri Lanka with the support of UNDP has secured funding from the Green Climate Fund (GCF) for “Strengthening the resilience of smallholder farmers in the Dry Zone to climate variability and extreme events through an integrated approach to water management”. Over the next seven years, project aims to strengthen the resilience of vulnerable smallholder farmers in 03 river basins (Mi Oya, Yan Oya & Malwathu Oya) in the Dry Zone, who are facing increasing risks of rising temperatures, erratic rainfall, and extreme events attributable to climate change. The Project covers seven administrative districts in the Dry Zone, including Anuradhapura and Polonnaruwa, Puttalam, Vavuniya, Trincomalee, Kurunegala and Mannar and would run for seven years.

As one of the major project outputs, the project focuses on upgrading the village irrigation systems with a cascade-based approach. Thus, Mamunugama and Anguruwella cascades in Kurunegala District have also been chosen for upgrading with the focus on adaptation measures to climate change effects.

## 2. LOCATION OF THE SITE

This contract package includes the rehabilitation works in Ihala Hunnegama wewa, Pahala Hunnegama wewa and Udakotuwa wewa irrigation tanks in Ehetuwewa divisional secretariat area.

**Location:** - Proceed along Galgamuwa - Saliyagama Road (From Galgamuwa) up to Wagolla Junction at the 14 Km post and turn right and proceed about 4 Km along the gravel road leading to Hunugallewa School and reach at Hunugallewa Village. The whole cluster of tanks in the Anguruwella Cascade is situated at the close proximity of the village. Assistance may be obtained from a villager to reach at the exact location.



**Location Map showing Anguruwella Cascade**

**(Red Circle shows the Ihala Hunnegama wewa, Pahala Hunnegama wewa and Udakotuwa wewa irrigation tanks)**

### 3. TECHNICAL DATA

Technical Data	Package		
Description	Tank Name	Tank Name	Tank Name
	Pahala Hunnegama Wewa	Ihala Hunnegama Wewa	Udakotuwa Wewa
Co-ordinates	Latitude : 7° 54' 24" N	Latitude : 7° 54' 18" N	Latitude : 7° 54' 16" N
	Longitude : 80° 19' 48"E	Longitude : 80° 19' 49"E	Longitude : 80° 19' 33"E
Catchment area-Net (km <sup>2</sup> )	0.167	0.046	0.173
Catchment area-Gross (km <sup>2</sup> )	0.167	0.213	0.173
Area at F.S.L. (Ha)	1.05	0.98	3.31
Capacity at F.S.L. (m <sup>3</sup> )	5332	8119	25764

B.T.L. (m asl)	108.10	106.80	108.15
H.F.L. (m asl)	107.48	106.19	107.49
F.S.L. (m asl)	107.05	105.82	107.22
B.T.W. (m)	3	3	3
Length of Bund (m)	185	205	260
Side slopes U/S	1:2	1:2	1:2
Side slopes D/S	1:2	1:2	1:2

Location (km+m)	0+168	0+000	0+260
Type	Natural	Natural	Clear overfall
Length (m)	12	9	4

No of Sluice	1	1	2
Locations (km+m)	0+108	0+170	0+125 & 0+170
Type	HW type.	HW type.	HP & HW types

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#### **4. SCOPE OF THE CONTRACT**

This scope of the work under this contract package includes the rehabilitation works in Ihala Hunnegama wewa, Pahala Hunnegama wewa and Udakotuwa wewa irrigation tanks in Ehetuwewa divisional secretariat area.

The civil construction works under this Contract are included under following components:

The detailed List of Works and Bill of Quantities of the issued Bidding Document gives the items of works to be carried out under this contract.

The main construction works under this contract package includes but are not limited to the following:

- (a) As preliminaries under the contract, provision of facilities to Employer and Contractor, key construction management staff or the contractor are included.
- (b) Clearing of Tank bunds including removing top soil is included
- (c) Demolition of existing structures and construction of new structures of the Head works (refer the list of works for the new structures and improvement proposed for the existing structures). The structures include sluices, spillways, bathing steps, etc.;
- (d) Removal of Ant hills, Dead & non-durable trees, filling the excavated holes.
- (e) Construction waste (including demolished structures) shall be removed, transported and dumped as directed by the engineer at site.
- (f) Dealing with water as required for construction works.
- (g) Desilting to improve the Dead storage and overall storage is included
- (h) Borrow earth from approved borrow sites or from excavated earth and filling embankments where necessary.
- (i) Gravelling of tank bunds top and turfing of bund slopes and maintaining the same within contract period is included.

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## **A. GENERAL TECHNICAL SPECIFICATIONS**

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ICTAD (CIDA) Technical Specifications are to be adhered in this Contract. The Engineer will refer where required to following Technical Specifications/Standards published by the Institute for Construction, Training and Development (CIDA). The Contractor shall familiarize himself with the contents of these Technical Specifications/Standards and shall have a copy of the same in his office.

SCA/3/1      Irrigation & Land Drainage – [2ndEdition (Revised) – Nov. 1999]

SCA/4      Building Works (Volume I) – [3rdEdition (Revised) – July. 2004]

## **A.1 Mobilisation and Demobilisation**

### **A.1.1 General**

This chapter of the Specifications refers to certain particulars of the Contractor's general obligations under the Condition of Contract hereunder all temporary works, provisions of construction plants and equipment required for execution of the Works together with other temporary works and supplies specified in this section. On completion of the Contract all temporary works, plants, equipment and surplus material shall be removed unless otherwise specified and the Contractor shall clean up all the premises of the Works.

- Areas for site offices, stores, garage and workshops and for the movement of Contractor's equipment at Site.
- The Contractor may occupy working areas mentioned above at the commencement of the works and at no cost to him. In case additional areas are required, the Contractor must make his own arrangements with property owners for obtaining access to the necessary working areas.
- The Employer will endorse applications from the Contractor to Government agencies for obtaining permission to use their land as working area. Unless otherwise agreed with the property owners (public and private) the working areas - when abandoned - shall be brought back to the same conditions as before occupied by the Contractor.

### **A.1.2 Clearance of the Sites**

The Contractor shall clear the working areas as necessary to carry out the construction. In order to preserve the vegetation the Contractor shall not be permitted to remove any trees unless approved by the Engineer's Representative and the respective landowner.

### **A.1.3 Plant and Equipment**

Mobilization of Contractor's constructional plant and equipment shall include:

- assembly, preparation and loading for shipment of all plant and equipment at the Contractor's home station or source of supply;
- transportation of plant, equipment and material from the home station or source of supply to the site; and
- unloading and installation of all plants and equipment ready for use.



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## **A.2 Survey Equipment and Assistance**

During the period of construction the Contractor shall provide Survey equipment, and assistants as required by the Engineer's Representative as well as their transport. Furthermore, the Contractor shall provide all plant and equipment required by the Engineer's Representative for carrying out his independent checking.

## **A.3 As-Built Drawings**

As soon as possible after completion of each as-built drawing, the Contractor shall deliver to the Engineer's Representative one print of the drawing for checking. One additional print shall be provided on request, if the Engineer's Representative finds errors and wishes to mark up the drawing with necessary amendments. The Engineer will confirm acceptance of each drawing when satisfied that it correctly records the as-built details. At the end of the contract, the contractor will hand over the as-built drawing (three sets of hard copy and one digital copy) to the Employer

## **A.4 Particular Technical Specifications**

### **a) Specification for De-silting in Tank and Reservoir Beds**

Prospective contractor shall be conversant and familiar with the following guidelines and specifications before the submission of bidding documents with regards to de-sitting of reservoir beds to minimize the negative impact to the environment and also of the cost. Approval has to be sought for matters which may not be covered under this document from the Engineer/consultant or their representative before the commencement of the job.

1. Contractor shall furnish the list of the machineries that he intends to deploy for de-sitting process to the Engineer/Consultant or the representative for approval before the commencement of the operation.
2. De-sitting of the tank bed shall not be done immediately upstream of the bund toe. The minimum distance from the toe shall be determined by the Engineer & informed to the contractor.
3. If the sluice approach is blocked due to silt, the approach shall be cleared for the ease of operations.
4. Removal of silt shall concentrate on the heavily silted areas, which is normally close to the Tank Bund.
5. Removal of silted material shall be done in layers. Excavation or dredging of deep pits shall not be allowed under any circumstances.
6. Excavated materials shall be transported to the upper shoreline to form island mounds above FSL contour of the tank bed. However, caution should be exercised to prevent blocking of the streams and waterways of the tank.

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7. Reasonable degree of compaction would be sufficient with the available machinery on the formation of Island mounds with the directions **from the Engineer**.
  8. Slopes of island mounds shall be trimmed and compacted sufficiently and turfed and watered until turf is re-established.
  9. The contractor shall utilize excavated material such as clay or any other materials suitable for formation of the clay walls, bunds or roads with the guidance of the Engineer.
  10. Any extra silt excavated can be used for forming the upstream soil ridges (“Iswetiya”)
  11. Any extra material excavated also can be deposited on the upstream of the Tank above the FSL as earth mounds. Such mounds shall be compacted to a reasonable level and the portion below the HFL shall be protected from erosion with turf. They should not interfere with the restoration and functioning of “Gasgommana” and “Perahana”.

Following methodology may be adopted for forming earth mounds

- a. The mounds shall be approximately 10 m long and 7 m wide parallel to the FSL
  - b. They shall be laid in 0.6 m layers and each layer shall be compacted with two passes of the machinery used to transport silt
  - c. No compaction is needed above 1.5 m or first two layers
  - d. Compaction testing is not required
  - e. Maximum height shall be 2.5 m
  - f. Side slopes shall be 1:2 and shall not contain loose material
  - g. Strip turfing shall be carried out up to 1 m height.
  - h. The dimensions are approximate.
12. Any other excess material if any shall be taken away from the tank bed or water shed area and disposed of as directed by the Engineer.
  13. Suitable plant species and trees shall be planted on the island mounts thus formed with the consultation of the appropriate institutions.
  14. All machinery deployed for the purpose of de-silting shall be kept in a good condition in order to prevent leakage of fuel and lubricants within the reservoir beds.
  15. Services of machineries shall be done well away from the reservoir bed area to avoid pollution of the tank water.

## A.5 Construction Schedule

### Tentative Construction Programme

		WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7	WK 8	WK 9	WK 10	WK 11	WK 12	WK 13	WK 14	WK 15	WK 16
1	Mobilization																
2	Improvements to Tank bund																
3	Turffing of newly constructed or improving tank bund areas																
4	Desilting works																
5	Construction of Sluices																
6	Construction of spill																
7	Construction of Bathing Steps																
8	Repairing of spill structures, Sluice structures																
9	Handing Over																

Note: Construction time duration is assumed 16 Weeks before November to December rainy season. The detailed construction schedule to be provided by the Contractor. The programme requires accurate information on construction according to the activities of the BOQ.

The Construction Schedule attached is provided only as an indication of the Employer's planning for the execution of the contract.

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## **B. LIST OF WORKS**

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## LIST OF WORKS UNDER THIS CONTRACT

The list of works given here shall be considered as guidance to Bidder and the quantities of works relevant to implementation of the Work items are given in “**Bill of Quantities**” and shall be read along with the drawings given in “**Drawings**”.

### I. Improvements to Ihala Hunnegama tank

No	Item Description	Station (km+m)	Rectification Category	Drawing No.	Work Description
1	Clearing, Stripping top soil and Earth Work in Bund Construction		I	AC-P3-IHW-PLS-01, AC-P3-IHW-CSS-01 & AC-P3-TYP-07	<p>(A) Clearing vegetation and secondary growths up to the root zone. Felling and uprooting dead and non-durable trees. Removal of ant hills. Demolition and removal of redundant / damaged structures. Disposal of all waste as directed by the Engineer.</p> <p>(B) Stripping top soil, benching as per the provided drawings and filling the embankment with approved quality borrow earth to form a bund profile with 1: 2 V: H U/S &amp; D/S slopes and a top width of 3m. Filling involved to form the bund profile is on the U/S side of the bund in most cases as shown in the drawings.</p> <p>(C) Provide a gravel wearing surface of average 150 mm thickness on top of road.</p> <p>(D) Planting stripes of grass sods (Strip Turfing) above the F.S.L on newly formed U/S slope and on entire D/S slope of the bund. This includes pegging the sods to keep in position and watering till grass take roots.</p>

No	Item Description	Station (km+m)	Rectification Category	Drawing No.	Work Description
2	Clay Cut-off		N	AC-P3-TYP-07	Provide a clay cut-off wall on the US toe of the bund to prevent seepage where necessary. The length and locations shall be decided by the engineer at site.
3	Access Road to the LB end of the Tank bund		N	AC-P3-TYP-11	Provide 01 nos of 600 mm Ø Pipe culverts and fill the lower segment (50m long) of the road and provide a 150mm thick gravel wearing surface to the road as per the drawing and the instruction given by the engineer at site. (Road length = 200 m , Width = 3m)
4	Bathing Steps	0+080	N	AC-P3-TYP-06	Construct a 3m wide new bathing steps as per the drawing and the instructions given by the engineer at site.
5	Head wall type sluice	0+108	N	AC-P3-TYP-01 & AC-P3-TYP-05	Construct new Head wall type sluice with 225mm Ø pipe, according to the drawing and instructions given by the engineer at site.
6	Natural Spillway with definition wall	0+168	D & R	AC-P3-TYP-09	Demolish the existing dilapidated spillway and reconstruct a 12 m long Natural Spillway with a definition wall as per the drawing and the instructions given by the engineer at site.
7	Desilting and forming small island mounds			AC-P3-IHW-BED-02 & AC-P3-GEN-05	Desilt the tank bed and suitable material shall be used to clay cut-off or bund forming with the approval of engineer and Remaining silts shall either be used for form island mounds within the water spread area including strip turving with the consultation of the engineer at site. or be removed outside the tank and deposited as directed by the engineer at site.

## II. Improvements to Pahala Hunnegama tank

No	Item Description	Station (km+m)	Rectification Category	Drawing No.	Work Description
1	Clearing, Stripping top soil and Earth Work in Bund Construction		I	AC-P3-PHW-PLS-01, AC-P3-PHW -CSS-01 & AC-P3-TYP-07	<p>(A) Clearing vegetation and secondary growths up to the root zone. Felling and uprooting dead and non-durable trees. Removal of ant hills. Demolition and removal of redundant / damaged structures. Disposal of all waste as directed by the Engineer.</p> <p>(B) Stripping top soil, benching as per the provided drawings and filling the embankment with approved quality borrow earth to form a bund profile with 1: 2 V: H U/S &amp; D/S slopes and a top width of 3m. Filling involved to form the bund profile is on the U/S side of the bund in most cases as shown in the drawings.</p> <p>(C) Provide a gravel wearing surface of average 150 mm thickness on top of road.</p> <p>(D) Planting stripes of grass sods (Strip Turfing) above the F.S.L on newly formed U/S slope and on entire D/S slope of the bund. This includes pegging the sods to keep in position and watering till grass take roots.</p>
2	Clay Cut-off		N	AC-P3-TYP-07	Provide a clay cut-off wall on the US toe of the bund to prevent seepage where necessary. The length and locations shall be decided by the engineer at site.

No	Item Description	Station (km+m)	Rectification Category	Drawing No.	Work Description
3	Natural Spillway with definition wall	0+000	N	AC-P3-TYP-09	Construct a 09 m long Natural Spillway with a definition wall as per the drawing and the instructions given by the engineer at site.
4	Bathing Steps	0+090	N	AC-P3-TYP-06	Construct a 1m wide new bathing steps as per the drawing and the instructions given by the engineer at site.
5	Head wall type sluice	0+170	N	AC-P3-TYP-01 & AC-P3-TYP-05	Construct new Head wall type sluice with 225mm Ø pipe, according to the drawing and instructions given by the engineer at site.
5	Access road from the Tank bund to paddy fields		I	AC-P3-TYP-11	Provide 01 nos of 600 mm Ø Pipe culverts and fill the lower segment (50m long) of the road and provide a 150mm thick gravel wearing surface to the road as per the drawing and the instruction given by the engineer at site. (Road length = 200 m , Width = 3m)
6	Desilting and forming small island mounds			AC-P3-PHW-BED-02 & AC-P3-GEN-05	Desilt the tank bed and suitable material shall be used to clay cut-off or bund forming with the approval of engineer and Remaining silts shall either be used for form island mounds within the water spread area including strip turfing with the consultation of the engineer at site. or be removed outside the tank and deposited as directed by the engineer at site.



### III. Improvements to Udakotuwa tank

No	Item Description	Station (km+m)	Rectification Category	Drawing No.	Work Description
1	Clearing, Stripping top soil and Earth Work in Bund Construction		I	AC-P3-UKW-PLS-01, AC-P3-UKW - CSS-01 & AC-P3-TYP-07	<p>(A) Clearing vegetation and secondary growths up to the root zone. Felling and uprooting dead and non-durable trees. Removal of ant hills. Demolition and removal of redundant / damaged structures. Disposal of all waste as directed by the Engineer.</p> <p>(B) Stripping top soil, benching as per the provided drawings and filling the embankment with approved quality borrow earth to form a bund profile with 1: 2 V: H U/S &amp; D/S slopes and a top width of 3m. Filling involved to form the bund profile is on the U/S side of the bund in most cases as shown in the drawings.</p> <p>(C) Provide a gravel wearing surface of average 150 mm thickness on top of road.</p> <p>(D) Planting stripes of grass sods (Strip Turfing) above the F.S.L on newly formed U/S slope and on entire D/S slope of the bund. This includes pegging the sods to keep in position and watering till grass take roots.</p>
2	Clay Cut-off		N	AC-P3-TYP-07	Provide a clay cut-off wall on the US toe of the bund to prevent seepage where necessary. The length and locations shall be decided by the engineer at site.
3	Access Road to the LB end of the Tank bund		N	AC-P3-TYP-11	Provide 01 nos of 600 mm Ø Pipe culvert and provide a 150mm thick gravel wearing surface to the road as per the drawing and the instruction given by the engineer at site. (Road length = 75 m , Width = 3m)
4	Bathing Steps	0+105	E		

No	Item Description	Station (km+m)	Rectification Category	Drawing No.	Work Description
5	Hume pipe tower sluice	0+125	I	AC-P3-TYP-04 & AC-P3-TYP-05	<p>Replace the existing defective gate including all the existing accessories with a new Cast Iron Gate (Ø-225mm) including all required paraphernalia viz frames Head stock, rod with threaded section, lifting gear, guide rings, operating handle etc. The accessories shall be approved by the engineer before purchasing.</p> <p>Construct 5 concrete steps (0.15m * 0.15m * 0.6m wide) to reach the sluice tower as per the instructions given by the engineer at site.</p> <p>Modify the DS stilling basin with measuring box according to the drawing and instructions given by the engineer at site.</p>
6	Bathing Steps	0+135	N	AC-P3-TYP-06	Construct a 3m wide new bathing steps as per the drawing and the instructions given by the engineer at site.
7	Head wall type sluice	0+170	N	AC-P3-TYP-01 & AC-P3-TYP-05	Construct new Head wall type sluice with 225mm Ø pipe, according to the drawing and instructions given by the engineer at site.
8	Spillway and tail canal	0+260	N	AC-P3-TYP-09	<p>Construct a 04 m long concrete Spillway on existing rock and construct a training bund (L - 50m) for the LB side of the tail canal as per the drawing and the instructions given by the engineer at site.</p> <p>Rock excavation (1m * 1.5m * 0.3m)</p>
9	Desilting and forming small island mounds			AC-P3-UKW-BED-02 & AC-P3-GEN-05	Desilt the tank bed and suitable material shall be used to clay cut-off or bund forming with the approval of engineer and Remaining silts shall either be used for form island mounds within the water spread area including strip turving with the consultation of the engineer at site. or be removed outside the tank and deposited as directed by the engineer at site.

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## **C. ENVIRONMENTAL MANAGEMENT PLAN**

### C. Environmental Management Plan

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
1.0		Advance Works					
	1.1	ESMP					
	(a)	ESMP should be included as a Special Condition in the Bid Document; and ESMP should be attached to contract to form part of the contract requirement	Prior to bidding	To be provided as bid item in the engineering cost	PMU-CRIWMP		PMU-CRIWMP
2.0		Construction Phase					
		Preparation of Site Specific Environmental and Social Management Plan should be done with the consultation of consultant and PMU	Before starting physical works	Engineering cost	Contactor	Engineering Consultant	PMU
	2.1	Water pollution control and water quality management					
	2.1.1	Over use of minor water sources and disruption to water users					
	(a)	Contractor should make employees aware on water conservation and waste minimization in the construction process.	Project sites and worker camps		Contactor	Consultant Engineer	PMU,

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(b)	Contactor shall not extract water from ground water or surface water bodies without the permission from engineer & relevant authorities. Obtain the permission for extracting water prior to the commencing of the project, from the relevant authority.					
	(c)	Contractor shall not divert, close or block existing canals and streams in a manner that adversely affect downstream intakes. If diversion or closure or blocking of canals and streams is required for the execution of work, contractor must inform the communities/ water users and relevant government officials in advance.	Waterways located in the surrounding areas				
	(d)	In case the contractors activities going to adversely affect the quantity or quality of water, the contractor shall serve notice to the relevant authorities and downstream users of water sufficiently in advance.	Project sites				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(e)	Apply best management practices to prevent and minimize contamination of run-off water during maintenance & operation of equipment.	construction sites, material and soil storage areas, and equipment and machinery service areas				
	(f)	Maintain adequate distance between stockpiles & water bodies to control effects to natural drainage paths.					
	2.1.2	Siltation into water bodies					
	(a)	Contractor shall take measures to prevent siltation of water bodies as a result of construction work including, construction of temporary / permanent devices to prevent water pollution due to siltation and increase of turbidity.	All water bodies located around the project areas	Engineering cost	Contactor	Consultant Engineer	PMU,
	(b)	Temporary soil dumps should be placed at least 200m away from all water bodies					
	(c)	If temporary soil piles are left at the site for a long time those piles should be covered with thick polythene sheets					
	(d)	The debris and spoil shall be disposed in such a manner that waterways and drainage paths are not blocked.					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(r)	Avoid/ minimize construction works near/ at such drainage locations during heavy rain seasons such as monsoon rain periods.					
	<b>2.1.3</b>	<b>Contamination of water from construction wastes</b>					
	(a)	Avoid / minimize construction works near / at such drainage locations during heavy rainy seasons	At all water courses located adjacent construction sites	-			PMU, CEA
	(b)	The discharge standards promulgated under the National Environmental Act shall be strictly adhered to. All waste arising from the project is to be disposed in a manner that is acceptable to the engineer and as per the guidelines/instructions issued by the CEA.	At all water courses located adjacent construction sites and downstream	Engineering cost			
	<b>2.1.4</b>	<b>Contamination from fuel and lubricants</b>					
	(a)	All vehicle and plant maintenance and servicing stations shall be located and operated as per the conditions and /or guidelines issued by CEA. In general, these should be located at least 200m away from water bodies and wastewater shall not be disposed without meeting the disposal standards	Vehicle and plant maintenance and servicing centers	Engineering cost	Contactor	Engineering Consultant	PMU, CEA

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		of the CEA. Wastewater from vehicle and plant maintenance and servicing stations shall be cleared of oil and grease and other contaminants to meet the relevant standards before discharging to the environment.					
	(b)	Storage facility of cement, oil and other chemicals should be an enclosed structure ensuring that no storm water flows in to the structure.	At all material storage locations				
	(c)	A ridge should be placed around the storage facility to avoid runoff getting in to the structure.					
	2.1.5	Extraction of water					
	(a)	Contractor shall not obtain water for his purposes including for labour camps from public or community water supplies without approval from the relevant authority. Such extraction (if approved) should be under direct supervision of the engineer	Within project sites and labor camps	Engineering cost	Contactor	Consultant Engineer	PMU
	(b)	Construction over and close to rivers, minor streams and lagoon shall be undertaken in dry season.	All drainage and irrigation activities				



Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(c)	The Contractor may use the natural sources of water subject to the provision that any claim arising out of conflicts with other users of the said natural sources of water shall be made good entirely by the contractor	At all natural water sources used for construction works				
	(d)	Keep all drainage paths and drains clear of blockage at all times.	Within project sites and labor camps				
	2.1.6	Blockage of drainage paths and drains					
	(a)	Contractor’s activities shall not lead to flooding conditions as a result of blocked drainage paths and drains. The contractor shall take all measures necessary or as directed by the Engineer to keep all drainage paths and drains clear of blockage at all times.	All construction work sites	Engineering cost	Contactor	Consultant Engineer	PMU
	2.2	Impacts to Flora and Fauna					
	2.2.1	Loss or Damage to Trees and Vegetation					
	(a)	Prevention of removal of trees as far as possible.	Applicable throughout the construction areas	Engineering cost	Contactor	Consultant Engineer	PMU

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(b)	If the removal of large trees is must and unavoidable, valid justification would be provided for each tree to be removed and attention should be paid to maintain minimum disturbances to soil cover and also care should be taken not to damage adjoining trees. Necessary approval would be taken to remove such trees from the relevant government agencies (Divisional Secretariat, Forest Department, Timber Corporation, Central Environmental Authority/Provincial Environmental Authority and Department of Wildlife Conservation) through the PMU.					
	(c)	Water spraying should be done at a regular interval to avoid dust generation due to site clearance					
	(d)	Corporation with Civil Society Organization and local community for replanting activities					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(e)	All works shall be carried out in a manner that the destruction to the flora and their habitats is minimized. Trees and vegetation shall be felled / removed only if that impinges directly on the permanent works or necessary temporary works. In all such cases contractor shall take prior approval from the Engineer and the PMU.					
	(f)	Contractor shall adhere to the guidelines and recommendations made by the Forest Department, Department of Wildlife Conservation and Central Environmental Authority, if any with regard to felling of trees and removal of vegetation.					
	(g)	PMU must be informed, in advance, before fell or remove an any plant or tree which protected under flora and fauna protection ordinance					
	(h)	Removed trees from public/government land must be handed over to the Timber Corporation/ Divisional Secretariat and must proceed with the coordination of PMU. Removed trees from private					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		lands must be handed over to the owners while receiving a letter of acknowledgement					
	(i)	Contractor must clean the construction machineries and equipment properly before dispatch/transport from where previously it operated or used to the project sites to avoid introduction of new vegetation to the area, specially to prevent spreading of invasive alien plant species (IAS)					
	2.2.2	Loss, Damage or Disruption to Fauna					
	(a)	All works shall be carried out in such a manner that the destruction or disruption to the fauna and their habitats is minimum. PMU must be informed, in advance, before proceed the work in places where an any fauna or their habitat which protected under flora and fauna protection ordinance	All project sites	Engineering cost	Contactor	Consultant Engineer	PMU
	(b)	Construction workers shall be instructed to protect fauna including wild animals and aquatic life as well as their habitats. Hunting, poaching and					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		unauthorized fishing by project workers is not allowed.					
	(c)	Siting of all workshops, depots and temporary worker camps and storing of toxic and hazardous materials at approved locations, and recycling and dumping of solid waste matter at locations approved by local authorities, maintenance of vehicles and equipment in good operable condition, ensuring no leakage of oil or fuel and the fitting of proper exhaust baffles. Any solid waste should not be dumped into natural habitats	Locations selected for erecting the asphalt, crusher and concrete batching plants and workshops				
	2.3	Prevention and minimizing of soil erosion, sedimentation and drainage management					
	2.3.1	Disposal of Debris and Spoil					
	(a)	All debris and residual spoil material including any left earth shall be disposed only at locations approved by the engineer for such purpose.	construction sites, material and soil storage areas, and equipment and machinery service areas	Engineering cost	Contractor	Engineering Consultant	PMU, CEA, Grama Niladari and LG body
	(b)	The contractor shall obtain the approval from the relevant Local Government (Pradeshiya Sabha, Municipal Council) and other government agencies (as					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		required) for disposal and spoil at the specified location, as directed by the Engineer					
	(c)	Private lands, if any, would selected for disposal should also require written consent from the land owner with the signature of the Grama Niladari and Divisional Secretariat to verify the ownership					
	(d)	Excavated earth materials and all debris materials shall be disposed immediately without allowing to stockpile at identified locations for debris disposal, recommended by the engineer.					
	2.3.2	Conservation and reuse of top soil and debris					
	(a)	All material that is reusable or recyclable shall be used for such purposes either by the contractor or through Civil Society Organization (CSO) and local community.	construction sites, material and soil storage areas	Engineering cost	Contractor	Engineering Consultant	PMU
	(b)	The debris and residual spoil material including any left earth shall be used, to refill the burrow					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		areas as directed by the engineer.					
	(c)	If approved by the engineer, contractor can dispose the debris and spoil as a filling material provided that the contractor can ensure that such material is used for legally acceptable purposes with disposed in an environmentally acceptable manner.					
	(d)	Removed top soil could be used as a productive soil when replanting/establishing vegetation. Contractor with the assistance of Consultants could be work together with CSO to stockpile top soils for use at plant nurseries and other agriculture lands					
	(e)	Topsoil thus stockpiled for reuse shall not be surcharged or overburdened. As far as possible multiple handling of topsoil stockpiles should be kept to a minimum.					
	(f)	Top soil of the agricultural areas and any other productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the engineer. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he shall obtain the direction from the engineer in writing					
	<b>2.3.3</b>	<b>Barrow materials</b>					
	(a)	Earth available from construction site excavation works as per design, may be used as embankment materials, subject to approval of the engineer	All the barrow sites	Engineering cost	Contractor	Engineering Consultant	PMU, CEA, GSMB, LG body
	(b)	Contractor shall comply with the environmental requirements/guidelines issued by the CEA, GSMB and the respective local authorities with respect of locating burrow areas and with regard to all operations related to excavation and transportation of earth from such sites.					
	(c)	Burrow areas shall not be opened without having a valid mining license from the GSMB. The location, depth of					



Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		excavation and the extent of the pit or open cut area shall be as approved by the engineer.					
	(d)	Contractor can also find suitable soil materials from currently operated licensed burrow pits in the surrounding area, subject to approval of the engineer					
	(b)	No burrow-sites be used (current approved) or newly established within areas protected under FFPO and FO					
	(e)	All burrow pits/areas should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the CEA, GSMB and the respective Local Government body.					
	2.3.4	Prevention of Soil erosion					
	(a)	Debris material shall be disposed in such a manner that waterways, drainage paths would not get blocked.	All the construction areas	Engineering cost	Contractor	Engineering Consultant	PMU, PID/DAD
	(b)	Drainage paths associated with the infrastructure should be improved / erected to drain rain					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		water properly					
	(c)	Silt traps will be constructed to avoid siltation into water ways where necessary.					
	(d)	To avoid siltation, drainage paths should not be directed to streams, other water bodies directly and they should be separated from streams / other water bodies					
	(e)	Work that lead to heavy erosion shall be avoided during the rain.					
	(f)	The disposed material should not be washed away by runoff and should not be a nuisance to the public					
	2.3.5	Contamination of soil by fuel and lubrications					
	(a)	Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer	Vehicle yards and plant maintenance and servicing centers	Engineering cost	Contractor	Engineering Consultant	PMU, CEA
	(b)	Approval from CEA should be secured by the contractor if he intends to prepare his own vehicle servicing yard					
	2.3.6	Quarry operations					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(a)	Utilizing the existing quarry sites available in the project influential area as much as possible which are approved by GSMB with valid EPL, Industrial Mining Licenses and Trade License	All, quarry sites which will be used during construction phase.	Engineering Cost	Contractor	Engineering Consultant	PMU, GSMB, CEA, Archaeology dept., LG Body
	(b)	If new quarries are to be opened, prior approval should be obtained from GSMB, CEA and local government such as Pradeshiya Sabha.					
	(c)	The maintenance and rehabilitation of the access roads in the event of damage by the contractors operations shall be a responsibility of the contractor.					
	2.4	Prevention of air pollution and air quality management					
	2.4.1	Earth work					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(a)	The contractor shall effectively manage the dust generating activities such as topsoil removal, handling and transporting sand, rubble, and cement during periods of high winds or during more stable conditions with winds directed towards adjacent residences and other facilities.	Within the construction area and paying special attention to sensitive locations	Engineering cost	Contractor	Engineering Consultant	PMU, Grama Niladari, Police, CEA
	(b)	All earthwork shall be protected in a manner acceptable to the minimize generation of dust.					
	2.4.2	Storage and handling of construction materials					
	(a)	Storage locations of sand, metal, soil should be located away from settlements and other sensitive receptors and covered (with artificial barriers or natural vegetation)	At all material storage locations (stock piles of sand, gravel and metal)	Engineering cost	Contractor	Engineering Consultant	PMU, CEA, Grama Niladari
	2.4.3	Transportation of material					
	(a)	During transportation, materials should be covered with tarpaulin. Avoid peak hours in roads with moderate to high traffic’; the contractor shall minimize possible public nuisance due to dust, traffic congestion, air pollution, etc.,	Within project influence area	Engineering cost	Contractor	Engineering Consultant	PMU, Police, Grama Niladari

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		due to such haulage; observe speed limits and maintain vehicles in the good condition.					
	(b)	If there are damages to local roads and other utilities due to hauling in roads which were not identified during design stage, Contractor shall attends to repair all damaged infrastructure/ roads, if needed through relevant authorities					
	(c)	During transportation, dispose materials should be covered with suitable cover such as tarpaulin.					
	(d)	The contractor should enforce vehicle speed limits to minimize dust generation.					
	(e)	All existing roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similar roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		such vehicles or their tyres.					
	(f)	The Contractor shall employ a water truck to sprinkle water for dust suppression in all access roads and on all exposed areas as required					
	2.4.4	Emission from construction Vehicles, Equipment and Machinery					
	(a)	The emission standards promulgated under the National Environment Act shall be strictly adhered to.	All plants, machinery and vehicles used for construction	Engineering cost	Contractor	Engineering Consultant	PMU, CEA
	(b)	All vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards.					
	2.5	Prevention and management of noise and vibration					
	2.5.1	Noise from Vehicles, Plants and Equipment					
	(a)	All machinery and equipment should be well maintained and fitted with noise reduction devices in accordance with manufacturer’s instructions.	All machinery and vehicles used for construction works	Engineering cost	Contractor	Engineering Consultant	PMU, CEA

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(b)	In construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing and batching, mechanical compaction, etc., will be stopped between 18.00 hours to 07.00 hours.	Within the construction sites and their vicinity				
	(c)	Noise limits for construction equipment used in this project such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators, and saws shall not exceed CEA Standards.					
	<b>2.5.2</b>	<b>Vibration</b>					
	(a)	Contractor shall take appropriate action to ensure that construction works do not result in damage to adjacent properties due to vibration.	Within the construction sites and their vicinity	Engineering cost	Contractor	Engineering Consultant	PMU, CEA, Grama Niladari
	(b)	Prior to commencement of excavation, blasting activity, the Contractor shall undertake a condition survey of existing structures within the zone of influence, as agreed with the relevant government agencies and the engineer.					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	2.6	Waste Management					
	2.6.1	Locating, sanitation and waste disposal in construction camps					
	(a)	Locations selected for labor camps should be approved by engineer and comply with guidelines/ recommendations issued by the CEA/Local Authority.	At all labor camps				
	(b)	Labor camps shall be provided with adequate and appropriate facilities for disposal of sewerage and solid waste. Compliance with the relevant regulations and guidelines issued by the CEA/LA shall be strictly adhered to.					
	(c)	Contractor shall ensure that all camps are kept clean and hygienic. Necessary measures shall be taken to prevent breeding of vectors					



Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(d)	Contractor shall report any outbreak of infectious disease of importance in a labor camp to the engineer and the Medical Officer of Health (MOH) or to the Public Health Inspector (PHI) of the area immediately. Contractor shall carry out all instructions issued by the authorities, if any.					
	(e)	Contractor should remove all labor camps fully after its need is over, empty septic tanks, remove all garbage, debris and clean and restore the area back to its former condition.					
	2.6.2	Disposal of harmful construction wastes					
	(a)	Waste oil, other petroleum products and untreated wastewater shall not be discharged on ground so that to avoid soil pollution. Adequate measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers. All waste petroleum products shall be disposed of in accordance with the guidelines issued by the	Servicing yards to be used for vehicle servicing				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		CEA or the engineer.					
	(b)	Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material, if any, that will be used in the project work to the Engineer. Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful materials have been dumped as waste at the end of the project.	Locations identified to store chemicals and waste disposal				
	(c)	Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as incidental to work.	New servicing yards developed by the contractor for the project				
	(d)	The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the engineer at his own cost.	All affected water bodies close to material storage and waste disposal sites				
	<b>2.7</b>	<b>Occupational Safety and Health Management</b>					
	<b>2.7.1</b>	<b>Public safety and Traffic Control</b>					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(a)	The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the tank bunds and access roads. The provision of traffic safety measures shall be considered incidental to work and follow The Institute for Construction Training and Development (ICTAD) guidelines and instructions given by the Police, if any. The vehicle hired for or operate for the project activities must have a signage such as project name to identify and recognize easily.	Project influence area including Construction areas, material storage and worker camps	Engineering Cost	Contractor	Engineering Consultant	PMU
	(b)	Informing the public through public notices/ announcements/ etc. in local language about the construction activities in order to avoid any inconveniences due to the construction.					
	(c)	Standard Safety signage must be provided as appropriate when	Construction areas, material storage and				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		and where necessary	worker camps				
	(d)	All reasonable precautions will be taken to prevent danger of the workers and the public from accidents such as heavy vehicles movements (vehicle use for material transport and heavy machineries), fire, explosions, blasts, falling to excavated pits/trenches etc.					
	2.7.2	Prevention of Risks of Electrocution					
	(a)	All electrical wiring and supply related work should confirm to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger/red lights, fencing and lights will be provided to protect the public and workers. All electric power-driven machines to be used in the construction shall be free from defect, be properly maintained and kept in good working order, be regularly	Construction areas, material storage and worker camps	Engineering Cost	Contractor	Engineering Consultant	PMU

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		inspected and as per BS provisions and to the satisfaction of the Engineer.					
	2.7.3	Handling of toxic and hazardous chemical and materials					
	(a)	The use of any toxic chemical shall be strictly in accordance with the manufacturer’s instructions. The Engineer shall be notified of toxic chemicals that are planned to be used in all contract related activities. A register of all toxic chemicals delivered to the site shall be kept and maintained up to date by the Contractor. The register shall include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product.	Construction areas and Stock yards		Contractor	Engineering Consultant	PMU
	(b)	No paint containing lead or lead products will be used except in the form of paste or readymade paint. Facemasks shall be supplied to workers who are working in spray painting or scraping lead paints.	Workshops, yards				
	2.7.4	Handling of Explosives					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(a)	Except as provided in the contract or ordered or authorized by the Engineer, the Contractor shall not use explosives. Where the use of explosives is so provided or ordered or authorized, the Contractor shall comply with the requirements of the following Sub-Clauses of this Clause besides the law of the land as applicable.	All locations where blasting activities will commence	Engineering Cost	Contractor	Engineering Consultant	PMU
	(b)	The Contractor shall at all times take every possible precaution and shall comply with relevant laws and regulations relating to the importation, handling, transportation, storage and use of explosives. Contractor shall obtain approval from Explosive Controller/Ministry of Defense (MoD) for importing and handling explosives and keep the Local Police informed of the same.					
	2.7.5	Prevention of Vector based Diseases					
	(a)	Contractor shall take necessary actions to prevent breeding of mosquitoes at places of work, labor camps, plus office and store buildings. Stagnation of water in all areas including	All construction areas, labour camps, store and yards	Engineering Cost	Contractor	Engineering Consultant	PMU

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		gutters, used and empty cans, containers, tires, etc. shall be prevented. Approved chemicals to destroy mosquitoes and larvae should be regularly applied.					
	(b)	All burrow sites should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the Geological and mines bureau, Central Environmental authority and relevant local authorities and other respective agencies					
	(c)	Contractor shall keep all places of work, labor camps, plus office and store buildings clean devoid of garbage to prevent breeding of rats and other vectors such as flies.					
	2.7.6	Workers' Safety and Health					





Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(a)	At every workplace and labor camps sufficient number of bathing facilities, latrines and urinals shall be provided in accordance with the Health and Safety regulations and/or as directed by the Engineer. These bathroom and toilet facilities shall be suitably located within the workplace/buildings. Latrines shall be cleaned at least three times daily in the morning, midday and evening and kept in a strict sanitary condition. If women are employed, separate latrines and urinals, screened from those for men and marked in the vernacular shall be provided. There shall be adequate supply of water, within and close to latrines and urinals.	Worker camps and temporary sheds at work sites	Engineering Cost	Contractor	Engineering Consultant	PMU, CEA, MOH
	(b)	The sewage system for the camp must be properly designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place.					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(c)	Garbage bins must be provided in the camp, work sites and regularly emptied and the garbage disposed off in a hygienic manner. Construction camps shall have a clean hygienic environment and adequate health care shall be provided for the work force.					
	(d)	Unless otherwise arranged for by the Local Authority, the contractor shall arrange proper disposal of sludge from septic tanks. The contractor shall obtain approval for such disposal from the Public Health Inspector of the area.					
	2.7.8	Emergency Response Plan					
	(a)	Fire extinguishers should be available within stores (specially where store chemical and fuels)	Store areas	Engineering Cost	Contractor	Engineering Consultant	PMU
	(b)	Training and awareness on emergency preparedness should be provided for the workers	For all workers				
	(c)	Any potential cause for fire such as smoking should be prohibited within and near fuel and chemical storage areas	Store areas				

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	2.8	Protection of Archaeological, Cultural and Religious Places and Properties					
	2.8.1	Prevention of damage to Cultural and Religious Places and Properties					
	(a)	During construction activities the contractor should take all necessary and adequate care to minimize impacts on cultural properties which includes cultural sites and remains, places of worship.	Project influence area including Construction areas, material storage and worker camps		Contractor	Engineering Consultant	PMU, Department of Archaeology, Priests
	(b)	Workers should not be allowed to trespass in to such areas.					
	2.8.2	Finding and appearing of Archaeological property					
	(a)	All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest etc. discovered on the site and/or during construction work shall be the property of the Government of Sri Lanka and shall be dealt with as per provisions of Antiquities Ordinance of 1940 (Revised in 1956 & 1998). If such thing found or notice,	Project influence area including Construction areas, material storage and worker camps		Contractor	Engineering Consultant	PMU, Department of Archaeology, Priests
	(b)	If directed by the PMU and Engineers the Contractor shall obtain advice and assistance from the Department of					

Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
		Archaeological of Sri Lanka on conservation measures to be taken with regard to the artefacts prior to recommencement of work in the area.					
	<b>2.9</b>	<b>Handling Environmental and Social Issues during Construction</b>					
	(a)	The Project Manager or dedicated person would be responsible for handling the environmental and social issues during the pre-construction and construction phases. He/she may have required knowledge, experiences and/or will on environmental and social safeguards and would be able to build a good rapport with all the stakeholders at the ground level including local community and community leaders. He/ She shall be responsible for ensuring the implementation of ESMP and shall act as the contractor representative in Grievance Redress Committees.	in all project sites	Engineering Cost	Contractor	Engineering Consultant	PMU

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Activities		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility		
					Implementation	Supervision	Monitoring
	(b)	The Project manager or the dedicated officer shall coordinate with PMU, Engineer, Divisional Secretariat and other field level government officers to get every possible action to redress environmental and social issues at the field level while ensure minimum disturbances to construction activities					

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## **D. BILL OF QUANTITIES**

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# **BILL OF QUANTITIES**

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## **1 A. PREAMBLE TO BILL OF QUANTITIES**

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## **Preamble to the Bill of Quantities**

### **A – General**

#### **SECTION 1- DEFINITION**

1. In the Bill of Quantities (BOQ), the item descriptions identify the work that has to be carried out but in the exact nature and extent of work to be performed to be ascertained by reference to the General Conditions of contract, Particular Conditions of Contract, Drawings, Specifications and physical, environmental, statutory, market and supply conditions applicable for the Works as observable and/or foreseeable before Base Date. These shall have to be ascertained in conjunction with the matters listed against the relevant heading and item description as described in the Bill of quantities.
2. The method of measurement adopted in the preparation of Bill of Quantities is Civil Engineering Standard Method of Measurement Sri Lanka (CESMM-SL). All rates and prices shall be in Sri Lankan Rupees with Cents as decimal fractions of one Rupee.

