Facility Administration Manual

Project Number: 47381-001
June 2015

Democratic Socialist Republic of Sri Lanka: Mahaweli Water Security Investment Program

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Facility Administration Manual Purpose and Process

The facility administration manual (FAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The FAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the FAM.

The Ministry of Mahaweli Development and Environment (MMDE) is wholly responsible for the implementation of ADB financed projects, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by the MMDE of its obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At Loan Negotiations the borrower and ADB shall agree to the FAM and ensure consistency with the Loan agreements. Such agreement shall be reflected in the minutes of the Loan Negotiations. In the event of any discrepancy or contradiction between the FAM and the Loan Agreements, the provisions of the Loan Agreements shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP) changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the FAM.

ABBREVIATIONS

ADB	=	Asian Development Bank
ADF	=	Asian Development Fund
AFS	=	audited financial statements
CQS	=	consultant qualification selection
DMF	=	design and monitoring framework
DOI	=	Department of Irrigation
EARF	=	environmental assessment and review framework
EIA	=	environmental impact assessment
EMP	=	environmental management plan
FAM	=	facility administration manual
GACAP	=	governance and anticorruption action plan
GDP	=	gross domestic product
ICB	=	international competitive bidding
ICS	=	International consultant selection
IEE	=	initial environmental examination
KMTC	=	Kalu Ganga - Moragahakanda Transfer Canal
LAR	=	land acquisition and resettlement
LIBOR	=	London interbank offered rate
MASL	=	Mahaweli Authority of Sri Lanka
MLBC	=	Minipe Left Bank Canal
MMDE	=	Ministry of Mahaweli Development and Environment
MWSIP	=	Mahaweli Water Security Investment Program
NCB	=	national competitive bidding
NGOs	=	nongovernment organizations
NWPC	=	North West Province Canal
PAI	=	project administration instructions
PIU	=	project implementation unit
QBS	=	quality-based selection
QCBS	=	quality- and cost-based selection
RRP	=	Report and Recommendation of the President
SBD	=	standard bidding documents
SCP	=	Stakeholder Communications Plan
SGIA	=	second generation imprest accounts
SOE	=	statement of expenditure
SPS	=	Safeguard Policy Statement
SPRSS	=	summary poverty reduction and social strategy
TOR	=	terms of reference
UEC	=	Upper Elahera Canal

I. INVESTMENT PROGRAM DESCRIPTION

1. The investment program will accelerate the economic activities of Sri Lanka's northern dry zone region[1] by transferring surplus water of the Mahaweli river basin for irrigation, drinking and commercial purposes. It will develop bulk water conveyance and storage infrastructure planned under the North Central Province Canal Program (NCPCP), a high priority development program of the government[2] that will support completion of the Mahaweli Development Program (MDP) which started in 1970.[3] Water management practices will also be strengthened.

2. Sri Lanka has abundant water resources with a mean annual rainfall of about 1,860 mm. However the water distribution is skewed in time and space. The majority of the rain falls during two distinct monsoons: during December to February and May to September. The majority of rain falls in the southwest and central highlands, called the "wet zone," during both monsoons with an annual rainfall typically exceeding 5,000 mm. In comparison, the country's lowlands are dry, particularly in the "northern dry zone" region where the mean annual rainfall is less than 1,500 mm, and there are regular droughts. The available freshwater per annum per capita[4] is only1,200 m^3 which is less than half of the national average at 2,600 m^3 and below the threshold of 1,700 m^3 denoting water stress. The water scarcity in the region would further deteriorate due to the growing population and anticipated climate change.

3. Over the past millennia, local communities have managed this water stress by constructing many small cascade systems of reservoirs, transfer canals and irrigation schemes. These have been sufficient to provide supplementary irrigation only for a single paddy crop each year and limited storage for drinking water supply. In many places, communities rely on groundwater, some of which is contaminated causing high incidences of chronic kidney disease. The limited availability of water resources constrains the agricultural and commercial production of the region suppressing social and economic development. The gross regional domestic product per capita in the northern dry zone is about 30% lower than other regions.

4. In the 1960s, under the MDP, the government initiated developments to augment water within these cascade systems with available water resources from the Mahaweli River, the country's largest river which starts in the wet zone and has abundant river flows, using large transfer canals and reservoirs. Key components of the MDP were completed by the mid-1980s, but its completion was halted owing to resource constraints and conflict. Since then, the government has updated the MDP accounting for socio-economic changes and national development priorities. The government's current priorities and investment roadmap for the irrigation and water resources sector are described in the Public Investment Strategy 2014-2016.[5] These focus on non-structural and structural investments to ensure availability of adequate water quantities. Agricultural production from irrigation systems will be increased by: improving water management, productivity, and system efficiencies to meet rising demands; minimizing spatial variations in water availability by developing trans-basin diversions to transfer available water to dry zone areas; and, increasing resilience to climate change. Providing additional and clean drinking water supplies to dry zone communities is also a key priority.

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[1] The northern dry zone region mainly comprises North Central, North Western and Eastern Provinces.

[2] Government of Sri Lanka. Ministry of Finance and Planning. 2013. *Public Investment Strategy, 2014-2016*. Colombo.

[3] The Asian Development Bank (ADB) provided project preparatory technical assistance. ADB. 2014 *Proposed Multitranche Financing Facility SRI: Water Resources Development Investment Program*. Manila.

[4] Technically termed as the annual per capita water endowment that is the notional volume of water in cubic meters defined by the volume of accessible/reliable freshwater available each year, and is allocated as a notional allowance to each person.

[5] Footnote 3, page 1.

5. These priorities will be addressed by completing the NCPCP which comprises the outstanding MDP components. The NCPCP is estimated to cost approximately $1,640 million and will be implemented in two phases. The investment program will finance Phase 1 which includes (i) key upstream investments of the NCPCP that will transfer water from the Mahaweli River to existing reservoirs in the Central, North Central and North Western Provinces, and (ii) rehabilitation of an existing irrigation system located in the lower reach of the Mahaweli River to improve its water management. Phase 1 comprises the following three projects:

(i) The Upper Elahera Canal Project (UECP) comprises two components. The first component is the 9 km Kalu Ganga-Moragahakanda Transfer Canal (including a 8km tunnel) that transfers water between the Kalu Ganga and Moragahakanda Reservoirs.[6] The second component is the Upper Elahera Canal that connects the Moragahakanda Reservoir to the existing reservoirs: Huruluwewa, Manankattiya, Eruwewa and Mahakanadarawa via 82 km of canals (including a 28 km tunnel). These reservoirs supply existing irrigation and water supply schemes.

(ii) The North Western Province Canal Project (NWPCP) will construct 96 km of new and upgraded canals (including a 940 m tunnel) and two new 25 m tall earth gravity dams impounding the Mahakithula and Mahakirula Reservoirs. It will transfer water from the Dambulu Oya River and the existing Nalanda and Wemedilla Reservoirs to command existing irrigation and water supply reservoirs.

(iii) Minipe Left Bank Canal Rehabilitation Project (MLBCRP), located in the downstream reaches of the Mahaweli River, will: (a) add upstream storage by heightening the headwork's weir by 3.5 m, (b) construct new intake gates to the left bank canal and emergency spill weirs to both left and right bank canals; and (c) rehabilitate the 74 km Minipe Left Bank Canal to improve conveyance and reliability of service to existing farmers.

6. The investment program also supports preparation of Phase 2 projects that will develop additional transfer canals and reservoirs to allow additional water be diverted from the Mahaweli River and extend the system to additional existing reservoirs in the North Central Province. The government plans to implement Phase 2 from 2018-2030 under separate financing, possibly with ADB's support. It may comprise the following projects: (i) Kalinganuwara Pumping Complex Project; (ii) Lower Uma Oya Reservoir Project; (iii) Randenigala-Kalu Ganga Transfer Canal Project; and (iv) North Central Province Canal Project. With Phase 2, Mahaweli river water may eventually augment drinking water supplies to Jaffna and Kilinochchi, complementing an ongoing ADB-financed water supply and sanitation project.[7] Figure 1 shows the projects of Phase 1 and 2. Figures 2-3 show the three projects under Phase 1.

7. The investment program's impact will be improved agricultural production and sustained economic growth in the North Central, Central, North Western and Eastern Provinces. Its outcome will be secured access to water resources for agricultural and non-agricultural purposes in the project areas. The outputs will be (i) Output 1: new and improved water conveyance and storage infrastructure developed, (ii) Output 2: systems for improving water resources management and productivity developed, and (iii) Output 3: efficient multi-disciplinary investment program management operational. Each tranche of the MFF finances slices of the investment projects.

[6] These reservoirs are currently under construction.

[7] ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Technical Assistance Grant to Sri Lanka for the Jaffna and Kilinochchi Water Supply and Sanitation Project.* Manila.

8. Output 2 will address the key non-structural sector priorities through two consulting packages. Firstly the “improving system efficiencies and water productivity” package investigates existing inefficiencies within the existing conveyance and irrigation systems, and also constraints to improving water productivity, and will recommend on-farm and system-wide improvements; structural recommendations will be incorporated into civil packages for implementation under subsequent tranches and possibly under Phase 2. The second consulting package, “strengthening institutions with integrated water resources management,” will recommend programs for modernizing policy and governance frameworks, and institutional strengthening, to improve national water resources planning and operational procedures.