#### **SECTION 2-GENERAL PRINCIPLES**

3. The relevant clause of this preamble shall be deemed to apply equally to work subsequently ordered for execution by the Contractor, either under provisional sums or variation orders except where specifically varied therein.

#### **SECTION 3-APPLICATION OF THE WORK CLASSIFICATION**

4. In so far as any clause of the Preamble may conflict or be inconsistent with any provision of the CESMM3, the Preamble shall always prevail.
5. All items of work specified and or shown in the drawing to be valued by the measurement of such items only as are included in the Bill of Quantities. Such items shall cover all costs incurred by the contractor in the fulfilment of his obligations under the Contract. No further cost is allowed for any items of Work which are indicated in the drawings and specifications but no separate item is given in the BOQ.
6. Item descriptions and headings in the BOQ shall be interpreted with correspondence to the nature and extent of relevant item of Work as depicted in the drawings and specifications. No variance to the Contract Sum shall be allowed for any difference between the nature/extent of item of Work perceivable from the drawings and specifications and the phraseology used in various item categories, headings and descriptions of the Bill of Quantities.
7. No variance to the Contract Sum shall be allowed for any difference between the method of measurement applicable to and the phraseology used in various item categories, headings and descriptions of the Bill of Quantities.

#### **SECTION 4-CODING AND NUMBERING OF ITEMS**

8. Various CESMM-SL- item codes stated in the BOQ are illustrative only, no additional payment whatsoever is allowed for any discrepancies arising out from such codes given.
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## **SECTION 5- INSTRUCTION TO METHOD OF MEASUREMENT**

9. Measurements unless otherwise stated in different clauses of Preambles with regard to different item categories of Work or within the item descriptions of the BOQ, shall be physical measurements at the time of Works before covering up as agreed between the Engineer and the Contractor or determined by the Engineer as per the Conditions of Contract.
10. Items marked “PSum” in the Bill of Quantities are Provisional Sums and shall not to be executed unless ordered by the Engineer. This may be expended wholly or in part as directed by the Engineer.
11. Sums stated in the Provisional Sums are speculative only. Such sums shall not be considered in substantiating any claims under the Contract arising in relation to increase or decrease in the Contract Sum.
12. Payments for the Provisional Sums shall be made following the provision of appropriate invoices, bills of payment, time sheets and delivery notes which have been duly certified by the Engineer’s Representative.
13. Sums stated in the Provisional Sums shall not be considered in determining the adjustment items (discount) if any.
14. The Quantities stated in the Bill of Quantities are estimates only. They are not regarded as the exact quantity of work to be done or materials to be supplied and all work will be measured net except where otherwise stated.
15. Quantities of such items, where their descriptions indicate that they are “provisional quantities” are speculative only. Such items shall not be considered in substantiating any claims under the Contract arising whatsoever in relation to their appropriate quantities.

The following abbreviations are used in the Bill of Quantities and carry the meanings as listed hereby.

mm	– millimetre
m	- metre
mm <sup>2</sup>	- square millimetre
m <sup>2</sup>	- square metre
ha	- hectare
m <sup>3</sup>	- cubic metre
kg	- kilogramme
t	- tonne
sum	- sum
nr	- number
h	- hour
wk	- week

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## **SECTION 6-COMPLETING, PRICING AND THE USE OF BILL OF QUANTITIES**

16. The rates and prices entered in the Bill of Quantities shall be deemed to be full inclusive value of the work covered by the several items including the following unless expressly stated otherwise;
    - (i) Labour, plant and all costs in connection there in
    - (ii) The supply of materials, goods storage and costs in connection there with including waste and delivery to site
    - (iii) Fixing erecting and installing or placing of materials and goods in position
    - (iv) Cost of surveying, preliminary investigations, exploratory excavation to the contractor's own discretion to investigate soil strata, underground rock (lime stone) or hard soil, ground water level or underground service lines.
    - (v) Costs arising due to existing physical, environmental, statutory, supply and market conditions prevailing at or adjacent the site, as information with regard to the same is observable before the base date and affecting upon the execution of the works and carrying out the duties under the contract.
    - (vi) Cost of preparation of shop drawings inclusive of all appropriate information required for the execution of the works despite whether available or not with the contract or construction issued drawings and as-built drawings to the satisfaction of the engineer.
    - (vii) All temporary works and construction maintenance works including all buildings and lands procured adjacent to or off the site.
    - (viii) All general obligations, liabilities, requisites and risks involved in the execution of the works
    - (ix) Selection provision and testing of materials and workmanship as required by the specifications
    - (x) Additional Cost incurrence during non-working days and hours, to compensate, retain, maintain, providing safety for Contractor's staff and Labour, Works, Material, Plants and Machinery
    - (xi) Cost of all taxes and levies applicable locally in executing the Works and supplying of Material, Plant, Machinery and Goods required under the Contract
    - (xii) Testing and commissioning of the Works as per the Specifications
    - (xii) Establishment charges overheads and profits
  17. A price or rate shall be entered against each item in the Bill of Quantities where quantities are stated or not. Items against which no price is entered shall be considered to be covered by or included with other prices or rates in the Bill of Quantities. No claim for omissions on the part of the contractor will be entertained.
  18. Bids which group several items together in the Bill of Quantities under one price will not be accepted.
  19. The Adjustment Item, if any, shall apply to all Bill Items (provisional sums)
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unless clearly indicated otherwise. During this Contract, the adjusted rates (discounted) shall be applied for the valuation of Variations.

20. The method and unit of measurement of completed work for payment shall be in accordance with the method described in the specifications for each item or in the Bill of Quantities. For Lump Sum items, measurements for Interim Payment Certificates shall be based on percentage completion of such item of work or milestone as per the Contractor's proposed schedule of monthly payments, as approved by the Project Manager.

## **SECTION 7-METHOD RELATED CHARGES**

21. Unless otherwise indicated in the relevant item in the Bill of Quantities, payment against lump sums which are defined as Method Related Charges under section 07 CESMM3, will be made based on the accepted break down for lump sum items, enabling the Contractor to receive the final payment of such items which are "Fixed Charges" at the completion of the work. Such "Time Related Charges" are paid to the Contractor bearing the ratio of value of the Works performed to the value of the Contract Sum, along with Interim Payment Certificates. Sums stated against Method Related Charges shall not increase or decrease as a reason of Variation Orders unless otherwise any change to their method of execution is ordered by the Engineer in relation to such Variation Orders.

### **B -ITEMS**

- 1.1 The rates and prices entered in the Bill of Quantities shall be full compensation for completed work and shall have taken full account of all requirements and obligations, covered by all parts of the contract, including but not limited to, the following, unless expressly stated otherwise:
- a. All setting out and survey works including Pre and Post Construction Surveys.
  - b. All additional site surveys and investigations, preparation of field amendment drawings, shop drawings and As-Built drawings.
  - c. Mobilization and Demobilization of labour, all construction plant and equipment.
  - d. Establishment, Maintenance and Removal of all temporary facilities (Contractor's and Project Manager's) including offices, workshops, houses, labour camps construction and storage yards, Laboratory facilities and Equipment, Transport for staff and labour etc.
  - e. Labour and all costs in connection therewith, including but not limited to social charges or fringe benefits.
  - f. The supply of material and goods, storage and costs in connection therewith including delivery to site and handling material within the site/sites.
  - g. Taking delivery of materials and goods supplied by others, unloading, storage, handling materials within site, and costs in connection therewith.
  - h. Construction Plant & Equipment and all costs in connection therewith.
  - i. Fixing, erecting and installing or placing of materials and goods in
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position, including usual auxiliary material etc.

- j. Temporary Works.
  - k. Complying with any limitations and constraints on the use of the site/sites including coordinating with other Contractor's, with regard to site access, security etc., maintenance of access to households and other users, maintenance of existing roads, waterways etc.
  - l. Dealing with the existing flow of water from any source including rainfall and surface runoff, groundwater, wave action and the like. This includes all and any dewatering operations necessary for the execution of the Works.
  - m. General obligations, liabilities and risks involved in the execution of the Works set forth or reasonably implied in the documents on which the tender is based.
  - n. Overheads and profit.
  - o. Waste of material.
  - p. Attendance and transport for surveys including provision of boats and survey instruments, sampling and testing carried out by the Project Manager.
  - q. Performing all sampling and testing which are required to be carried out by the Contractor, and supplying results of such tests.
  - r. Providing required material delivery certificates.
  - s. Coordination with Regulatory Institutes & all stake holders.
  - t. Disposal of all waste material.
  - u. Complying with all requirements in Specifications and Conditions of Contract where separate items have not been provided.
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## **2 B. BILL OF QUANTITIES**

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## Bill of Quantities for Rehabilitation of Ihala Hunne Wewa , Pahala Hunne Wewa and Udakotuwa Wewa

### Summary of BOQ

Bill No	General Summary	Amount (LKR)
Bill No. 1	General Requirements (Excluding Provisional Sum Items)	
Bill No. 2	Tank and Dam Embankment Works - Ihala Hunnegama Wewa	
Bill No. 3	Tank and Dam Embankment Works -Pahala Hunnegama Wewa	
Bill No. 4	Tank and Dam Embankment Works - Udakotuwa Wewa	
A	Total of Bill Nos 1 to 4	
B	Allow Discount (.....)%	
C	Sub Total (A-B)	
Bill No. 5	Provisional Sum	500,000.00
D	Provisional Sum for Physical Contingencies (10% of C) (0.1 x C)	-
E	<b>Grand Total (C + Bill No.5+D)</b>	

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**Bill No. 01 - General Requirements**

Item	Description of works	Unit	Total Quantity	Rate (LKR)	Amount(LKR)
<b>1.1</b>	<b>Securities, Insurances etc.,</b>				
1.1.1	Provision of Performance Security	Lump Sum	1		
1.1.2	Provision of Security Bonds and Guarantees	Lump Sum	1		
1.1.3	Insurance of property and works at site	Lump Sum	1		
1.1.4	Third party insurance	Lump Sum	1		
1.1.5	Insurance against accidents and injury to workmen	Lump Sum	1		
1.1.6	Implementation of Environmental Management Plan (Section VI-F)	Provisional Sum			Refer Bill No.05 Item No.5.1.1
<b>1.2</b>	<b>Contractor's Requirements</b>				
1.2.1	Constructing, maintaining ,dismantling and removal on completion of the works, all temporary building for the Contractor at contractor's camp	Lump Sum	1		
1.2.2	Provision of Construction Management Services as specified				
1.2.2.1	01 No. of Engineer	Month	1		
1.2.2.2	03 No. of TOO	Month	4		
<b>1.3</b>	<b>Other Requirements</b>				
1.3.1	All types of testing of material , earthwork, concrete as per specifications	Lump Sum	1		
1.3.2	Allow lump sum for providing and maintaining 3 Nos name board 1500mm x 900mm as directed by the Engineer.	Lump Sum	1		
1.3.3	Preparation of "As-built drawings"	Lump Sum	1		
	<b>Total Cost for Bill No:01 - General Requirements (Carried to Summary of BOQ)</b>				

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**Bill No. 02 - Tank and Dam Embankment Works for Rehabilitation of Ihala Hunnegama Wewa**

ITEM NO:	DESCRIPTION	UNIT	QUANTITY	RATE (LKR)	AMOUNT (LKR)
<b>2.0</b>	<b>Bill no 02 - Tank and Dam Embankment Works</b>				
<b>2.1</b>	<b>Earth Work in Tank Bund</b>				
2.1.1	Clearing and grubbing shrub jungle on both side of dam including removing outside of the reservation and burning as directed by the Engineer ..... by machinery	ha	0.30		
2.1.2	Felling logging uprooting and disposal of dead trees on tank bund and filled back with suitable material including watering and compaction as directed by the Engineer	no.	2.00		
2.1.3	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	1,310.00		
2.1.4	Removal of Ant Hills including destroying of the queen and application of anti-termite treatment and filled back with suitable material including watering and compaction	no	8.00		
2.1.5	Desilting of tank bed in specified area to a given depth as shown in the drawings and transport outside water spread area as spoil to waste or forming Island mounds with providing erosion protection (including turfing) as directed by the Engineer	m <sup>3</sup>	500.00		
2.1.6	Common Excavation for Clay Core Trench and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	11.00		
2.1.7	Construction of puddle clay cut off wall in U/S of the tank bund by manually as directed by Engineer	m <sup>3</sup>	11.00		
2.1.8	Earth excavation from borrow & forming tank bund including watering & compaction with Benching as directed by Engineer.(haulage within 2 km)	m <sup>3</sup>	1,082.00		
2.1.9	Gravel excavation from borrow and placing, spreading gravel for wearing surface for tank bund road including watering and compaction as directed by Engineer	m <sup>3</sup>	84.00		
2.1.10	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	331.00		
	<b>Sub Total of 2.1</b>				
<b>2.2</b>	<b>Construction of an New Access Road to the LB end of the Tank bund</b>				

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<b>2.2.1</b>	<b>Earth Work in Access Road</b>				
2.2.1.1	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	800.00		
2.2.1.2	Earth excavation from borrow & forming road including watering & compaction with Benching as directed by Engineer.(haulage within 2 km)	m <sup>3</sup>	114.00		
2.2.1.3	Gravel excavation from borrow and placing, spreading gravel for wearing surface for new access road including watering and compaction as directed by Engineer	m <sup>3</sup>	90.00		
2.2.1.4	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	45.00		
<b>2.2.2</b>	<b>Construction of a New Hume Pipe Culvert</b>				
2.2.2.1	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	14.00		
2.2.2.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	11.00		
2.2.2.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	169.00		
2.2.2.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	44.00		
2.2.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	10.00		
2.2.2.6	Supplying, Laying, joining 600 mm dia. Long Reinforce Cement Concrete Pipe. ( Including Transport & loading , unloading )	lm	7.40		
2.2.2.7	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	26.00		
2.2.2.8	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	28.00		
	<b>Sub Total of 2.2</b>				
<b>2.3</b>	<b>Construction of a New 3.0m wide Bathing Steps at 0+080m</b>				
2.3.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	5.00		

2.3.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	250.00		
2.3.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	36.00		
2.3.4	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	5.00		
2.3.5	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	4.00		
	<b>Sub Total of 2.3</b>				
<b>2.4</b>	<b>Construction of a New of Head Wall Type Sluice along with 5 m Long Rectangular Lining to its D/S at 0+108m</b>				
<b>2.4.1</b>	<b>Construction of New of Head Wall Type Sluice</b>				
2.4.1.1	Common earth excavation for an approach canal to sluice and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	13.00		
2.4.1.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	27.00		
2.4.1.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	340.00		
2.4.1.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	37.00		
2.4.1.5	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
2.4.1.6	Furnishing, Placing and Compacting concrete Class C16/20 concrete excluding formwork	m <sup>3</sup>	0.50		
2.4.1.7	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	4.00		
2.4.1.8	Supplying, Laying, joining 225 mm dia. Long Reinforce Cement Concrete Pipe. ( Including Transport & loading , unloading )	lm	7.32		
2.4.1.9	Furnishing and install in 225 mm dia. Cast iron gates & hoist complete with spindle etc. ( Including Transport & loading , unloading )	No	1.00		

2.4.1.10	Supplying , Fixing of 6 mm thick weir plate	No	2.00		
2.4.1.11	Furnishing and fixing 100x200mm ceramic tile gauge according to Engineer's instruction	No	1.00		
2.4.1.12	Providing 225 mm thick pitching using 150 - 225 mm rubbles with 1:5 cement mortar.	m <sup>2</sup>	2.00		
2.4.1.13	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	25.00		
2.4.1.14	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	9.00		
<b>2.4.2</b>	<b>Construction of 5 m Long Rectangular Lining to D/S of New Sluice</b>				
2.4.2.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	1.00		
2.4.2.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	70.00		
2.4.2.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	14.00		
2.4.2.4	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
2.4.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	2.50		
2.4.2.6	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	4.00		
2.4.2.7	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	7.00		
	<b>Sub Total of 2.4</b>				
<b>2.5</b>	<b>Removal of the existing dilapidated spillway and Construction of a New Natural Spillway with Definition wall at 0+168 m</b>				
2.5.1	Removal of existing spillway	Lump sum	1.00		
2.5.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	230.00		

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2.5.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	47.00		
2.5.4	Furnishing, Placing and Compacting concrete Class C16/20 concrete excluding formwork	m <sup>3</sup>	20.00		
2.5.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	5.00		
2.5.6	Furnishing, placing and packing of 225-300 mm rubble for slope of spillway by manually	m <sup>3</sup>	18.00		
2.5.7	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	15.00		
2.5.8	Clearing of spill Approach & tail canal	m <sup>2</sup>	1,200.00		
2.5.9	Lowering of spill Approach & tail canal according to Engineer's instruction	m <sup>3</sup>	180.00		
	<b>Sub Total of 2.5</b>				
	<b>Total Cost for Bill No:02 - (Carried to Summary of BOQ)</b>				

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**Bill No. 03 - Tank and Dam Embankment Works for Rehabilitation of Pahala Hunnegama Wewa**

ITEM NO:	DESCRIPTION	UNIT	QUANTITY	RATE (LKR)	AMOUNT (LKR)
<b>3.0</b>	<b>Bill no 03 - Tank and Dam Embankment Works</b>				
<b>3.1</b>	<b>Earth Work in Tank Bund</b>				
3.1.1	Clearing and grubbing shrub jungle on both side of dam including removing outside of the reservation and burning as directed by the Engineer ..... by machinery	ha	0.30		
3.1.2	Felling logging uprooting and disposal of dead trees on tank bund and filled back with suitable material including watering and compaction as directed by the Engineer	no.	2.00		
3.1.3	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	1,845.00		
3.1.4	Removal of Ant Hills including destroying of the queen and application of anti-termite treatment and filled back with suitable material including watering and compaction	no	23.00		
3.1.5	Desilting of tank bed in specified area to a given depth as shown in the drawings and transport outside water spread area as spoil to waste or forming Island mounds with providing erosion protection (including turfing) as directed by the Engineer	m <sup>3</sup>	550.00		
3.1.6	Common Excavation for Clay Core Trench and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	12.00		
3.1.7	Construction of puddle clay cut off wall in U/S of the tank bund by manually as directed by Engineer	m <sup>3</sup>	12.00		
3.1.8	Earth excavation from borrow & forming tank bund including watering & compaction with Benching as directed by Engineer.(haulage within 2 km)	m <sup>3</sup>	1,474.00		
3.1.9	Gravel excavation from borrow and placing, spreading gravel for wearing surface for tank bund road including watering and compaction as directed by Engineer	m <sup>3</sup>	93.00		
3.1.10	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	449.00		
	<b>Sub Total of 3.1</b>				



<b>3.2</b>	<b>Construction of Natural Spillway with Definition wall , Spill Approach and Tail Canals at 0+000 m</b>				
3.2.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	178.00		
3.2.2	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	36.00		
3.2.3	Furnishing, Placing and Compacting concrete Class C16/20 concrete excluding formwork	m <sup>3</sup>	19.00		
3.2.4	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	4.00		
3.2.5	Furnishing, placing and packing of 225-300 mm rubble for slope of spillway by manually	m <sup>3</sup>	14.00		
3.2.6	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	15.00		
3.2.7	Clearing of spill Approach & tail canal	m <sup>2</sup>	900.00		
3.2.8	Lowering of spill Approach & tail canal according to Engineer's instruction	m <sup>3</sup>	135.00		
	<b>Sub Total of 3.2</b>				
<b>3.3</b>	<b>Construction of a New 1.0m wide Bathing Steps at 0+090m</b>				
3.3.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	4.00		
3.3.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	175.00		
3.3.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	27.00		
3.3.4	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	3.50		
3.3.5	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	5.00		
	<b>Sub Total of 3.3</b>				

<b>3.4</b>	<b>Construction of a New of Head Wall Type Sluice along with 5 m Long Rectangular Lining to its D/S at 0+170m</b>				
<b>3.4.1</b>	<b>Construction of New of Head Wall Type Sluice</b>				
3.4.1.1	Common earth excavation for an approach canal to sluice and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	13.00		
3.4.1.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	31.00		
3.4.1.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	340.00		
3.4.1.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	40.00		
3.4.1.5	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
3.4.1.6	Furnishing, Placing and Compacting concrete Class C16/20 concrete excluding formwork	m <sup>3</sup>	0.50		
3.4.1.7	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	4.00		
3.4.1.8	Supplying, Laying, joining 225 mm dia. Long Reinforce Cement Concrete Pipe. ( Including Transport & loading , unloading )	lm	9.76		
3.4.1.9	Furnishing and install in 225 mm dia. Cast iron gates & hoist complete with spindle etc. ( Including Transport & loading , unloading )	No	1.00		
3.4.1.10	Supplying , Fixing of 6 mm thick weir plate	No	2.00		
3.4.1.11	Furnishing and fixing 100x200mm ceramic tile gauge according to Engineer's instruction	No	1.00		
3.4.1.12	Providing 225 mm thick pitching using 150 - 225 mm rubbles with 1:5 cement mortar.	m <sup>2</sup>	3.00		
3.4.1.13	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	28.00		
3.4.1.14	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	9.00		
<b>3.4.2</b>	<b>Construction of 5 m Long Rectangular Lining to D/S of New Sluice</b>				

3.4.2.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	1.00		
3.4.2.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	70.00		
3.4.2.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	14.00		
3.4.2.4	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
3.4.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	2.50		
3.4.2.6	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	4.00		
3.4.2.7	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	7.00		
	<b>Sub Total of 3.4</b>				
<b>3.5</b>	<b>Improvement of the Access road from the Tank bund to paddy fields</b>				
<b>3.5.1</b>	<b>Earth Work in Access Road</b>				
3.5.1.1	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	800.00		
3.5.1.2	Gravel excavation from borrow and placing, spreading gravel for wearing surface for new access road including watering and compaction as directed by Engineer	m <sup>3</sup>	90.00		
<b>3.5.2</b>	<b>Construction of a New Hume Pipe Culvert</b>				
3.5.2.1	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	14.00		
3.5.2.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	11.00		
3.5.2.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	169.00		

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3.5.2.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	44.00		
3.5.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	10.00		
3.5.2.6	Supplying, Laying, joining 600 mm dia. Long Reinforce Cement Concrete Pipe. ( Including Transport & loading , unloading )	lm	7.40		
3.5.2.7	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	26.00		
3.5.2.8	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	28.00		
	<b>Sub Total of 3.5</b>				
	<b>Total Cost for Bill No:03 - (Carried to Summary of BOQ)</b>				

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**Bill No. 04 - Tank and Dam Embankment Works for Rehabilitation of Udakotuwa Wewa**

ITEM NO:	DESCRIPTION	UNIT	QUANTITY	RATE (LKR)	AMOUNT (LKR)
<b>4.0</b>	<b>Bill no 04 - Tank and Dam Embankment Works</b>				
<b>4.1</b>	<b>Earth Work in Tank Bund</b>				
4.1.1	Clearing and grubbing shrub jungle on both side of dam including removing outside of the reservation and burning as directed by the Engineer ..... by machinery	ha	0.50		
4.1.2	Felling logging uprooting and disposal of dead trees on tank bund and filled back with suitable material including watering and compaction as directed by the Engineer	no.	2.00		
4.1.3	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	1,164.00		
4.1.4	Removal of Ant Hills including destroying of the queen and application of anti-termite treatment and filled back with suitable material including watering and compaction	no	11.00		
4.1.5	Desilting of tank bed in specified area to a given depth as shown in the drawings and transport outside water spread area as spoil to waste or forming Island mounds with providing erosion protection (including turfing) as directed by the Engineer	m <sup>3</sup>	3,100.00		
4.1.6	Common Excavation for Clay Core Trench and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	16.00		
4.1.7	Construction of puddle clay cut off wall in U/S of the tank bund by manually as directed by Engineer	m <sup>3</sup>	16.00		
4.1.8	Earth excavation from borrow & forming tank bund including watering & compaction with Benching as directed by Engineer.(haulage within 2 km)	m <sup>3</sup>	506.00		
4.1.9	Gravel excavation from borrow and placing, spreading gravel for wearing surface for tank bund road including watering and compaction as directed by Engineer	m <sup>3</sup>	117.00		
4.1.10	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	230.00		
	<b>Sub Total of 4.1</b>				

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<b>4.2</b>	<b>Construction of an New Access Road to the Tank bund</b>				
<b>4.2.1</b>	<b>Earth Work in Access Road</b>				
4.2.1.1	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	300.00		
4.2.1.2	Gravel excavation from borrow and placing, spreading gravel for wearing surface for new access road including watering and compaction as directed by Engineer	m <sup>3</sup>	34.00		
<b>4.2.2</b>	<b>Construction of a New Hume Pipe Culvert</b>				
4.2.2.1	Stripping top soil to a depth of 75 - 150 mm , to receive new earth including dispose away from the site as directed by Engineer	m <sup>2</sup>	14.00		
4.2.2.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	11.00		
4.2.2.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	169.00		
4.2.2.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	44.00		
4.2.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	10.00		
4.2.2.6	Supplying, Laying, joining 600 mm dia. Long Reinforce Cement Concrete Pipe. ( Including Transport & loading , unloading )	lm	7.40		
4.2.2.7	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	26.00		
4.2.2.8	Furnishing & planting strip Turf on newly formed earth surface around tank bund and watering until turf takes root	m <sup>2</sup>	28.00		
	<b>Sub Total of 4.2</b>				
<b>4.3</b>	<b>Improvement of Tower Sluice at 0+125m along with Construction of 5 m Long Rectangular Lining to its D/S</b>				
<b>4.3.1</b>	<b>Improvement of Tower Sluice</b>				
4.3.1.1	Common earth excavation for an approach canal to sluice and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	13.00		

4.3.1.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	3.00		
4.3.1.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	255.00		
4.3.1.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	24.00		
4.3.1.5	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
4.3.1.6	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	3.00		
4.3.1.7	Furnishing and install in 225 mm dia. Cast iron gates & hoist complete with spindle etc. ( Including Transport & loading , unloading )	No	1.00		
4.3.1.8	Supplying , Fixing of 6 mm thick weir plate	No	1.00		
4.3.1.9	Furnishing and fixing 100x200mm ceramic tile gauge according to Engineer's instruction	No	1.00		
4.3.1.10	Providing 2m wide 225mm thick pitching using 150 - 225 mm rubble work with 1:5 cement mortar in the U/S	m <sup>2</sup>	12.00		
4.3.1.11	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	2.00		
4.3.1.12	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	9.00		
<b>4.3.2</b>	<b>Construction of 5 m Long Rectangular Lining to D/S of Sluice</b>				
4.3.2.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	1.00		
4.3.2.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	70.00		
4.3.2.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	14.00		
4.3.2.4	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
4.3.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	2.50		

4.3.2.6	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	4.00		
4.3.2.7	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	7.00		
	<b>Sub Total of 4.3</b>				
<b>4.4</b>	<b>Construction of a New 3.0m wide Bathing Steps at 0+135m</b>				
4.4.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	7.00		
4.4.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	350.00		
4.4.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	45.00		
4.4.4	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	7.00		
4.4.5	Furnishing, placing & compacting backfill around structure, any haul.	m <sup>3</sup>	6.00		
	<b>Sub Total of 4.4</b>				
<b>4.5</b>	<b>Construction of a New of Head Wall Type Sluice along with 5 m Long Rectangular Lining to its D/S at 0+170m</b>				
<b>4.5.1</b>	<b>Construction of New of Head Wall Type Sluice</b>				
4.5.1.1	Common earth excavation for an approach canal to sluice and Spoil to Waste or Fill Material as directed	m <sup>3</sup>	13.00		
4.5.1.2	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	43.00		
4.5.1.3	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	kg	467.50		
4.5.1.4	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	51.00		



4.5.1.5	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
4.5.1.6	Furnishing, Placing and Compacting concrete Class C16/20 concrete excluding formwork	m <sup>3</sup>	0.50		
4.5.1.7	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	5.50		
4.5.1.8	Supplying, Laying, joining 225 mm dia. Long Reinforce Cement Concrete Pipe. ( Including Transport & loading , unloading )	lm	9.76		
4.5.1.9	Furnishing and install in 225 mm dia. Cast iron gates & hoist complete with spindle etc. ( Including Transport & loading , unloading )	No	1.00		
4.5.1.10	Supplying , Fixing of 6 mm thick weir plate	No	2.00		
4.5.1.11	Furnishing, making and fixing of handrails for Passarelle including painting of two coats of anti-corrosive	m	1.00		
4.5.1.12	Furnishing and fixing 100x200mm ceramic tile gauge according to Engineer's instruction	No	1.00		
4.5.1.13	Providing 225 mm thick pitching using 150 - 225 mm rubbles with 1:5 cement mortar.	m <sup>2</sup>	6.00		
4.5.1.14	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	38.00		
4.5.1.15	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	9.00		
<b>4.5.2</b>	<b>Construction of 5 m Long Rectangular Lining to D/S of New Sluice</b>				
4.5.2.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	1.00		
4.5.2.2	Furnishing, cutting, bending, fabricating, hoisting and placing tor steel reinforcement as directed waste , all spacing , laps etc. , In reinforced steel other than design laps	Kg	70.00		
4.5.2.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	14.00		
4.5.2.4	Furnishing, Placing and Compacting concrete Class C12/15 concrete excluding formwork	m <sup>3</sup>	0.50		
4.5.2.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	2.50		

4.5.2.6	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	4.00		
4.5.2.7	Furnishing , planting Turf on newly formed earth surface around structures and watering until turf takes root	m <sup>2</sup>	7.00		
	<b>Sub Total of 4.5</b>				
<b>4.6</b>	<b>Construction of Spillway at 0+260 m</b>				
4.6.1	Excavation for foundation in any material except rock requiring blasting , and spoil to waste or fill material as directed by Engineer	m <sup>3</sup>	90.00		
4.6.2	Rock excavation and spoil to waste / Quarry products by manual labour.	m <sup>3</sup>	0.45		
4.6.3	Furnishing, making 12 mm plywood formwork each 05 uses and fixing and removing same once	m <sup>2</sup>	16.00		
4.6.4	Furnishing, Placing and Compacting concrete Class C16/20 concrete excluding formwork	m <sup>3</sup>	17.00		
4.6.5	Furnishing, Placing and Compacting concrete Class C20/25 concrete excluding formwork	m <sup>3</sup>	2.00		
4.6.6	Furnishing, placing and packing of 225-300 mm rubble for slope of spillway by manually	m <sup>3</sup>	6.00		
4.6.7	Furnishing, placing & compacting backfill around structure,	m <sup>3</sup>	15.00		
4.6.8	Clearing of spill Approach & tail canal	m <sup>2</sup>	200.00		
4.6.9	Lowering of spill Approach & tail canal according to Engineer's instruction	m <sup>3</sup>	30.00		
	<b>Sub Total of 4.6</b>				
	<b>Total Cost for Bill No:04 - (Carried to Summary of BOQ)</b>				

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**Bill No 05 -Provisional Sum Items**

Item	Description of works	Unit	Total Quantity	Rate (LKR)	Amount(LKR)
5.1	Implementation of Environmental Management Plan (Section VI-F)				
5.1.1	Implementation of Environmental Management Plan (Section VI-F)	Provisional Sum			500,000.00
	<i>Total Cost for Bill No:05 - Provisional Sum Items(Carried to Summary of BOQ)</i>				<i>500,000.00</i>

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## **C. RATE BREAK-DOWN**

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## **Rate Break-down**

Rate break-down shall be provided for following three major items of works:

1. Earth excavation from borrow & forming tank bund including watering & compaction with Benching as directed by Engineer. Haul distance 2.0km maximum from center of the bund to center of borrow area.
2. De-silting of tank bed in specified area to a given depth as shown in the drawings and transport outside water spread area as spoil to waste or forming island mounds with erosion protection (including turfing) as directed by the Engineer.
3. Furnishing, Placing and Compacting Grade 20 concrete excluding formwork

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## **E. DRAWINGS**



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

# UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

DESIGNED DRAWINGS - HEAD WORKS



UNITED NATIONS DEVELOPMENT PROGRAMME



GREEN CLIMATE FUND



CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

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குளங்கள் கிராமங்களின் மறுமலர்ச்சி



CONSULTANT



INFOTECHS IDEAS (PVT) LTD.

No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.



# **1.0 GENERAL DRAWINGS ANGURUWELLA CASCADE**



Path: F:\K\_GALA TENDER PACKAGES (WITHOUT SIG)\ANGURUWELLA\PACKAGE 1\_2\_3 ANGURUWELLA\ANGURUWELLA PACK 3\01 GENERAL\01DR INDEX PACKAGE 03.DWG Printed : 2017/Oct/17

## INDEX OF DRAWING - ANGURUWELLA CASCADE - PACKAGE 3

PLATE NO. 001

SERIAL NO.	TITLE OF DRAWING	DRAWING NUMBER	SHEET NUMBER	PLATE NUMBER
1.0	GENERAL ANGURUWELLA CASCADE PACKAGE 3			
	INDEX OF DRAWINGS FOR DESIGNS	AC-P3-GEN-01	01 OF 01	001
	STRUCTURAL GENERAL NOTES	AC-P3-GEN-02	01 OF 01	002
	GENERAL LAYOUT	AC-P3-GEN-03	01 OF 01	003
	SCHEMATIC DIAGRAM	AC-P3-GEN-04	01 OF 01	004
	GENERAL LAYOUT OF ISLAND MOUNDS	AC-P3-GEN-05	01 OF 01	005
2.0	IHALA HUNNEGAMA WEWA (IHW)			
	TANK BED SURVEY	AC-P3-IHW-BED-01	01 OF 01	006
	ZONING MAP FOR DESILTING	AC-P3-IHW-BED-02	01 OF 01	007
	PLAN AND LONGITUDINAL PROFILE OF TANK BUND	AC-P3-IHW-PLS-01	01 OF 01	008
	CROSS SECTIONS OF TANK BUND Stn.0+000 - 0+125	AC-P3-IHW-CSS-01	01 OF 02	009
	CROSS SECTIONS OF TANK BUND Stn.0+150 - 0+184.66	AC-P3-IHW-CSS-01	02 OF 02	010
3.0	UDAKOTUWA WEWA (UKW)			
	TANK BED SURVEY	AC-P3-UKW-BED-01	01 OF 01	011
	ZONING MAP FOR DESILTING	AC-P3-UKW-BED-02	01 OF 01	012
	PLAN AND LONGITUDINAL PROFILE OF TANK BUND	AC-P3-UKW-PLS-01	01 OF 01	013
	CROSS SECTIONS OF TANK BUND Stn.0+000 - 0+125	AC-P3-UKW-CSS-01	01 OF 02	014
	CROSS SECTIONS OF TANK BUND Stn.0+150 - 0+260	AC-P3-UKW-CSS-01	02 OF 02	015
4.0	PAHALA HUNNE WEWA (PHW)			
	TANK BED SURVEY	AC-P3-PHW-BED-01	01 OF 01	016
	ZONING MAP FOR DESILTING	AC-P3-PHW-BED-02	01 OF 01	017
	PLAN AND LONGITUDINAL PROFILE OF TANK BUND	AC-P3-PHW-PLS-01	01 OF 01	018
	CROSS SECTIONS OF TANK BUND Stn.0+000 - 0+125	AC-P3-PHW-CSS-01	01 OF 02	019
	CROSS SECTIONS OF TANK BUND Stn.0+150 - 0+205.81	AC-P3-PHW-CSS-01	02 OF 02	020
5.0	TYPE PLANS			
	HEAD WALL TYPE SLUICE (WITH PASSERELLE)	AC-P3-TYP-01	01 OF 01	021
	HEAD WALL TYPE SLUICE (WITHOUT PASSERELLE)	AC-P3-TYP-02	01 OF 01	022
	MODIFIED HEADWALL TYPE SLUICE	AC-P3-TYP-03	01 OF 01	023
	TOWER TYPE SLUICE	AC-P3-TYP-04	01 OF 01	024
	RF DETAILS FOR SLUICES	AC-P3-TYP-05	01 OF 02	025
	RF DETAILS FOR SLUICES	AC-P3-TYP-05	02 OF 02	026
	BATHING STEPS	AC-P3-TYP-06	01 OF 02	027
	RF DETAILS OF BATHING STEPS	AC-P3-TYP-06	02 OF 02	028
	TYPICAL SECTION OF EMBANKMENT	AC-P3-TYP-07	01 OF 01	029
	SPILL CUM CAUSEWAY	AC-P3-TYP-08	01 OF 01	030
	NATURAL SPILL	AC-P3-TYP-09	01 OF 01	031
	TYPE PLAN FOR TURNOUT STRUCTURE	AC-P3-TYP-10	01 OF 01	032
	PIPE CULVERT FOR ACCESS ROAD ( SINGLE BARREL)	AC-P3-TYP-11	01 OF 01	033
	PIPE CULVERT FOR ACCESS ROAD ( DOUBLE BARREL)	AC-P3-TYP-12	01 OF 01	034

Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				ANGURUWELLA CASCADE PACKAGE 03 INDEX OF DRAWINGS		
RECOMMENDED											
CHECKED		2019 - 02 - 22							DRAWING No.	AC-P3-GEN-01	
DRAWN		2019 - 02 - 22							SCALE	N.T.S.	SHEET NO. 01 OF 01
DESIGNED		2019 - 02 - 22				CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT 	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.			

1.0 GENERAL

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS.
2. X,Y,Z VALUES INDICATED ARE IN ACCORDANCE WITH THE TOPOGRAPHIC SURVEYS
3. ALL ELEVATIONS ARE IN METRES ABOVE SEA LEVEL AND DENOTED AS " masl "
4. ALL AZIMUTH BEARINGS ARE REFERENCED TO TRUE NORTH.
5. ALL DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS SPECIFIED OTHERWISE.

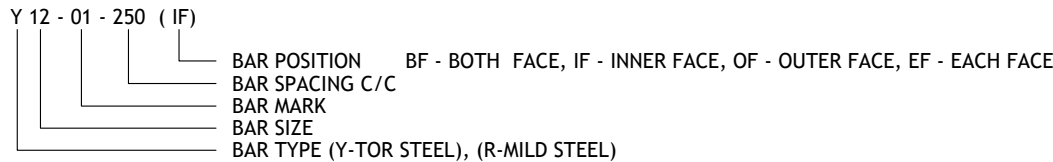
2.0 STRUCTURE NOTES

1. PLACE ENTIRE STRUCTURE ON A FOUNDATION OF ROCK, UNDISTURBED EARTH OR COMPACTED FILL. FOUNDATIONS PLACED ON DIFFERENT BEDDING CONDITIONS SHALL BE AS APPROVED BY THE ENGINEER.
2. ALL EXPOSED EDGES AND CORNERS OF CONCRETE SURFACES SHALL BE CHAMFERED WITH 45° BEVEL 20mm X 20mm UNLESS SHOWN OTHERWISE.
3. CLASSES OF FINISHES FOR FORMED AND UNFORMED CONCRETE SURFACES SHALL BE AS PER SPECIFICATIONS.
4. STRUCTURAL STEELWORK EXPOSED TO AIR OR WATER SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH BS EN ISO 1461.
5. CLEAR COVER FOR ANY REINFORCING STEEL SHALL BE IN ACCORDANCE WITH SPECIFICATIONS, BUT NOT LESS THAN 50mm AND ANCHORAGE BOND LENGTH SHALL BE AS PER TABLE UNLESS NOTED OTHERWISE.
6. REINFORCEMENT SHALL BE LAP SPICED AT LOCATIONS INDICATED IN THE PLANS OR AT LOCATIONS SPECIFIED BY THE ENGINEER DURING REVIEW OF THE REINFORCING STEEL SHOP DRAWINGS.
7. ALL IDENTIFIED CONTRACTION AND EXPANSION JOINTS SHALL BE PROVIDED AS SHOWN ON THE DRAWINGS.
8. WATERSTOPS SHALL BE MADE CONTINUOUS IN JOINTS (WHERE NECESSARY BY WELDING).
9. ALL PROJECTING WATERSTOPS AND METAL SEALS SHALL BE SUPPORTED AND PROTECTED FROM DAMAGE AND EXPOSURE.
10. BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEDDED ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE.

3.0 MATERIALS

1. ALL SPECIFIED CONCRETE CLASS C12/15, C16/20, C20/25, etc. SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS.
2. ALL REINFORCEMENT STEEL SHALL BE CONFORM TO DIN 488 OF THE SPECIFICATION TO STRENGTH 500 Mpa.

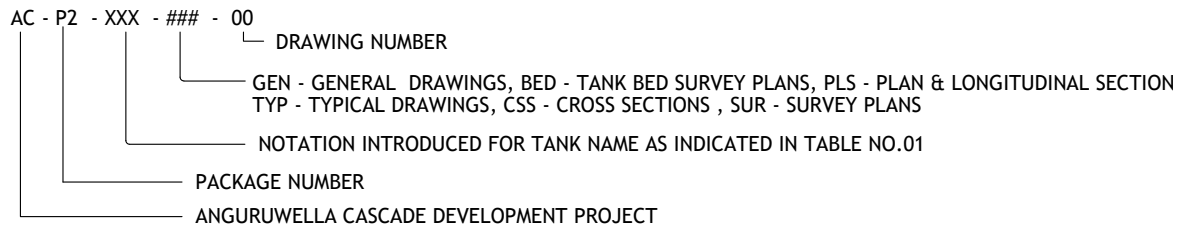
4.0 BAR NOTATION



5.0 MISCELLANEOUS

1. DIMENSIONS OBTAINED BY SCALING FROM THE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION.
2. ANY DISCREPANCIES IN THE DRAWINGS SHALL BE REFERRED TO THE ENGINEER FOR REVISION BEFORE PROCEEDING WITH WORK.
3. ANY AMBIGUITIES IN THE DIMENSIONS SHOWN ON DRAWINGS SHALL BE VERIFIED FROM THE ENGINEER.

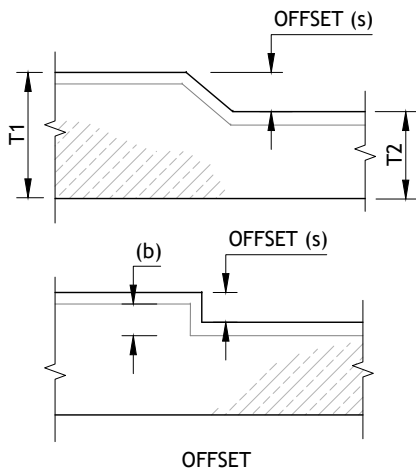
6.0 ABBREVIATIONS ADOPTED FOR DRAWING NUMBERING



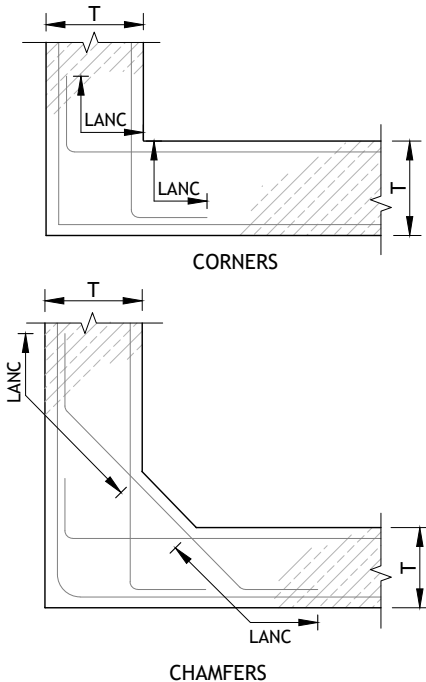
7.0 TYPICAL REINFORCEMENT DETAILS AT VARIED SECTIONS

- (i) OFFSETS (ii) CORNERS (iii) BLOCKOUT RECESSES (iv) OPENINGS ARE AS SHOWN HEREIN  
(v) WATERSTOPS

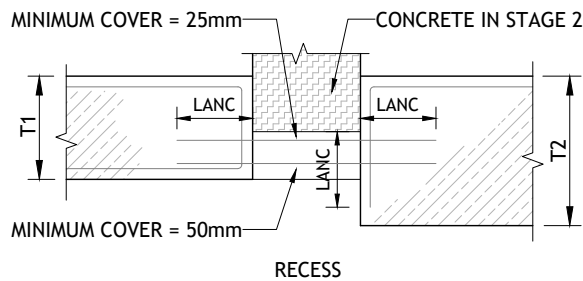
(i) TYPICAL R/F DETAILS AT OFFSET (s)



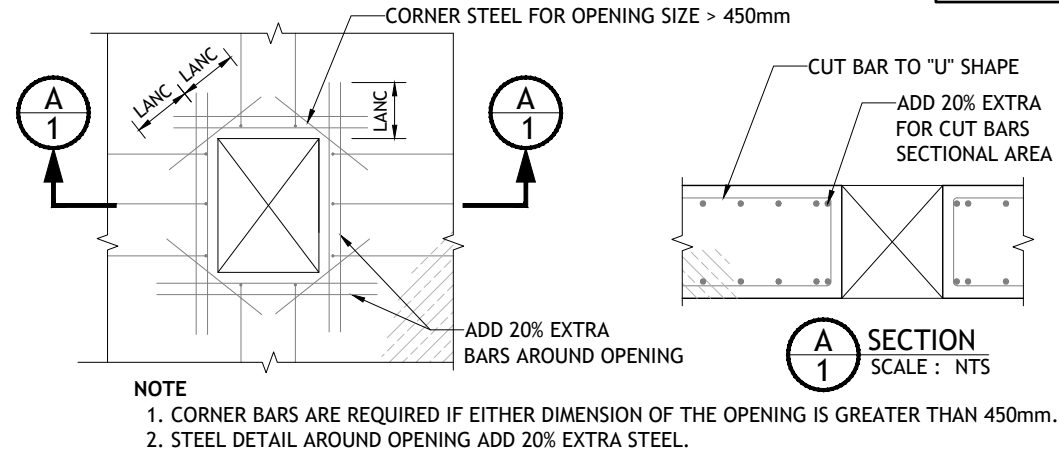
(ii) TYPICAL CORNER R/F DETAILS



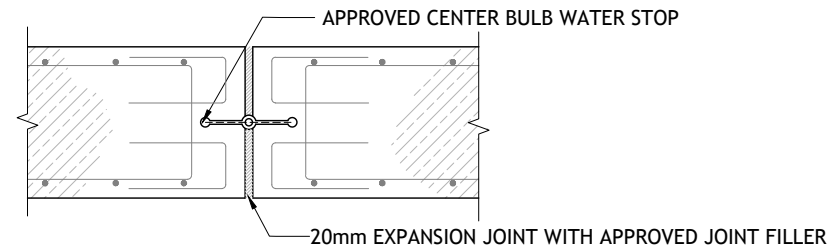
(iii) TYPICAL R/F DETAILS AT BLOCKOUT RECESSES



(iv) ADDITIONAL REINFORCEMENT AROUND OPENINGS



(v) TYPICAL R/F DETAILS FOR WATER STOP AT EXPANSION JOINTS



MINIMUM MANDREL DIAMETERS d<sub>br</sub> ACCORDING TO EC2

BAR DIAMETER	BENDS, HOOKS and LOOPS	VALUE OF MINIMUM CONCRETE COVER PERPENDICULAR TO PLANE OR CURVATURE OR HALF THE FREE DISTANCE BETWEEN ADJACENT BARS	BENT-UP BARS OR OTHER CARVED BARS
dia ≤ 20 mm	4 dia	> 100 mm and > 7 dia	10 dia
dia > 20 mm	7 dia	> 50 mm and > 3 dia	15 dia
		≤ 50 mm or ≤ 3 dia	20 dia

ALL BENDING DIMENSIONS ARE OUTSIDE TO OUTSIDE MEASUREMENTS

TABLE 01

Serial No.	Tank Name	Notation
8	Ihala Hunnegama wewa	IHW
11	Udakotuwa wewa	UKW
9	Pahala Hunne wewa	PHW

ABBREVIATIONS

- LANC - ANCHORAGE LENGTH

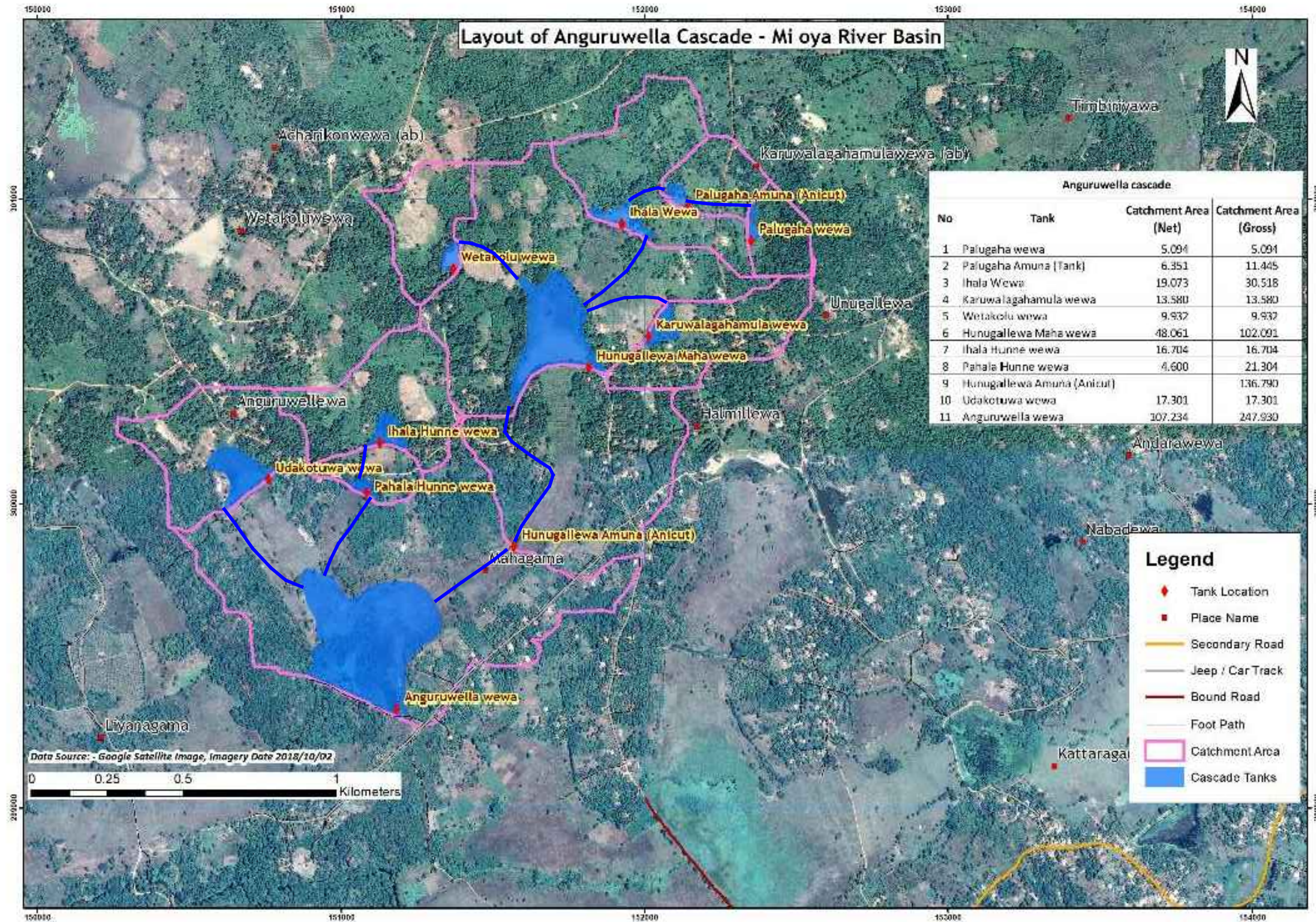
Ref.	SIGNATURE	DATE	REVISION	DESCRIPTION
APPROVED			No.	APPROVED
RECOMMENDED				
CHECKED		2019 - 02 - 22		
DRAWN		2019 - 02 - 22		
DESIGNED		2019 - 02 - 22		

	DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT
	CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

	GREEN CLIMATE FUND
	UNITED NATIONS DEVELOPMENT PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	DRAWING No. AC-P3-GEN-02
CONSULTANT	INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.





Ref.	SIGNATURE	DATE	REVISION	
APPROVED			No.	APPROVED
RECOMMENDED				DATE
CHECKED		2019 - 02 - 22		
DRAWN		2019 - 02 - 22		
DESIGNED		2019 - 02 - 22		



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

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ඉහළින් කිරාගන්නකින් මග්ගාමාර්ග



GREEN CLIMATE FUND

UNITED NATIONS DEVELOPMENT PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

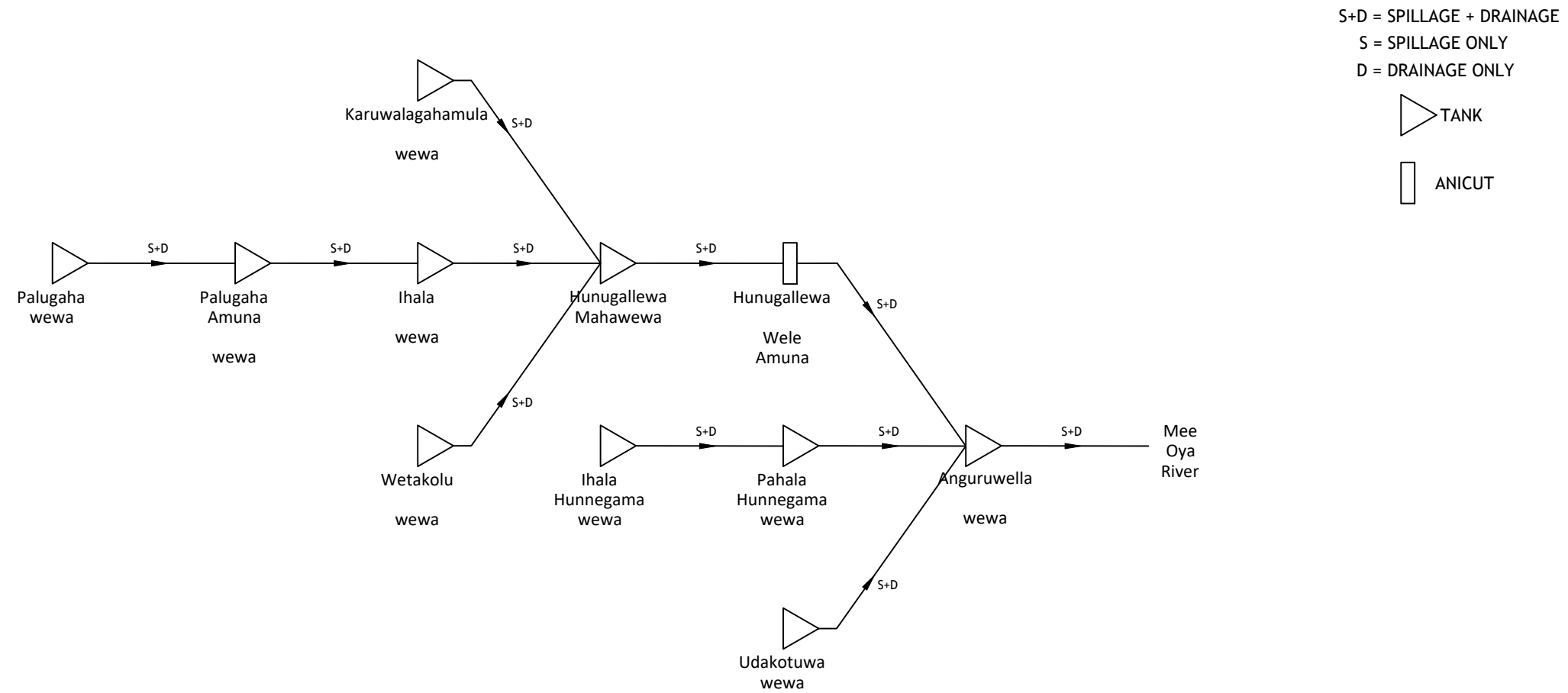
CONSULTANT

Infotechs IDEAS

INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.

DESCRIPTION		
ANGURUWELLA CASCADE PACKAGE 3 GENERAL LAYOUT		
DRAWING No.	AC-P3-GEN-03	
SCALE	N.T.S.	SHEET NO. 01 OF 01



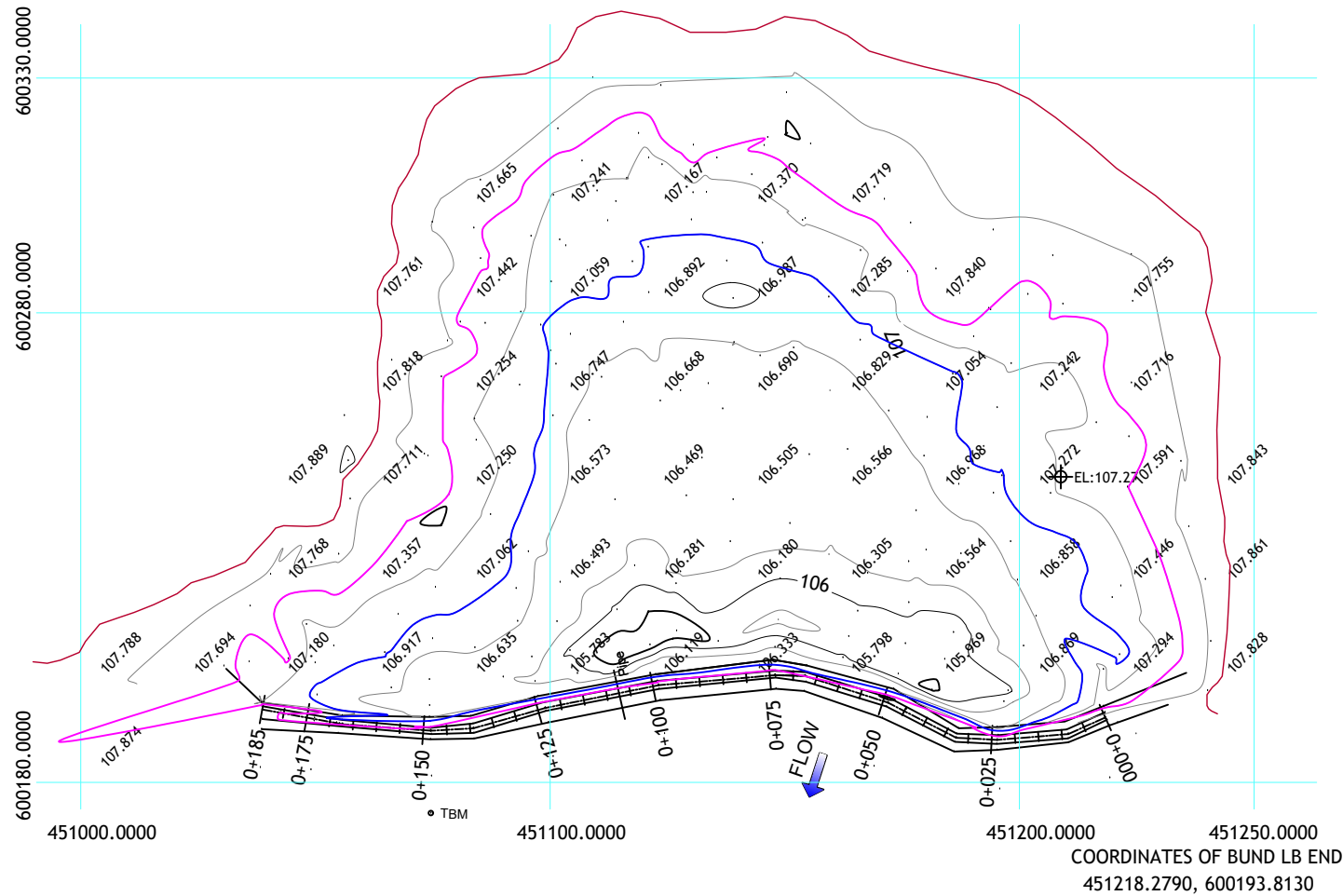


Ref.	SIGNATURE	DATE	REVISION			 <b>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</b> <b>MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT</b>	 <b>GREEN CLIMATE FUND</b>	 <b>UNITED NATIONS DEVELOPMENT PROGRAMME</b>	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				ANGURUWELLA CASCADE PACKAGE 3 SCHEMATIC DIAGRAM		
CHECKED		2019 - 02 - 22				 <b>CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT</b>	 <b>INFOTECHS IDEAS (PVT) LTD.</b> No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	DRAWING No.	AC-P3-GEN-04	
DRAWN		2019 - 02 - 22							SCALE	N.T.S.	SHEET NO. 01 OF 01
DESIGNED		2019 - 02 - 22									



## 2.0 IHALAHUNNEGAMA TANK

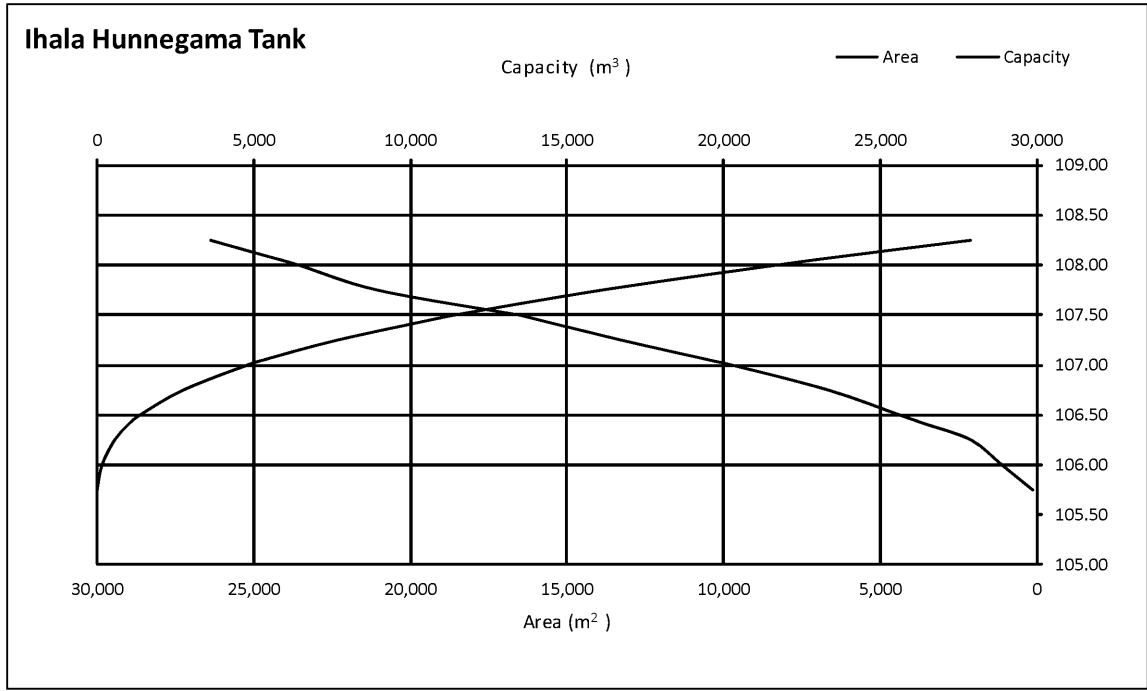
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N

	EXISTING		DESIGNED	
	B.T.L.	F.S.L.	B.T.L.	F.S.L.
LEVEL (masl)	107.70	107.000	108.100	107.054
CAPACITY (m <sup>3</sup> )		4787		
CAPACITY (Ac.ft.)		3.88		

CONTOUR (masl)	HEIGHT BETWEEN CONTOURS (m)	AREA (m <sup>2</sup> )	AVERAGE AREA (m <sup>2</sup> )	VOULME (m <sup>3</sup> )	CAPACITY (m <sup>3</sup> )	REMARKS
105.75	0	127		0	0	
106.00	0.25	1,113	620	155	155	
106.25	0.25	2,093	1,603	401	556	
106.415	0.17	3,595	2,844	469	1,025	MOL
106.50	0.08	4,369	3,982	338	1,364	
106.75	0.25	6,645	5,507	1,377	2,740	
107.00	0.25	9,726	8,185	2,046	4,787	
107.054	0.05	10,488	10,107	546	5,332	FSL
107.25	0.20	13,254	11,871	2,327	7,659	
107.484	0.23	16,296	14,775	3,457	11,116	HFL
107.50	0.02	16,503	16,399	262	11,379	
107.75	0.25	21,024	18,764	4,691	16,070	
108.00	0.25	23,547	22,286	5,571	21,641	
108.100	0.10	24,677	24,112	2,411	24,052	BTL
108.25	0.15	26,373	25,525	3,829	27,881	



Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
WATER MANAGEMENT PROJECT



GREEN  
CLIMATE  
FUND



UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

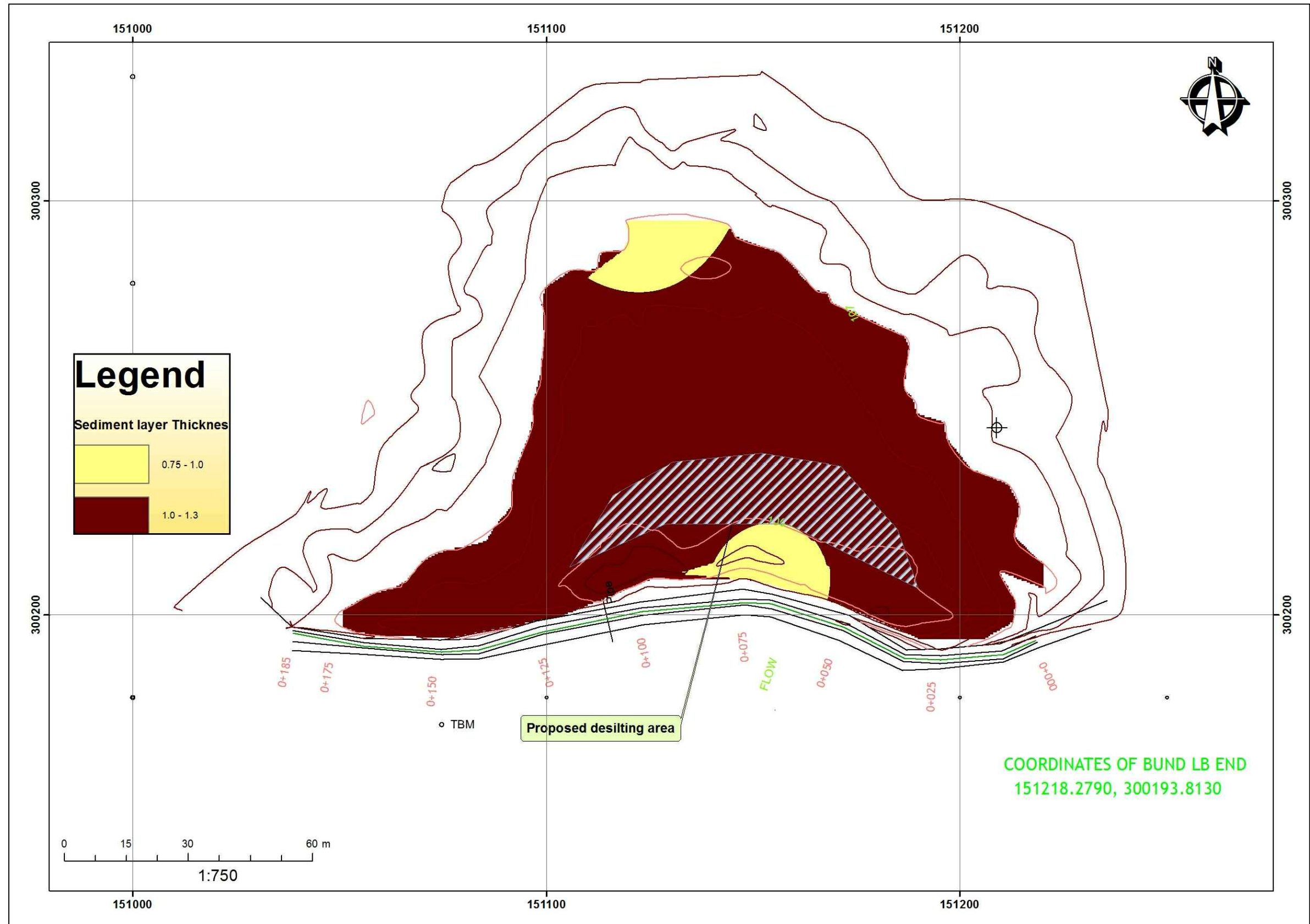
UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

CONSULTANT  
Infotechs IDEAS

INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

DESCRIPTION		
IHALA HUNNEGAMA WEWA TANK BED SURVEY		
DRAWING No.	AC-P3-IHW-BED-01	
SCALE	1 : 1500	SHEET NO. 01 OF 01

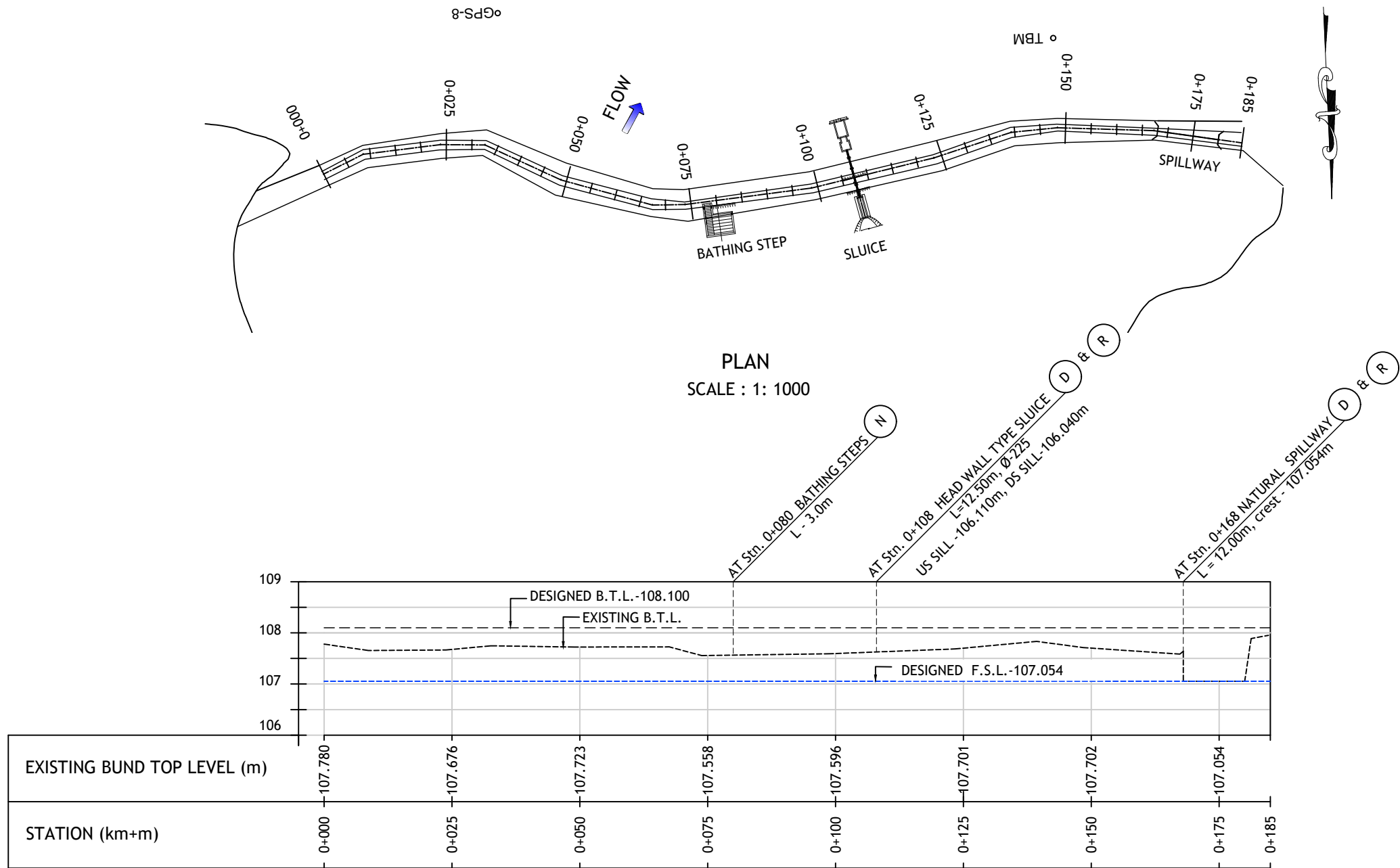




Ref.	SIGNATURE	DATE	REVISION			 <b>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</b> <b>MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT</b>	 <b>GREEN CLIMATE FUND</b>	 <b>UNITED NATIONS DEVELOPMENT PROGRAMME</b>	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				IHALA HUNNEGAMA WEWA ZONING MAP FOR DESILTING		
RECOMMENDED											
CHECKED		2019 - 02 - 22							DRAWING No. AC-P3-IHW-BED-02		
DRAWN		2019 - 02 - 22							SCALE N.T.S. SHEET NO. 01 OF 01		
DESIGNED		2019 - 02 - 22				<b>CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT</b>  <b>චන්ද්‍රිකා මහේස්වරිය</b> <b>கனங்கள் கிராமங்களின் மறுமலர்ச்சி</b>			<b>CONSULTANT</b>	 <b>Infotech IDEAS</b> <b>INFOTECHS IDEAS (PVT) LTD.</b> <b>No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.</b>	

Path: F:\K\_GALA TENDER PACKAGES (WITHOUT SIG)\ANGURUWELLA\PACKAGE 1\_2\_3 ANGURUWELLA\ANGURUWELLA PACK 3\02\IHALA HUNNE WEWA\08 10PLS & CSS IHW.DWG Printed : 2017/Oct/17

PLATE NO. 008



SCALE : V-1:100  
H-1:1000

LONGITUDINAL PROFILE FROM Stn. 0+000 TO Stn. 0+185

Ref.	SIGNATURE	DATE	REVISION			DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION	
APPROVED			APPROVED	DATE					IHALA HUNNE WEWA PLAN AND LOGITUDINAL PROFILE OF TANK BUND	
RECOMMENDED									DRAWING No.	AC-P3-IHW-PLS-01
CHECKED		2019 - 02 - 22							SCALE	AS SHOWN SHEET NO. 01 OF 01
DRAWN		2019 - 02 - 22								
DESIGNED		2019 - 02 - 22								