Figure 1: Map of Investment Program

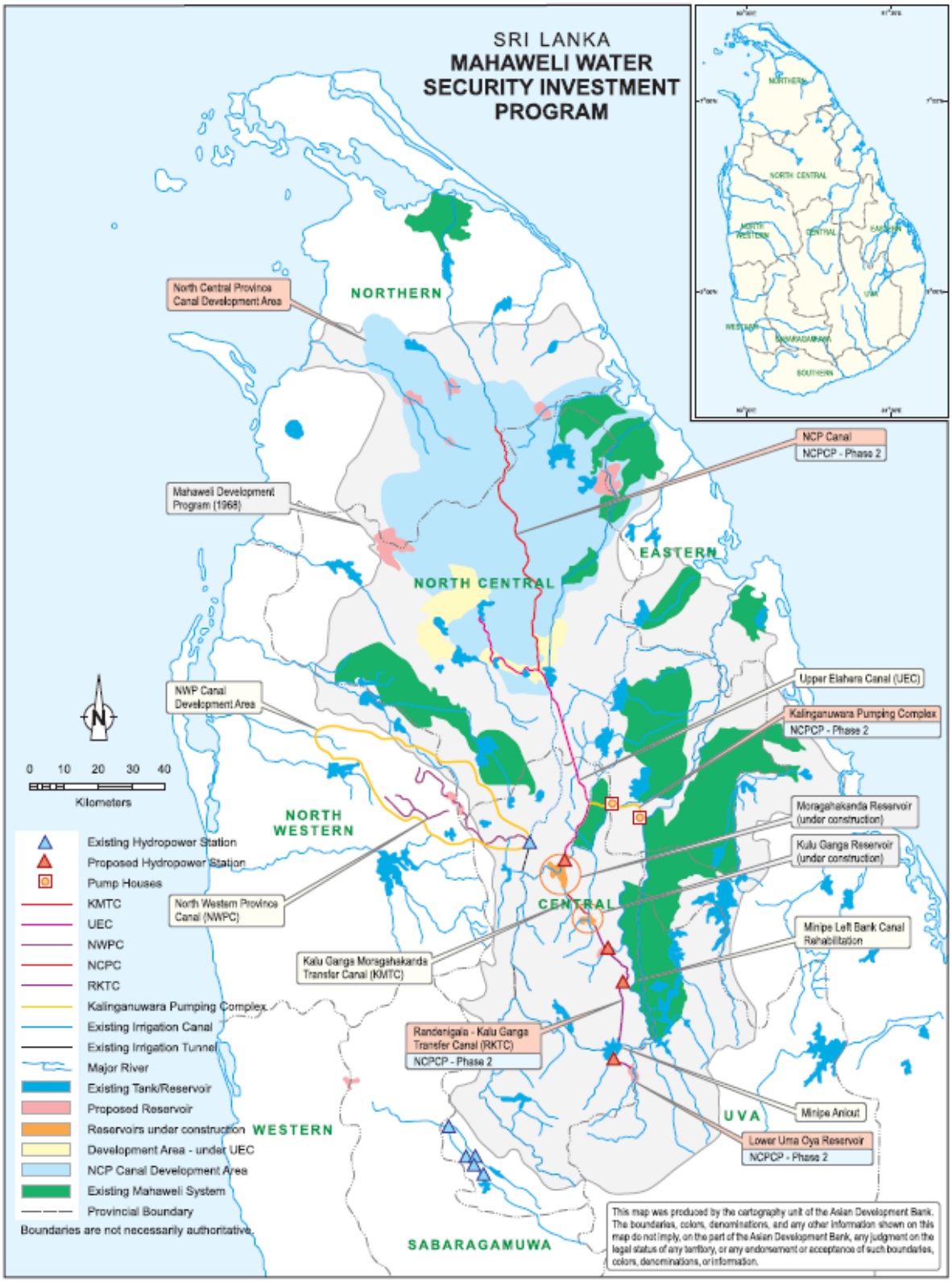


Figure 2: Map of MLBCRP

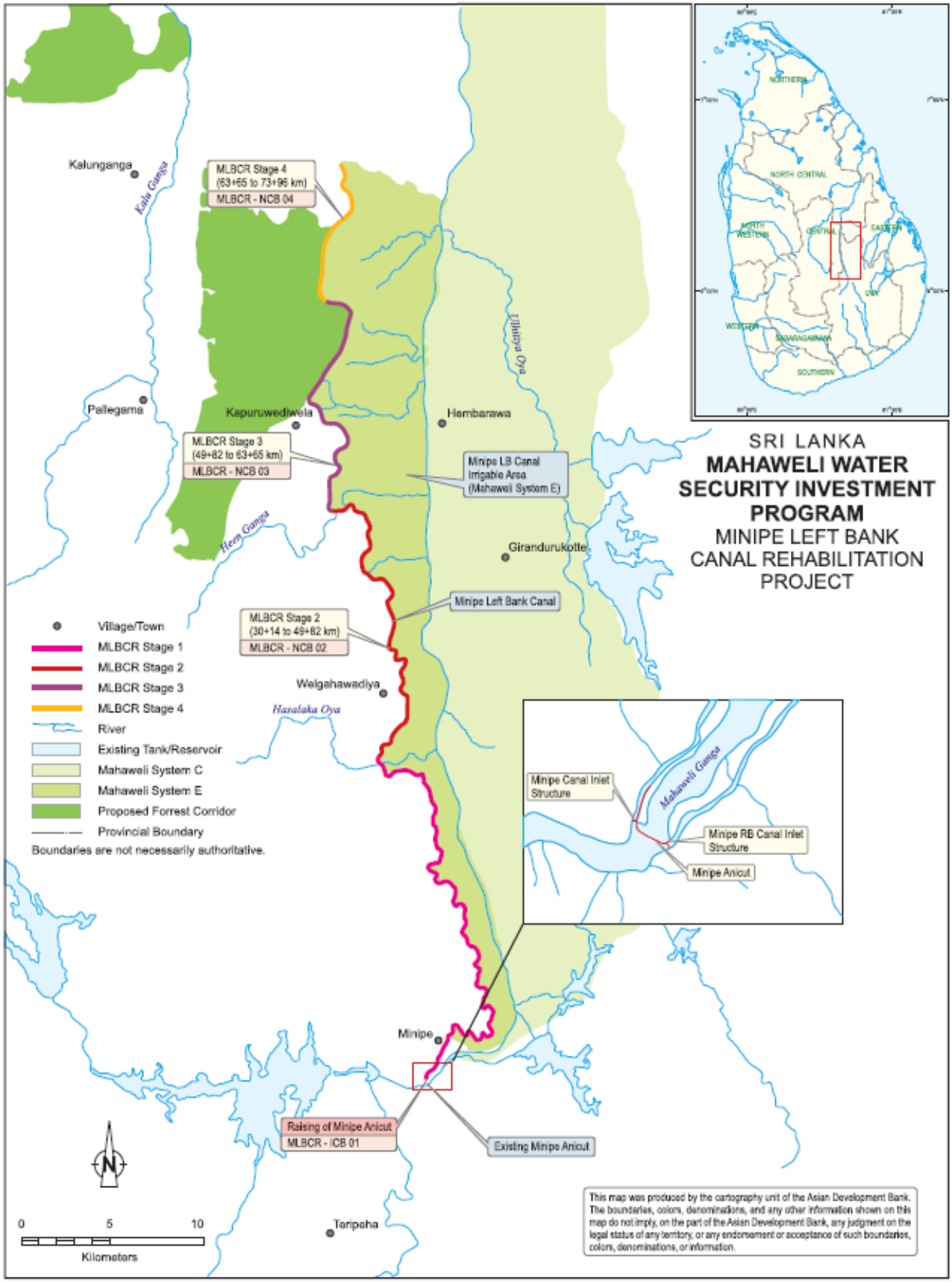


Figure 3: Map of UECP

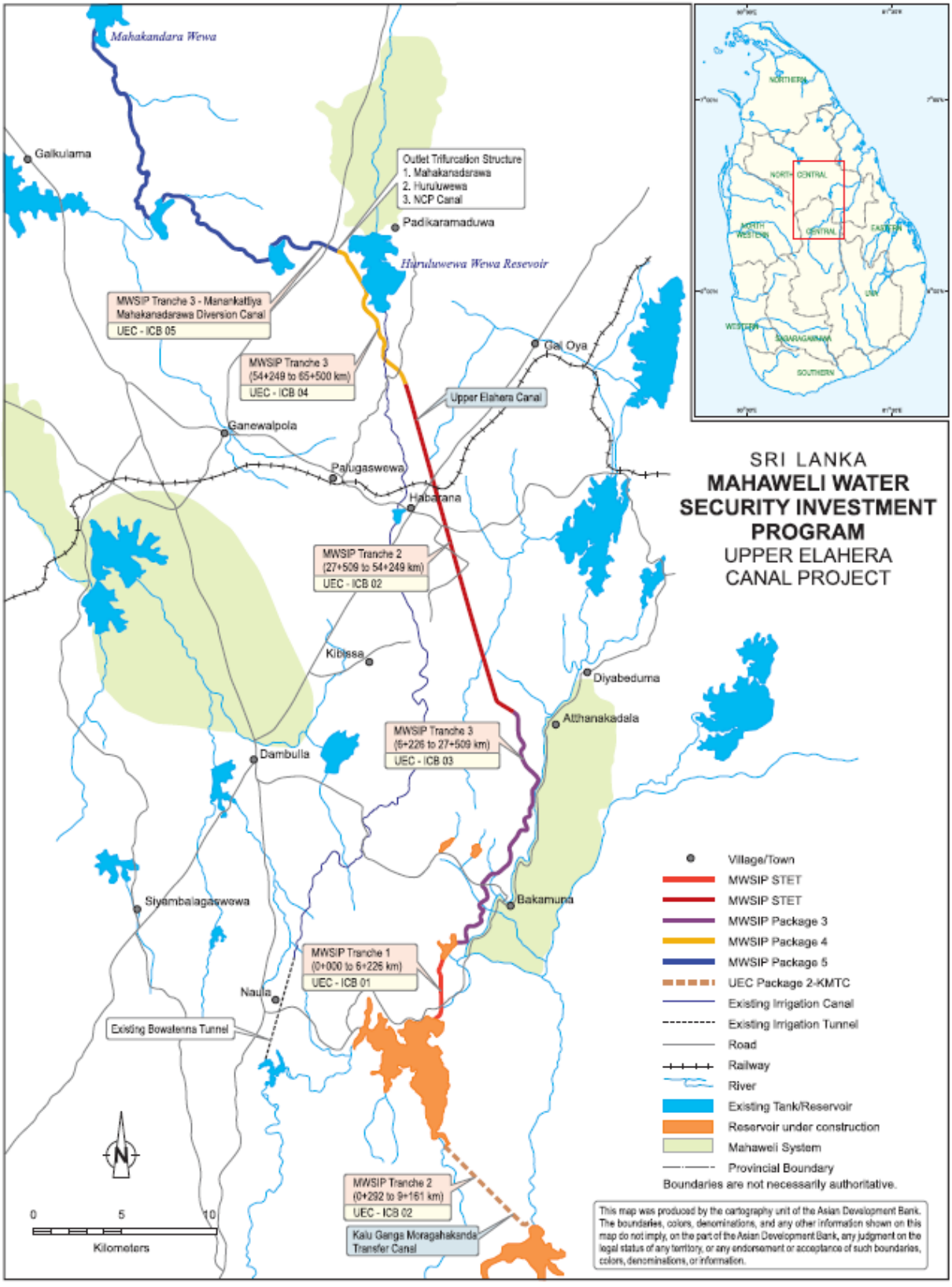
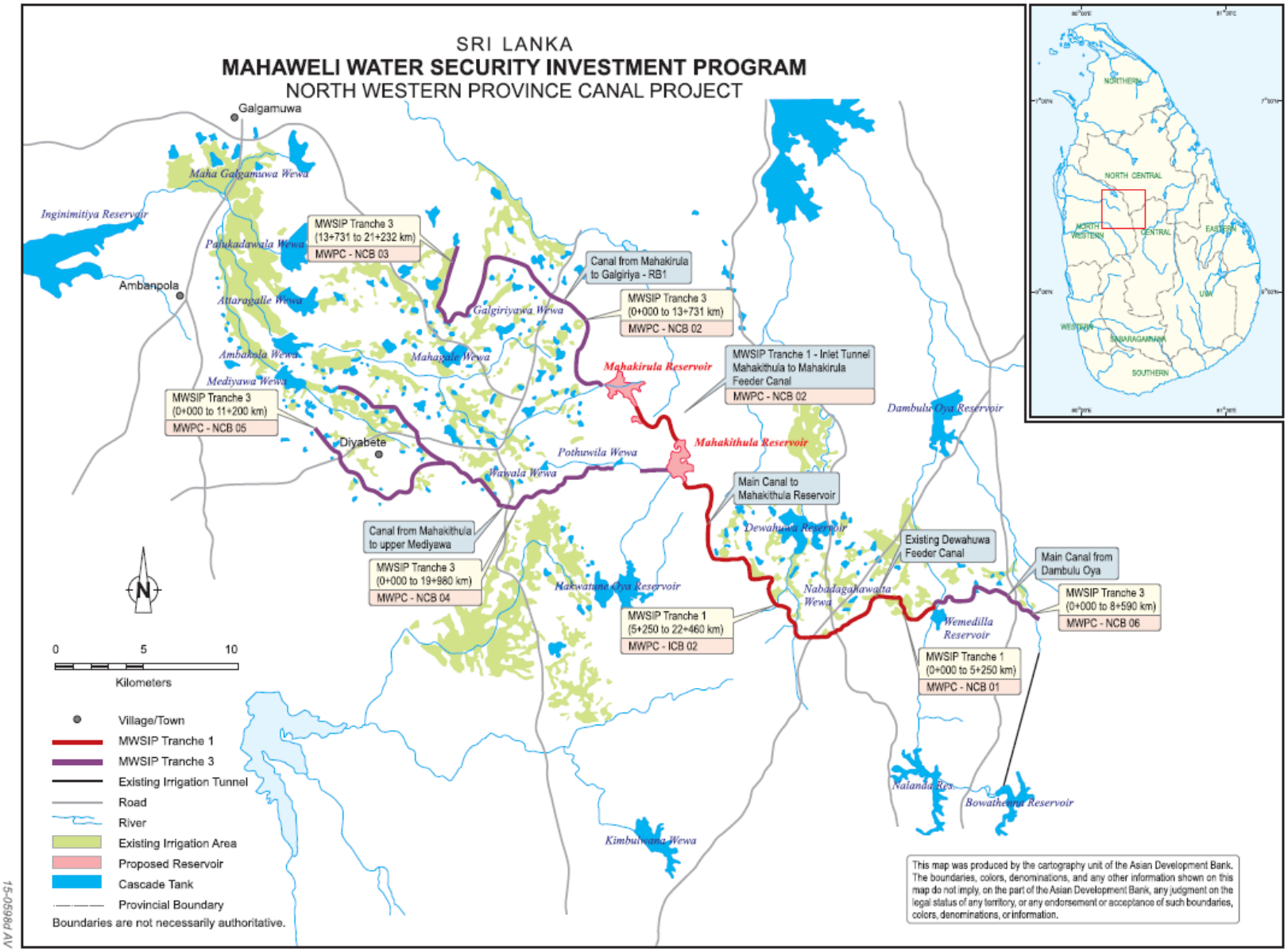


Figure 4: Map of NWPCP



II. IMPLEMENTATION PLANS

9. The tentative schedule for the investment program is to initiate tendering and award of contracts in Q1/Q2 2015 via advance contracting and retroactive financing. The MFF is designed for a 10-year implementation period. The government has expressed its desire to complete critical sub-projects of the investment program by 2020. Progress will depend on the expeditious implementation of civil works, disbursement rates, and timely submissions of periodic financing requests under the MFF.

A. Tranche 1 Readiness Activities

Indicative Activities	Responsible Agency	2014	2015							
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Advance contracting actions										
– Surveys and detailed designs completed for all packages	EA	x	x	x	x					
– Finalization of NCB and ICB bidding documents for advance action packages	EA	x	x	x	x	x	x	x		
– Approval of EIAs and IEE and initiate implementation of resettlement plan	EA, ADB						x			
Contract award and mobilization of contractors and PMDSC										
– Evaluation of expressions of interest	ADB	x								
– Issue of request for proposals	ADB				x					
– Submission of proposals and evaluation	ADB				x	x	x			
– Contract negotiations and award	EA							x		
– Mobilization and implementation	EA, PMDSC								x	x
Establish program implementation arrangements	EA	x	x	x	x	x	x	x	x	
ADB Board approval	ADB							x		
Loan signing	ADB, MOFP,								x	

	EA									
Government legal opinion provided	MOFP, EA								x	
Government budget inclusion	MOFP, EA		x							
Loan effectiveness	EA, MOFP, ADB									x

ADB = Asian Development Bank, EA = executing agency, EIA = environmental impact assessment, ICB = international competitive bidding, IEE = initial environmental examination, MOFP = Ministry of Finances and Planning, NCB = national competitive bidding, PMDSC = Program Management, Design and Supervision Consultant

B. Overall Project Implementation Plan

10. The implementation schedule is in Attachment 1.

III. INVESTMENT PROGRAM MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations – Roles and Responsibilities

Project implementation organizations	Management Roles and Responsibilities
Central Bank of Sri Lanka	– Setup and management investment program imprest account.
Program Steering Committee (PSC)	– Chaired by Secretary, Ministry of Mahaweli Development and Environment (MMDE), and members are shown in Attachment 2. The PSC will be responsible for: o Overseeing and monitoring implementation of the investment program, as well as overall program funding o Convening at least quarterly meetings to support implementation of the investment program. The meetings will discuss overall status and implementation issues, and when and as necessary, invite other participants from government and non-government organizations to support coordination and implementation of the investment program o Facilitating inter-ministerial coordination o Ensuring coordination among government agencies o Monitoring implementation progress of the investment program including its safeguard and development objectives o Rectifying issues that may be hindering implementation progress of the investment program o Providing guidance to the executing agency
Ministry of Mahaweli Development and Environment (MMDE)	– MMDE is the executing agency for the investment program. To implement the investment program, MMDE will establish a Program Management Unit (PMU) under which there will be three Project Implementation Units (PIUs) as described below. MMDE's implementing department is the Mahaweli Authority of Sri Lanka (MASL) and it will second staff to the PMU and UECP PIU. After completion and commissioning of the UECP, MASL will take over its management, operation and maintenance.
Executing Agency (EA)	– As the EA, MMDE will be responsible for: o Execution of the entire investment program o Providing overall coordination of all project activities o Leading inter-agency coordination o Providing policy guidance, strategic direction, and oversight o Ensuring adequacy of overall investment program financing o Establishing the PMU and PIUs and ensuring staffing positions are continuously filled with appropriately qualified and experienced officers and support staff o Securing annual budgetary allocations proposed by the

Project implementation organizations	Management Roles and Responsibilities
	PMU o Ensuring cabinet approval of contract packages o Preparing and submitting to ADB: (i) periodic financing requests for all tranches: (ii) quarterly progress reports; (iii) quarterly disbursement projections; and (iv) updated implementation plans, etc. o Monitoring and ensuring compliance of loan covenants and environmental and social safeguards, and facilitate the implementation of corrective actions o Establishing and chairing the PSC. o Manage investment program's imprest sub-accounts.
Department of Irrigation (DOI)	– DOI, under the Ministry of Irrigation, will second staff to the PMU and PIUs for MLBCRP and NWPCP. – After completion and commissioning of the MLBCRP and NWPCP, DOI will take their management, operation and maintenance.
Mahaweli Authority of Sri Lanka (MASL)	– MASL, under MMDE, will second staff to the PMU and PIU for UECP. – After completion and commissioning of the UECP, MASL will take its management, operation and maintenance.
Program Management Unit (PMU)	– The PMU will be accommodated within MMDE offices in Colombo. – The PMU will be led by either a Special Grade Engineer or Senior Engineer of Class 1 from MMDE who will be responsible for overall implementation management of the investment program. – The PMU will be responsible for: o Preparation of implementation plans and annual budgets o Overseeing the overall implementation of the program and each of its tranches o Liaising and corresponding with ADB on all issues relating to the investment program and each project o Coordinating with other government agencies to resolve any interdepartmental issues, and other aid agencies for implementation of non-physical activities as necessary o Approving all planning, design and contract documents associated with the investment program o Overall management of the Program Management, Design and Supervision Consultant (PMDSC) o Recruiting and managing the ISEWP and SIWRM consultant services packages o Acting as the "Employer" for all civil works packages o Overseeing and managing the procurement of services, works and goods by the respective PIUs o Monitoring the activities of the project implementation units (PIUs) and advising as necessary o Maintaining investment program accounts and comprehensive loan financial records, and submitting consolidated quarterly reports o Establishing and maintaining a project performance

Project implementation organizations	Management Roles and Responsibilities
	monitoring and evaluation system (PPMES) at each subproject level, as well as a project and investment program levels o Monitoring physical and non-physical investment activities under each project; obtaining necessary data for establishing baselines, maintaining and updating the PPMES o preparing and submitting: (i) reports to the PSC and MMDE for consideration and approval; (ii) periodic progress reports on each investment activities; (iii) periodic financing requests (through the Ministry of Finance and Planning) for ADB's consideration; (iv) audit reports; and (v) reports mandated under the loan and project agreements o Preparing and submitting withdrawal applications to ADB o Reviewing, approving and transferring of PIUs' request for payments o Preparing media information and implementing the investment program's communications plan o Updating and monitoring of the satisfactory implementation of resettlement plans, environment management plans (EMPs), and any correction action plans including resettlement plan for additional facilities such as access roads and camps, consistent with safeguards requirements and ADB's Safeguards Policy Statement (2009), and submitting updated safeguards and monitoring reports for review and disclosure.
MLBRC, UEC and NWPC Project Implementation Units (PIUs)	– Under the PMU, MMDE will establish separate PIUs for the MLBRC, UEC and NWPC investment projects with staff seconded from MMDE, DOI, MASL, and new recruits. The MLBRC and NWPC PIUs will be led by Class 2 officers from DOI, while the UEC PIU will be led by a Class 2 officer from MASL. – The PIUs will be accommodated within DOI and MASL offices within the project areas. – The PIUs will be responsible for: o Preparing, reviewing and approving services, works and goods packages o Leading implementation of the investment projects by: (i) procuring and evaluating services, works and goods under each investment project; (ii) obtaining all necessary government approval and right-of-way clearances from other state departments and private land owners as necessary; (iii) implementing the Environment Management Plans and Resettlement Plans in compliance with ADB's policies; (iv) monitoring the implementation of social dimensions of the project including adherence to the labor law and core labor standards; and (v) managing contracts awarded under the investment projects o publishing and formally disclosing the project cutoff date

Project implementation organizations	Management Roles and Responsibilities
	to the affected people and communities upon finalization of Detail Measurement Survey (DMS) for updating the required Resettlement Plans o Preparing and submitting to the PMU monthly safeguards progress reports, with complaint-grievances status included, and implementation of labor law and core labor standard for the preparation of biannual safeguards monitoring reports o acting as focal point, with support from the PMU, for the implementation of Grievance and Redress Mechanism and complaint resolutions o Managing the PMDSC at the investment project level o Preparing work and procurement plans, budgets, monitoring plans, and accounts o Submission of request for payments to PMU for prior approval o Undertaking day-to-day project and safeguards management o Coordination with the field staff of concerned line departments o Coordination with Project Management Committees, Farmer Organizations, and respective Project Managers of the beneficiary irrigation systems. o Implementing safeguards actions following the relevant plans o Preparing program progress reports and safeguards monitoring reports o Maintaining project accounts and financial records
Project Advisory Committee (PAC)	– The PAC will comprise of senior technical staff from MMDE, MASL, DOI, and other government agencies as required. It will: o Provide advice on Phase 2 investments o provide strategic feedback to the PSC about the quality of construction, safeguards planning and implementation, and any design or construction issues requiring special attention o assist the PMU and PIUs in identifying future issues and providing impartial and technically competent opinions o meet as and when required but at least quarterly
Program Management, Design and Supervision Consultant (PMDSC)	– Finalizing the detailed engineering designs, cost estimates and bid documents for all work, goods and services packages under the investment program – Preparing due diligence reports (technical, economic, financial, safeguards) and draft ADB board documents for possible financing of Phase 2 – Providing overall investment program management and administration support on reporting, financial management, and monitoring and evaluation – Supporting the PMU and PIUs with establishing and maintaining the PPMES – Undertaking any necessary additional surveys and

Project implementation organizations	Management Roles and Responsibilities
	investigations to support designs and implementation – Serving as the "Engineer" and representing MMDE in the construction contracts – Supporting commissioning and operation of the investments, including preparing management, operation and maintenance manuals – Preparing a Strategic Environment Assessment (SEA)
Independent Review Panel	– The independent review panel will comprise selected experts engaged on an individual basis who will review outputs from the PMDSC and other consultants, and provide advice to the PMU and ADB on technical and contractual matters. Experts may include tunnel, dam and contract specialists, and others if determined necessary.
ADB	– Monitoring and reviewing overall implementation of the investment program in consultation with the EA including: the project implementation schedule; actions required in terms of environmental impacts and RPs as applicable; timeliness of budgetary allocations and counterpart funding; project expenditures; progress with procurement and disbursement; statement of expenditure when applicable; compliance with particular loan covenants; and the likelihood of attaining the investment program's immediate development objectives. – Undertaking periodic review and supervision of the implementation of the investment program through regular loan review missions, midterm and final review missions. – Recruiting the PMDSC under Tranche 1.

B. Key Persons Involved in Implementation

Executing Agency

Ministry of Mahaweli Development and Environment	N.A. Sisira Kumara Additional Secretary Telephone: +94 (0) 11 2554 081 Email address: pdadbproject@gmail.com Office address: No. 11 Jawatta Road, Colombo 05, Sri Lanka

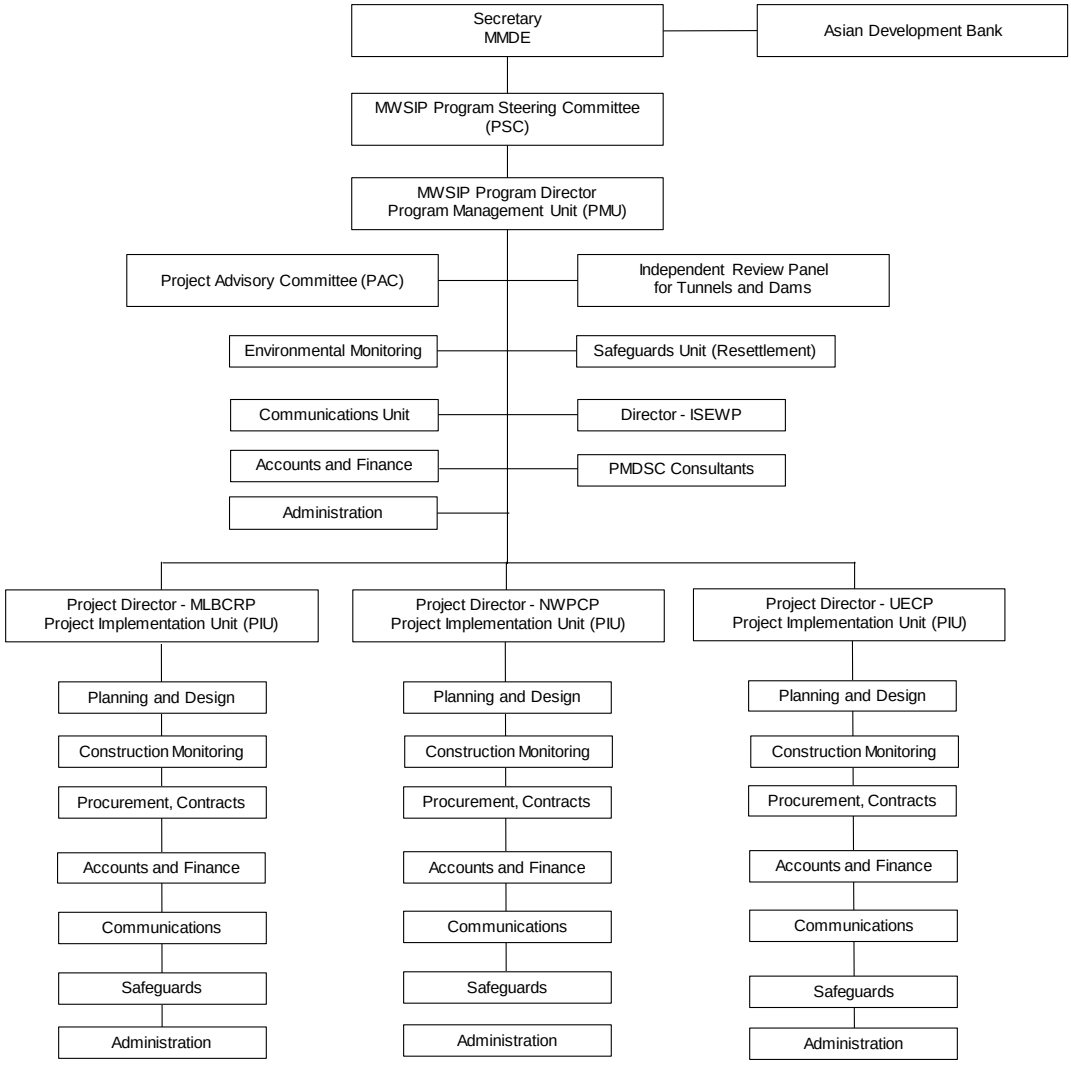
ADB

Environment, Natural Resources and Agriculture Division (SAER)	Takashi Matsuo Director, SAER Telephone: +632 632-5579 Email address: tmatsuo@adb.org

Mission Leader	Lance Gore Water Resources Specialist, SAER Telephone: +632 632-4444 Email address: lgore@adb.org
Resident Mission Focal	K.M. Palitha Bandara Senior Project Officer (Environment) Telephone: +94 11 4455455 Email address: kbandara@adb.org

C. Project Organization Structure

11. The following organogram shows the reporting lines and essential internal structures of key organizations involved in implementation of the investment program. The PMU and PIU staffing and indicative vehicle requirements are in Attachment 3.



IV. COSTS AND FINANCING

12. The cost of the investment program is estimated at $675 million, inclusive of taxes and duties, and financing charges during implementation. The estimated cost of Tranche 1 is $190 million (Table 1). The Tranche 1 OCR and ADF loans from ADB will finance: (i) civil works, (ii) mechanical and electrical equipment, (iii) consulting services, (iv) training and strategic communication planning, and (iv) part of incremental staff recurrent costs. The government will provide $40 million equivalent to cover: (i) taxes and duties, (ii) environment and social mitigation costs, (iii) part of recurrent staff costs, (iv) equipment operation and maintenance costs, (v) improvement of minor tanks and (vi) financing charges on the ADB loan during construction.