 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	විභවී ගම් ප්‍රවෘද්ධි ඉහලින් කිරාමත්තන් මණ්ඩලයේ	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.
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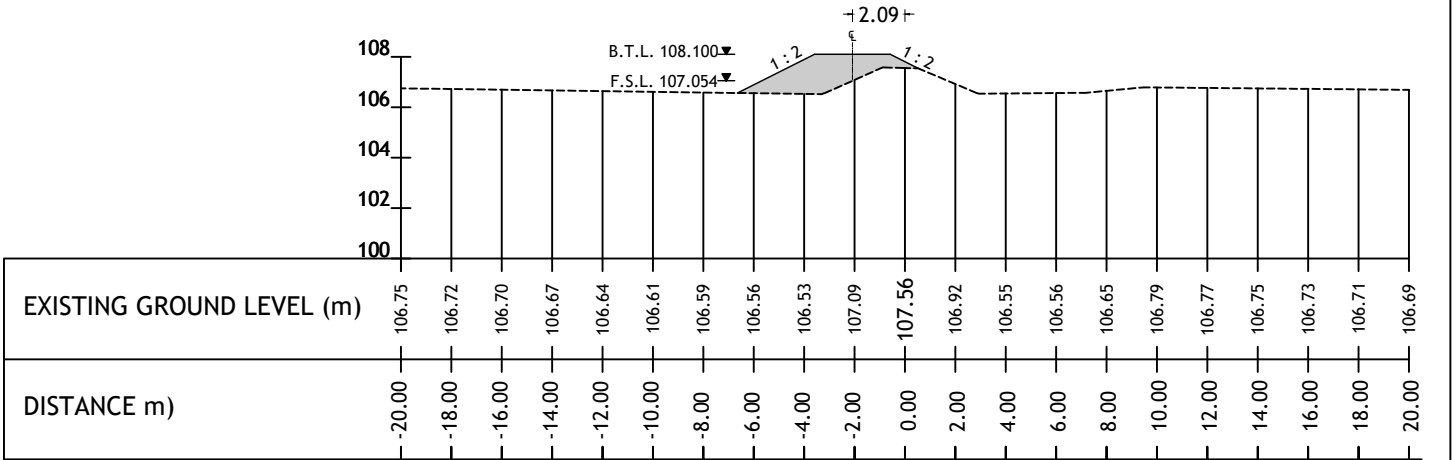
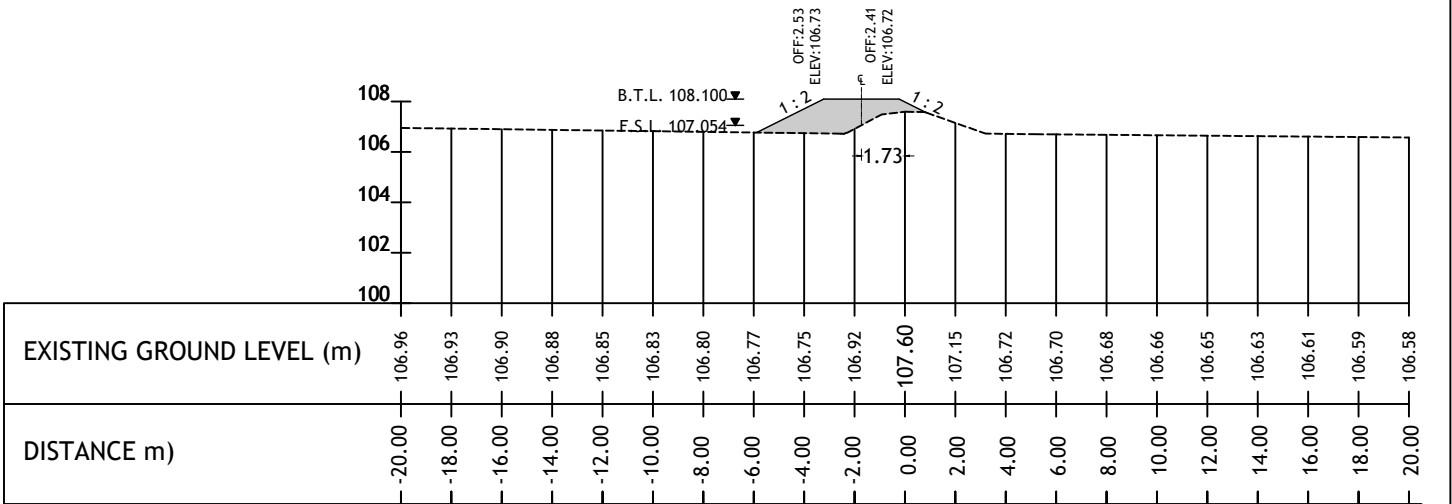
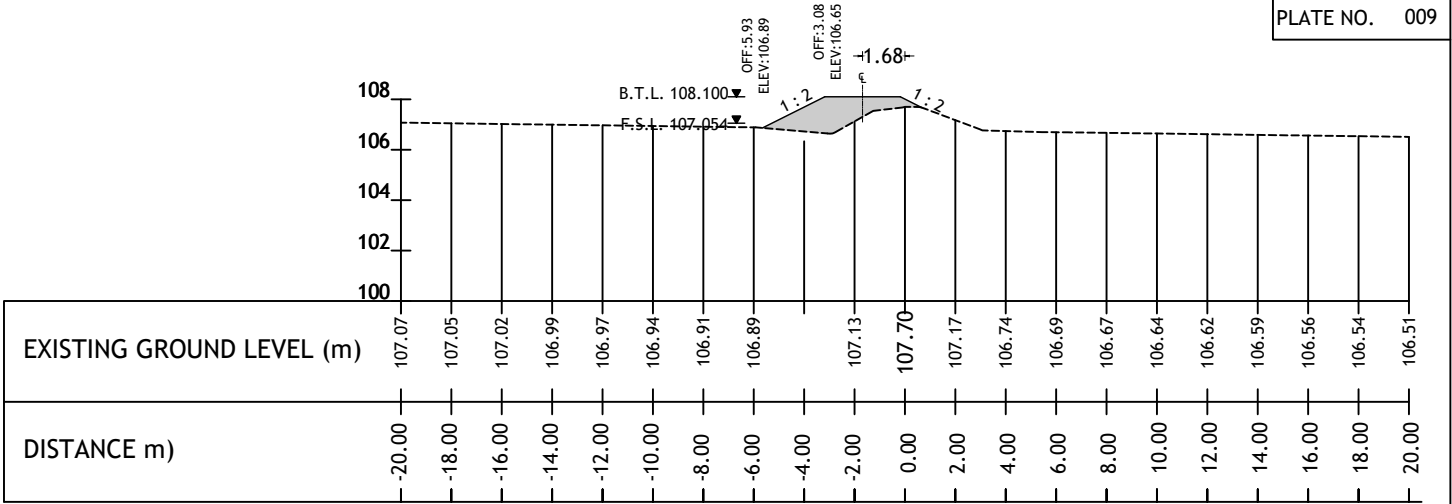
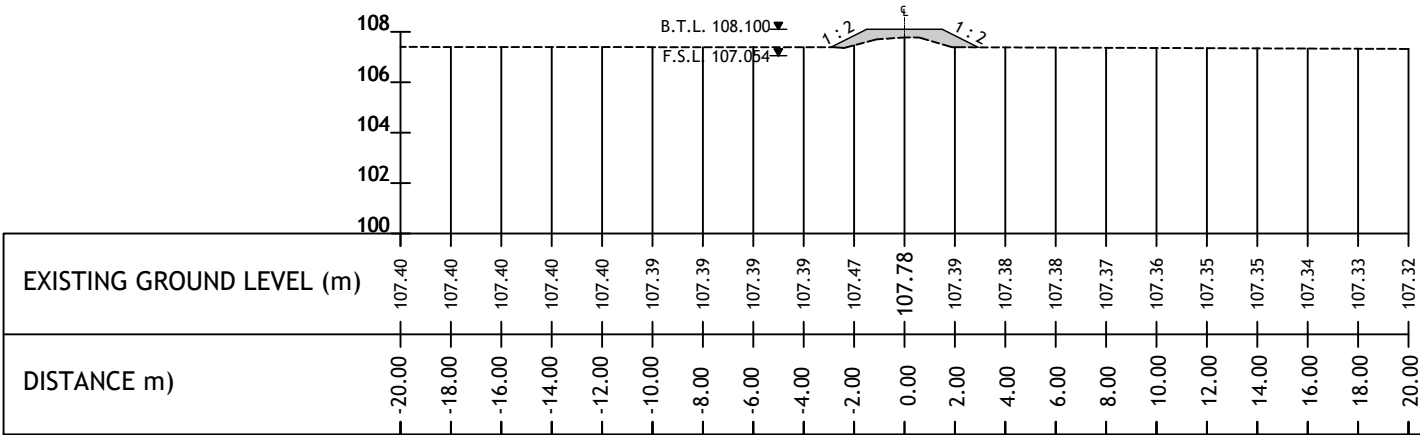
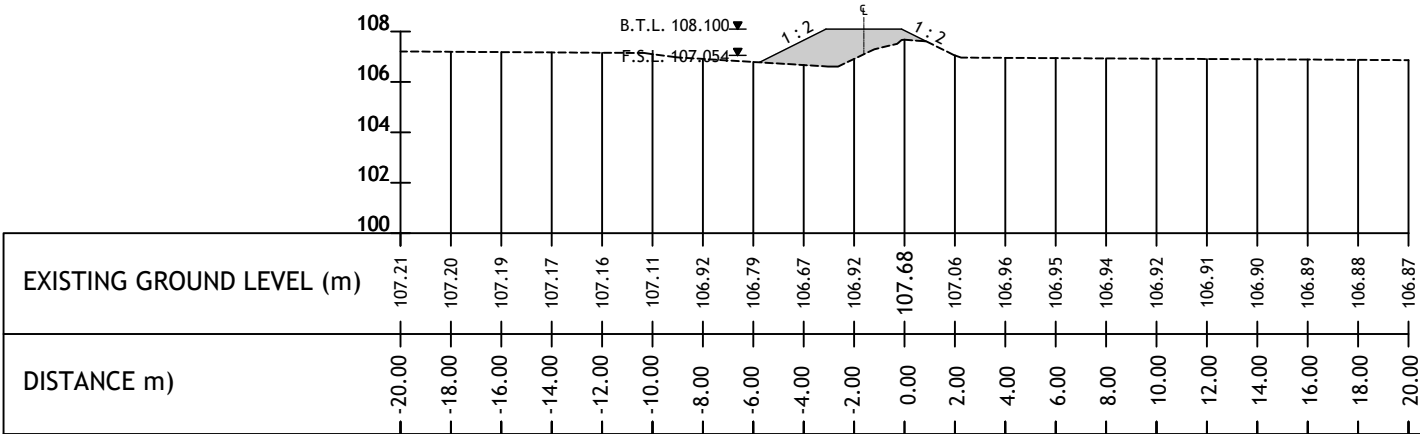
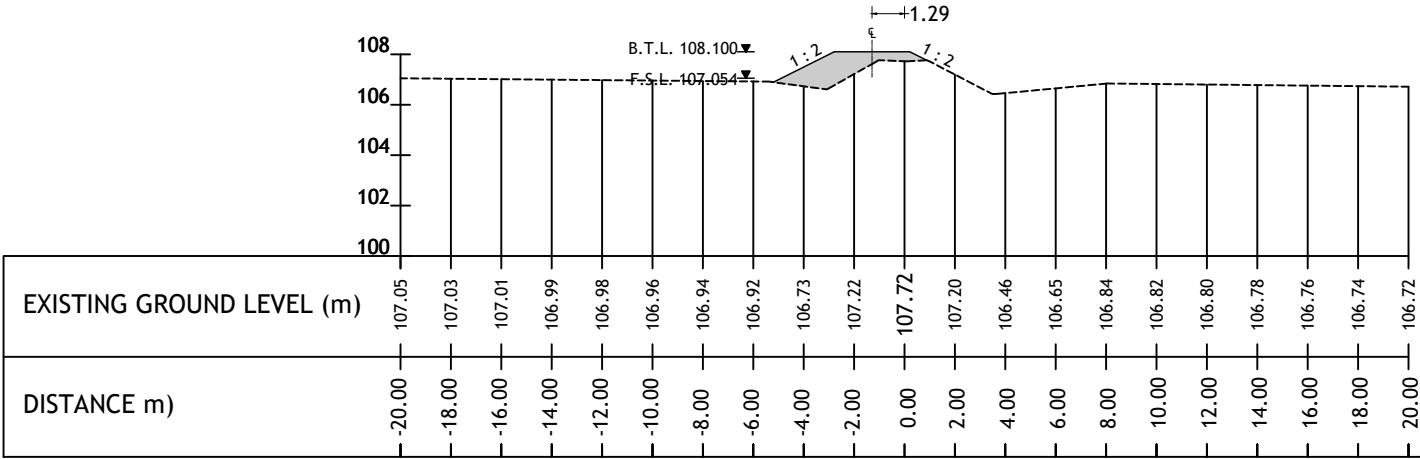


PLATE NO. 009

Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
WATER MANAGEMENT PROJECT

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GREEN  
CLIMATE  
FUND



UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

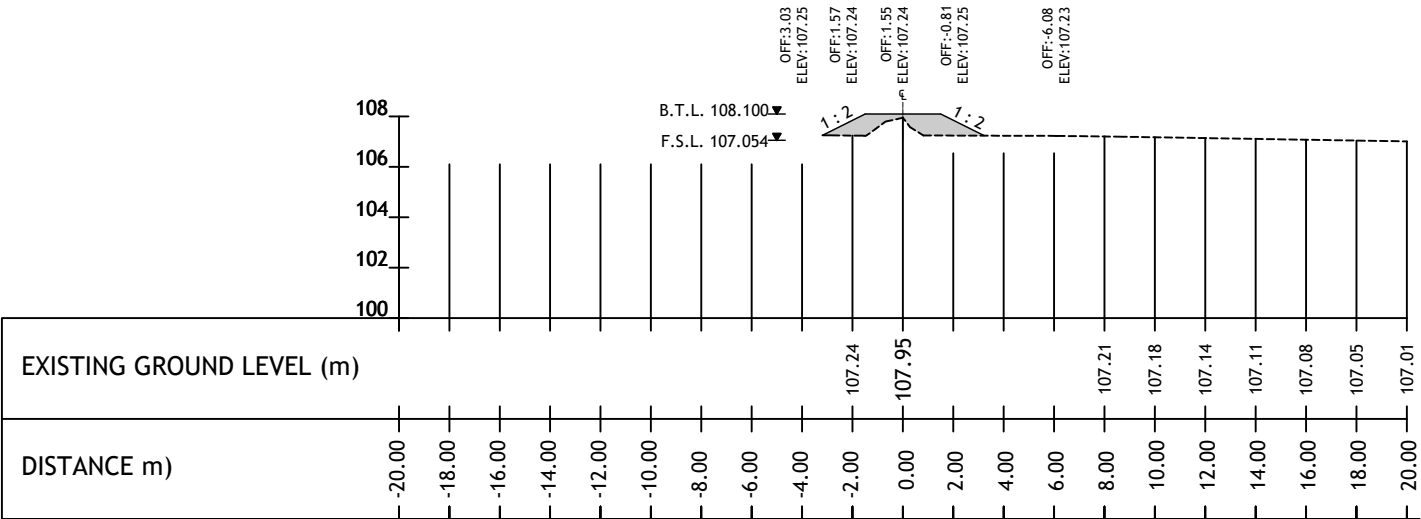
CONSULTANT



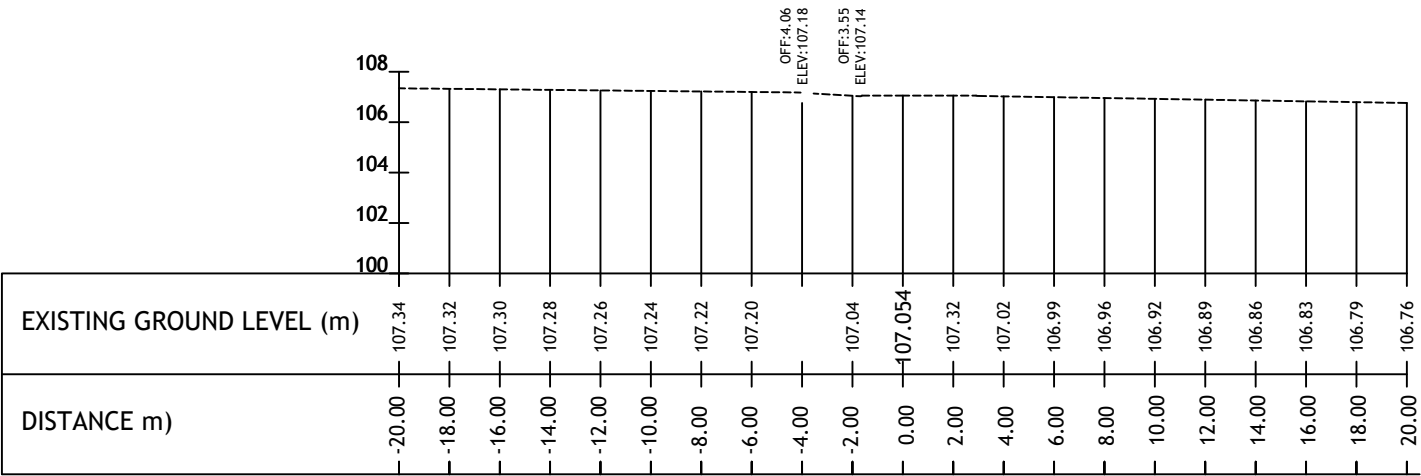
INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

DESCRIPTION		
IHALA HUNNE WEWA CROSS SECTIONS OF TANK BUND Stn.0+000 - 0+125		
DRAWING No.	AC-P3-IHW-CSS-01	
SCALE	1:300	SHEET NO. 01 OF 02

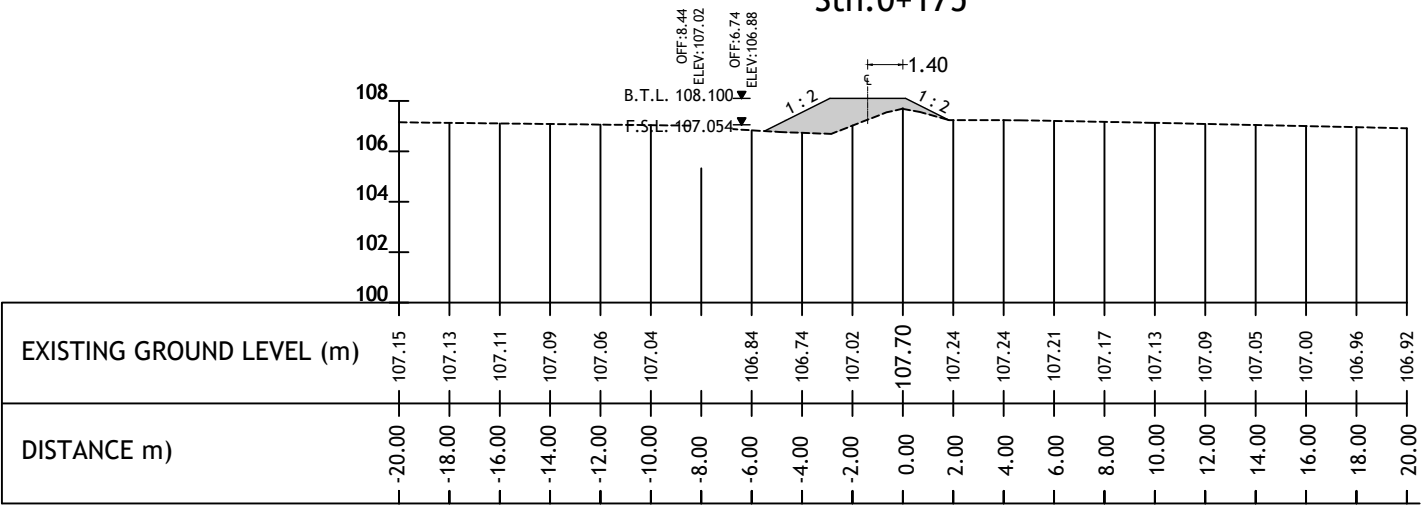
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Stn.0+184.66



Stn.0+175

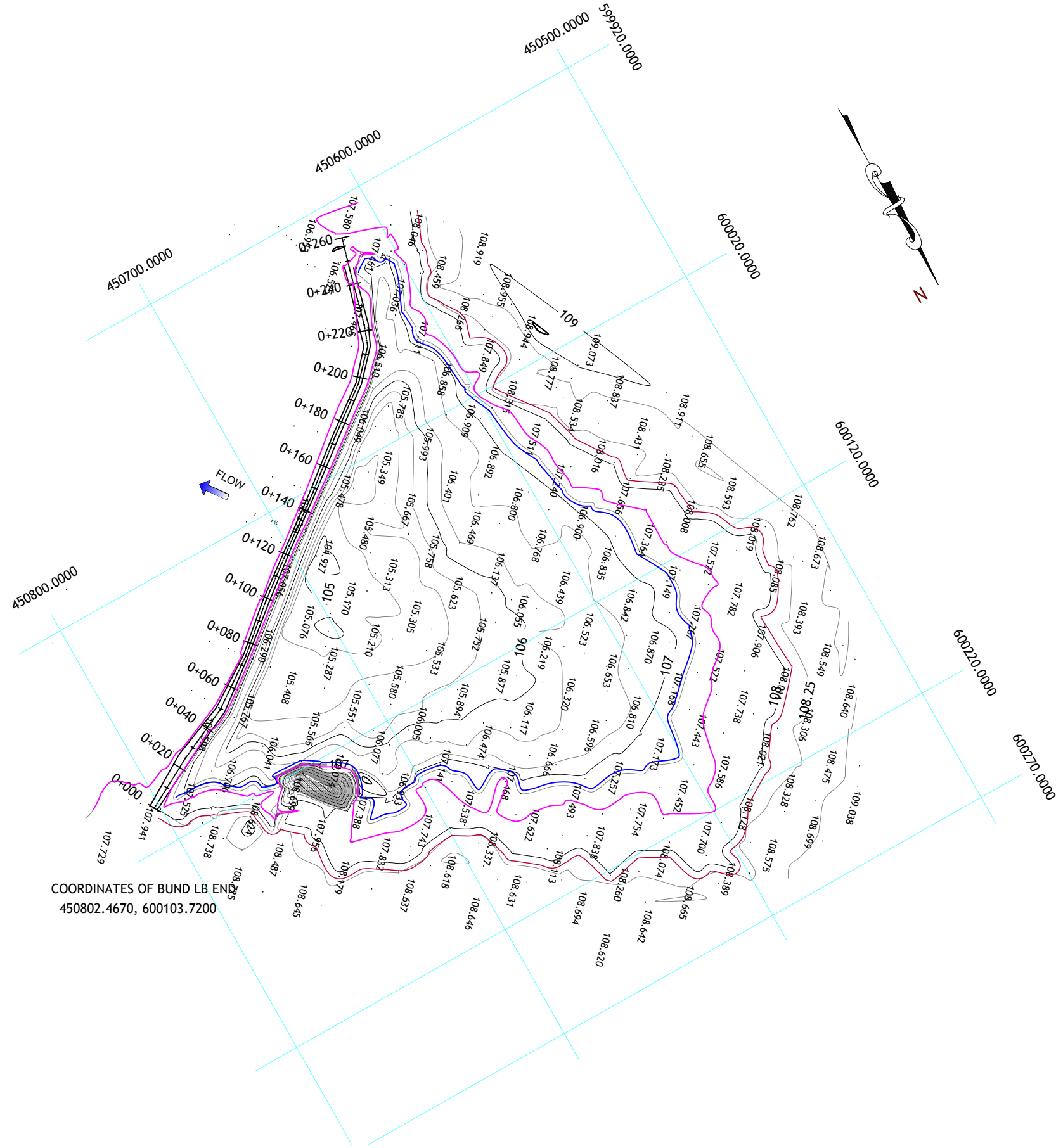


Stn.0+150

Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				IHALA HUNNE WEWA CROSS SECTIONS OF TANK BUND Stn.0+150 - 0+184.66		
RECOMMENDED									DRAWING No. AC-P3-IHW-CSS-01		
CHECKED		2019 - 02 - 22							SCALE	1:300	SHEET NO. 02 OF 02
DRAWN		2019 - 02 - 22									
DESIGNED		2019 - 02 - 22				 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	 CONSULTANT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.			

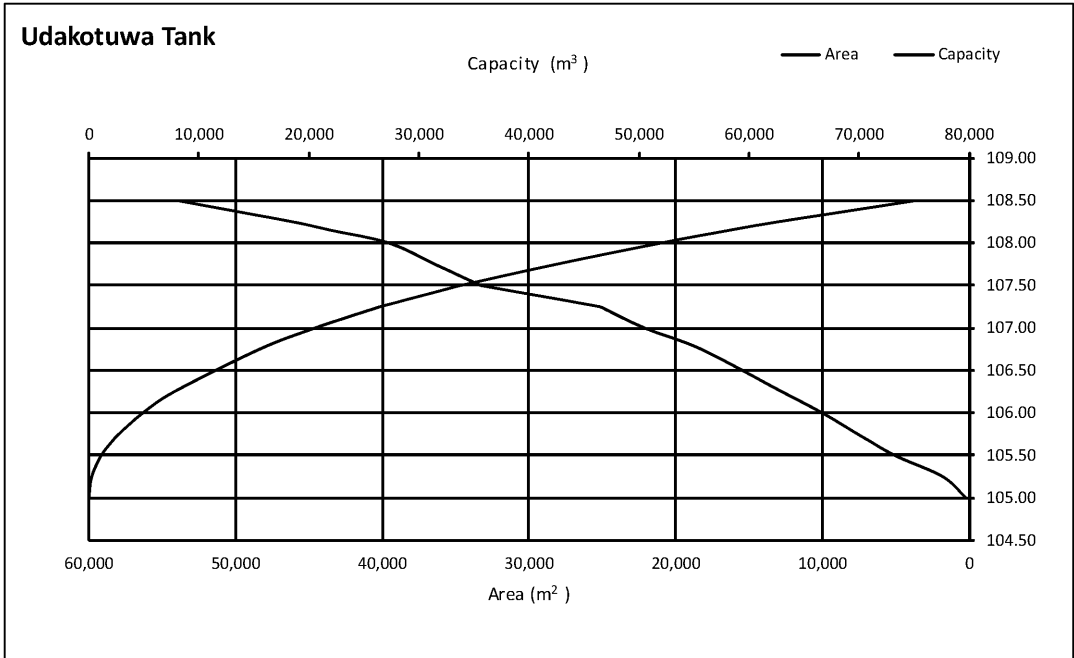
## 3.0 UDAKOTUWA TANK





	EXISTING		DESIGNED	
	B.T.L.	F.S.L.	B.T.L.	F.S.L.
LEVEL (masl)	108.150	107.223	108.150	107.223
CAPACITY (m³)		25764		25764
CAPACITY (Ac.ft.)		20.89		20.89

CONTOUR (masl)	HEIGHT BETWEEN CONTOURS (m)	AREA (m²)	AVERAGE AREA (m²)	VOULME (m³)	CAPACITY (m³)	REMARKS
105.00	0	217		0	0	
105.25	0.25	1,788	1,003	251	251	
105.50	0.25	5,057	3,423	856	1,106	
105.688	0.19	6,957	6,007	1,129	2,236	MOL
105.75	0.06	7,584	7,271	451	2,686	
106.00	0.25	9,995	8,790	2,197	4,884	
106.25	0.25	12,756	11,375	2,844	7,728	
106.75	0.50	18,260	15,508	7,754	15,482	
107.00	0.25	22,123	20,192	5,048	20,529	
107.223	0.22	24,822	23,473	5,234	25,764	FSL
107.25	0.03	25,149	24,986	675	26,439	
107.493	0.24	33,053	29,101	7,072	33,510	HFL
107.50	0.01	33,281	33,167	232	33,742	
107.75	0.25	36,406	34,844	8,711	42,453	
108.00	0.25	39,532	37,969	9,492	51,945	
108.150	0.15	43,495	41,513	6,227	58,172	BTL
108.25	0.10	46,137	44,816	4,482	62,654	
108.50	0.25	53,980	50,058	12,515	75,169	



Ref.	SIGNATURE	DATE	REVISION	
APPROVED			APPROVED	DATE
RECOMMENDED				
CHECKED		2019 - 02 - 22		
DRAWN		2019 - 02 - 22		
DESIGNED		2019 - 02 - 22		




DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT




CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

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GREEN CLIMATE FUND



UNITED NATIONS DEVELOPMENT PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

CONSULTANT



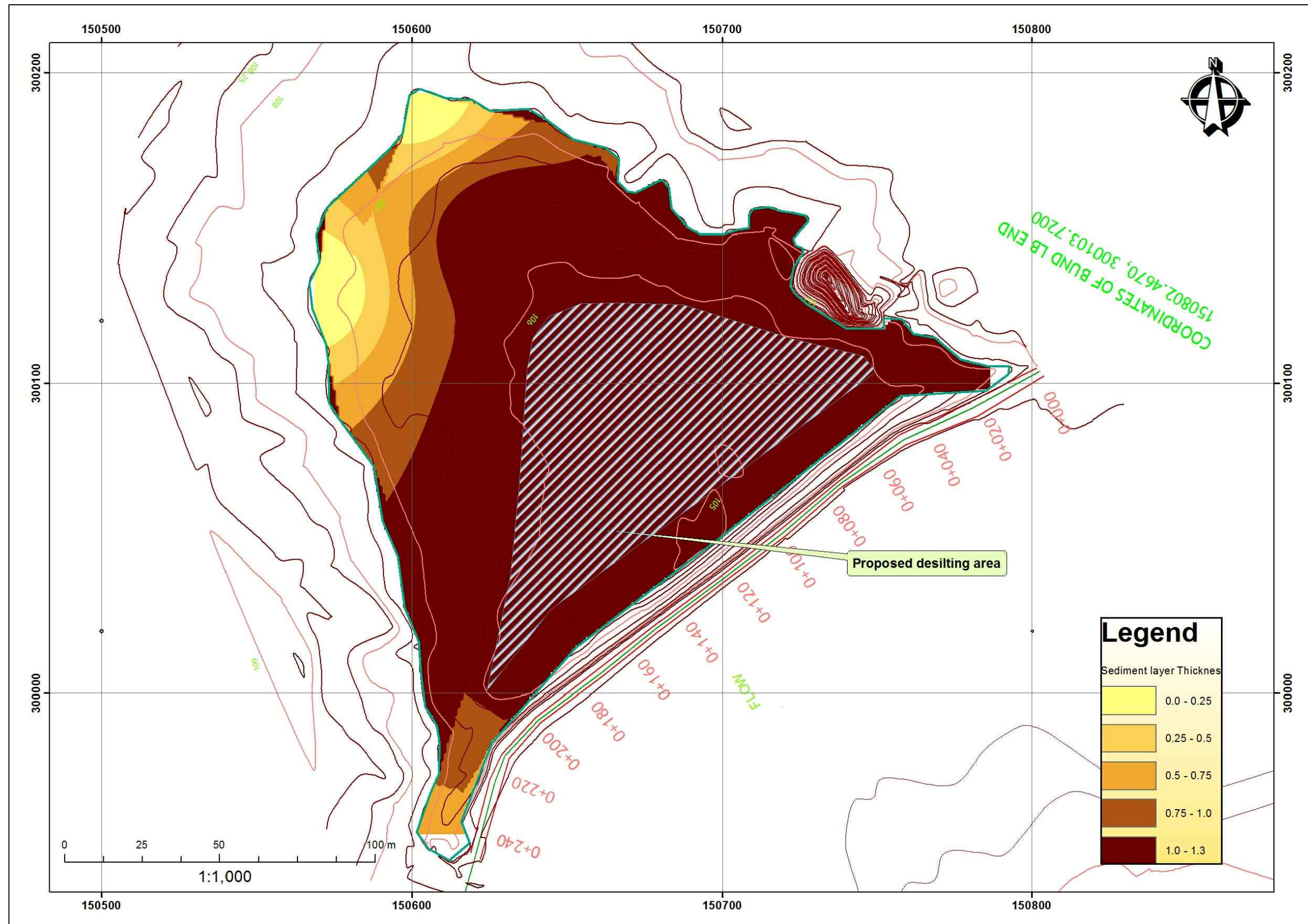
INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

DESCRIPTION

UDAKOTUWA WEWA TANK BED SURVEY

DRAWING No. AC-P3-UKW-BED-01

SCALE 1: 2000 SHEET NO. 01 OF 01

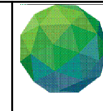


Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT



GREEN CLIMATE FUND



UNITED NATIONS DEVELOPMENT PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

CONSULTANT



INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.