Table 1: Investment Program

Item	Amount[a] ($ million)			
	Investment Program	**Tranche 1**	**Tranche 2**	**Tranche 3**
A. Base Cost[b]				
1. New and improved water conveyance and storage infrastructure constructed	465	116	228	121
2. Systems for improving water resources management and productivity developed	4	2	-	2
3. Multi-disciplinary investment program management operational	46	31	-	15
Subtotal (A)	**515**	**149**	**228**	**138**
B. Contingencies[c]	**134**	**32**	**48**	**54**
C. Financing Charges during Implementation[d]	**26**	**9**	**9**	**8**
Total (A+B+C)[e]	**675**	**190**	**285**	**200**

[a] Includes taxes and duties to be financed from government resources ($15 million for the first tranche and $53 million for the investment program) as cash contributions. Amounts for the second and third tranches are indicative.
[b] In mid-2014 prices.
[c] Physical contingencies computed at 10% for civil works and equipment. Price contingencies computed at 0.3%-1.4% on foreign exchange costs and 6.0% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Includes interest and commitment charges. Interest during construction for the OCR loan has been computed at the 5-year forward LIBOR plus a spread of 0.50%, plus maturity premium of 0.10%. Maturity premium is based on the average loan maturity of 15.75 years, computed based on the loan terms and the government's choice of repayment options and dates. Commitment charges for the OCR loan are 0.15% per year to be charged on the undisbursed loan amount. Interest during implementation for the Special Funds resources loan has been computed at an interest rate of 2% per year.
[e] Any incidental expenditure relating to bank charges, local transport, freight and insurance are eligible for ADB financing.

Source: Asian Development Bank estimates.

13. The government has requested an MFF in an amount up to $453 million equivalent from ADB's resources to help finance the investment program. The MFF will be financed from loans from ADB's ordinary capital resources ($262 million) and Special Funds resources ($191 million).

14. Tranche 1 of the MFF will finance the following: (i) Stage 1 of the UECP comprising construction of the first 6.2 km of open canals and associated structures of UEC); (ii) Stage 1 of NWPCP comprising construction of two new dams and two new reservoirs at Mahakithula and Mahkirula, the 29 km of open canals between the Wemedilla tank and the new Mahakithula and

Mahkirula Reservoirs, and a 940m tunnel; (iii) all of MLBCRP; (iv) Stage 1 of PMDSC; and (v) ISEWP. Tranche 1 will be financed, in part, from a loan from ADB's ordinary capital resources ($76 million) and a loan from ADB's Special Funds resources ($74 million). The ADB (OCR) loan will have a 26-year term, including a grace period of 5 years, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility,[8] a commitment charge of 0.15% per year, and such other terms and conditions set forth in the loan agreement. The loan from ADB's Special Funds will have a 25-year term, including a grace period of 5 years, an interest rate of 2.0% per annum, and such other terms and conditions set forth in the loan agreement. The remainder of the cost of Tranche 1 will be funded by the government ($40 million). The financing plan for the investment program and Tranche 1 is in Table 2.

15. The approval of Tranche 2 is expected in 2017.9 Tranche 2 is envisaged to be financed by ADB ($130 million) and various bilateral development partners that have expressed an interest in cofinancing Tranche 2. The cofinancing requirements for Tranche 2 are estimated at approximately $114 million. Tranche 3 is envisaged to be financed by ADB ($173 million) and the government, and is expected to be approved in 2018.

Table 2: Financing Plan

Source	Investment Program		Tranche 1	
	Amount ($ million)	**Share** (%)	**Amount** ($ million)	**Share** (%)
Asian Development Bank				
Ordinary capital resources (loan)	262	39	76	40
Special Funds resources (loan)	191	28	74	39
Cofinanciers [a]	114	17	-	-
Government of Sri Lanka	108	16	40	21
Total	**675**	**100**	**190**	**100**

[a] To be confirmed. Initial discussions are taking place with potential cofinancier(s).
Source: Asian Development Bank estimates.

[8] The interest includes a maturity premium of 10 basis points. This is based on the above loan terms and the government's choice of repayment option and dates.

[9] ADB, Country Operations Business Plan 2015-2017, Manila, shows Tranche 2 as firm for 2017 and on standby for 2016. Similarly, Tranche 3 is on standby for 2017.

A. Detailed Cost Estimates by Expenditure Category for Tranche 1

Item		Amount ($ million) Foreign Exchange	Local Currency	Total Cost	% of Total Base Cost
A.	**Investment Costs**				
1.	Civil works	38.39	69.11	107.50	72.24
2.	Mechanical and electrical equipment	2.83	1.13	3.97	2.67
3.	Environment and social mitigation	-	4.98	4.98	3.35
4.	Consulting services				
	a. Project management	9.73	12.37	22.09	14.85
	b. Other consulting services	0.77	1.86	2.64	1.77
	Subtotal (A)	**51.72**	**89.45**	**141.17**	**94.87**
B.	**Recurrent Costs**				
1.	Incremental PMU and PIU salaries[a]	-	5.38	5.38	3.62
2.	Strategic communication plan	-	0.85	0.85	0.57
3.	Training	-	0.86	0.86	0.58
4.	Equipment operation and maintenance	-	0.55	0.55	0.37
	Subtotal (B)	**-**	**7.63**	**7.63**	**5.13**
	Total Base Cost	**51.72**	**97.08**	**148.80**	**100.00**
C.	**Contingencies**				
1.	Physical	5.59	8.02	13.61	9.15
2.	Price	1.61	17.42	19.03	12.79
	Subtotal (C)	**7.19**	**25.44**	**32.64**	**21.93**
D.	**Financing Charges During Implementation**				
1.	Interest during implementation	8.26	-	8.26	5.55
2.	Commitment charges	0.30	-	0.30	0.20
	Subtotal (D)	**8.56**	**-**	**8.56**	**5.75**
	Total Project Cost (A+B+C+D)[b]	**67.48**	**122.52**	**190.00**	**127.68**

[a] per government management services circular no.33 and subsequent circulars.

[b] any incidental expenditures relating to bank charges, local transport, freight and insurance are eligible for ADB financing.

Source: Asian Development Bank estimates.

B. Allocation and Withdrawal of Loan Proceeds for Tranche 1

Allocation and Withdrawal of ADB (OCR) Loan Proceeds				
		Amount Allocated $		Percentage and Basis for Withdrawal from the Loan Account
Number	Item	Category	%	
1	Civil Works	54,540,000	51	percent of total expenditure claimed
2	Mechanical and electrical equipment	2,090,000	53	percent of total expenditure claimed
3	Consulting services	-	-	-
4	Incremental PMU and PIU salaries	450,000	8	percent of total expenditure claimed
5	Strategic communication plan	500,000	59	percent of total expenditure claimed*
6	Training	450,000	53	percent of total expenditure claimed
7	Unallocated	17,970,000		
	Total	**76,000,000**		

*Exclusive of taxes and duties imposed within the territory of the borrower

Allocation and Withdrawal of ADF Loan Proceeds				
		Amount Allocated $		Percentage and Basis for Withdrawal from the Loan Account
Number	Item	Category	%	
1	Civil Works	37,800,000	35	percent of total expenditure claimed
2	Mechanical and electrical equipment	1,450,000	37	percent of total expenditure claimed
3	Consulting services	21,330,000	86	percent of total expenditure claimed
4	Incremental PMU and PIU salaries	310,000	6	percent of total expenditure claimed
5	Strategic communication plan	350,000	41	percent of total expenditure claimed*
6	Training	310,000	37	percent of total expenditure claimed
7	Unallocated	12,450,000		
	Total	**74,000,000**		

*Exclusive of taxes and duties imposed within the territory of the borrower

C. Detailed Cost Estimates by Financier for Tranche 1 ($ million)

Item	Total	ADB (OCR)		ADF		Government[a]			
	Amount	Amount	%	Amount	%	Costs	Taxes and duties[b]	Total	%
A. Investment Costs									
1. Civil works	107.50	54.54	51	37.80	35	3.63	11.52	15.15	14
2. Mechanical and electrical equipment	3.97	2.09	53	1.45	37	-	0.43	0.43	11
3. Environment and social mitigation [c]	4.98	-	-	-	-	4.98	-	4.98	100
4. Consulting services									
a. Project management	22.09	-	-	19.72	89	-	2.37	2.37	11
b. Other consulting services	2.64	-	-	1.60	61	0.75	0.28	1.04	39
Subtotal (A)	**141.17**	**56.64**	**40**	**60.58**	**43**	**9.37**	**14.59**	**23.96**	**17**
B. Recurrent Costs									
1. Incremental PMU and PIU salaries	5.38	0.45	8	0.31	6	4.61	-	4.61	86
2. Strategic communication plan [d]	0.85	0.50	59	0.35	41	-	-	-	-
3. Training	0.86	0.45	53	0.31	37	-	0.09	0.09	11
4. Equipment operation and maintenance	0.55	-	-	-	-	0.51	0.04	0.55	100
Subtotal (B)	**7.63**	**1.40**	**18**	**0.97**	**13**	**5.12**	**0.13**	**5.25**	**69**
Total Base Cost	**148.80**	**58.04**	**39**	**61.55**	**41**			**29.21**	**20**
C. Contingencies									
1. Physical	13.61	7.82	57	5.42	40	0.36	-	0.36	3
2. Price	19.03	10.14	53	7.02	37	1.87	-	1.87	10
Subtotal (C)	**32.64**	**17.96**	**55**	**12.45**	**38**	**2.23**	**-**	**2.23**	**7**
D. Financing Charges During Implementation									
1. Interest during implementation	8.26	-	-	-	-	8.26	-	8.26	100
2. Commitment charges	0.30	-	-	-	-	0.30	-	0.30	100
Subtotal (D)	**8.56**	**-**	**-**	**-**	**-**	**8.56**	**-**	**8.56**	**100**
Total Project Cost (A+B+C+D)	**190.00**	**76.00**	**40**	**74.00**	**39**	**25.28**	**14.72**	**40.00**	**21**

Source: Asian Development Bank estimates.
[a] Audit cost is included as part of the government cost.
[b] Cash contributions
[c] Resettlement implementation and environment management.
[d] Implementing the investment program's Strategic Communications Plan and its related components and activities.

D. Detailed Cost Estimates by Component for Tranche 1

Item		Cost	1. Water conveyance infrastructure constructed or rehabilitated		2. Systems for SIWRM and ISEWP developed		3. Multi-disciplinary investment program management operational	
			$million	%	$million	%	%	$million
A.	**Investment Costs**							
1.	Civil works	107.50	107.50	100	-	-	-	-
2.	Mechanical and electrical equipment	3.97	3.97	100	-	-	-	-
3.	Environment and social mitigation	4.98	4.98	100	-	-	-	-
4.	Consulting services							
	a. Project management	22.09	-	-	-	-	22.09	100
	b. Other consulting services	2.64	-	-	2.20	83	0.44	17
	Subtotal (A)	**141.17**	**116.45**	**82**	**2.20**	**2**	**22.53**	**16**
B.	**Recurrent Costs**							
1.	Incremental PMU and PIU salaries	5.38	-	-	-	-	5.38	100
2.	Strategic communication plan	0.85					0.85	100
3.	Training	0.86	-	-	-	-	0.86	100
4.	Equipment operation and maintenance	0.55	-	-	-	-	0.55	100
	Subtotal (B)	**7.63**	**-**	**-**	**-**	**-**	**7.63**	**100**
	Total Base Cost	**148.80**	**116.45**	**78**	**2.20**	**2**	**30.16**	**20**
C.	**Contingencies**							
1.	Physical	13.61	13.61	100	-	-	-	-
2.	Price	19.03	14.38	76	0.30	2	4.34	23
	Subtotal (C)	**32.64**	**27.99**	**86**	**0.30**	**1**	**4.34**	**13**
D.	**Financing Charges During Implementation**							
1.	Interest during implementation	8.26	6.46	78	0.12	1	1.67	20
2.	Commitment charges	0.30	0.24	78	0.00	1	0.06	20
	Subtotal (D)	**8.56**	**6.70**	**78**	**0.13**	**1**	**1.74**	**20**
	Total Project Cost (A+B+C+D)	**190.00**	**151.13**	**80**	**2.63**	**1**	**36.24**	**19**

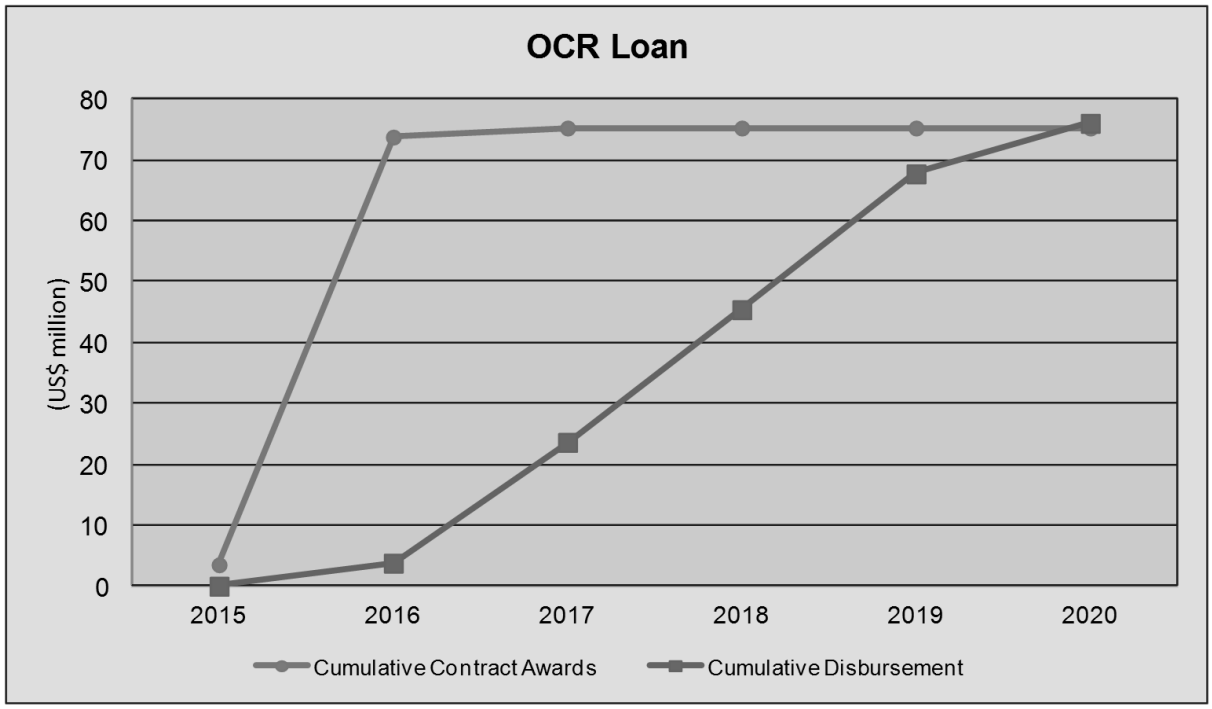
Source: Asian Development Bank estimates.