DESCRIPTION

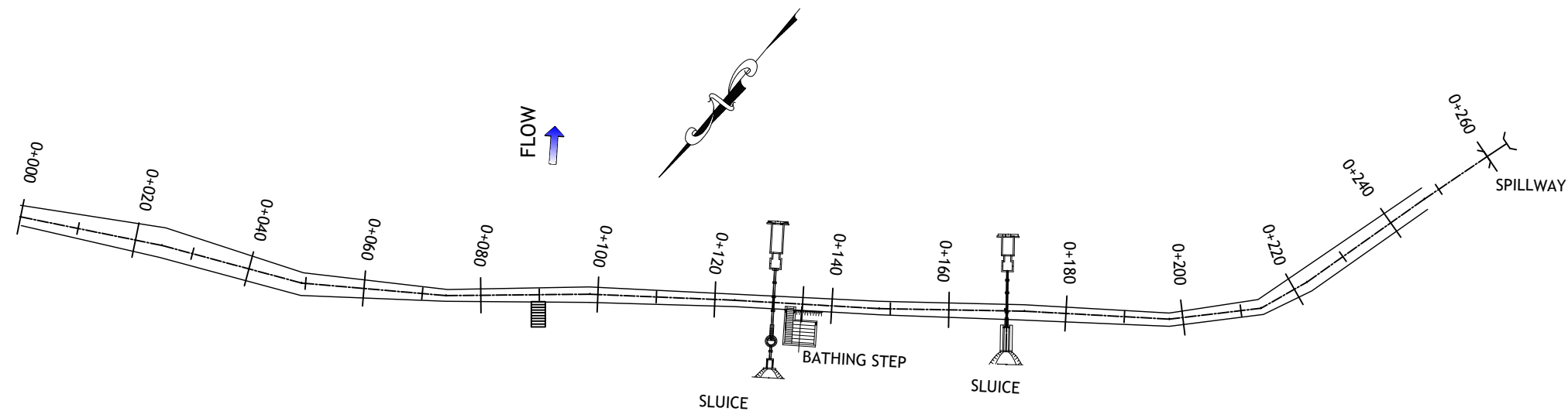
UDAKOTUWE WEWA ZONING MAP FOR DESILTING

DRAWING No. AC-P3-UKW-BED-02

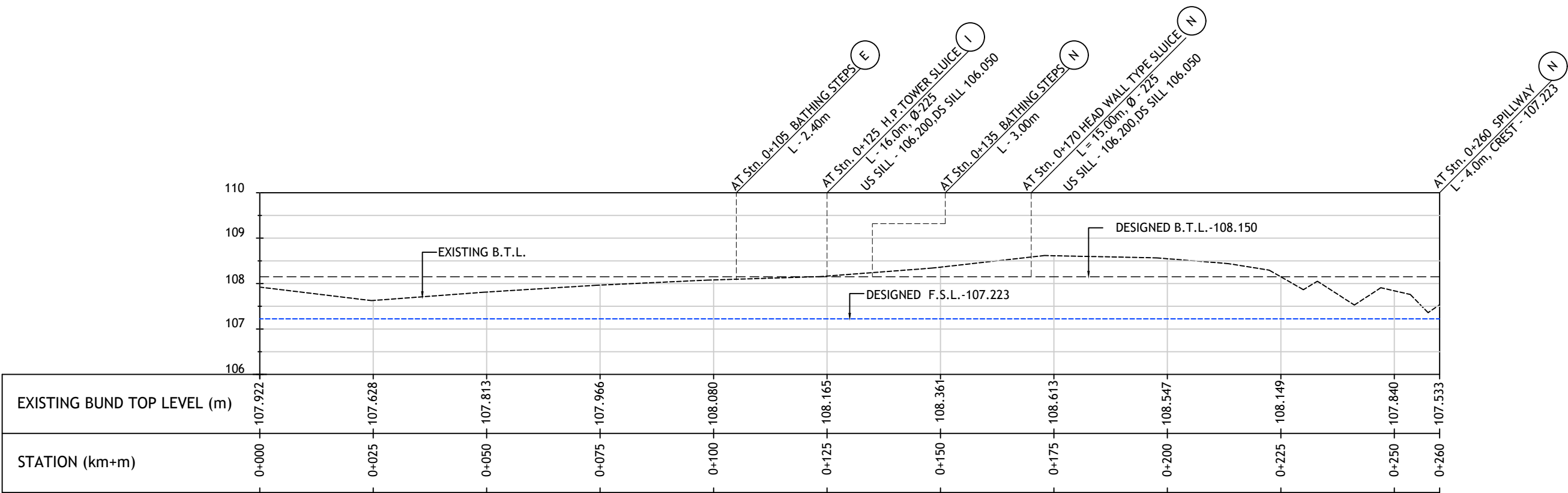
SCALE N.T.S. SHEET NO. 01 OF 01



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PLAN  
SCALE : 1: 1000

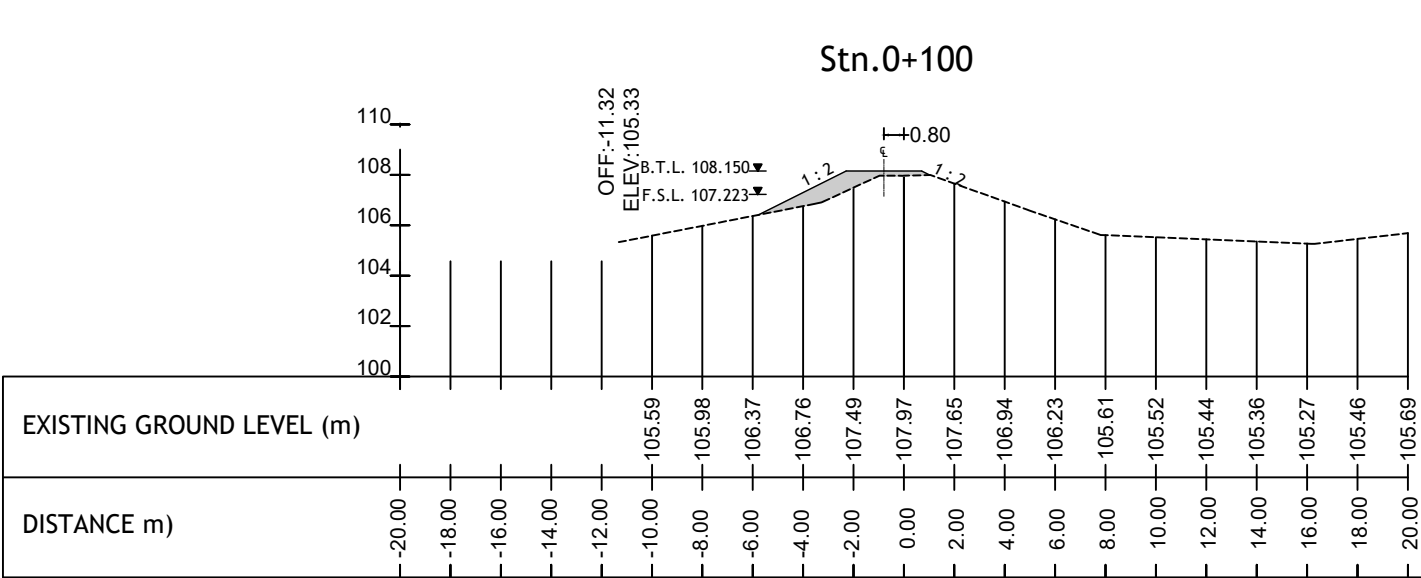
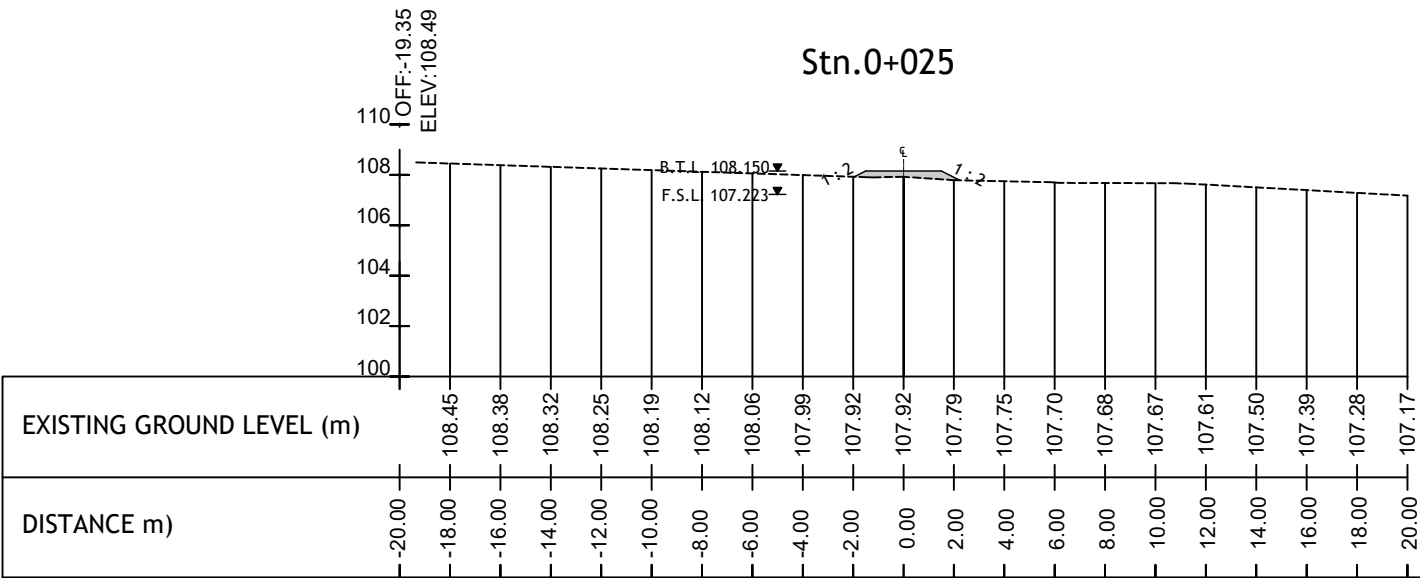
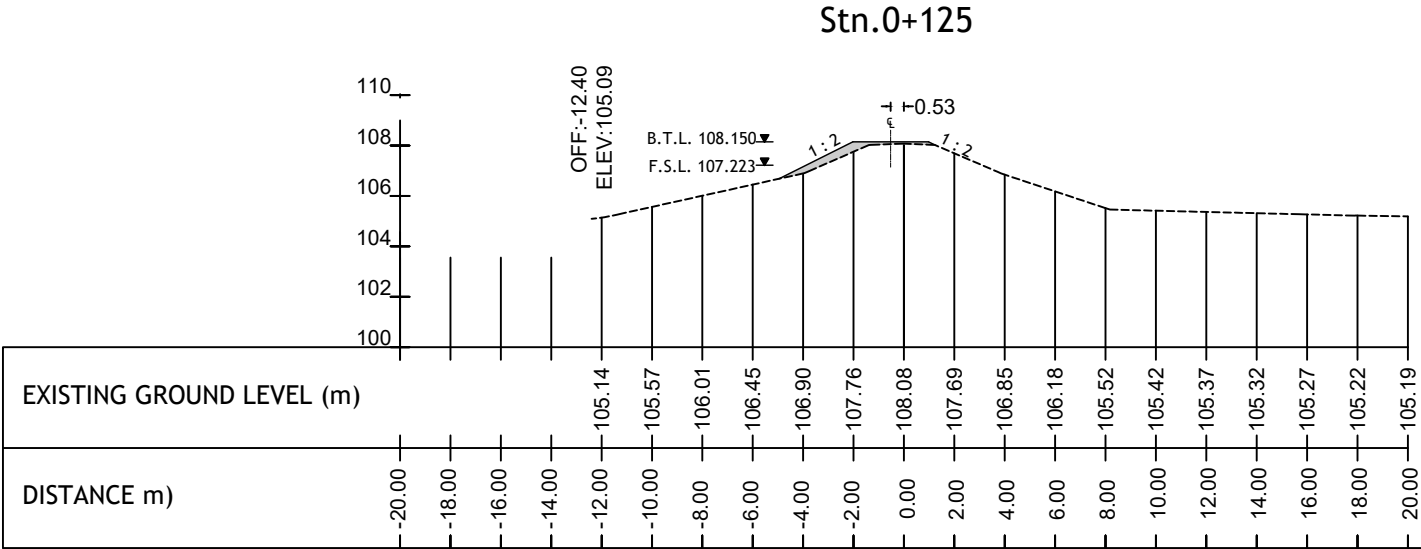
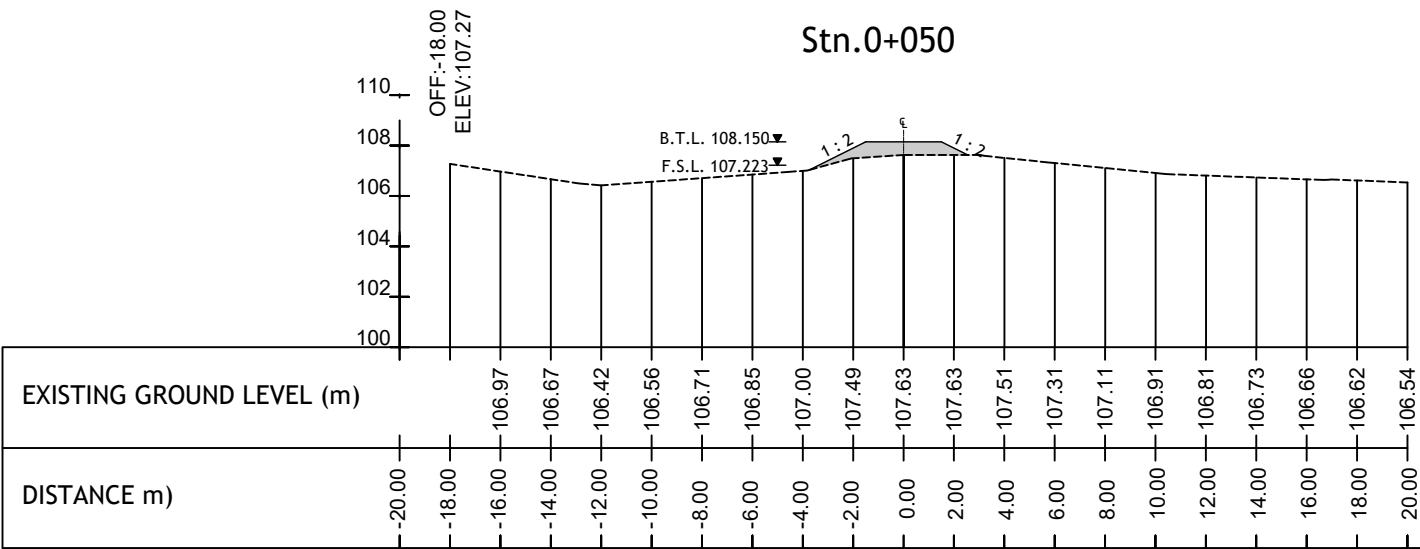
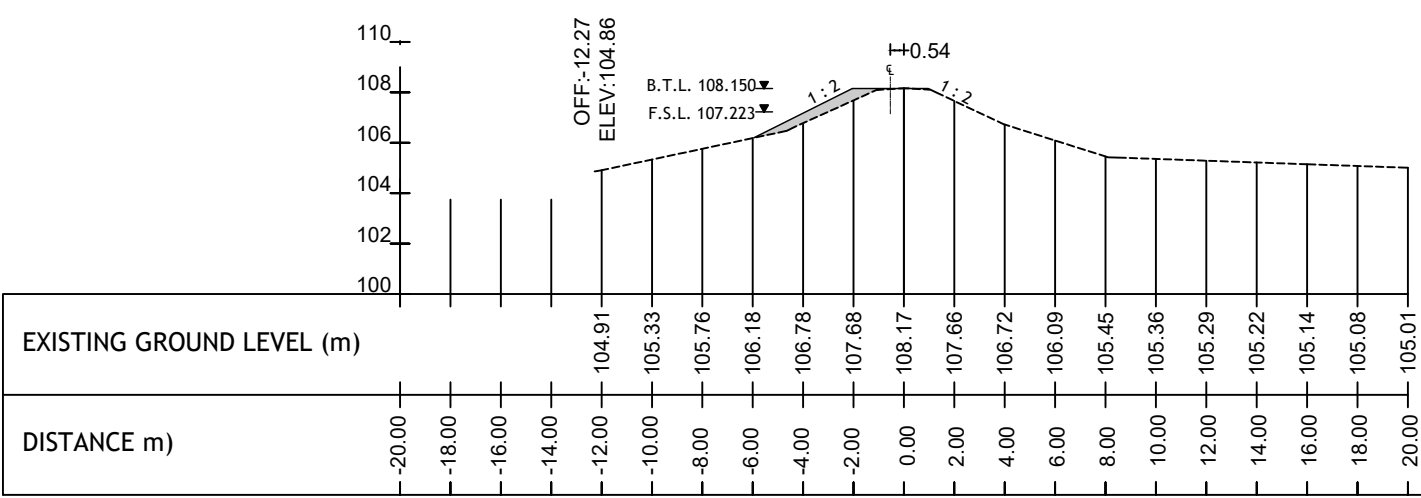
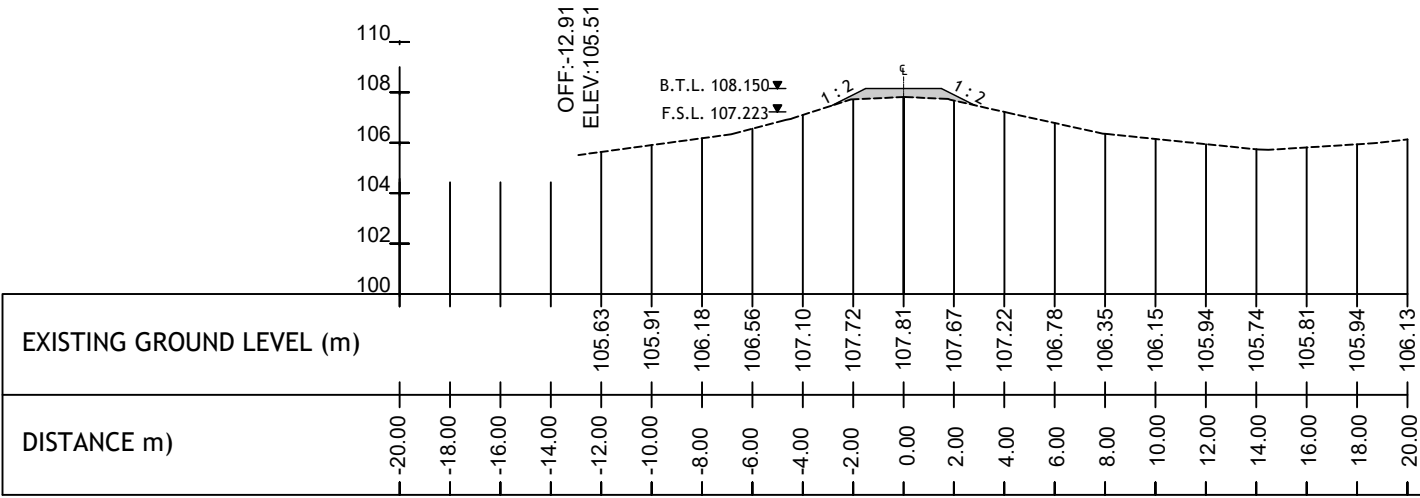


SCALE : V-1:100  
H-1:1000

LONGITUDINAL PROFILE FROM Stn. 0+000 TO Stn. 0+260

Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION	
APPROVED			No.	APPROVED	DATE				UDAKOTUWE WEWA PLAN AND LOGITUDINAL PROFILE OF TANK BUND	
RECOMMENDED										
CHECKED		2019 - 02 - 22							DRAWING No.	AC-P3-UKW-PLS-01
DRAWN		2019 - 02 - 22							SCALE	AS SHOWN
DESIGNED		2019 - 02 - 22								
						 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCAD		
								CONSULTANT	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCAD IN KURUNEGALA DISTRICT	





Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			

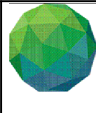


DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
WATER MANAGEMENT PROJECT

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ඉහළ නැංවීමේ ක්‍රියාමාර්ගය



GREEN  
CLIMATE  
FUND



UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

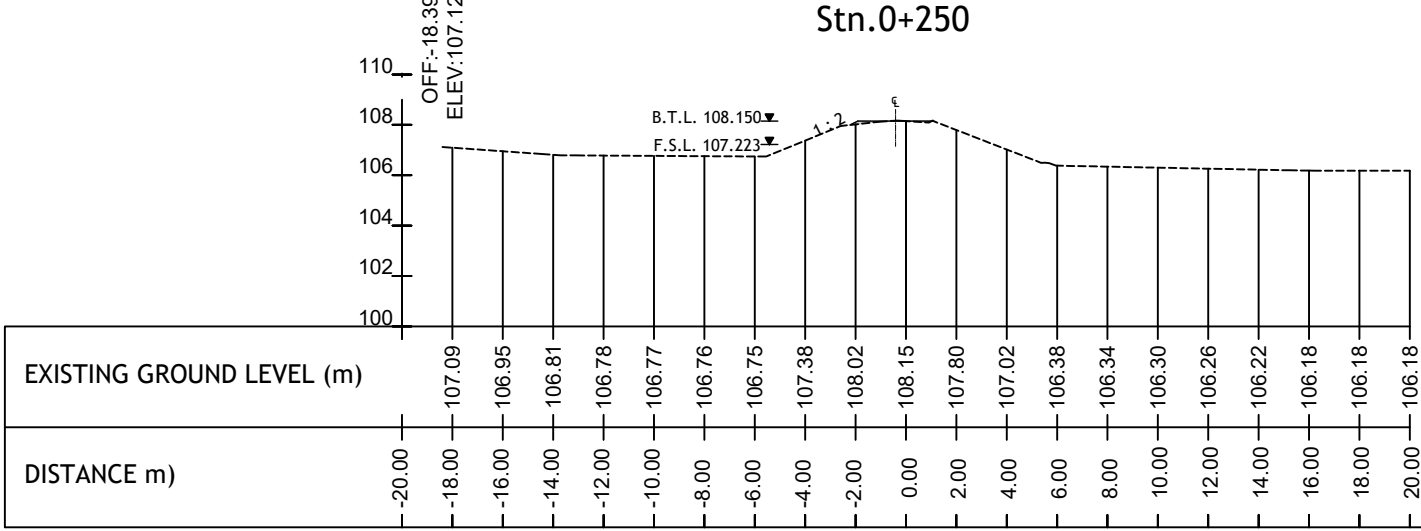
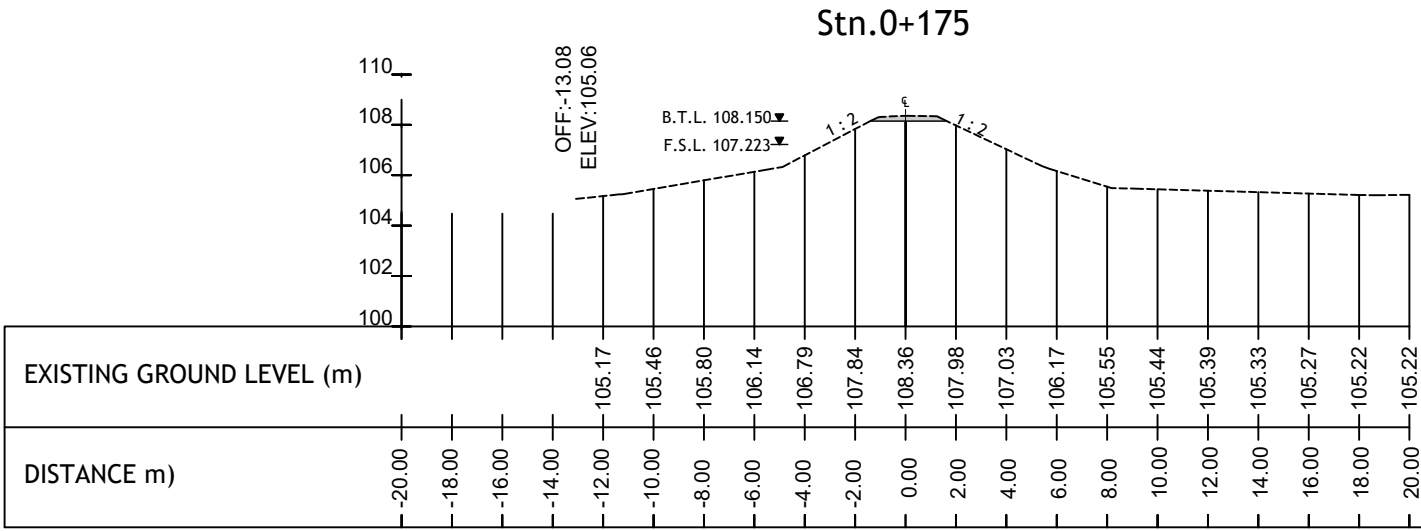
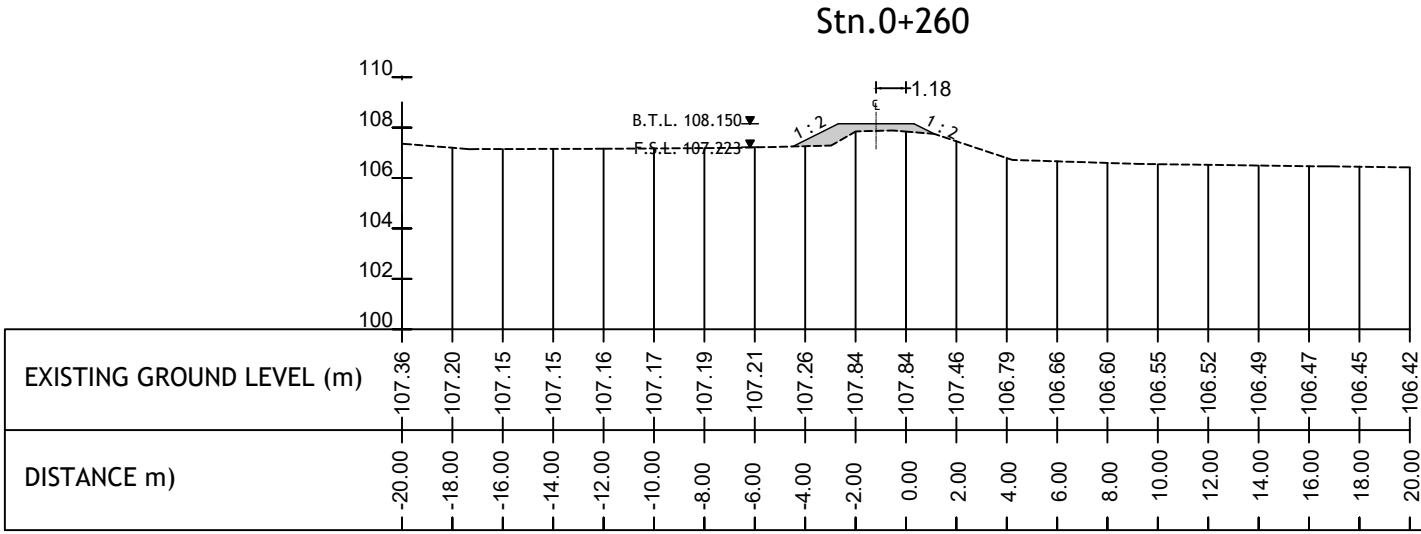
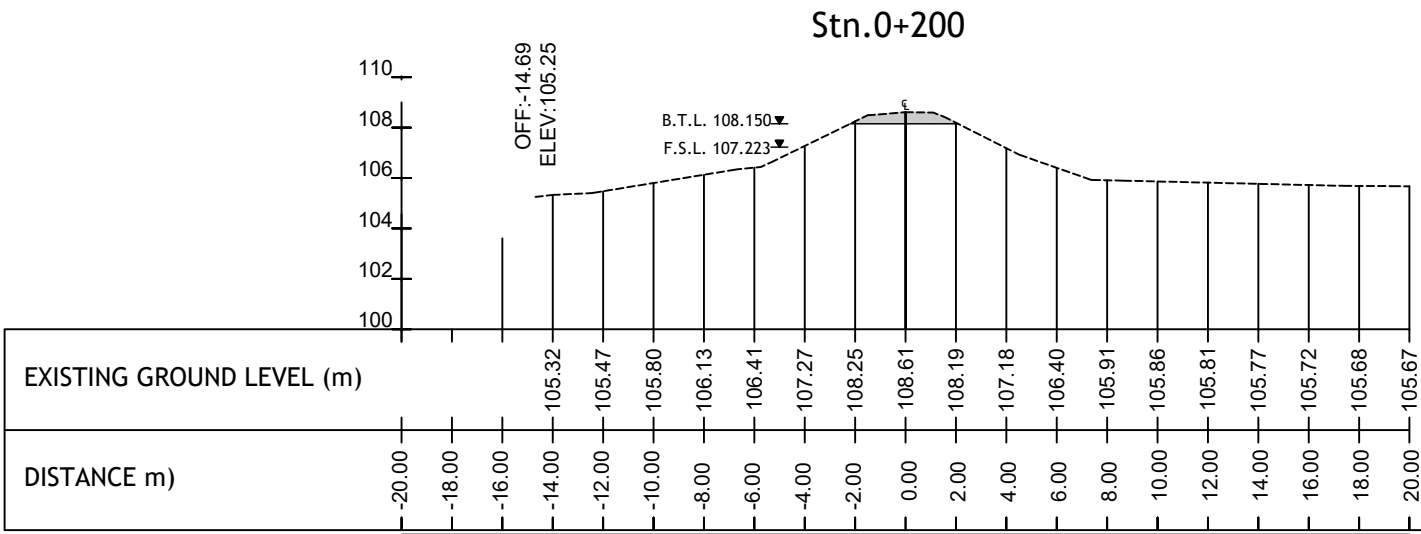
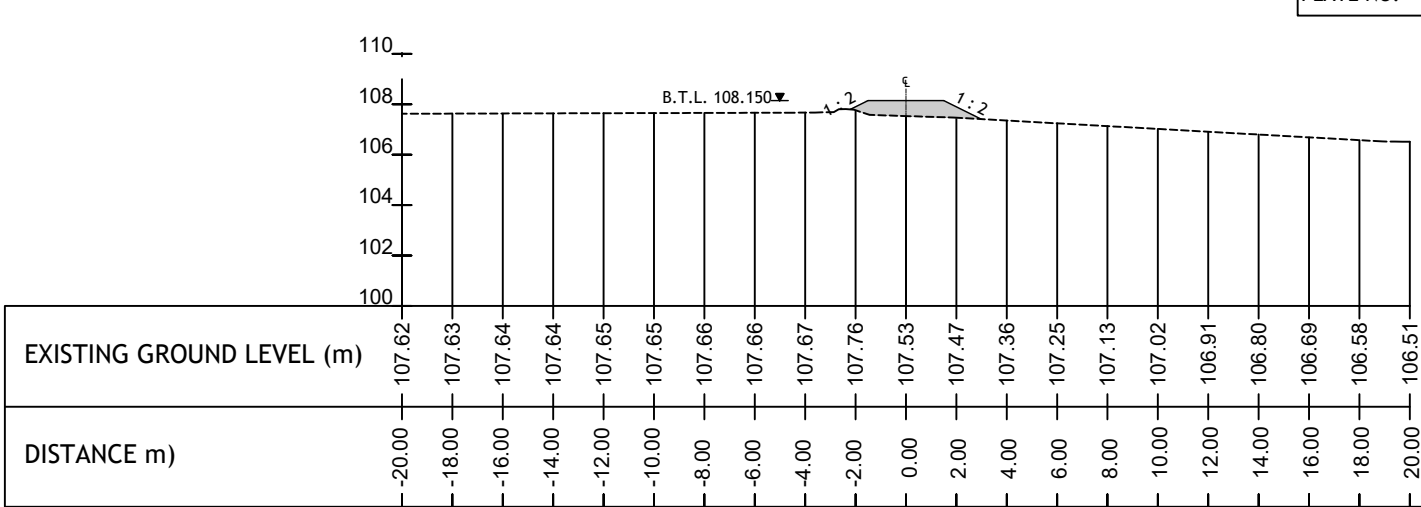
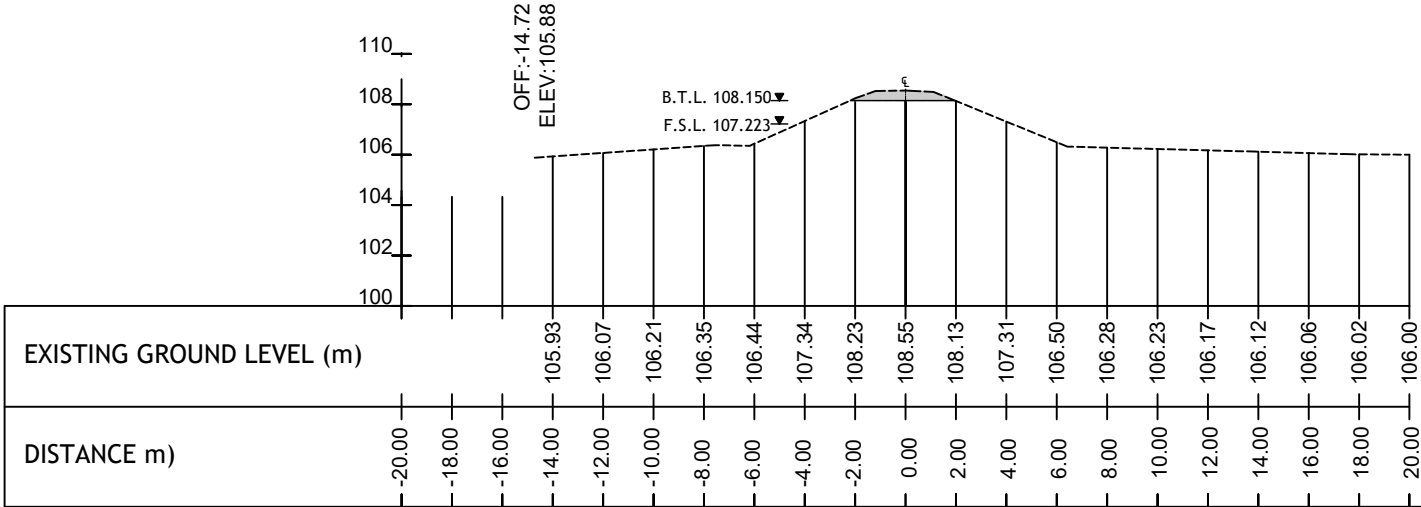
UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

CONSULTANT



INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

DESCRIPTION		
UDAKOTUWA WEWA CROSS SECTIONS OF TANK BUND Stn.0+000 - 0+125		
DRAWING No.	AC-P3-UKW-CSS-01	
SCALE	1:300	SHEET NO. 01 OF 02



Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
WATER MANAGEMENT PROJECT



GREEN  
CLIMATE  
FUND



UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

CONSULTANT

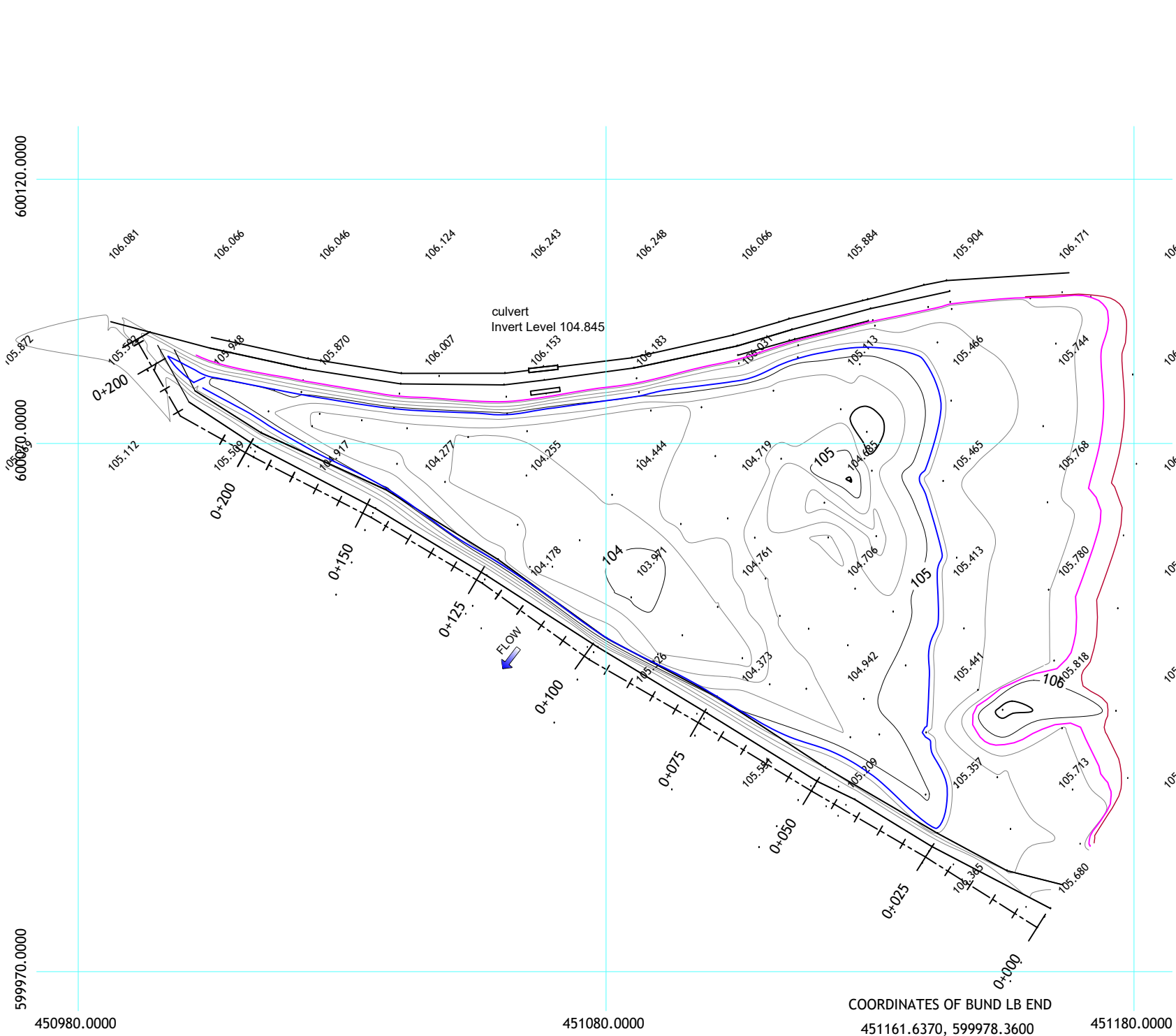


INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.

DESCRIPTION		
UDAKOTUWA WEWA CROSS SECTIONS OF TANK BUND Stn.0+150 - 0+260		
DRAWING No.	AC-P3-UKW-CSS-01	
SCALE	1:300	SHEET NO. 02 OF 02

## 4.0 PAHALA HUNNE TANK

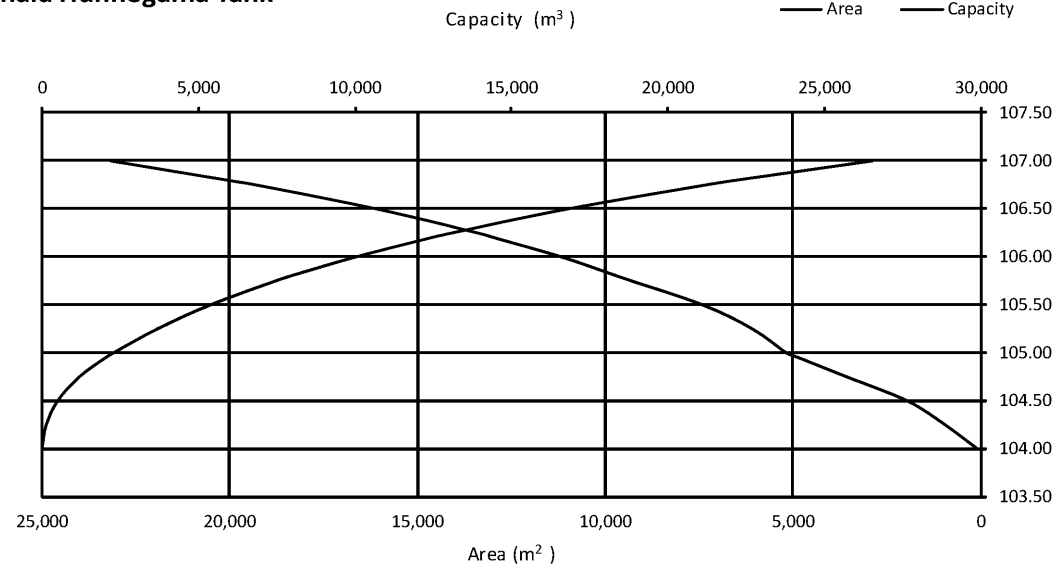
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	EXISTING		DESIGNED	
	B.T.L.	F.S.L.	B.T.L.	F.S.L.
LEVEL (masl)	106.250	105.818	106.800	105.818
CAPACITY (m³)		8119		8119
CAPACITY (Ac.ft.)		6.58		6.58

CONTOUR (masl)	HEIGHT BETWEEN CONTOURS (m)	AREA (m²)	AVERAGE AREA (m²)	VOULME (m³)	CAPACITY (m³)	REMARKS
104.00	0	98		0	0	
104.25	0.25	953	526	131	131	
104.50	0.25	1,964	1,458	365	496	
104.75	0.25	3,573	2,768	692	1,188	
104.955	0.20	4,892	4,233	868	2,056	MOL
105.00	0.05	5,182	5,037	227	2,282	
105.25	0.25	6,088	5,635	1,409	3,691	
105.50	0.25	7,410	6,749	1,687	5,378	
105.75	0.25	9,309	8,359	2,090	7,468	
105.818	0.07	9,816	9,563	650	8,119	FSL
106.00	0.18	11,171	10,493	1,910	10,028	
106.188	0.19	12,851	12,011	2,258	12,286	HFL
106.25	0.06	13,405	13,128	814	13,100	
106.50	0.25	16,087	14,746	3,686	16,787	
106.75	0.25	19,304	17,695	4,424	21,211	
106.800	0.05	20,076	19,690	984	22,195	BTL
107.00	0.20	23,165	21,620	4,324	26,519	

Pahala Hunnegama Tank



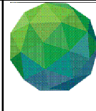
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APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT



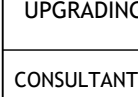
CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT



GREEN CLIMATE FUND



UNITED NATIONS DEVELOPMENT PROGRAMME

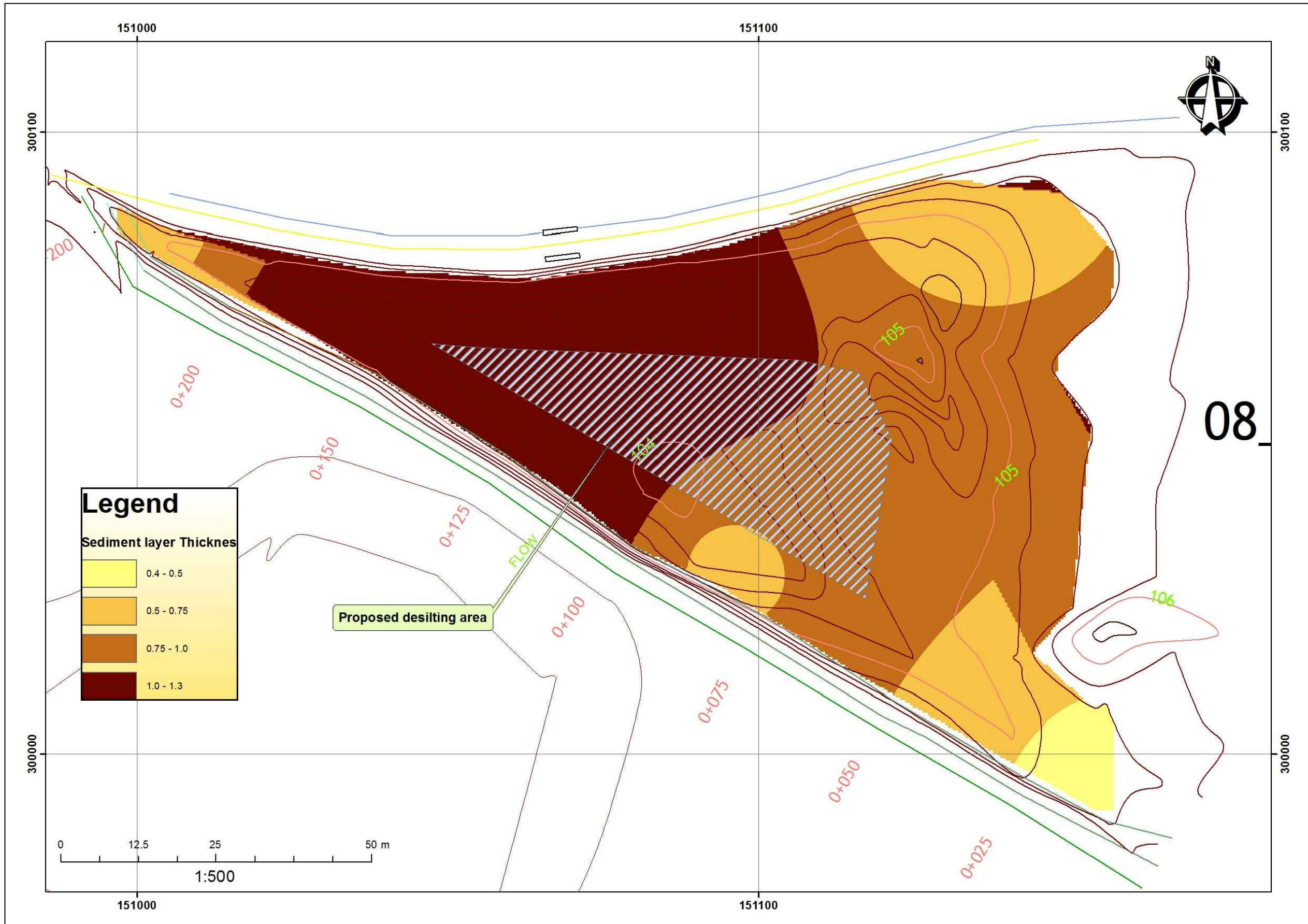


INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

DESCRIPTION		
PAHALA HUNNE WEWA TANK BED SURVEY		
DRAWING No.	AC-P3-PHW-BED-01	
SCALE	1 : 1000	SHEET NO. 01 OF 01





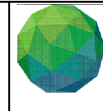
Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

විද්‍යා ගම් ප්‍රවර්ධන  
ප්‍රශංසකර්ම ක්‍රියාමාර්ගයේ ප්‍රථම අංශය



GREEN CLIMATE FUND



UNITED NATIONS DEVELOPMENT PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

CONSULTANT



INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.