E. Detailed Cost Estimates by Year for Tranche 1

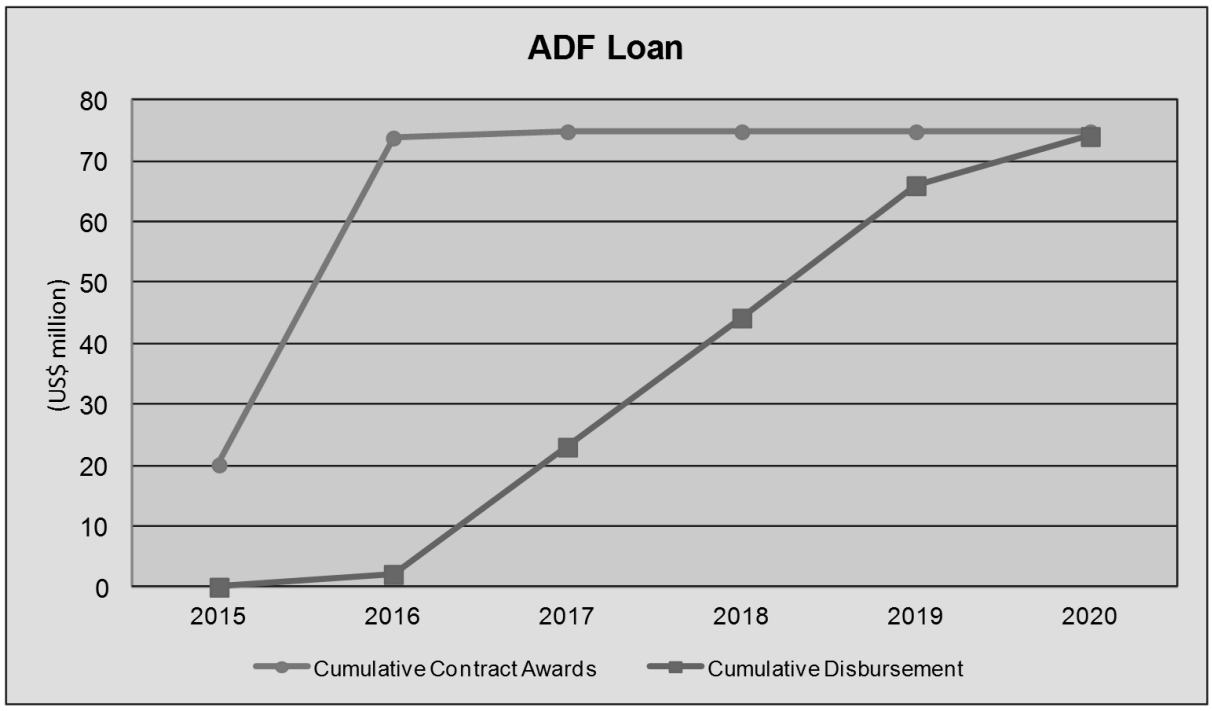
Item	($ million)					
	Total	**2015**	**2016**	**2017**	**2018**	**2019**
A. Investment Costs						
1. Civil works	107.50	4.16	29.91	33.76	32.83	6.85
2. Mechanical and electrical equipment	3.97	1.27	2.09	-	-	0.60
3. Environment and social mitigation	4.98	4.33	0.17	0.16	0.16	0.15
4. Consulting services						
a. Project management	22.09	2.42	4.66	4.48	4.31	6.22
b. Other consulting services	2.64	0.10	0.67	1.19	0.61	0.08
Subtotal (A)	**141.17**	**12.28**	**37.50**	**39.59**	**37.90**	**13.90**
B. Recurrent Costs						
1. Incremental PMU and PIU salaries	5.38	1.18	1.12	1.07	1.03	0.98
2. Strategic communication plan	0.85	0.19	0.18	0.17	0.16	0.15
3. Training	0.86	0.19	0.18	0.17	0.16	0.16
4. Equipment operation and maintenance	0.55	0.12	0.11	0.11	0.10	0.10
Subtotal (B)	**7.63**	**1.67**	**1.59**	**1.52**	**1.46**	**1.39**
Total Base Cost	**148.80**	**13.95**	**39.09**	**41.11**	**39.36**	**15.30**
C. Contingencies						
1. Physical	13.61	0.49	4.01	4.12	4.34	0.67
2. Price	19.03	0.57	2.99	5.17	6.94	3.36
Subtotal (C)	**32.64**	**1.06**	**6.99**	**9.28**	**11.28**	**4.02**
D. Financing Charges During Implementation						
1. Interest during implementation	8.26	0.09	0.63	1.60	2.62	3.32
2. Commitment charges	0.30	0.11	0.09	0.06	0.03	0.01
Subtotal (D)	**8.56**	**0.20**	**0.73**	**1.66**	**2.65**	**3.33**
Total Project Cost (A+B+C+D)	**190.00**	**15.21**	**46.81**	**52.05**	**53.28**	**22.65**
%Total Project Cost	100.00	8.00	24.64	27.40	28.04	11.92

Source: Asian Development Bank estimates.

F. Contract and Disbursement S-curves for Tranche 1

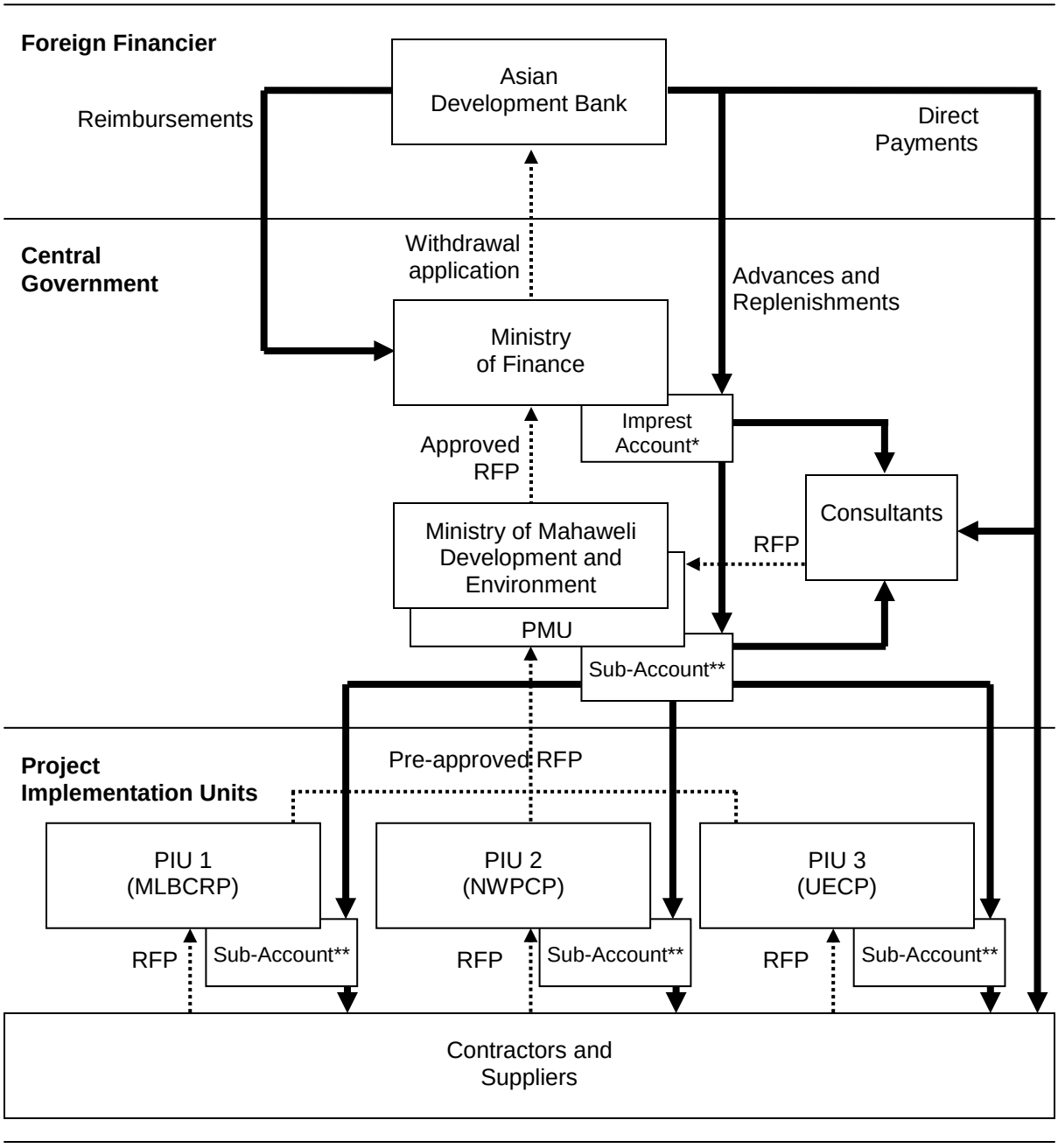


Source: Asian Development Bank estimates
Note: Cumulative disbursement of the OCR loan exceeds cumulative contract awards by $2.2 million (this is the amount to be disbursed for training and incremental PMU/PIU salaries)



Source: Asian Development Bank estimates
Note: Cumulative disbursement of the ADF loan exceeds cumulative contract awards by $0.6 million (this is the amount to be disbursed for training and incremental PMU/PIU salaries)

G. Fund Flow Diagram



→ fund flow
- - - → document flow

RFP: request for payment
* US$ account in Central Bank of Sri Lanka
** LKR sub-accounts in state-owned bank under MMDE

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

16. A financial management assessment of MMDE,[10] DOI and MASL was undertaken in 2014 in accordance with ADB's Guidelines for the *Financial Management and Analysis of Projects* (2005) and *Financial Due Diligence: a Methodology Note* (2009).[11] This included an assessment of the financial management capacity of MMDE, DOI and MASL including fund-flow arrangements, staffing, accounting and financial reporting systems, financial information systems, internal controls, and internal and external auditing arrangements.

17. MMDE is the executing agency. Staff from the DOI and MASL will be seconded to MMDE to fill PMU and PIUs positions as required for the duration of the investment program. MMDE is structured to guide the PMU and PIUs by exercising supervision and progress control over the overall programs and individual projects and tranches. MMDE has extensive past experience in executing large foreign funded projects and is also currently managing an ongoing portfolio of foreign and government funded development projects.

18. MASL operates under MMDE as a semi-autonomous institution. The activities of MASL form the cornerstone of the MDP, which include regulating and harnessing the waters of Mahaweli River for power generation, land settlement and food production, thereby providing employment. Although MASL has not worked with any development partners, it has completed an array of large hydro and water resource development initiatives and its past experience will serve well in the implementation of the investment program. MMDE, together with MASL, has a budget allocation of over $300 million for 2014, which reflects the combined financial strength of the two organizations and their scale of technical and administrative expertise.

19. DOI was under MMDE until January 2015 when it was placed under the new Ministry of Irrigation. However, DOI has always functioned as an independent department with separate budget accounts. It has been playing a key role in the irrigation sector of the country for over 100 years with responsibility for some of the nation's main irrigation systems. DOI is well staffed with the reporting and organizational structures in place to implement the investment program. DOI's 2014 budget is currently estimated to be around $100 million. DOI also has considerable past experience in implementing major irrigation systems and schemes funded both locally as well as by development partners.

20. Therefore, MMDE with the support of MASL and DOI, has sufficient financial management capacity and expertise to execute and implement this investment program however the following improvements are recommended:

(i) A financing management manual be prepared for the investment program and training is provided to MMDE, PMU and PIU staff. This is recommended since MMDE has not implemented ADB-funded for more than 10 years. The manual and training will be based on ADB's policies, procedures and guidelines, focused on the requirements of the investment program. The PMDSC is tasked with preparing the manual and ADB SLRM can provide training as required.

[10] The assessment was of the Ministry of Irrigation and Water Resources Management which changed its name to MMDE in January 2015.

[11] The detailed financial management assessment is a supplementary linked document and is available on request.

(ii) A firm commitment from Treasury to prioritize funding for the investment program to ensure timely fund disbursements. This is necessary to avoid re-prioritized projects during the fiscal year resulting in non-disbursements and delays.
(iii) MMDE to include complete financial statements of the investment program to Treasury for their appropriation account, including a balance sheet, profit and loss account, and a cash flow statement.
(iv) MMDE should routinely update its Corporate Plan through extensive participation of staff in the form of workshops to improve monitoring and physical and financial progress of project against targets.
(v) MMDE should update their project implementation monitoring key performance indicators (KPIs) to track physical progress with financial disbursements of projects and programs. This will enable effective decision-making, planning and allocation of resources and funds. The PMDSC is tasked with preparing a monitoring and evaluation system, and supporting the PMU/PIUs with overall monitoring of the investment program.

21. The overall pre-mitigation financial management risk is rated as 'Substantial.' A summary of the risk assessment is in Attachment 4 along with proposed risk mitigation measures. There are no high risk areas and overall MMDE's financial management arrangements are considered adequate. Financial management risks should be considered and updated throughout the life of the investment program along with appropriate risk mitigation measures.

B. Disbursement

22. The Loan proceeds will be disbursed in accordance with ADB's Loan Disbursement *Handbook* (2015, as amended from time to time),[12] and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available online.[13] PMU and PIU staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

23. ADB's disbursement procedures (direct payment, commitment, reimbursement, and/or imprest fund) will be used for withdrawal of project funds. Direct payment and commitment letter procedures by ADB may be used for payments above $100,000. Reimbursement procedures may be used for incremental PMU and PIU salaries. Reimbursement and imprest fund (liquidation or replenishment) procedures may be utilized for other recurrent costs (strategic communication plan and training), and payments less than $100,000. Withdrawal applications will be authorized by MMDE and sent directly to ADB. One imprest account in US dollar will be established per funding source and administered by the Central Bank of Sri Lanka. Four sub-accounts in local currency will be established per funding source and maintained by MMDE. Similar fund flow arrangements may continue for subsequent tranches.

24. The imprest and sub-accounts will be established, managed, replenished and liquidated in accordance with the Loan Disbursement Handbook. The imprest and sub-accounts are to be used exclusively for ADB's share of eligible expenditures. MMDE who established the sub-accounts in its name is accountable and responsible for proper use of advances to the imprest account including advances to the sub-accounts.

[12] Available at: http://www.adb.org/Documents/Handbooks/Loan_Disbursement/loan-disbursement-final.pdf
[13] Available at: http://wpqr4.adb.org/disbursement_elearning

25. The total outstanding advance to the imprest account should not exceed the estimate of ADB's share of expenditures to be paid through the imprest account for the forthcoming six months. MMDE may request for initial and additional advances to the imprest account based on an Estimate of Expenditure Sheet[14] setting out the estimated expenditures to be financed through the account for the forthcoming six months. Supporting documents should be submitted to ADB or retained by the borrower in accordance with ADB's Loan Disbursement Handbook when liquidating or replenishing the imprest account.

26. The statement of expenditures (SOE) procedure will be used for reimbursement and liquidation and replenishment of the imprest accounts. Any individual payments to be reimbursed or liquidated under SOE procedure will not exceed the equivalent of $100,000. Payments in excess of the SOE ceiling should be accompanied by full supporting documentation. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB' and for independent audit.[15] A ceiling of $100,000 for the use of SOE procedures is considered reasonable given that, although the accounting departments are well staffed and competent, MMDE does not have significant prior experience in ADB funded projects.

27. MMDE will be responsible for: (i) preparing disbursement projections; (ii) requesting budgetary allocations for foreign aid allocation and counterpart funds; (iii) collecting supporting documents; and (iv) preparing and sending withdrawal applications to ADB in accordance with Loan Disbursement Handbook. Each PIU should submit relevant supporting documents and periodic expenditure statements to PMU. The PMU should consolidate PIU expenses when preparing withdrawal applications.

28. Before submission of the first withdrawal application, MMDE should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the borrower, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is US$100,000 equivalent. Individual payments below this amount should be paid: (i) by MMDE and subsequently claimed to ADB through reimbursement; or (ii) from the imprest account, unless otherwise accepted by ADB.

C. Accounting

29. MMDE will: (i) maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the investment program; and (ii) prepare program financial statements in accordance with the government's accounting laws and regulations, which are consistent with international accounting principles and practices. Program financial statements shall include at the minimum, a statement of receipts and payments with accompanying notes and schedules. These shall be prepared to ensure maximum alignment to international accounting standards. Financial statements for individual tranches may be consolidated with a separate table prepared for each loan.

D. Auditing

30. MMDE will ensure the detailed consolidated investment program accounts are audited in accordance with International Standards on Auditing and with the government's audit

[14] Available in Appendix 10B of the *Loan Disbursement Handbook*
[15] Checklist for SOE procedures and formats are available at: http://www.adb.org/documents/loan-disbursement-handbook

regulations by an auditor acceptable to ADB. The audited project financial statements will be submitted in the English language to ADB within 6 months of the end of the fiscal year by MMDE.

31. The annual audit report will include audit opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan proceeds were used only for the purposes of the project or not; (iii) the level of compliance for each financial covenant contained in the legal agreements for the project; (iv) use of the imprest fund procedure; and (v) the use of the statement of expenditure procedure certifying to the eligibility of those expenditures claimed under SOE procedures, and proper use of the SOE and imprest procedures in accordance with ADB's Loan Disbursement Handbook and the project documents. A management letter shall also be provided.

32. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

33. The government and MMDE have been made aware of ADB's approach on delayed submission, and the requirements for satisfactory and acceptable quality of the audited accounts. ADB reserves the right to verify the program's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

34. Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011).[16] After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The management letter will not be disclosed.

[16] Available from http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications.

VI. PROCUREMENT AND CONSULTING SERVICES

35. A procurement capacity assessment for the investment program was prepared in accordance with ADB's "Guide on Assessing Procurement Risks and Determining Project Procurement Classification."[17] MMDE has substantial experience in implementing large-scale development projects in the sector. However, the investment program is classified as Category A with a concurrent procurement risk classified as "Substantial" because MMDE have not been recently exposed to ADB-financed projects and the level and type of funding that is envisaged under the investment program. The ensuing risk mitigation / management measures have been identified and following mitigation measures are recommended.

(i) The government needs to strengthen its overall procurement fiduciary, monitoring and capacity development efforts considerably;
(ii) Government needs to explore the possibilities of increasing procurement approval thresholds procedurally for program procurement, until it makes blanket changes;
(iii) MMDE, MASL and DOI need to disseminate opportunities that will be available in the irrigation sector to the construction industry, especially to those who are strong in road construction, in a broad, transparent manner, to stimulate interest of capable contractors who have hitherto not participated in such work;
(iv) While ADB's general Sri Lanka NCB/ICB thresholds will remain the same for the sector, it is recommended to keep NCB packages below $ 7.5 million threshold for tranche 1 of the MFF, given the present irrigation sector contractor capacity. This should be reviewed during tranche 2 processing;
(v) MMDE, MASL and DOI need to establish a proper complaints handling mechanism;
(vi) MMDE, MASL and DOI need to improve systems for collecting procurement data for monitoring, analysis and feedback. The unit rates used for contract estimates need to be periodically updated; and
(vii) MMDE should also conduct hands-on procurement and contract management training to relevant project staff and take measures to retain them.

36. Procurement under the investment program essentially comprises: (i) recruitment of international consulting firms for project preparation and implementation assistance to PMU/PIUs and for the ISEWP consultancy package; (ii) civil works for the new construction of new conveyance and water delivery infrastructure and rehabilitation of existing canal infrastructure; and (iii) procurement of goods viz. software, project vehicles, office furniture, etc. These are detailed in the Procurement Plan in Attachment 5.

37. The consulting firm for PMDSC services (estimated total cost about $40 million) for implementation assistance to PMU and PIUs will be recruited on QCBS method with the FTP system. MMDE has requested ADB to select the PMDSC to expedite their recruitment, and the EA will thereafter negotiate and execute the contract with the selected consultancy firm. Goods such as office furniture and equipment, vehicles etc., are locally available and will be procured through shopping. All transport costs related to all Goods packages are included in the cost estimates. Procurement activities will be carried out with prior review by ADB, unless otherwise stated in the Procurement Plan.

[17] ADB. 2014. *Guide on Assessing Procurement Risks and Determining Project Procurement Classification*. Manila

A. Advance Contracting and Retroactive Financing

38. In order to expedite program implementation, the government has requested and ADB has approved advance contracting actions for the procurement and consulting service (Table 3). All advance contracting and retroactive financing will be undertaken in conformity with ADB's *Procurement Guidelines* (February 2013, as amended from time to time)[18] and ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time).[19] The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The borrower and the MMDE have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the investment program.

39. Advance contracting includes tendering and bid evaluation for civil works packages, recruitment of the PMDSC consultant services, and shopping for goods.

Table 3: Advance Contracting

Name	Description	Type
MLBCRP Package 1 – heightening the Minipe Anicut crest level, including water control and measurement facilities	Civil works	ICB
UECP Package 1 – new canal construction for the first 6+226 km of the project	Civil works	ICB
NWPCP Package 1 – new Mahakithula Wewa and Mahakirula Reservoirs, a link canal/tunnel, and associated facilities	Civil works	ICB
PMDSC	Consultant	QCBS
Office equipment and vehicles		Shopping goods
Field office upgrading		Forced account

ICB = international competitive bidding, MLBCRP = Minipe Left Bank Canal Rehabilitation Project, NCB = national competitive bidding, NWPCP = North Western Province Canal Project, PMDSC = program management, design and supervision consultants, UECP = Upper Elahera Canal Project

40. Under each tranche, ADB may, subject to its policies and procedures, allow on request (a) advance contracting of civil works, equipment and materials, and consulting services and (b) retroactive financing of eligible expenditures incurred for consulting services and procurement of goods, services and civil works, project management, and project administration up to 20% of proposed individual loan, incurred prior to loan effectiveness but not earlier than 12 months before the date of signing of the related legal agreement. This applies to items in Table 3.

B. Procurement of Goods, Works and Consulting Services

41. All procurement of goods and works will be undertaken in accordance with ADB's *Procurement Guidelines* (2013, as amended from time to time). ADB and the government will review the public procurement laws of the central and provincial governments to ensure consistency with ADB's *Procurement Guidelines* as and when necessary.

42. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in Section C.

[18] Available at: http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf
[19] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf

43. All consultants will be recruited according to ADB's *Guidelines on the Use of Consultants*.[20] The terms of reference for all consulting services are detailed in Section D.

44. To facilitate program management and implementation of Project 1, an international firm, as PMDSC will be recruited. The PMDSC will assume the role of the "Engineer" and will supervise respective civil works and provide on-the-job training to counterpart staff from the MMDE, and/or provincial and local agencies. The consulting firm will be engaged using the quality- and cost-based selection (QCBS) method with a weighting of 90% technical and 10% financial as the nature of the assignment requires priority consideration for quality including designing and supervising the construction of specialized dams and tunnels.

C. Procurement Plan

45. The procurement plan is in Attachment 5.

D. Consultant's Terms of Reference

46. The PMDSC will support the PMU for five years under Tranche 1 and the contract will be signed for the same period. The PMDSC will be responsible for assisting the PMU to: (i) finalize designs for all packages and the bid documents of the remaining contract packages to be awarded under Project 1, and all contract packages of Project 2 and Project 3; (ii) procure, mobilize, and manage the contractors for Project 1, Project 2 and Project 3; (iii) recruit, mobilize, and manage the consultant for the ISEWP consulting services package; (iv) finalize the terms of reference, recruitment and management of a consulting firm to undertake the SIWRM consulting services package; (v) manage and supervise all civil works contracts and act as the "Engineer"; (vi) prepare Phase 2 investments and necessary ADB financing documents; (vii) provide technical and management advice, as required; (viii) manage and administer the investment program; and (ix) prepare draft periodic financing requests for subsequent tranches, and routine reporting requirements of ADB. The PMDSC will also assist MMDE with preparations, logistics and reporting for missions fielded by ADB and other cofinanciers, as necessary, throughout the investment program. A total of 1,420 person-months of consulting services have been provided for the PMDSC, of which 260 person-months will be for international key specialists and 1,160 person-months will be for national key specialists. Detailed terms of reference are in Attachment 6.