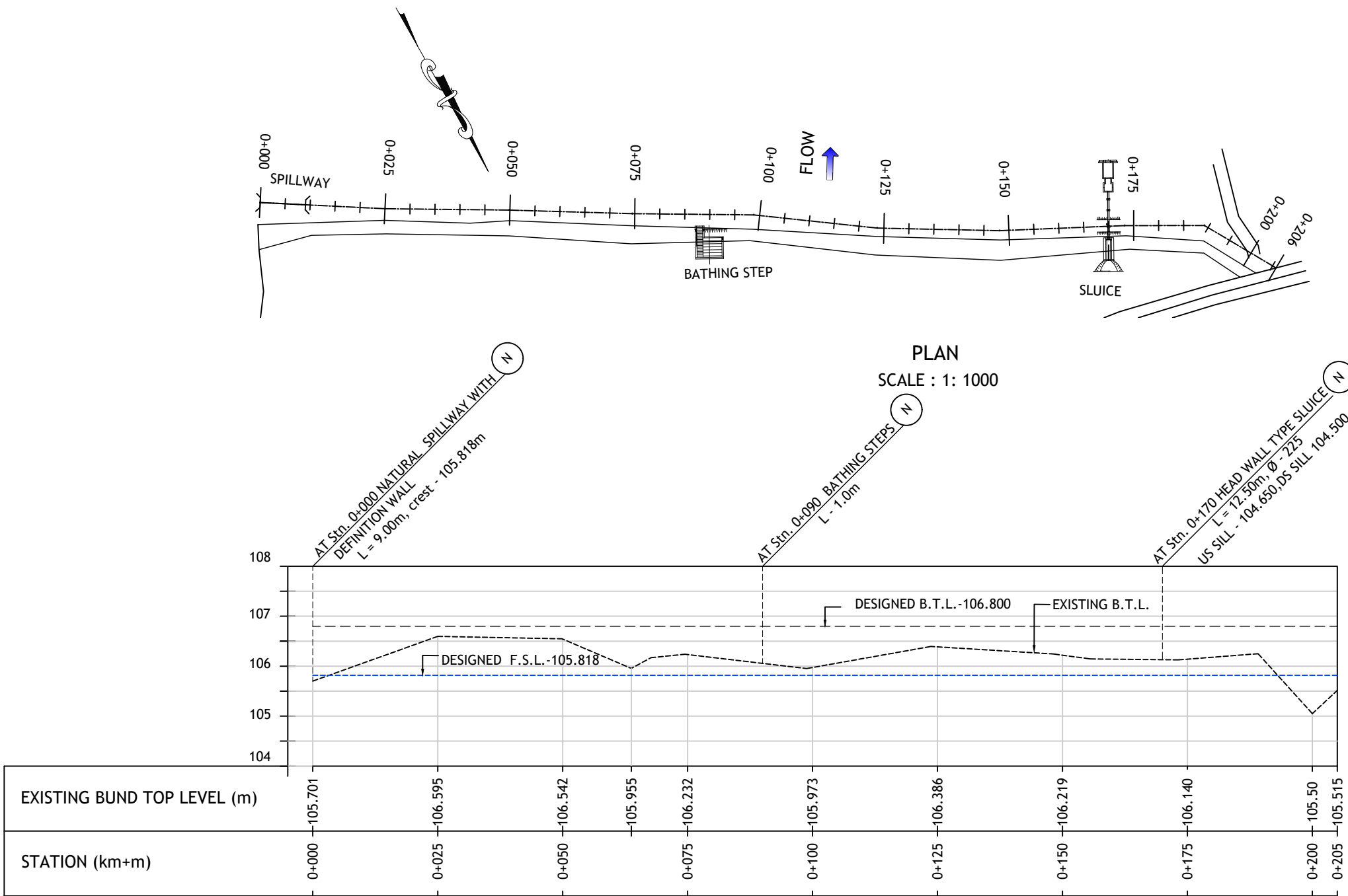
DESCRIPTION

PAHALA HUNNEGAMA WEWA ZONING MAP FOR DESILTING

DRAWING No. AC-P3-PHW-BED-02

SCALE N.T.S. SHEET NO. 01 OF 01

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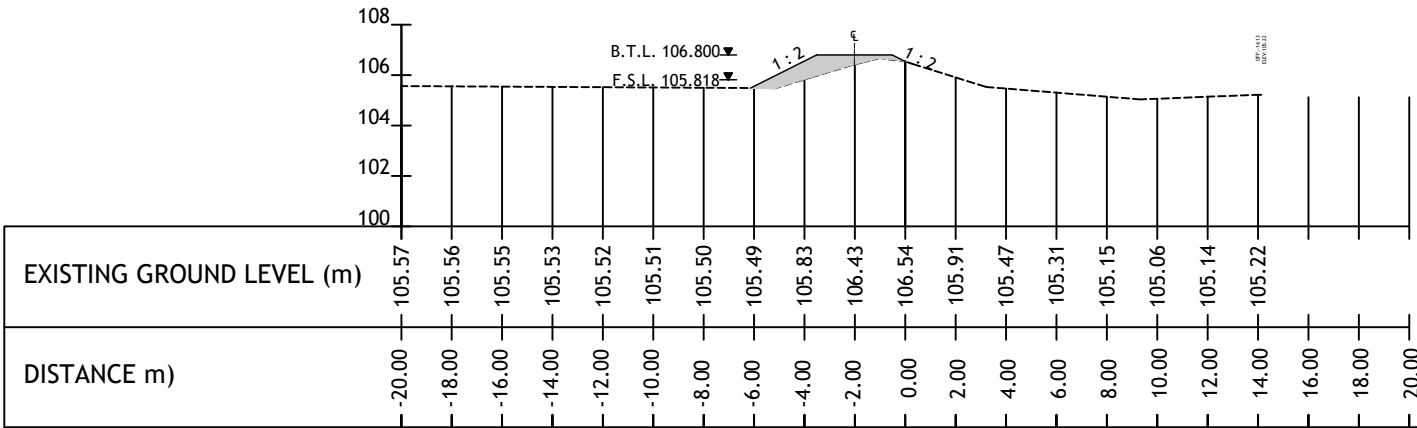
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LONGITUDINAL PROFILE FROM Stn. 0+000 TO Stn. 0+205

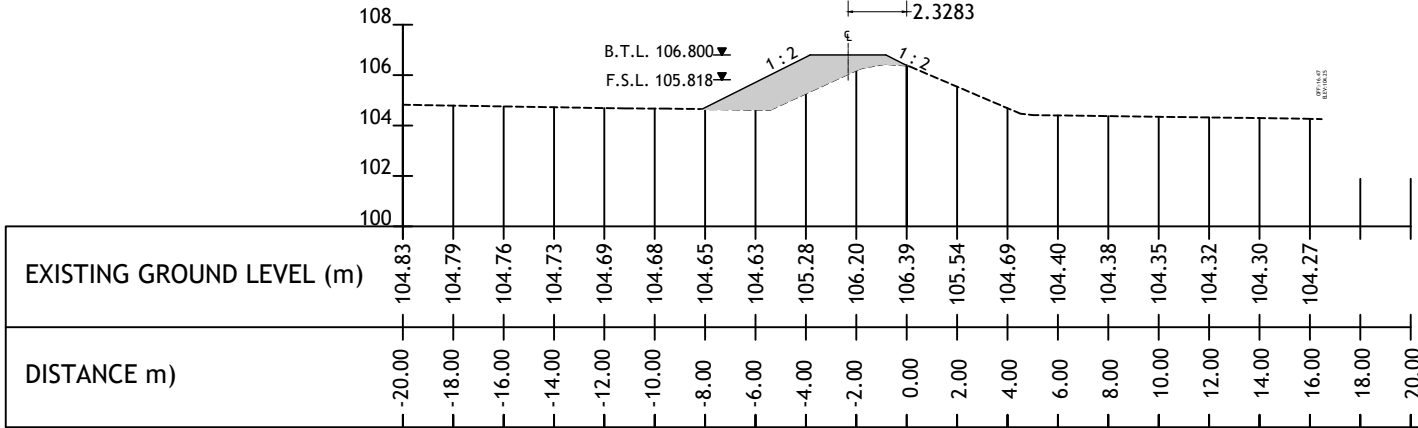
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APPROVED			No.	APPROVED	DATE							PAHALA HUNNE WEWA PLAN AND LOGITUDINAL PROFILE OF TANK BUND				
RECOMMENDED																
CHECKED		2019 - 02 - 22				 <td rowspan="3">CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT</td> <td rowspan="3"><td rowspan="3">චෛ ගම් ප්‍රවෘද්ධි கனங்கள் கிராமங்களின் மறுமலர்ச்சி</td><td rowspan="3">UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT</td><td>DRAWING No.</td><td>AC-P3-PHW-PLS-01</td></td>	CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	 <td rowspan="3">චෛ ගම් ප්‍රවෘද්ධි கனங்கள் கிராமங்களின் மறுமலர்ச்சி</td> <td rowspan="3">UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT</td> <td>DRAWING No.</td> <td>AC-P3-PHW-PLS-01</td>	චෛ ගම් ප්‍රවෘද්ධි கனங்கள் கிராமங்களின் மறுமலர்ச்சி	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	DRAWING No.	AC-P3-PHW-PLS-01				
DRAWN		2019 - 02 - 22									SCALE	AS SHOWN				
DESIGNED		2019 - 02 - 22									SHEET NO. 01 OF 01					
													CONSULTANT		INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.	

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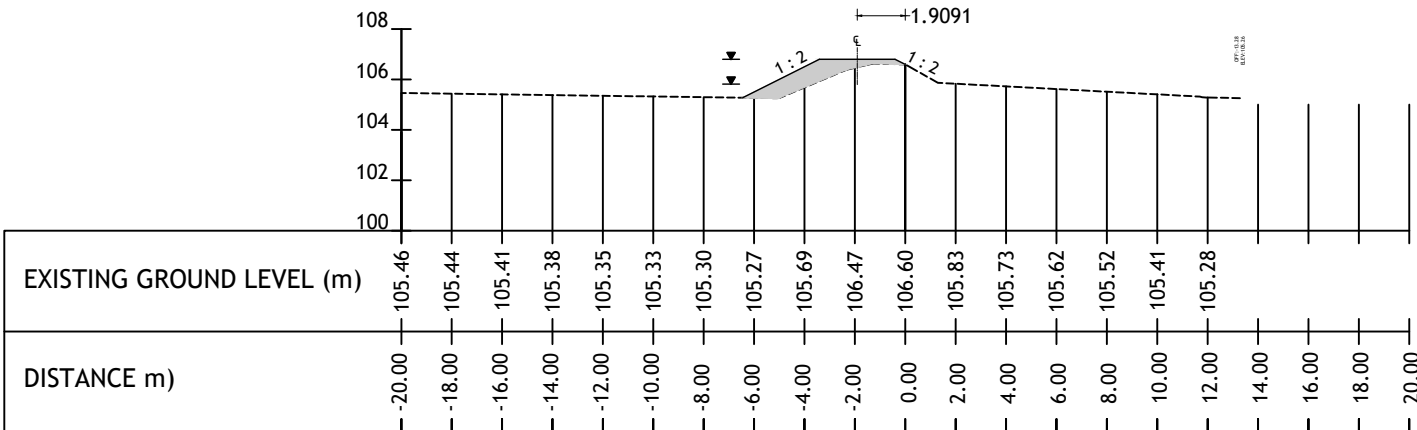
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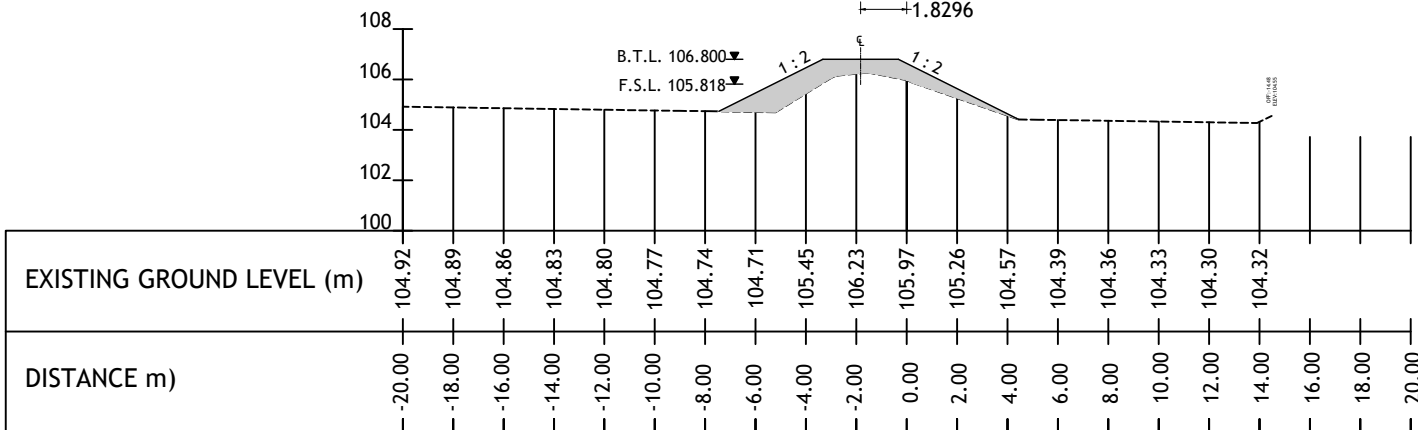
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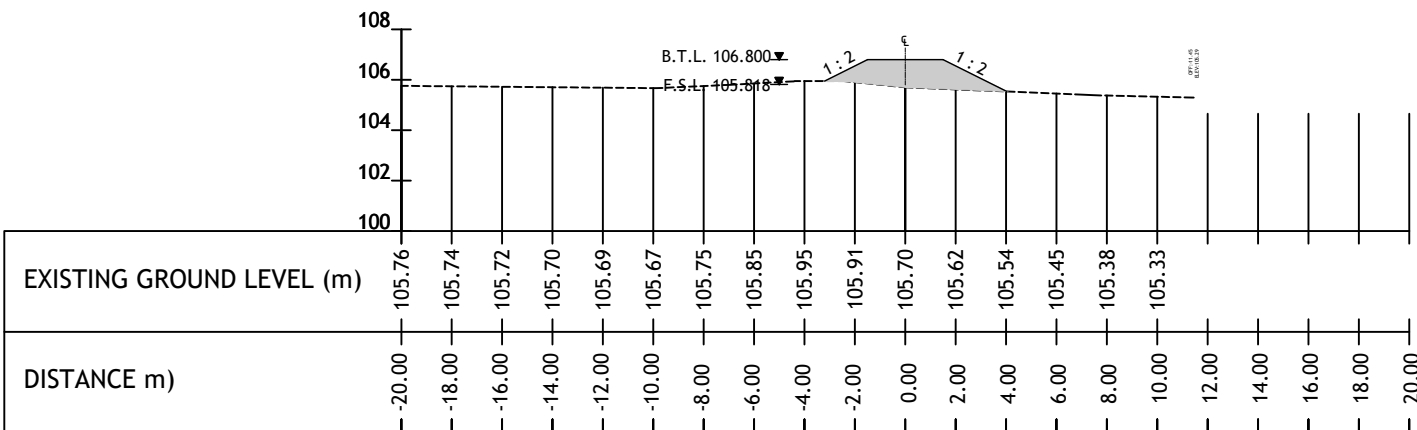
Stn.0+125



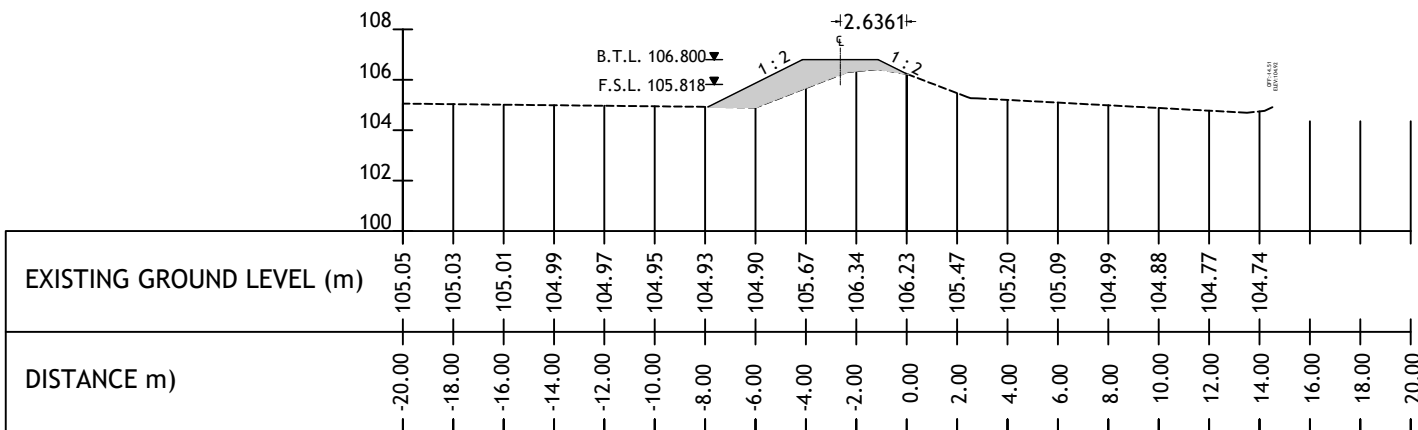
Stn.0+025



Stn.0+100



Stn.0+000



Stn.0+075

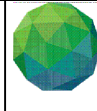
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APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
WATER MANAGEMENT PROJECT



GREEN  
CLIMATE  
FUND



UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

CONSULTANT

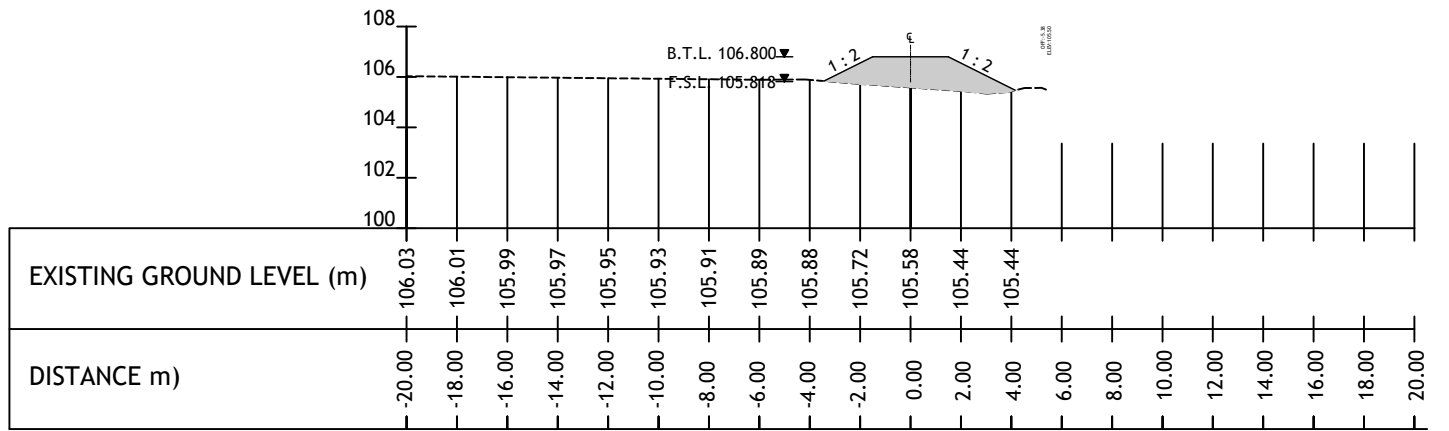
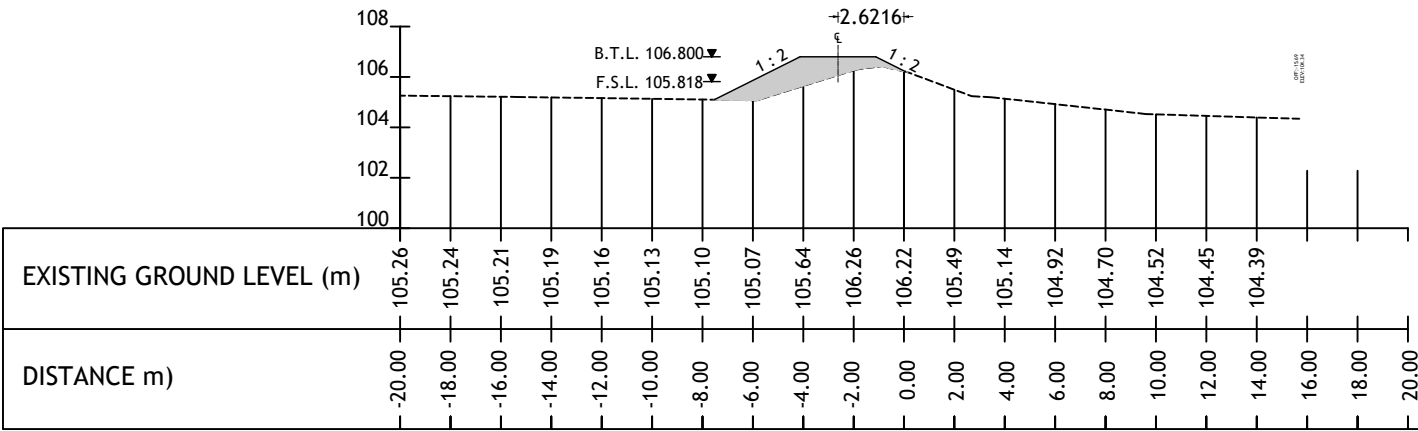
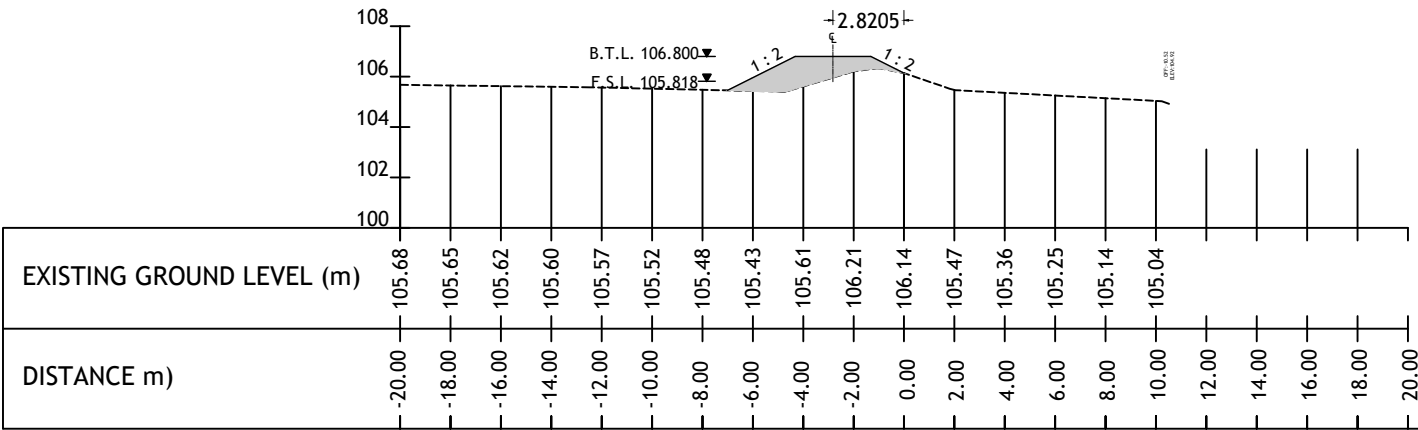
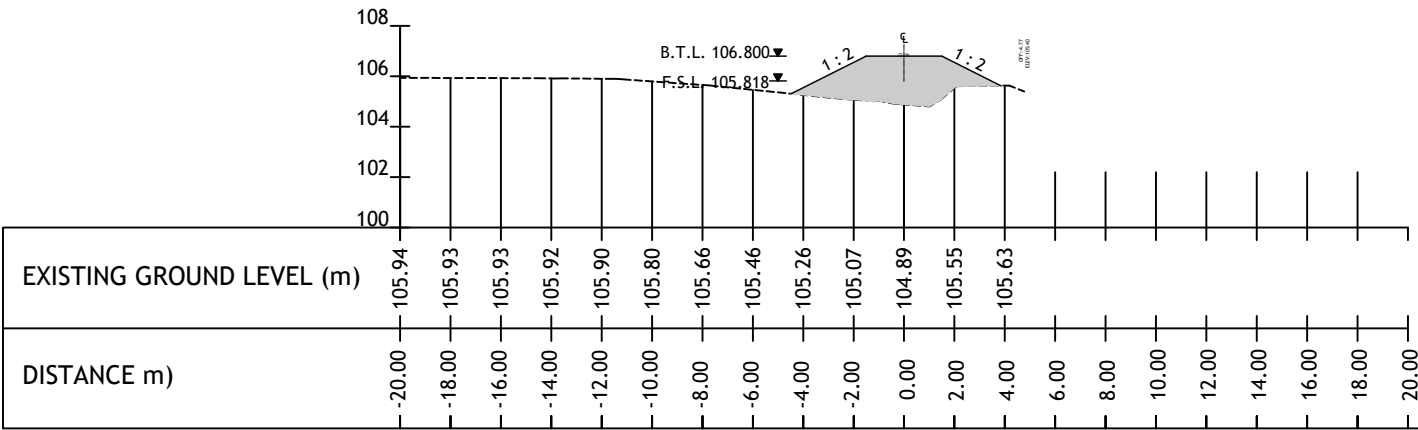


INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.

DESCRIPTION		
PAHALA HUNNE WEWA CROSS SECTIONS OF TANK BUND Stn.0+000 - 0+125		
DRAWING No.	AC-P3-PHW-CSS-01	
SCALE	1:300	SHEET NO. 01 OF 02



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DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
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DEVELOPMENT  
PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

CONSULTANT

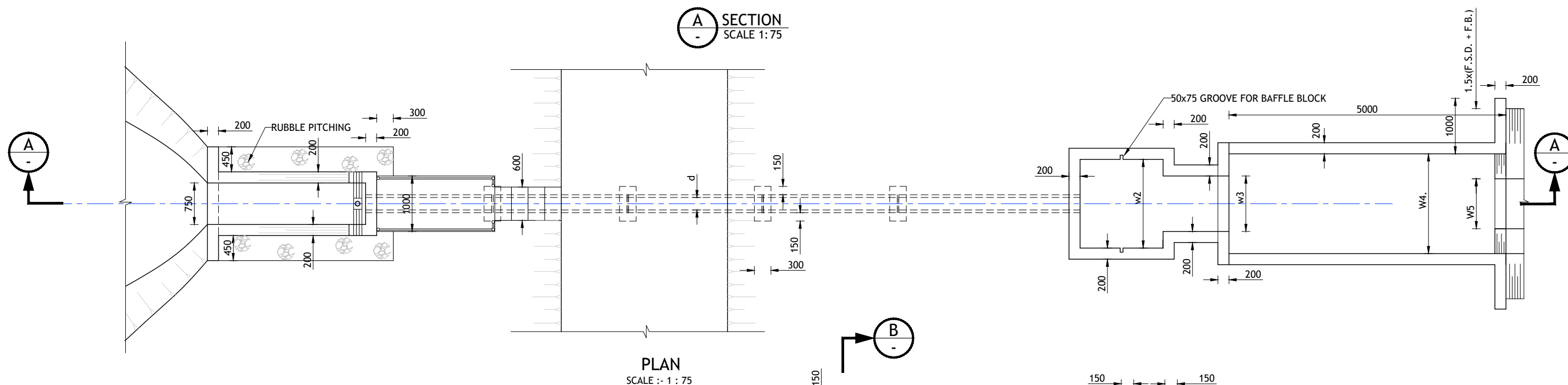
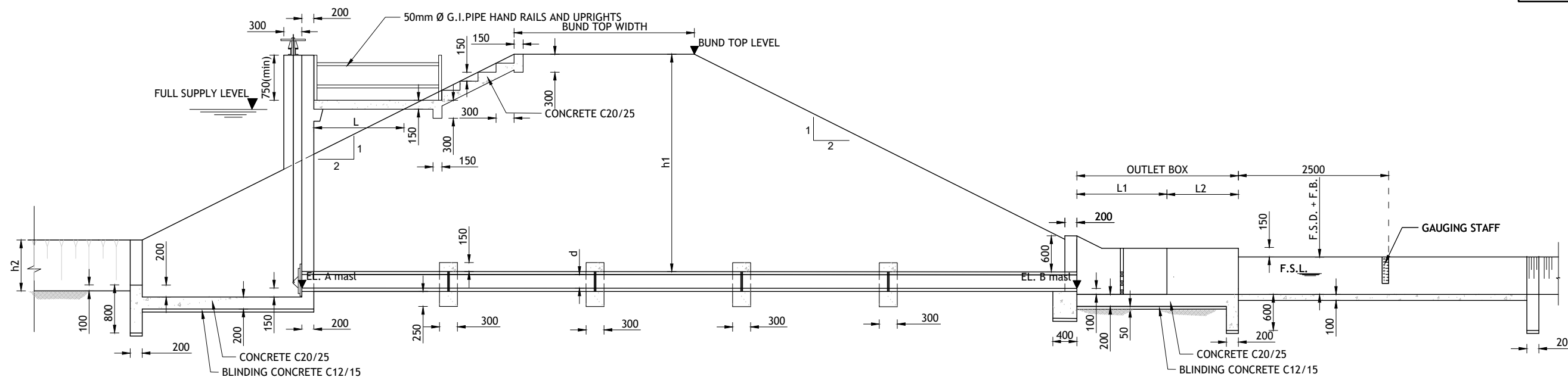


INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

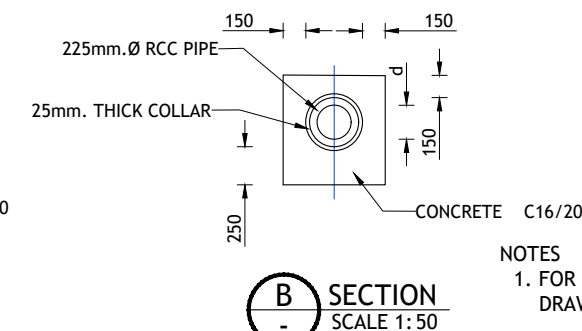
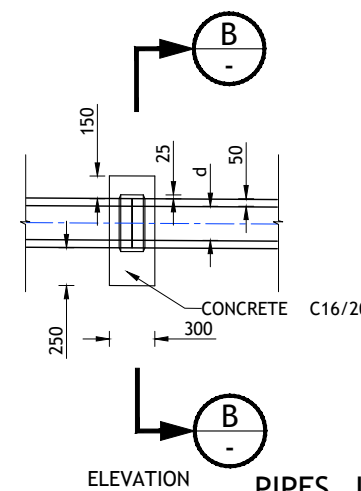
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DRAWING No.	AC-P3-PHW-CSS-01	
SCALE	1:300	SHEET NO. 02 OF 02



## 5.0 TYPE PLANS



DISCHARGE		PIPE Dia. d mm	L1 mm	L2 mm	W2 mm	W3 mm	W4 mm	W5 mm	F.S.D mm	FB mm
CUSEC	CUMEC									
1	0.028	150	1270	750	950	300	410	300	225	225
2	0.057	225	1400	750	1050	450	580	460	270	225
3	0.085	300	1600	900	1200	600	720	610	300	225
4	0.113	300	1800	900	1350	750	755	610	350	225
5	0.142	300	1800	900	1350	750	860	760	365	225
6	0.170	350	1800	1050	1350	750	900	760	400	225
7	0.198	350	2000	1050	1500	900	1000	910	405	225
8	0.226	350	2000	1125	1500	900	1025	910	435	225
9	0.255	375	2000	1350	1500	900	1060	910	460	225



- NOTES
1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No. AC-P3-GEN-02
  2. FOR R/F DETAILS REFER DRAWING No. AC-P3-TYP-05 SHEET No. 01 OF 02 & 02 OF 02.

Ref.	SIGNATURE	DATE	REVISION	
APPROVED			No.	APPROVED
RECOMMENDED				DATE
CHECKED		2019 - 02 - 22		
DRAWN		2019 - 02 - 22		
DESIGNED		2019 - 02 - 22		



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND  
ENVIRONMENT



CLIMATE RESILIENT INTEGRATED  
WATER MANAGEMENT PROJECT

විවේ ගම් ප්‍රවෘද්ධි  
குவள்கள் கிராமங்களின் மறுமலர்ச்சி



GREEN  
CLIMATE  
FUND



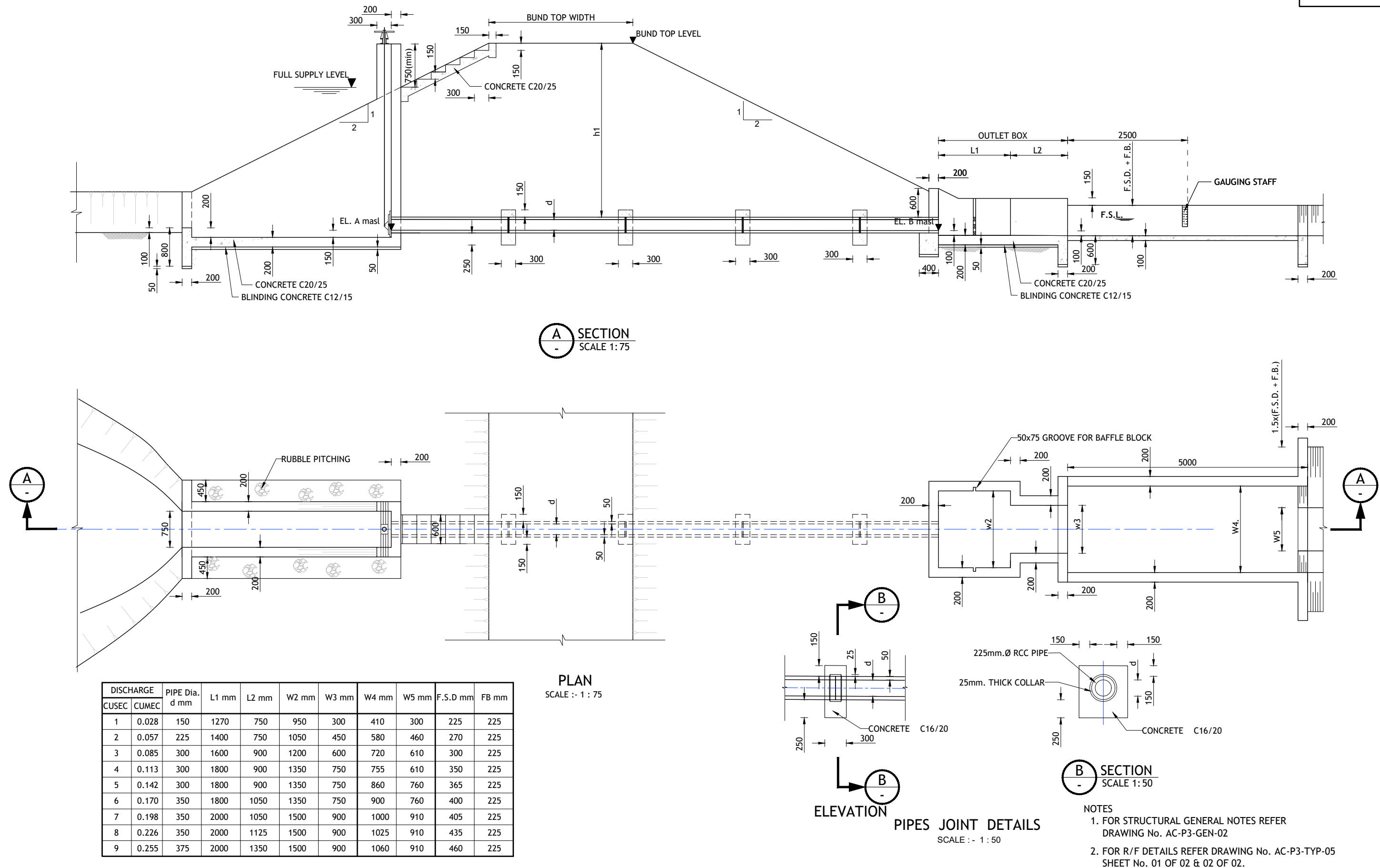
UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

DESCRIPTION  
TYPE PLAN  
FOR HEADWALL TYPE SLUICE (WITH PASSERELLE)  
GENERAL PLAN, SECTION AND DETAILS  
DRAWING No. AC-P3-TYP-01  
SCALE AS SHOWN SHEET NO. 01 OF 01

CONSULTANT



INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.



Ref.	SIGNATURE	DATE	REVISION	
APPROVED			No.	APPROVED
RECOMMENDED				DATE
CHECKED		2018 - 10 - 20		
DRAWN		2018 - 10 - 20		
DESIGNED		2018 - 10 - 20		

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT

GREEN CLIMATE FUND

UNITED NATIONS DEVELOPMENT PROGRAMME

CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT

CONSULTANT

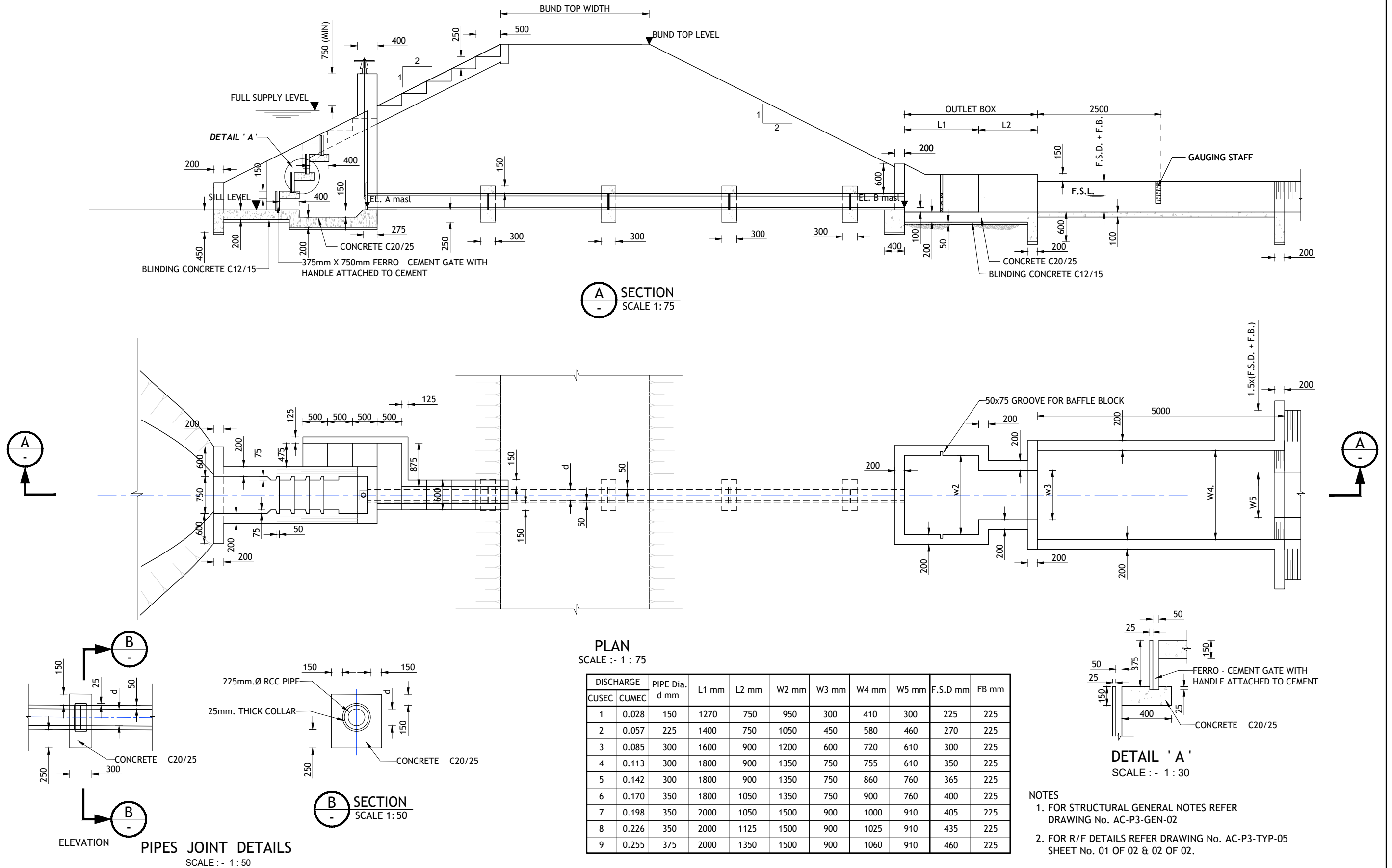
DESCRIPTION

TYPE PLAN

FOR HEADWALL TYPE SLUICE (WITHOUT PASSERELLE) GENERAL PLAN, SECTION AND DETAILS

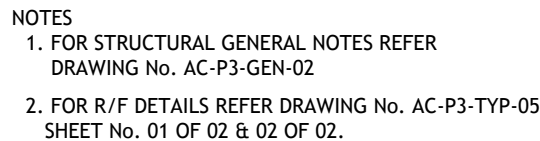
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SCALE AS SHOWN SHEET NO. 01 OF 01



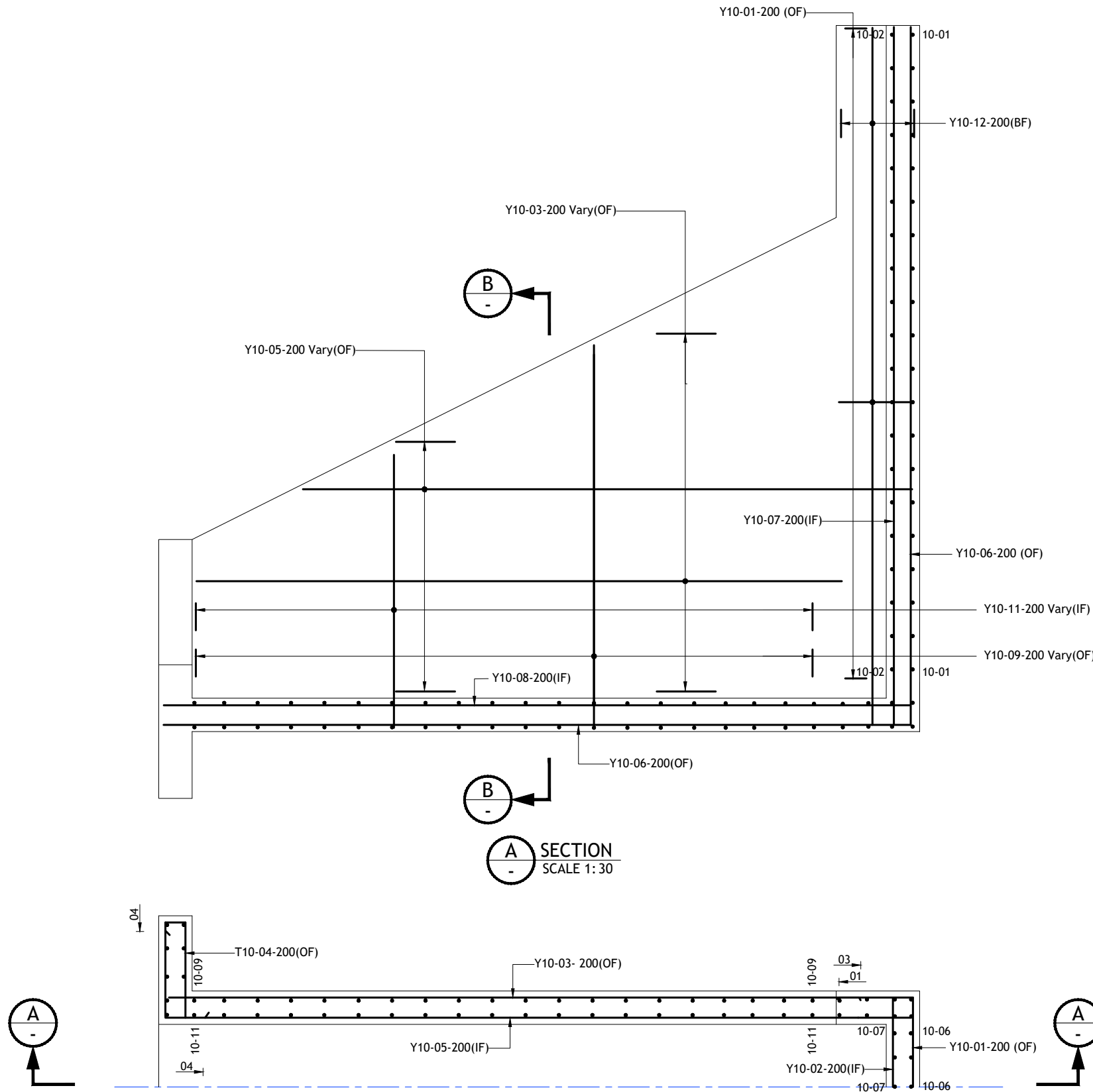
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RECOMMENDED								MODIFIED HEADWALL TYPE SLUICE	
CHECKED		2019 - 02 - 22						GENERAL PLAN, SECTION AND DETAILS	
DRAWN		2019 - 02 - 22						DRAWING No. AC-P3-TYP-03	
DESIGNED		2019 - 02 - 22						SCALE AS SHOWN	SHEET NO. 01 OF 01

<p>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT</p>	<p>CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT</p>	<p>GREEN CLIMATE FUND</p>	<p>UNITED NATIONS DEVELOPMENT PROGRAMME</p>	<p>UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT</p>	<p>INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.</p>

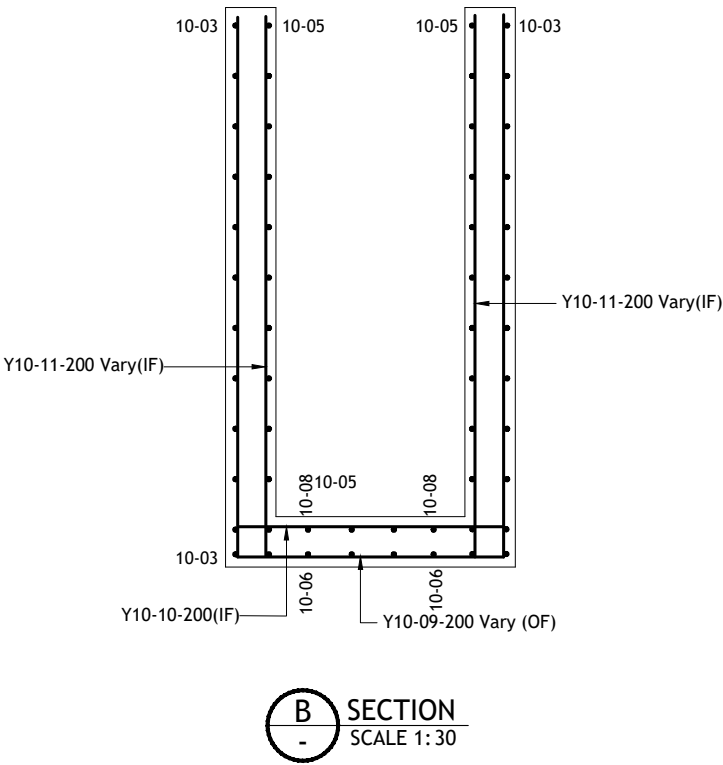


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APPROVED			No.	APPROVED	DATE				TYPE PLAN	
RECOMMENDED									TOWER TYPE SLUICE (WITH PASSERELLE) GENERAL PLAN, SECTION AND DETAILS	
CHECKED		2019 - 02 - 22				 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT චෂ්ම ගම් ප්‍රවෘද්ධි குளங்கள் கிராமங்களின் மறுமலர்ச்சி	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	DRAWING No.	AC-P3-TYP-04	
DRAWN		2019 - 02 - 22						SCALE	AS SHOWN	SHEET NO. 01 OF 01
DESIGNED		2019 - 02 - 22						CONSULTANT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.	

Path: F:\K\_GALA\_TENDER\_PACKAGES (WITHOUT SIG)\ANGURUWELLA\PACKAGE 1\_2\_3 ANGURUWELLA\ANGURUWELLA PACK 3\05TYPE PLANS\025 26R-F DETAILS FOR SLUICES 1 T5\_1.DWG Printed : 2017/Oct/17



R/F DETAILS OF INLET BOX (HALF PLAN)  
SCALE :- 1 : 30

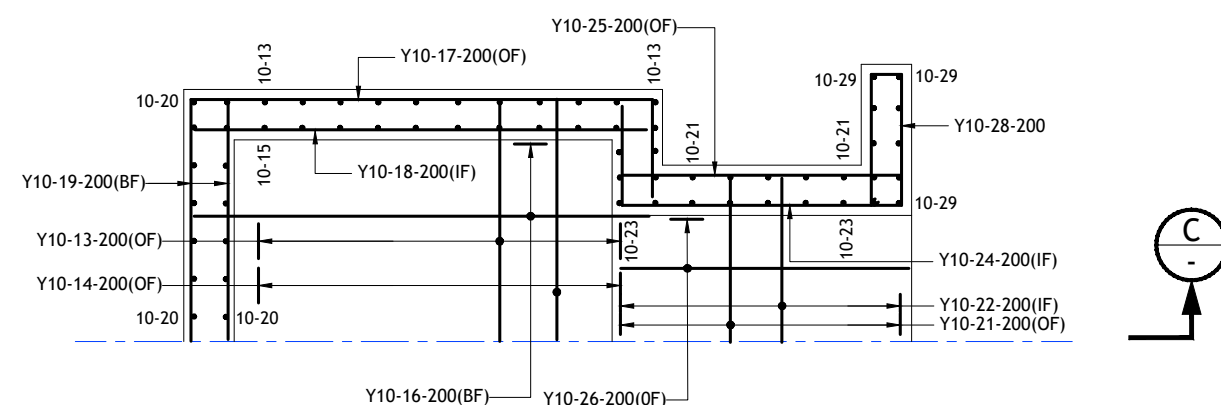
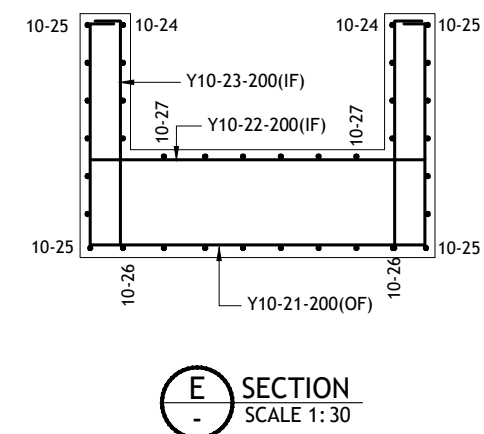
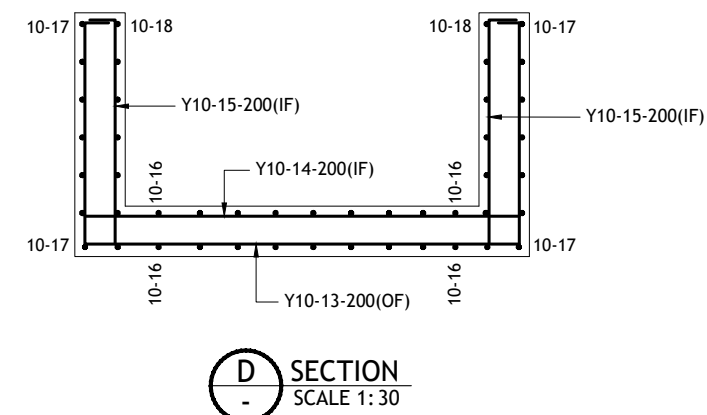
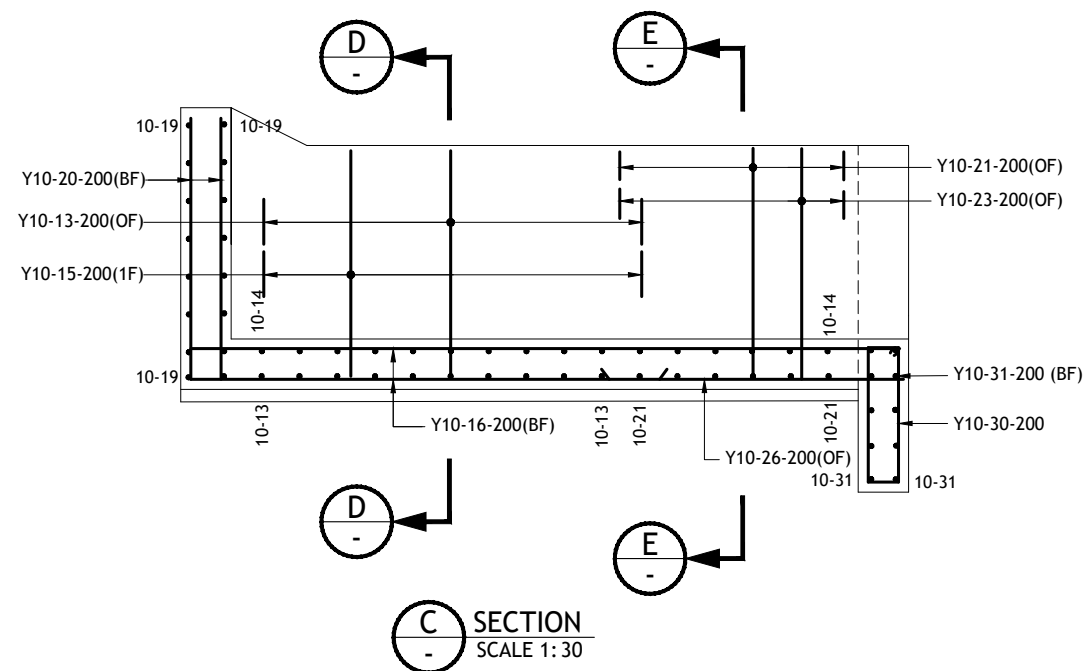


SECTION B-B  
SCALE 1: 30

NOTES  
1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No. AC-P3-GEN-02

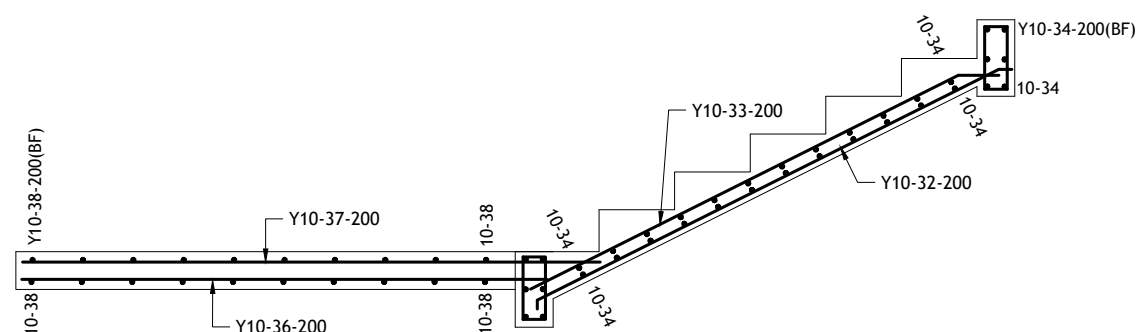
Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				TYPE PLAN		
RECOMMENDED									R/F DETAILS FOR SLUICES		
CHECKED		2018 - 10 - 20							HEAD WALL, TOWER & JUNCTION BLOCK TYPE		
DRAWN		2018 - 10 - 20							DRAWING No.	AC-P3-TYP-05	
DESIGNED		2018 - 10 - 20				SCALE			AS SHOWN	SHEET NO. 01 OF 02	
						 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	චෛ ගම් ප්‍රවුද්‍රව් குளங்கள் கிராமங்களின் மறுமலர்ச்சி			UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	
							CONSULTANT	 infotechsIDEAS KNOWLEDGE. INNOVATION. SOLUTIONS.	INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.		





R/F DETAILS OF OUTLET BOX (HALF PLAN)

SCALE :- 1 : 30



R/F DETAILS OF STEPS & PASSERELLE

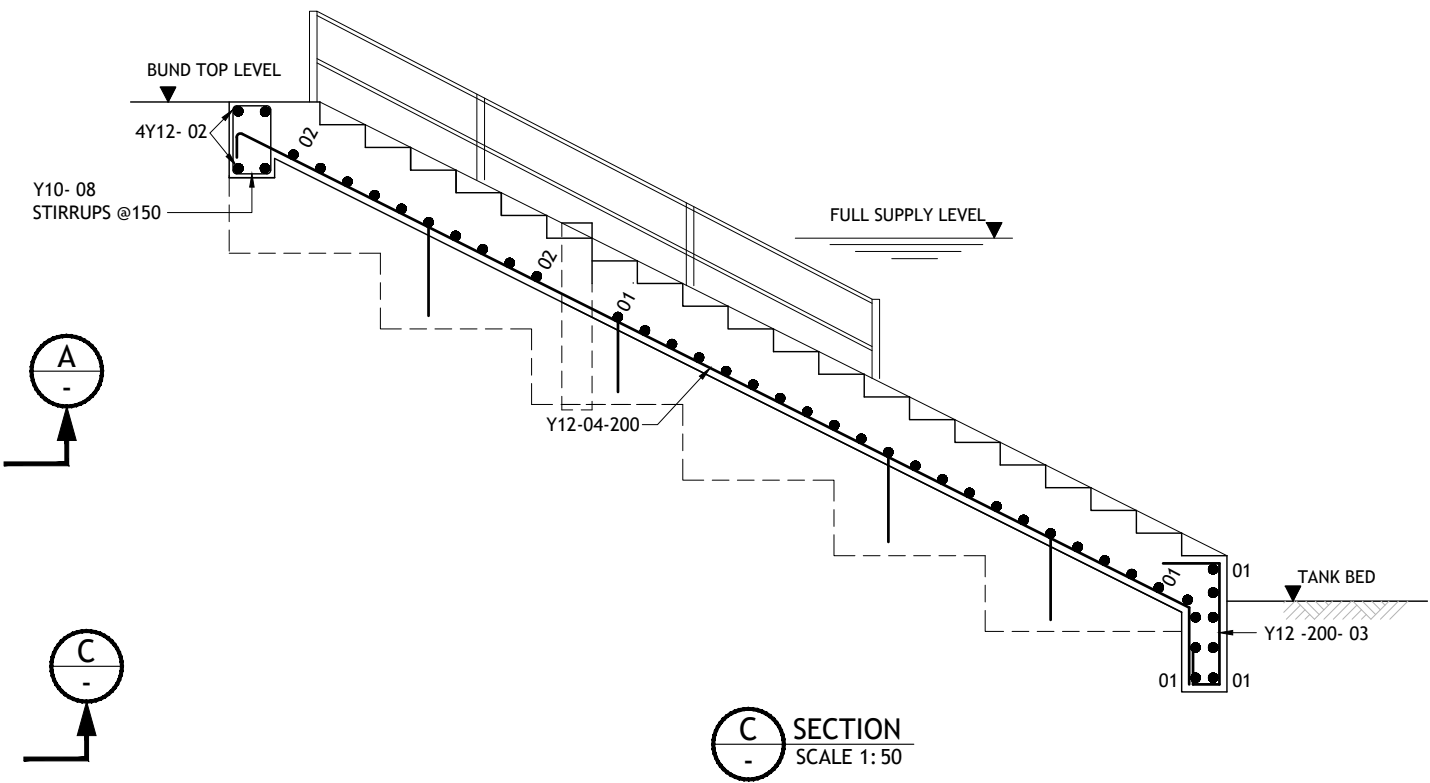
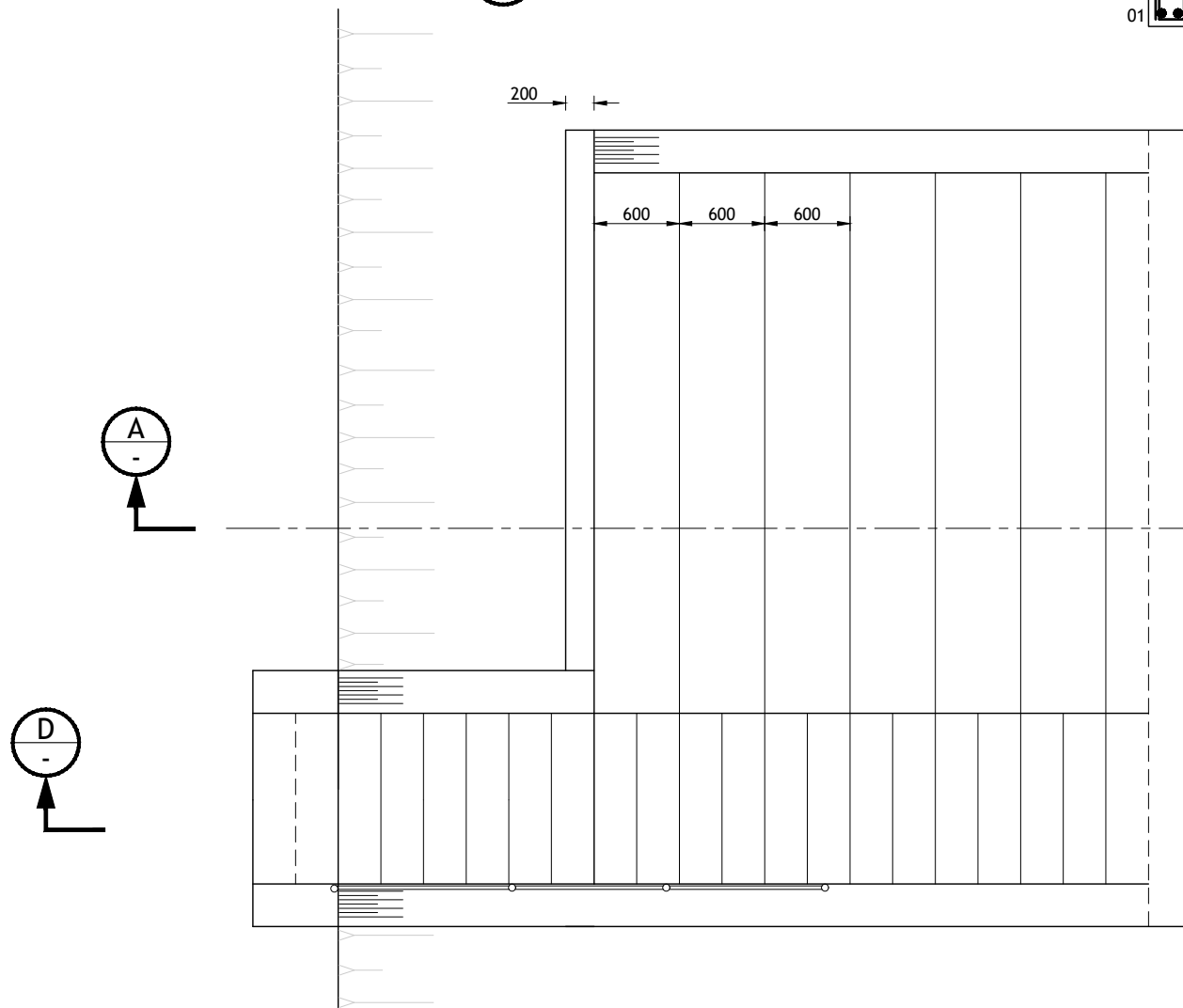
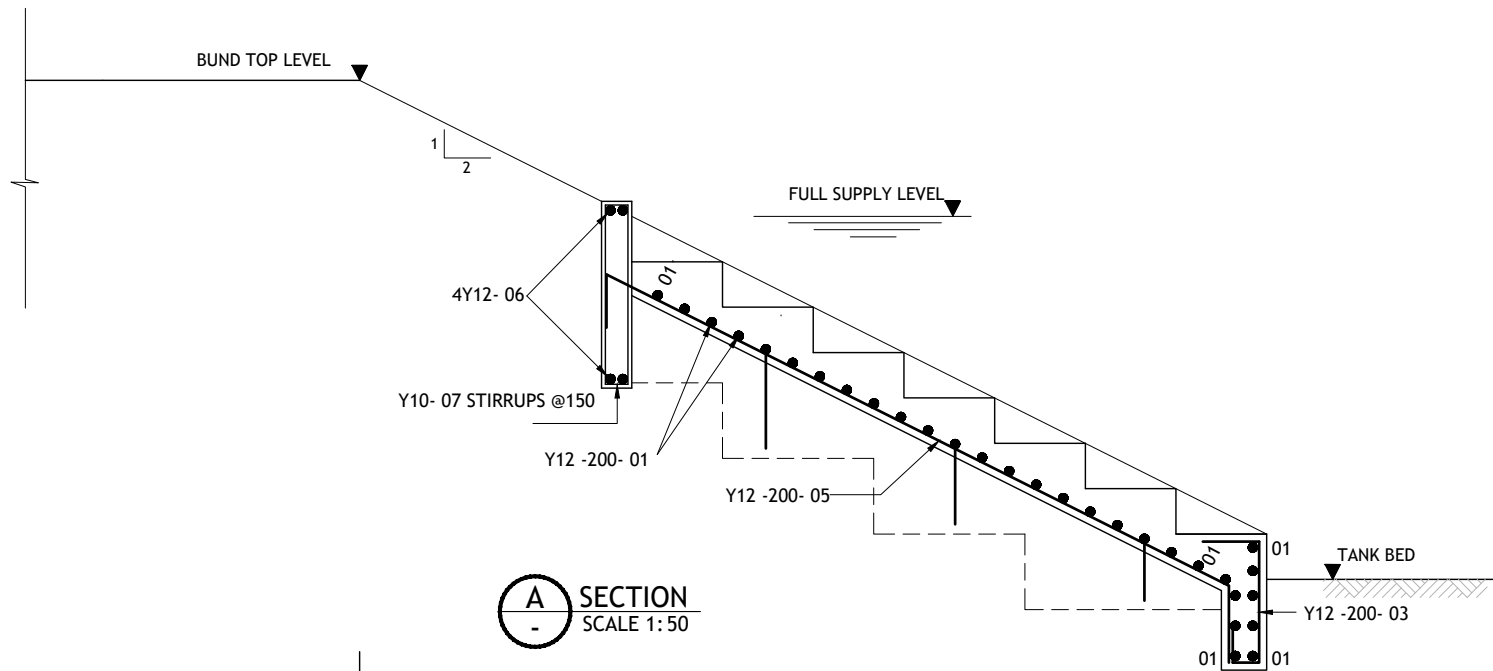
SCALE :- 1 : 30

NOTES

1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No. AC-P3-GEN-02

Ref.	SIGNATURE	DATE	REVISION		DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	GREEN CLIMATE FUND	UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION	
APPROVED			No.	APPROVED				TYPE PLAN	
RECOMMENDED								R/F DETAILS FOR SLUICES	
CHECKED		2019 - 02 - 22						HEAD WALL, TOWER & JUNCTION BLOCK TYPE	
DRAWN		2019 - 02 - 22						DRAWING No.	AC-P3-TYP-05
DESIGNED		2019 - 02 - 22						SCALE	AS SHOWN
					CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.	SHEET NO. 02 OF 02	

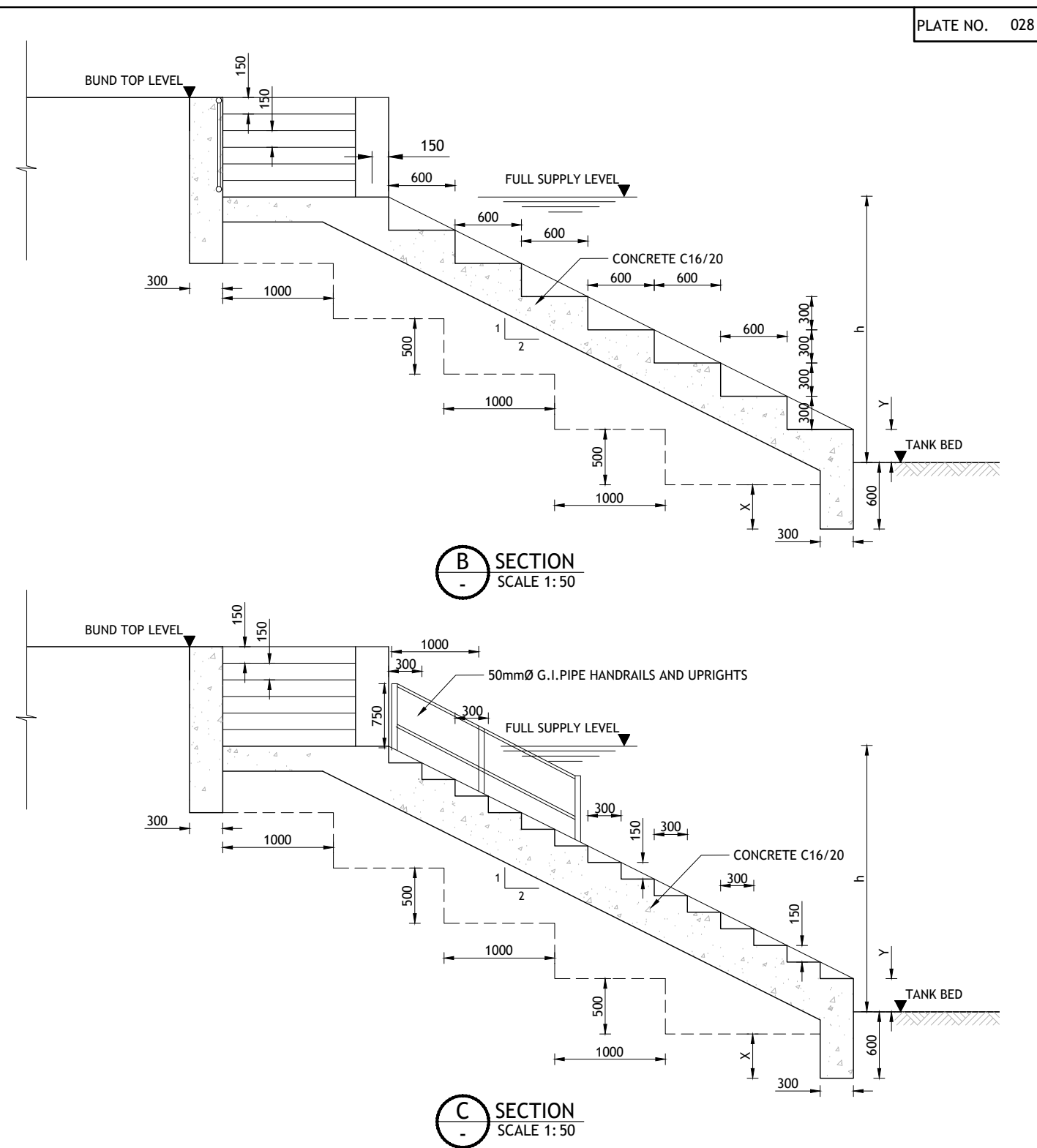
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NOTES  
1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No. AC-P3-GEN-02

Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND  UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION	
APPROVED			No.	APPROVED	DATE			TYPE PLAN	
RECOMMENDED								BATHING STEPS	
CHECKED		2019 - 02 - 22						REINFORCEMENT DETAILS	
DRAWN		2019 - 02 - 22						DRAWING No.	AC-P3-TYP-06
DESIGNED		2019 - 02 - 22				 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT 	SCALE	AS SHOWN SHEET NO. 02 OF 02	
							CONSULTANT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.	

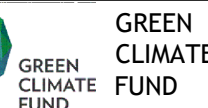




Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2018 - 09 - 25			
DRAWN		2018 - 09 - 25			
DESIGNED/SURVEYED		2018 - 09 - 25			



# CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT

UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

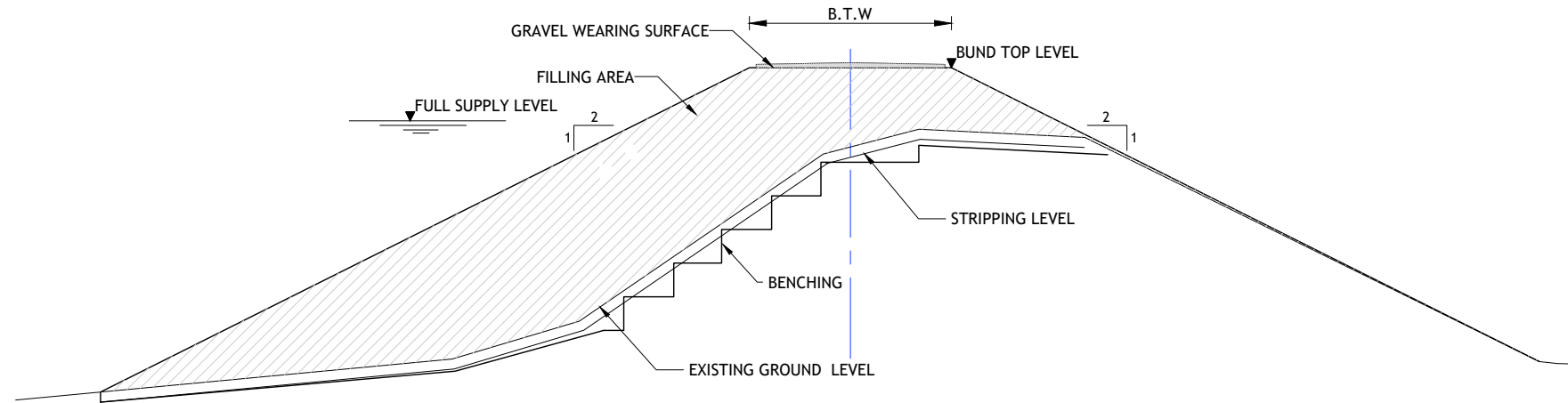
CONSULTANT



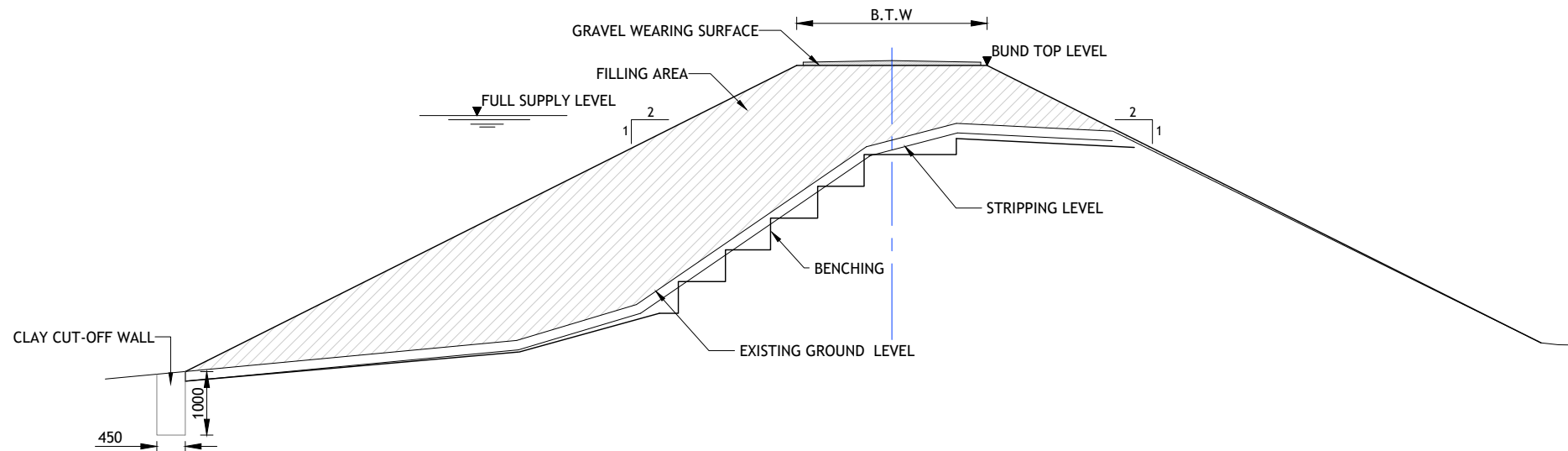
**INFOTECHS IDEAS (PVT) LTD.**  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

DESCRIPTION	
TYPE PLAN	
BATHING STEPS	
GENERAL PLAN, SECTION AND DETAILS	
DRAWING No.	AC-P3--TYP-06
SCALE	AS SHOWN SHEET NO. 01 OF 02

P:\K\_GALA TENDER PACKAGES (WITHOUT SIG)\ANGURUWELLA\PACKAGE 1\_2\_3\_ANGURUWELLA\ANGURUWELLA PACK 3\05TYPE PLANS\029TYPICAL SECTION OF EMBANKMENT T7.DWG Printed : 2017/Oct/17


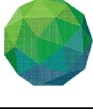





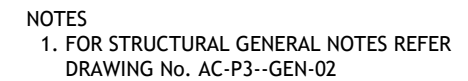
GENERAL TYPICAL SECTION OF EMBANKMENT  
SCALE :- 1 : 100




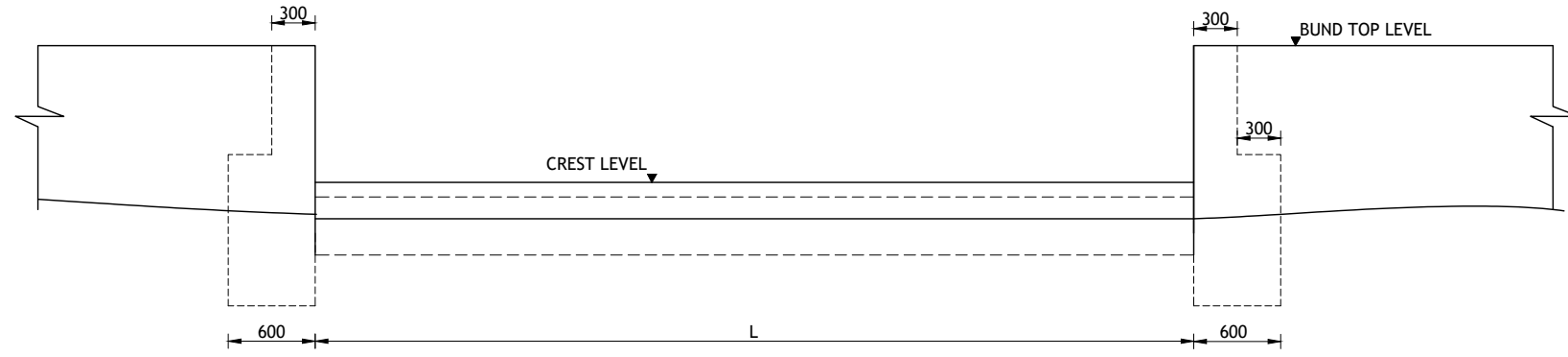
TYPICAL SECTION OF EMBANKMENT WITH CLAY CUT-OFF WALL  
SCALE :- 1 : 100

NOTES  
1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No. AC-P3-GEN-02

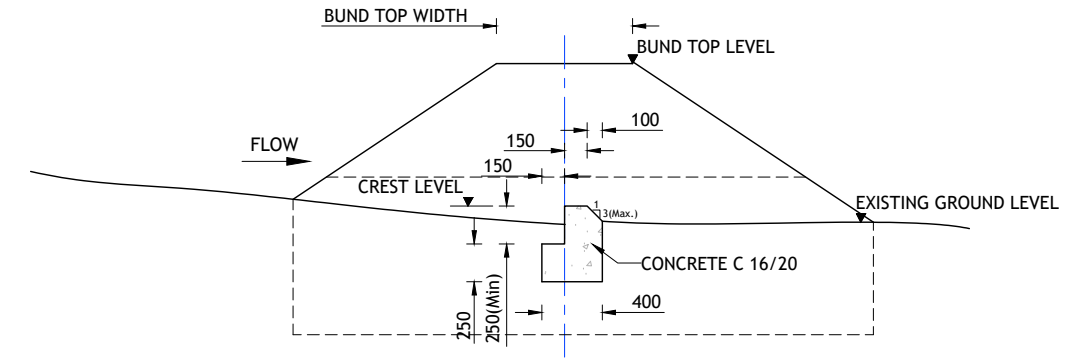
Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION	
APPROVED			No.	APPROVED	DATE				TYPE PLAN	
RECOMMENDED									GENERAL TYPICAL EMBANKMENT AND TYPICAL EMBANKMENT WITH CLAY CUTOFF WALL	
CHECKED		2019 - 02 - 22							DRAWING No.	AC-P3-TYP-07
DRAWN		2019 - 02 - 22							SCALE	AS SHOWN
DESIGNED		2019 - 02 - 22				 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.	UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT		