47. The "improving system efficiencies and water productivity" (ISEWP) consulting services package will seek to increase water availability to all areas within the NCPCP project area through investigating current water management and application practices, and identifying areas for improvements. The objective is to maximize overall systems efficiencies and productivity of water within the planned, expanded Mahaweli System being financed by this investment program and under Phase 2. The investment program will construct the main conveyance system which supplies water to existing reservoirs that supply the cascade irrigation systems. The cascade systems comprise major and minor tanks supplying distribution and tertiary canal systems which are largely operated by Provincial Councils and Farmer Organizations (FOs). The systems are characterized by predominately paddy rice cultivation, gross water application rates of approximately 30,000 m^3/ha per annum and distribution efficiencies in the order of 50%. This package will consider how water is managed within these cascade systems. It will study

[20] Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: http://www.adb.org/documents/handbooks/project-implementation/

and identify options for improvement of the system's infrastructure and management. The approach will be based on benchmarking (water management, yields and local water management institutions) of 'typical systems' within the NWPCP and MLBCRP areas, analysis of current and future performance (with future changes in water availability) and formulation of options for improvements to infrastructure, and the system's management, operation and maintenance. The study will also: (i) review past and ongoing efforts to improve system water use efficiencies and productivity of water, and apply the lessons learned to the study's recommendations; (ii) consider what commercial support and extension programs are required to encourage farmers to adopt water-saving practices (for example precise irrigation) and crop diversification; (iii) prepare detailed designs of recommended structural interventions for the NWPC project area that will be included within the NWPC Project - Stage 2; (iv) prepare guidelines for up-scaling recommendations to the national level; and (v) recommend capacity development programs for government staff and FOs. Detailed terms of reference are in Attachment 7. The PMDSC will assist MMDE with finalizing the TOR, recruiting, and managing the ISEWP consultants.

48. The "strengthening of integrated water resources management" consulting services package seeks to promote integrated water resources management (IWRM) principles both within the investment program area and nationally, including recommending and supporting strengthening of water resources management and irrigation sector policies, legislation and institutions. This will be achieved through the review of current policy and legal frameworks, benchmarking of key water sector institutions, and formulation of recommendations and guidelines for improvements to institutionalize IWRM. This activity will also support: (i) updating of current water resources management master plans to include the completed MDP incorporating analysis of climate change impacts and water management practices for dry periods; (ii) possible crop diversification and impacts to scheme designs and management; (iii) assessment of the water demands of, and management of, other major water users including the environment; (iv) design, development and implementation of an IWRM decision support system; and (v) updating and modernizing the Water Management Secretariat under the MASL. The PMDSC will assist MMDE with preparing the TOR.

49. MMDE, when ADB requests, will recruit and engage a panel of individual experts with qualifications, experience and terms of reference acceptable to ADB, to review, analyze and advise on the detailed engineering designs, contract documents, and implementation of the dam and tunnel components of the investment program and its projects. Draft TOR for these specialists is in Attachment 8.

VII. SAFEGUARDS

A. Key Safeguards Documents and Responsibilities

50. Pursuant to ADB's Safeguard Policy Statement (SPS, 2009) ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS.

51. The investment program will have three projects implemented time-sliced across three tranches. Implementation of all three projects will be initiated under Tranche 1. Therefore, all three projects have been categorized and assessments prepared prior to ADB Board approval. The following safeguards documents were prepared for the investment program as per ADB's SPS and the government rules:

(i) Environmental Impact Assessment: Upper Elahera Canal Project
(ii) Environmental Impact Assessment: North Western Province Canal Project
(iii) Initial Environmental Examination: Minipe Left Bank Canal Rehabilitation Project
(iv) Environmental Assessment and Review Framework
(v) Resettlement Implementation Plan: North Western Province Canal Project
(vi) Resettlement Framework

52. The Environmental Assessment and Review Framework (EARF) and the Resettlement Framework (RF) serve to guide safeguard assessments and the preparation of relevant safeguards documents in all three projects. The safeguard frameworks cover project specific information and requirements in accordance with ADB's SPS: (i) the general anticipated impacts of the projects to be financed under the investment program on the environment, involuntary resettlement, and indigenous peoples; (ii) the safeguard criteria that are to be used in selecting projects; (iii) the requirements and procedure that will be followed for screening and categorization, impact assessments, development of management plans, public consultation and information disclosure (including the 120-day disclosure rule, for the Environmental Impact Assessments), and monitoring and reporting; (iv) the institutional arrangements (including budget and capacity requirements) and the government's and ADB's responsibilities and authorities for the preparation, review and clearance of safeguard documents. Given that all environmental assessments and resettlement plans required for the entire investment program will be finalized prior to approval of the MFF, these frameworks also provide guidance to the EA on process to be followed if the approved documents need to be revised or updated later due to any changes in design or scope.

53. The government through MMDE will ensure that all safeguards requirements prescribed in the EARF and RF are complied with during the processing and implementation of the program. Pursuant to ADB's SPS, ADB will not finance investments that do not comply with the SPS and national laws. All institutions under the investment program will ensure that their investments are in compliance with applicable national laws and regulations, and will apply the prohibited investment activities list to sub-projects financed by ADB.

54. A safeguards cell will be established in the PMU. The safeguards cell will be responsible to oversee overall monitoring and verification of environment and resettlement activities of the investment program. Two counterpart personnel with relevant experience will be assigned to the safeguards cell which will have responsibility for ensuring compliance of the safeguards requirements including (i) environment and (ii) resettlement including gender. While MMDE will be responsible for overall coordination, planning, and financing of resettlement program, the

implementation of Resettlement Implementation Plans and supervision of the implementation of the Environment Management Plans (EMPs) is the responsibility of PMU.

55. No Indigenous Peoples issues are foreseen to be addressed during the investment program implementation. Tranche 1 is categorized as C for the indigenous peoples safeguard. There are no indigenous peoples as defined by ADB's SPS in any of the areas of the three projects under the Investment Program. As the remaining tranches would also be categorized as C, an Indigenous Peoples Planning Framework has not been prepared.

B. Environment

56. Since the MFF is designed as a time-slice investment, and all three projects are to be initiated in Tranche 1, environmental assessments of the three sub-projects have been prepared prior to ADB's Board approval. Each project has been categorized as per ADB's SPS to determine the level of assessment required.

57. MLBCRP is classified as Category "B" according to ADB's SPS. An IEE was prepared for MLBCRP and includes an EMP that describes mitigation measures to be adopted during design, construction and operation. The EMP is a plan for mitigating all anticipated environment impacts during project construction and operation. Specific mitigation measures with details on location, time and responsible agency for implementation are given in the EMP.

58. Both NWPCP and UECP are classified as Category 'A' for environment in accordance with ADB's SPS as they traverse through forest reserves. An EIA was prepared for each project. A range of mitigation measures have been proposed to avoid or minimize negative impacts, and to achieve effective offsets for any residual impacts. Impacts on physical resources, human settlements and land use, biodiversity and natural resources, community health and safety, and occupational safety and archaeological/historical resources have been identified. The long-term impacts of the proposed projects under the investment program on physical archaeological, historical and physical cultural resources, socio-economic aspects, are not significant. A large proportion of adverse impacts are confined to the construction phases and they can be minimized and mitigated with appropriate and timely interventions, with adequate supervision and monitoring by the project proponent and other stakeholders.

59. The category of the tranche is determined by the most environmentally sensitive component. Therefore, Tranche 1 which comprises all three projects is classified as Category A. Tranche 2 includes only the UECP and will be Categorized A. Tranche 3 includes NWPCP and UECP and will be also be Category A. Therefore, all three tranches under the investment program will be categorized as A for environment. The EIAs for NWPCP and UECP will be disclosed on ADB's website 120 days prior to Board approval of the investment program.

60. The Program Director, supported by the PMU's Environmental Officer, will be responsible for overseeing and managing the implementation of environmental safeguards in the entire investment program. The PIU Project Directors, supported by PIU Environment Officers, will assume primary responsibility for the environmental assessment as well as implementation of EMPs for their respective projects. The duties of the PIU Environmental Officers will include: (i) oversight of construction contractors for monitoring and implementing mitigation measures; (ii) preparing and implementing environment policy guidelines and environmental good practices; (iii) liaising with the environmental agencies and seeking their help to solve the environment-related issues of project implementation; (iv) providing awareness training on environmental and social issues related to the program and; (v) preparation of

environmental monitoring reports every 6 months for EIAs and once a year for IEEs (as required by ADB).

61. The PMU and PIU Environmental Officers will also be supported by the PMDSC's Environmental Specialists. The PMDSC will support the PMU and PIUs to: (i) update the environmental assessments including EMP based on detailed designs; (ii) ensure EMPs are included in bidding documents and civil works contracts; (iii) provide oversight on environmental management aspects of the project and ensure EMPs are implemented by the contractors (iv) facilitate and ensure contractors comply with all government rules and regulations regarding permits as well as any other relevant approvals required for works; (v) supervise and provide guidance to the contractors to properly carry out implementation of the EMPs; (vi) review, monitor and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary; (vii) consolidate periodic environmental monitoring reports to be submitted to ADB on a semi-annual basis; (viii) ensure timely disclosure of final environmental assessments in locations and forms accessible to the public; (ix) take corrective actions when necessary to ensure no environmental impacts; (x) conduct ongoing consultation with the community during implementation of the project; and (xi) establish a grievance redress mechanism and ensure it is operated satisfactorily. In addition the two consultants will train the PMU and PIU environmental officers on environmental monitoring and reporting.

C. Involuntary Resettlement

62. The NWPCP and UECP will have involuntary resettlement impacts on PAPs. The first tranche of the investment program is categorized B for involuntary resettlement impacts, based on identified involuntary resettlement impacts of the separate projects: the NWPCP is category B, while the UECP and MLBCRP are both category C. A Resettlement Framework (RF) for the investment program and a Resettlement Implementation Plan (RIP) for the NWPCP under the first tranche were prepared. Additionally, RIPs were also completed for the entire NWPCP and UECP to identify all PAPs for the investment program and prepare total cost estimates for resettlement.

63. A socioeconomic survey was conducted to identify the nature and significance of potential project impacts on potential PAPs. A resettlement census was conducted in May and June 2014 in the project areas to obtain a demographic overview of the total affected population. It covered the PAPs' assets and main sources of livelihood affected, and their socioeconomic status. The gender-disaggregated socioeconomic data have been used to determine if special actions are needed by poor and vulnerable households, especially female-headed households, to overcome their socioeconomic marginality and disarticulation.

64. The RIPs address land acquisition, compensation, resettlement assistance, income restoration and improvement, and physical relocation requirements. They also include social impact assessments. The RIPs will be implemented in close consultation with the stakeholders, particularly with PAPs through focus group discussions and stakeholder consultation meetings. Women's participation will be ensured by involving them in public consultations at various stages of project preparation and implementation, and by arrangements which would enhance their ability to attend such meetings.

65. The EA will ensure that no physical/or economic displacement of affected households will occur until: (i) compensation at full replacement cost has been paid to each displaced person for project components or sections that are ready to be constructed; (ii) other

entitlements listed in the resettlement plan are provided to PAPs; (iii) a comprehensive income and livelihood rehabilitation program, supported by adequate budget, is in place to help displaced persons, improve, or at least restore, their incomes and livelihoods; and (iv) civil works implementation for MLBCRP and NWPCP will be scheduled in such a way to minimize the risk of disruption on the existing irrigation systems. In case additional land will be required for access roads and other facilities to support the projects, MMDE has to ensure that a RIP in accordance with the RF will be prepared, and submitted to ADB.

66. In accordance with IR principles listed in the RF, all PAPs will be entitled to a combination of compensation packages and resettlement assistance according to the nature of ownership/user/occupier rights and interests on lost assets and the degree of project impacts on socio-economic conditions and vulnerability of PAPs. A RF with compensation matrix have been prepared and agreed with the government, consistent with ADB's policy for sector projects, to address any impact, should it occur.

67. The PMU will have Resettlement Unit or Cell with a full time specialist(s) who will assist the formulation of RIPs and updated RIPs and RF as required, resettlement due diligence reports, monitoring implementation of RIPs, and preparing monitoring reports. PMU will develop the specialist(s) TOR(s) and forward them to ADB for review. The specialist(s) key activities include, but not be limited to: (i) screening of proposed projects and their supporting facilities for potential resettlement impacts and risks;(ii) reviewing and providing project alternatives to avoid or minimize resettlement impacts; (iii) assessing social impacts of the project; (iv) formulating appropriate approach and conducting public consultations and resettlement information disclosure; (v) formulating or update RIPs and preparing RIPs for other project support facilities such as access roads and camps, if required, with support of resettlement consultants; and (vi) taking the role as the PMU contact person in implementing GRM and monitoring of their effectiveness. All RIP's will be reviewed and approved by ADB prior to the award of any contracts. The RP will be updated by the Resettlement Specialist (RS) in consultation with AP's, line agencies and NGO's.

68. The PMU/PIU will monitor the RIPs' implementation to determine whether resettlement goals have been achieved and livelihood and living standards have been restored, and to recommend how to further improve implementation. Resettlement issues will be coordinated by the PMU, which will ensure that all subprojects comply with involuntary resettlement safeguards. For this, each project will elaborate specific, relevant and detailed monitoring indicators. The PMU/PIU will prepare half-yearly monitoring reports to submit to EA and ADB. The reports will focus on whether resettlement activities have complied with IR safeguard principles and loan covenants of the project. The report will also document consultations conducted with PAPs and summaries of issues identified and actions taken to resolve them. It will also provide a summary of grievances or complaints lodged by PAPs and actions taken to redress them and the specific activities conducted to restore and improve income sources and livelihoods of PAPs. The PMU/PIU will also engage external monitor (EM), who is not associated with the project planning, and implementation to monitor resettlement implementation process and to suggest how to address if any weakness is detected. The EM will also verify the implementation of RIPs including payment of compensation and implementation of income restoration program and its results.