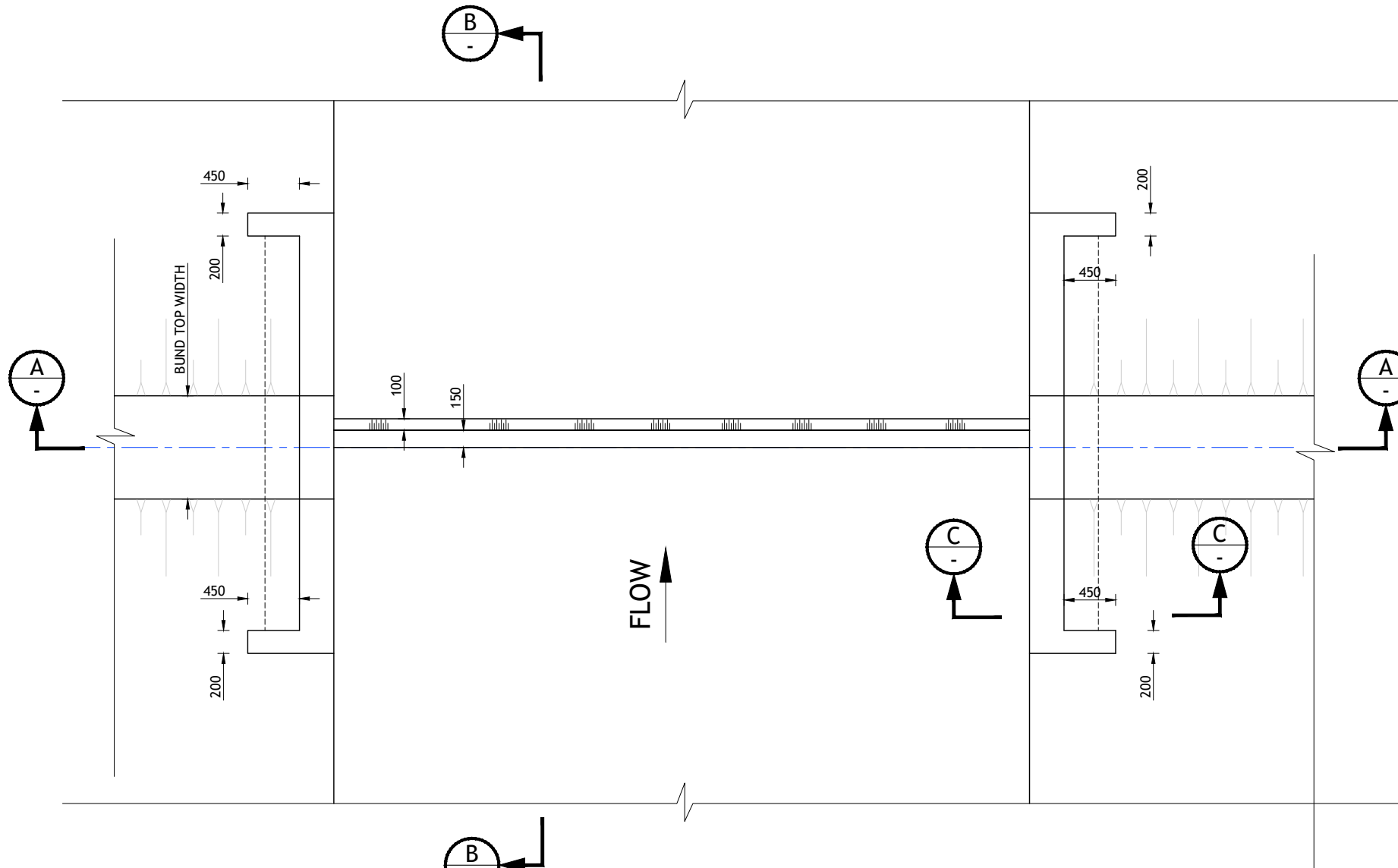
Ref.	SIGNATURE	DATE	REVISION			 <b>DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA</b> <b>MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT</b>	 <b>GREEN CLIMATE FUND</b>	 <b>UNITED NATIONS DEVELOPMENT PROGRAMME</b>	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				TYPE PLAN SPILL CUM CAUSEWAY GENERAL PLAN, SECTION AND DETAILS		
RECOMMENDED											
CHECKED		2019 - 02 - 22				 <b>CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT</b>	 <b>Infotechs IDEAS</b> <small>KNOWLEDGE. INNOVATION. SOLUTIONS.</small>	<b>INFOTECHS IDEAS (PVT) LTD.</b> <b>No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.</b>	DRAWING No.	AC-P3--TYP-08	
DRAWN		2019 - 02 - 22							SCALE	AS SHOWN	SHEET NO. 01 OF 01
DESIGNED		2019 - 02 - 22									



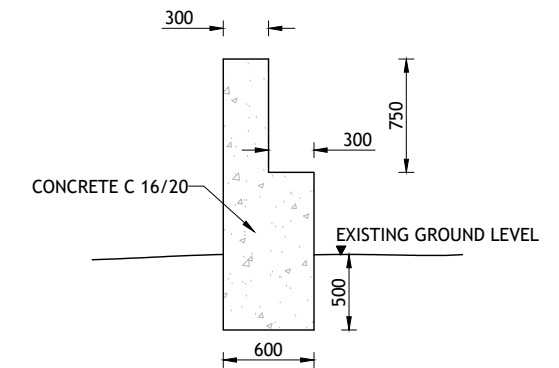
**A** SECTION  
SCALE 1: 50



**B** SECTION  
SCALE 1: 50



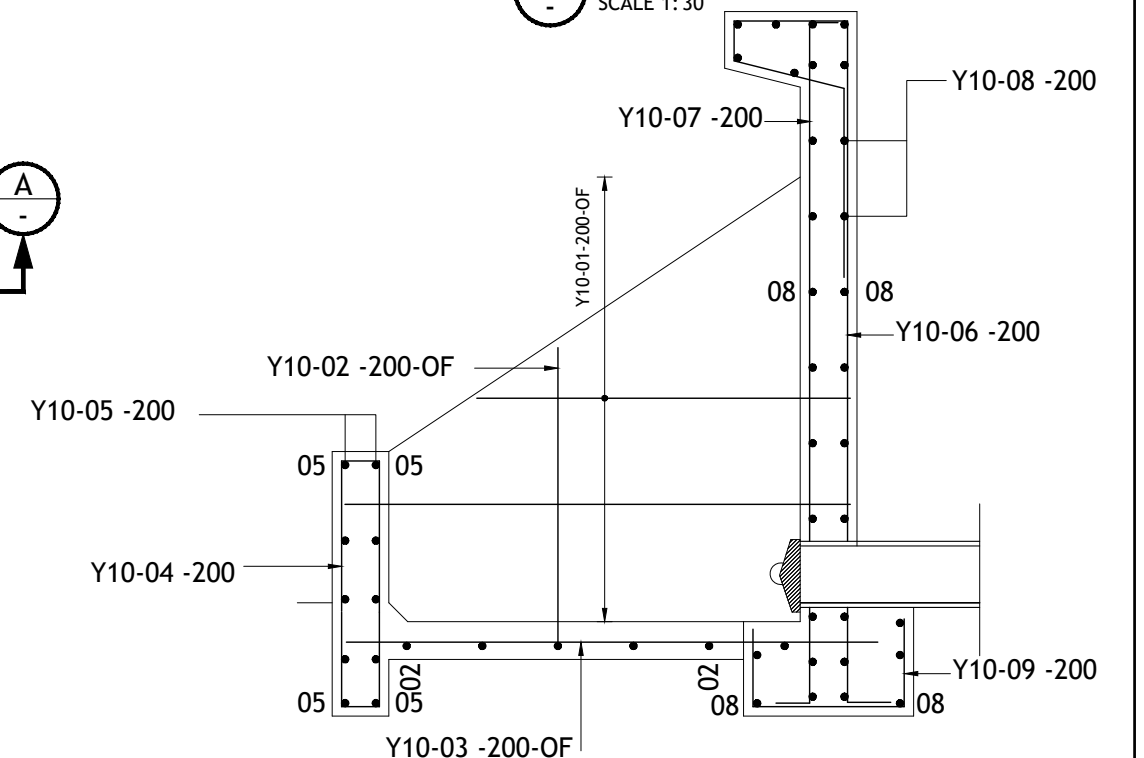
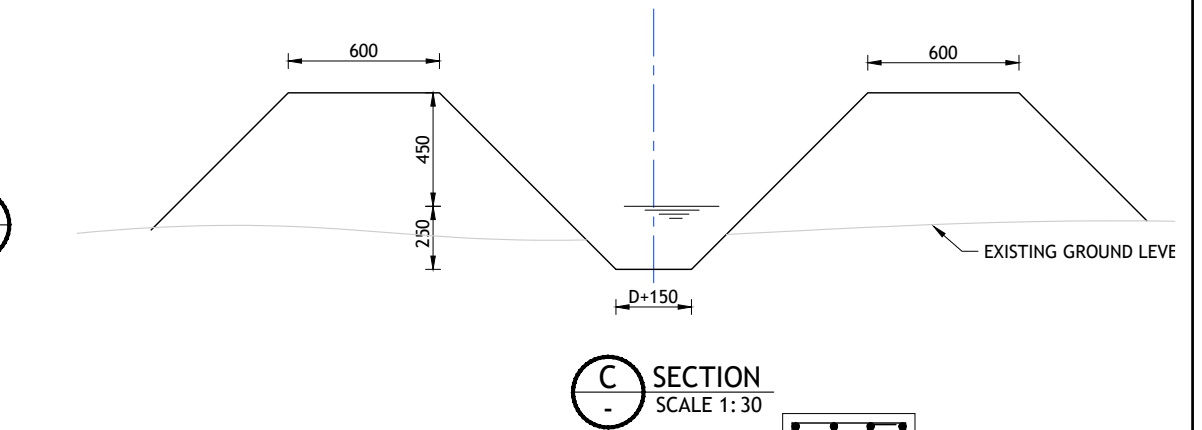
**PLAN**  
SCALE 1: 50



**C** SECTION  
SCALE 1: 50

- NOTES  
1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No. AC-P3--GEN-02

Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				TYPE PLAN NATURAL SPILL GENERAL PLAN, SECTION AND DETAILS		
RECOMMENDED											
CHECKED		2019 - 02 - 22				 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	 CONSULTANT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.	DRAWING No.	AC-P3--TYP-09	
DRAWN		2019 - 02 - 22							SCALE	AS SHOWN	SHEET NO. 01 OF 01
DESIGNED		2019 - 02 - 22									



PLAN  
SCALE :- 1 : 30

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA  
MINISTRY OF MAHAWELE DEVELOPMENT AND  
ENVIRONMENT



# CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT



குளங்கள் கிராமங்களின் மறுமலர்ச்சி



GREEN  
CLIMATE  
FUND



UNITED NATIONS  
DEVELOPMENT  
PROGRAMME

UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA  
CASCADE IN KURUNEGALA DISTRICT

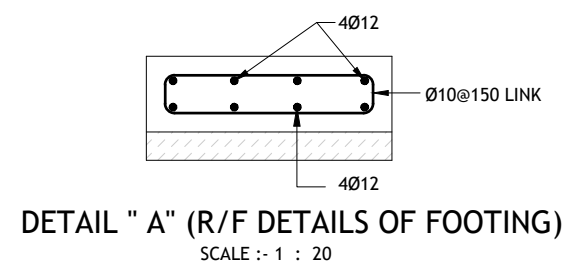
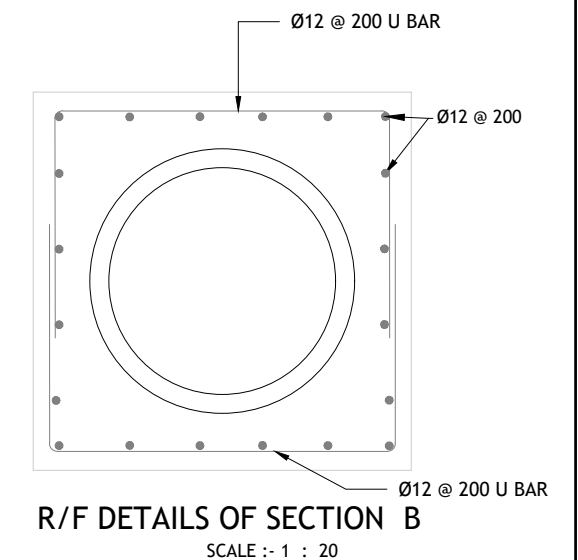
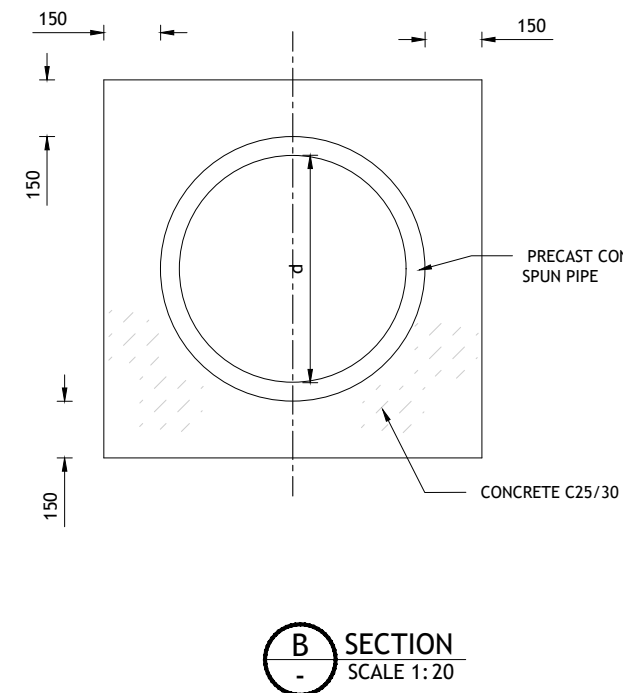
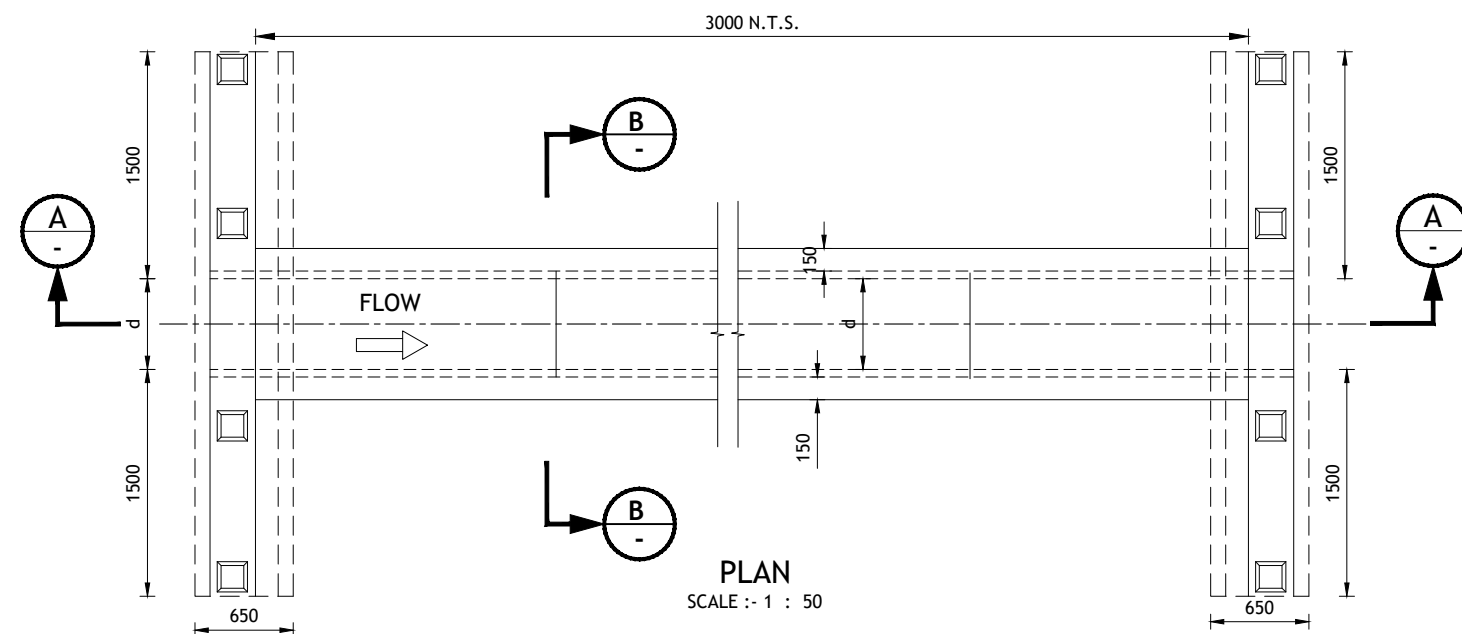
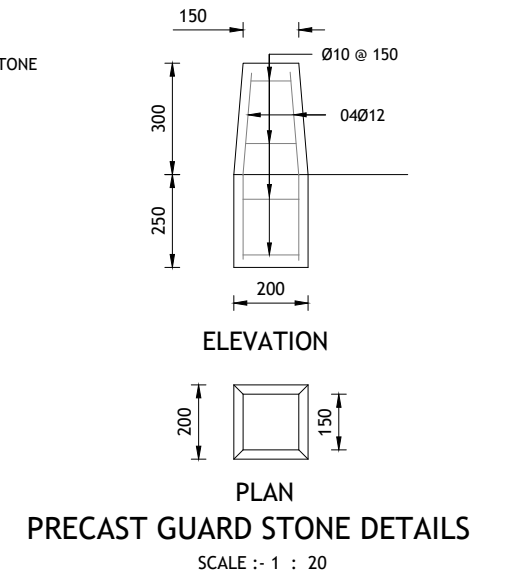
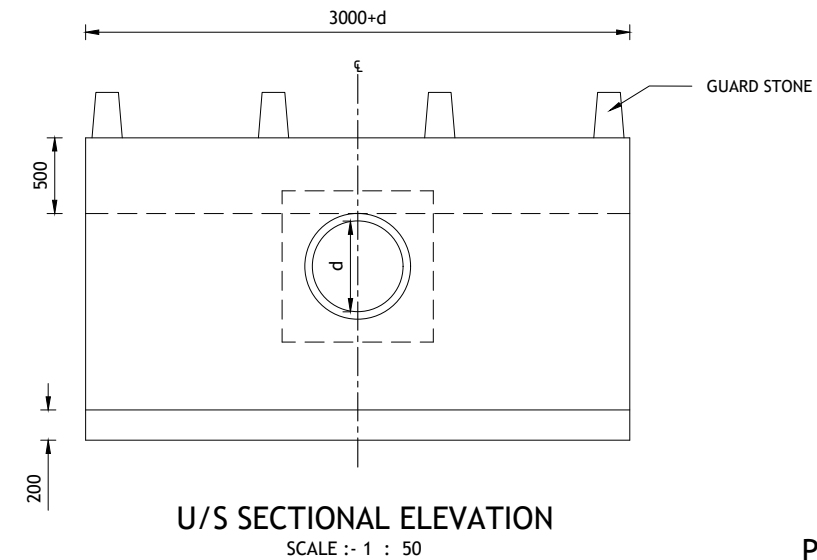
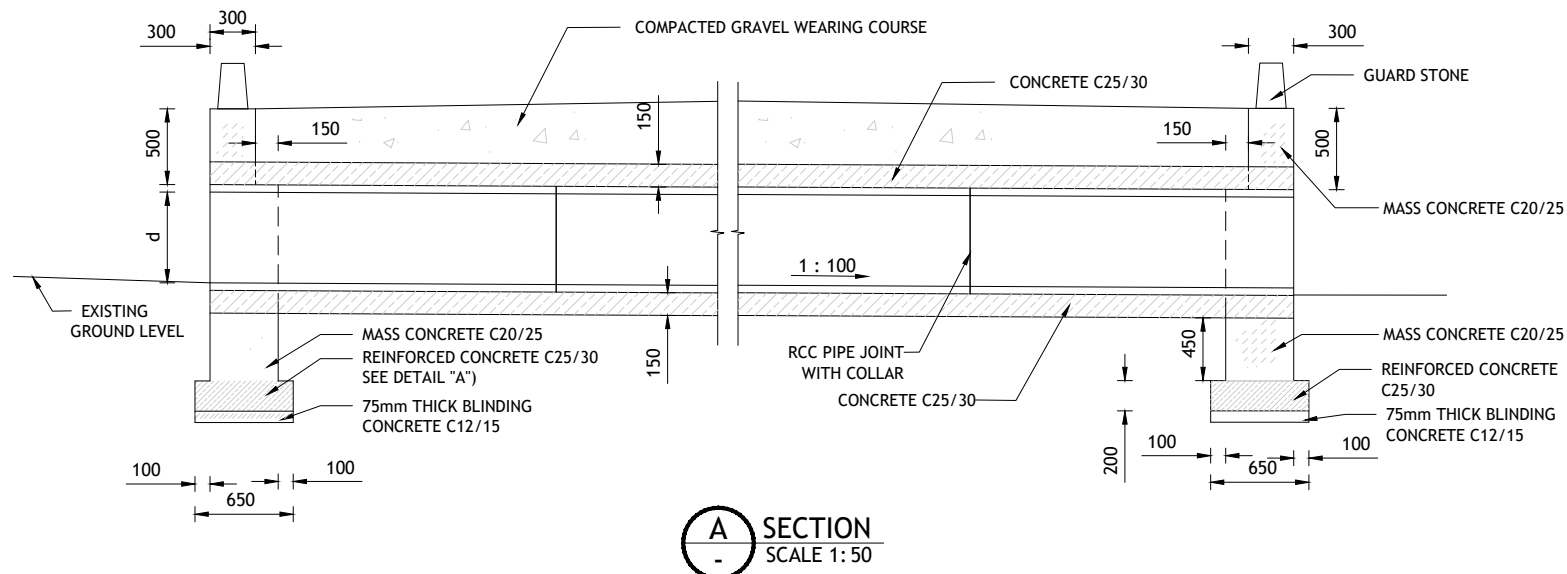
CONSULTANT



INFOTECHS IDEAS (PVT) LTD.  
No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.

Ref.	SIGNATURE	DATE	REVISION		
APPROVED			No.	APPROVED	DATE
RECOMMENDED					
CHECKED		2019 - 02 - 22			
DRAWN		2019 - 02 - 22			
DESIGNED		2019 - 02 - 22			

DESCRIPTION		
<p align="center"><b>TYPE PLAN</b>  <b>TURNOUT STRUCTURE</b>  <b>GENERAL PLAN, SECTION AND DETAILS</b></p>		
DRAWING No.	AC-P3-TYP-10	
SCALE	AS SHOWN	SHEET NO. 01 OF 01



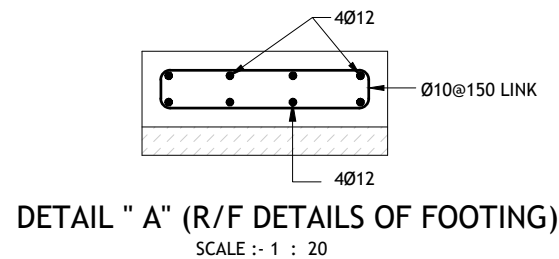
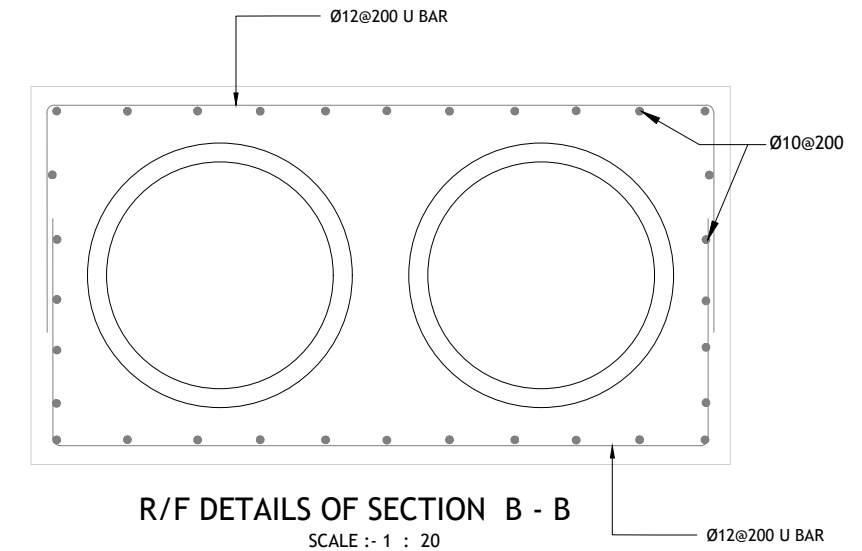
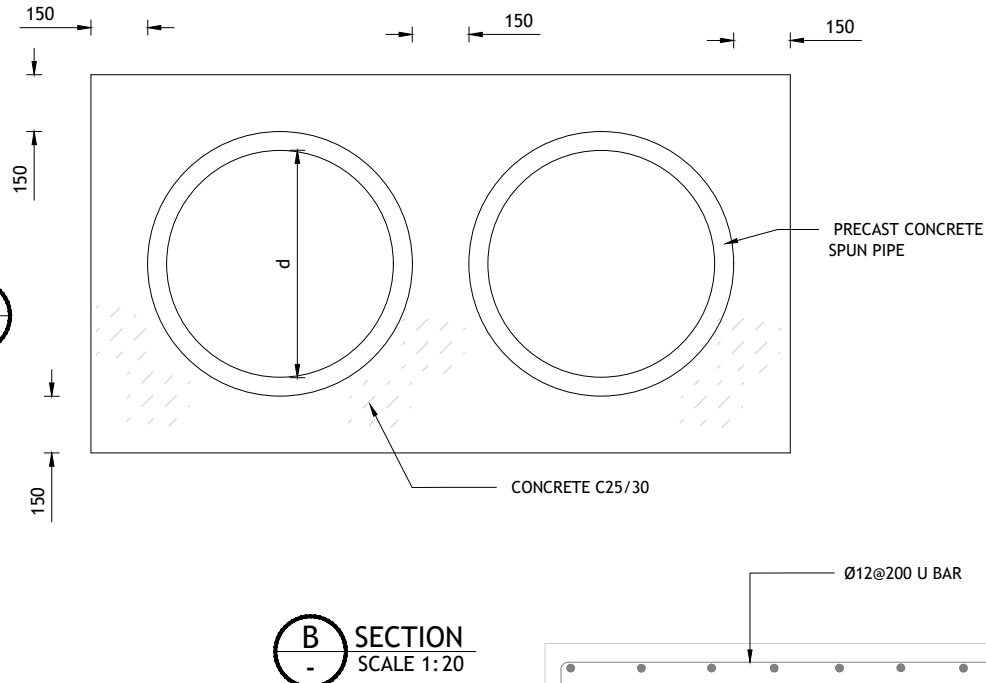
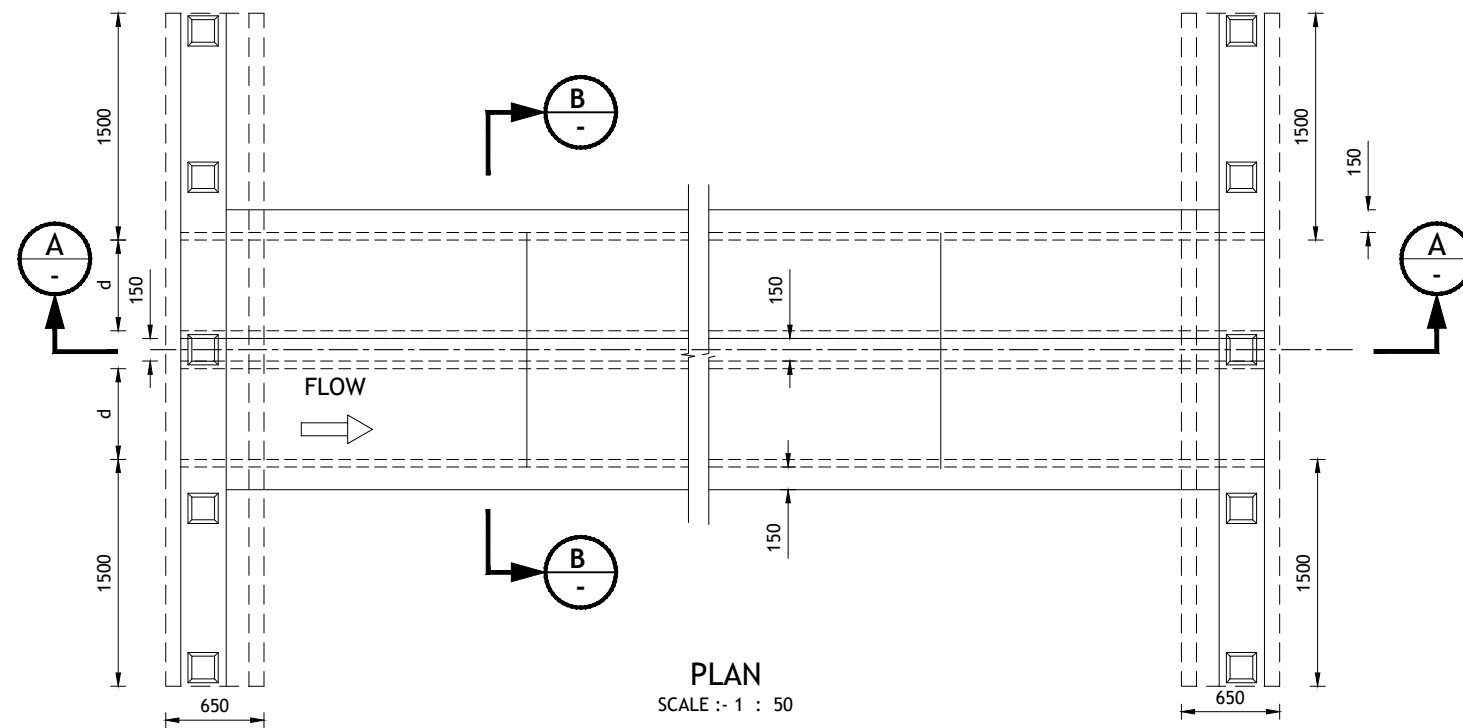
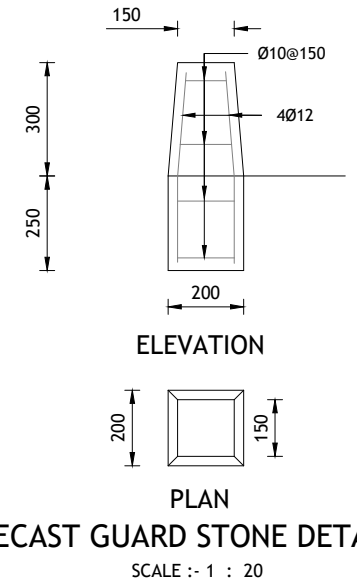
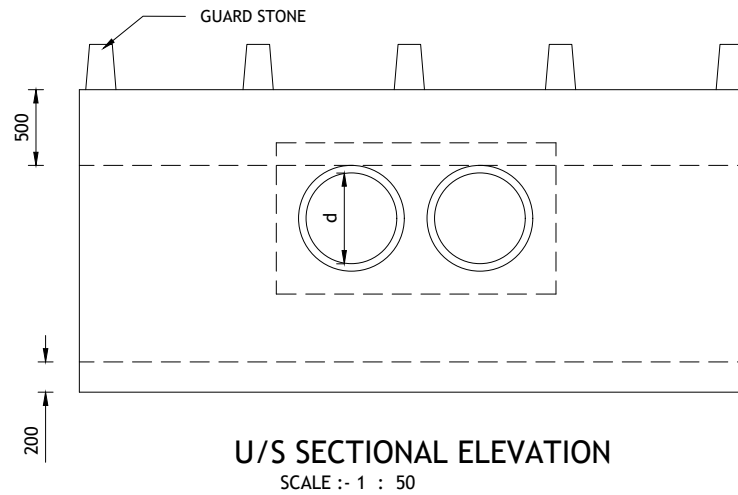
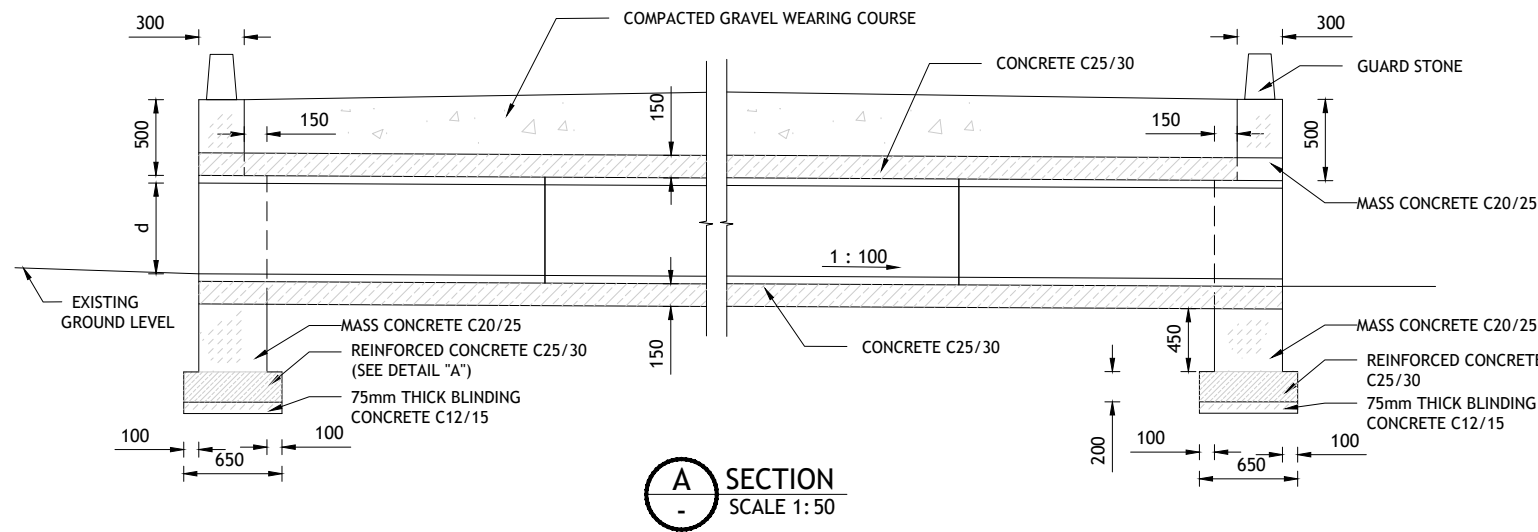
#### NOTES

- FOR STRUCTURAL GENERAL NOTES REFER DRAWING No AC-P3-GEN-02
- PIPES SHALL BE LAID TO A GRADIENT OF 1 IN 100 OR AS DIRECTED BY THE ENGINEER AT SITE ACCORDING TO THE SITE CONDITIONS.
- RCC PIPE JOINT WITH COLLAR AND APPROVED FILLER ACCORDING TO SPECIFICATION AT EVERY 2.4m OR APPROPRIATE INTERVAL, SHALL BE DECIDED BY THE ENGINEER.
- REFER LIST OF WORKS IN THE EMPLOYER'S REQUIREMENTS FOR LOCATIONS AND PIPE DIAMETER

Path: F:\K. GALA TENDER PACKAGES (WITHOUT SIG)\ANGURUWELLA\PACKAGE 1\_2\_3 ANGURUWELLA\ANGURUWELLA PACK 3\05TYPE PLANS\033 34TYP\_13 PIPE CULVERT FOR ACCESS ROAD.DWG Printed : 2017/Oct/17

Ref.	SIGNATURE	DATE	REVISION			 DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION		
APPROVED			No.	APPROVED	DATE				TYPE PLAN PIPE CULVERT		
RECOMMENDED									GENERAL PLAN, SECTION AND DETAILS		
CHECKED		2019 - 02 - 22							UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT		
DRAWN		2019 - 02 - 22							DRAWING No.	AC-P3-TYP-11 <td></td>	
DESIGNED		2019 - 02 - 22							SCALE	AS SHOWN	SHEET NO. 01 OF 01
						 CLIMATE RESILIENT INTEGRATED WATER MANAGEMENT PROJECT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03. SRI LANKA.				





NOTES

1. FOR STRUCTURAL GENERAL NOTES REFER DRAWING No AC-P3-GEN-02
2. PIPES SHALL BE LAID TO A GRADIENT OF 1 IN 100 OR AS DIRECTED BY THE ENGINEER AT SITE ACCORDING TO THE SITE CONDITIONS.
3. RCC PIPE JOINT WITH COLLAR AND APPROVED FILLER ACCORDING TO SPECIFICATION AT EVERY 2.4m OR APPROPRIATE INTERVAL, SHALL BE DECIDED BY THE ENGINEER.
4. REFER LIST OF WORKS IN THE EMPLOYER'S REQUIREMENTS FOR LOCATIONS AND PIPE DIAMETER

Ref.	SIGNATURE	DATE	REVISION			DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF MAHAWELI DEVELOPMENT AND ENVIRONMENT	 GREEN CLIMATE FUND	 UNITED NATIONS DEVELOPMENT PROGRAMME	DESCRIPTION	
APPROVED			No.	APPROVED	DATE				TYPE PLAN PIPE CULVERT	
RECOMMENDED							UPGRADING VILLAGE IRRIGATION WORKS OF ANGURUWELLA CASCADE IN KURUNEGALA DISTRICT	 INFOTECHS IDEAS (PVT) LTD. No. 546/6 GALLE ROAD, COLOMBO 03, SRI LANKA.	GENERAL PLAN, SECTION AND DETAILS	
CHECKED		2019 - 02 - 22							DRAWING No.	AC-P3-TYP-12
DRAWN		2019 - 02 - 22							SCALE	AS SHOWN
DESIGNED		2019 - 02 - 22							SHEET NO. 01 OF 01	