D. Grievance Redress Mechanism

69. A Grievance Redress Mechanism (GRM) will be established at the project level to resolve disputes and grievances relating to land acquisition, relocation and implementation of

the RIPs, and environment-related grievance and complaints. The GRM comprises of two level grievance redress committees (GRCs) at the Grama Niladhari and Divisional Secretariat level. The GRC at the grama niladhari level will include: (i) the head of the Grama Niladhari division and comprise Village level government officer (agrarian services or DOI), community based organization leaders, project representative (environment and social resettlement officers), project affected parties, contractor or his representative and any other person/government officer if required based on the issue. If the issue is not resolved at this level it will be forwarded to the second tier committee at the divisional secretary level. The GRC at the divisional secretariat level will comprise of Divisional Secretary (Chair). Grama Niladharis of relevant GND, Project director of PIU or his representative, CBO leaders, Contractors or his representative, relevant line agencies. If issues still remain unresolved they will be raised at the national steering committee.

70. The GRCs will be an ex-gratia, legal, semi-structured body empowered to make decisions on disputes resolution during the implementation of RIPs or environment related concerns. The fundamental objective of formation of a GRC is to resolve disputes at the grass-roots level in order to avoid lengthy and costly judicial process. The GRC will not deal with matters pending in the court of law. Also it has no jurisdiction over the rate of compensation.

71. Grievances from the affected people on social and environmental issues during program implementation will be addressed mainly through the existing local administrative system. Depending on the nature and significance of the grievances or complaints, grievances will be addressed at one of the four levels identified above. All attempts will be made to resolve grievances at the project level, where complaints will be directly received and addressed by the contractor, PMDSC or PIU representative on site. Grievances which are simple but still cannot be addressed at the grass roots level will be addressed at the Grama Niladhari level. More complex grievances which cannot be addressed at the Grama Niladhari level will be addressed at the Divisional Secretariat level.

VIII. GENDER AND SOCIAL DIMENSIONS

72. The investment program activities for Tranches 1 and 2 will be limited to constructing and rehabilitating major water storage and conveyance infrastructure. Hence there are no negative gender impacts leading to women's loss of traditional land rights or employment opportunities. In fact, the project will give an opportunity for women to participate in the construction stage, and in the long run, will secure an access to domestic water supplies that will reduce their traditional burden of fetching water from far away and thereby reduce household chores. Therefore, Trances 1 and 2 are classified as "no gender elements." Nonetheless it is expected, that Tranche 3 may have "some gender elements" since there may be some modernization of distribution systems.

73. MMDE will ensure that the investment program monitors the social impacts throughout the implementation financed by the loan, in consultation with local governments, local communities and civil society organizations. In this respect, the PMU and PIU will take the following actions:

(i) Conduct awareness program for contractors, sub-contractors on gender, core labor standards (CLS), and other social concerns such as communicable diseases and other social risk to ensure that:
    a. Women and men should be given equal opportunities to work in the project, and women and men will also opt equal payment, and treatment;
    b. Contractors/sub-contractors will provide a basic service requirement for women such as toilet, and other necessary facilities;

c. All workers will be treated in accordance to the CLS such as no child will be employed, the right of workers on health and safety, as well as the right of workers to be part of labor union are guarantee, no forced labor in whatever form involve in their activities;
d. Contractors and subcontractors should provide appropriate camps with all necessary basic facilities for their workers; and
e. Contractors and subcontractors should take responsibility to ensure that their workers would not be contributing in any spread of communicable diseases (HIV), using drug and alcohol, and minimize any potential conflict with local communities.

(ii) Conduct awareness program for local communities to encourage participation of women and men in project activities both in pay activities such as working with contractors or suppliers, and also unpaid activities (volunteer) in monitoring any impact associates with project activities to the local communities.
(iii) Ensure that contractors and subcontractors have an emergency plan that involves local communities, in occurrence of un-expected accident associated with the project
(iv) Ensure that the monthly progress reports from contractors include detailed information on workers employed for the project during the reported period. The data should be disaggregated according to sex and age. The progress reports should also ensure: (i) compliance with all applicable labor laws; (ii) use their best efforts to employ women and local people, including disadvantaged people, living in the vicinity of the projects financed under the loan; (iii) information is disseminated at worksites on health and safety for those employed during construction; (iv) equal pay to men and women is maintained for work of equal type; (v) safe working conditions are provided along with separate, culturally appropriate facilities for male and female workers; and (vi) abstinence from child labor. The investment program is classified as 'general intervention' as it supports poverty reduction indirectly, and gender is classified as 'no gender elements.'

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION

A. Investment Program Design and Monitoring Framework

74. The design and monitoring framework (DMF) for the investment program is in Attachment 9 and for Tranche 1 in Attachment 10.

B. Monitoring

75. **Project performance monitoring.** During the course of the investment program implementation, monitoring will be carried out for: (i) periodic progress reporting; (ii) safeguard monitoring; (iii) benefit monitoring and evaluation; and (iv) financial management monitoring. The design and monitoring frameworks will be the basis for monitoring progress.

76. The PMU and PMDSC will prepare separate progress reports for the investment program and submit to ADB with copies to Department of Project Management and Monitoring on a quarterly basis within 15 days from the end of each quarter. The reports will provide a narrative description of progress made during the period, changes in the implementation schedule, problems or difficulties encountered, performance of the program management and implementation consultants, and the work to be carried out in the next period. The progress reports will also include a summary financial account for the program, consisting of expenditures

for the year to date and total expenditure to date. Performance will be evaluated on the basis of indicators and targets stipulated in the design and monitoring framework.

77. The PMU through the project performance management evaluation system (PPMES), will rigorously monitor the overall performance of each project under the investment program. The PMU will establish a PPMES within 6 months from investment program commencement and collect and update baseline data for performance monitoring. The PMDSC's Monitoring and Evaluation Specialist will establish the system, with on-going support to the PMU from the national consultant. The system will be tailored to program-specific requirements and prepared in consultation MMDE and specialists within the PMU. The key indicators and targets, assumptions, and risks outlined at the impact, outcome, and output levels in the investment program's design and monitoring framework will be the primary data required for analysis. In addition, a database of key benchmark indicators will be established by the PMU and become a part of the program monitoring system and be routinely updated and monitored at least twice a year and in greater detail immediately prior to midterm review and project completion. These will be reported through the MMDE's quarterly progress reports and after each ADB review mission. These quarterly reports will provide information to regularly update ADB's PPR system.[21]

78. **Compliance monitoring**. The status of compliance with loan covenants, including policy, legal, financial, economic, environmental, and others, will be monitored and reported by the PMU and PIUs through the quarterly progress reports, which will be consolidated and submitted by the PMU to ADB. The results will be reviewed in detail during ADB's review missions. In particular, the status of the implementation of safeguard measures described in EMPs and RIPs, as well as implementation of measures described in the SPRSS, will be monitored and reported by PIUs in quarterly progress reports for each sub-project.

79. The main aim will be for the PMU to ensure the investment program is implemented with due concern for quality and specifically to ensure that any issues are adequately addressed to the requirements of MMDE and ADB.

80. **Safeguards monitoring** will be performed by the Safeguards Unit of the PMU and PIUs and PMDSC consultants, and the results will be included in the quarterly progress reports. In addition the PMU will submit, biannual (for UECP and NWCP) and annual (for MLBRCP) environmental monitoring reports, and (ii) semi-annual resettlement monitoring report for UECP and NWCP. Such monitoring should adhere to the requirements in the EMPs of the EIAs and IEE, and RIPs. This will include (i) environmental quality monitoring of water and soil quality parameters (as referred to in the EIAs and IEE), and (ii) potential resettlement impacts such as compensation for loss of income.

81. Implementation of the EMPs will be monitored internally by the PMU and PIUs, and the PMDSC. For environment safeguards monitoring of EMP implementation will be carried out during the preconstruction, construction and operation and maintenance stages of the investment program. Based on the EMPs, monitoring checklists will be prepared for each of these stages. Records of these completed checklists must be systematically maintained with the PIUs or PMU office. Based on these records and site visits monitoring reports will be prepared during the construction and operations stage on an annual basis per project area and submitted to ADB for disclosure on the ADB website. Satisfactory due diligence reports will be prepared and submitted to ADB before approval of the next tranche.

[21] ADB's project performance reporting system is available at: http://www.adb.org/Documents/Slideshows/PPMS/default.asp?p=evaltool

82. For resettlement, internal monitoring will be carried out by the PMU and PIUs with the support from the PMDSC. If land donation is required, an independent monitor will be engaged to verify the land donation process. Annual monitoring reports will be submitted to MMDE and ADB. Annual monitoring reports will be disclosed on the ADB website. Satisfactory due diligence reports will be prepared and submitted to ADB before approval of the next tranche.

C. Evaluation

83. Within 24 months of loan effectiveness, ADB will undertake a mid-term review in consultation with the relevant government departments to identify problems and constraints encountered and suggest measures to address them, including appropriateness of scope, design, implementation arrangements, schedule of activities and compliance with safeguard and other covenants.

D. Reporting

84. MMDE will provide ADB with: (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including: (a) progress achieved by output as measured through the indicator's performance targets including contract awards and disbursements, (b) key implementation issues and solutions; (c) updated procurement plan, and (d) updated implementation plan for next 12 months with quarterly contract awards and disbursements projections; (iii) environmental and social monitoring reports; (iv) a project completion report to ADB within 6 months of physical completion of each tranche MMDE will submit;[22] and (v) a MFF completion report within 6 months of physical completion of the MFF. MMDE will also make available, as required, the audit reports as mentioned in Section V.

E. Stakeholder Communication Strategy

85. A comprehensive stakeholder analysis and strategic communications plan (SCP) has been prepared for the investment program.[23] This was developed on the basis of a thorough stakeholder analysis and consultations during project preparation. Specifically, the strategy emphasizes two main objectives: (i) establishing and maintaining two-way information flow for stakeholders to exchange relevant and timely information and feedback; and (ii) supporting effective communication by building the communication capacity of the PMU and PIUs. The central audiences and activities under the strategy are summarized in the Communications Strategy Matrix in Attachment 11.

86. Implementation of the SCP will engage and inform relevant investment program stakeholders and sectors with timely, accurate, and comprehensive information. Such information sharing will help to build consensus, be responsive to stakeholder concerns, and ensure continuous stakeholder support throughout the investment program. Public notification of project milestones and safeguards, as well as progress towards these milestones and the measures taken to impose safeguards, will be posted on both the investment program's and ADB's websites. They will be also be displayed prominently in hard copy in the PIU offices.

[22] Project completion report format is available at: http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar

[23] Link reference to the SCP.

87. The SCP identifies the information needs of each stakeholder group including PAPs, civil society, collaborating government agencies government officers, and the media. Activities are proposed for each stakeholder group to ensure that information regarding the investment program is easily accessible and timely presented in ways that are appropriate for each stakeholder. Emphasis is on project information such as scope, general progress status, project benefits and impacts, mitigating measures, results of monitoring activities, invitation for bids, consultant recruitment notices, and mechanisms for feedback. Feedback mechanisms will include contact points for questions and concerns and details for the grievance redress mechanisms. Given the lengthy time frame of the investment program and the high expectations among some sectors of the public, there is also an emphasis on expectation management through transparent timelines and information about likely project benefits.

88. Key communication channels to be used include: (i) community level interpersonal channels such as consultations and outreach to farmer organizations and other community leaders through established local coordinating meetings; (ii) use of posters, brochures, fact sheets and local media to disseminate project information in affected communities; (iii) national-level media outreach; (iv) consultative meetings for stakeholders including NGOs; (v) consultative meetings and capacity building with government officers to enable them to better engage with affected communities and the media; and (vi) internal communications to facilitate accuracy and consistency of information sharing.

89. The PMU includes a Communications Officer position who will lead the delivery of the SCS for the investment program. Each PIU will also include a Communication's Officer who will support delivery of communication activities in the area of the specific project.

90. Training activities will be used to enable other project staff in the PMU and PIUs serve as project communicators both with the public (with emphasis on PAPs and beneficiaries) as well as with the media. Trainings will also be organized to equip government officers at the division, district and village levels to serve as sources of information for community members.

X. ANTICORRUPTION POLICY

91. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the investment program.[24] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all contractors, suppliers, consultants and other service providers. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the investment program.[25]

92. To support these efforts, relevant provisions are included in the loan agreement and the bidding documents for the investment program. Risks associated with program management, including procurement and disbursement, will be mitigated by (i) providing consulting inputs to advise and assist in the procurement of goods and services; (ii) requiring that civil work contracts include a condition that contractors adhere to ADB"s Anticorruption Policy (1998, amended, from time to time); (iii) the PMU and PIUs periodically inspecting the contractors fund withdrawals and settlements; and (iv) reporting on project activities and implementation on the website to foster transparency and timely awarding of contracts.

[24] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[25] ADB's Integrity Office web site is available at: http://www.adb.org/integrity/unit.asp

93. The government will ensure that (i) MMDE conducts periodic monitoring inspections on all contractors' activities related to fund withdrawals and settlements, and (ii) all contracts financed by ADB in connection with the investment program include provisions specifying the right of ADB to audit and examine the records and accounts of MMDE and all contractors, suppliers, consultants and other service providers as they relate to the investment program.

94. A grievance redress mechanism will be established throughout the investment program. A grievance redress mechanism will be put in place at the PMU to receive and resolve complaints, as well as to act upon stakeholders' reports of irregularities on project related matters, including grievances concerning land donation procedures. MMDE will widely publicize the existence of this mechanism to ensure that stakeholders are aware that a venue is available to address concerns or grievances relating to fraud, corruption, abuse, and any other aspects of program implementation.

XI. ACCOUNTABILITY MECHANISM

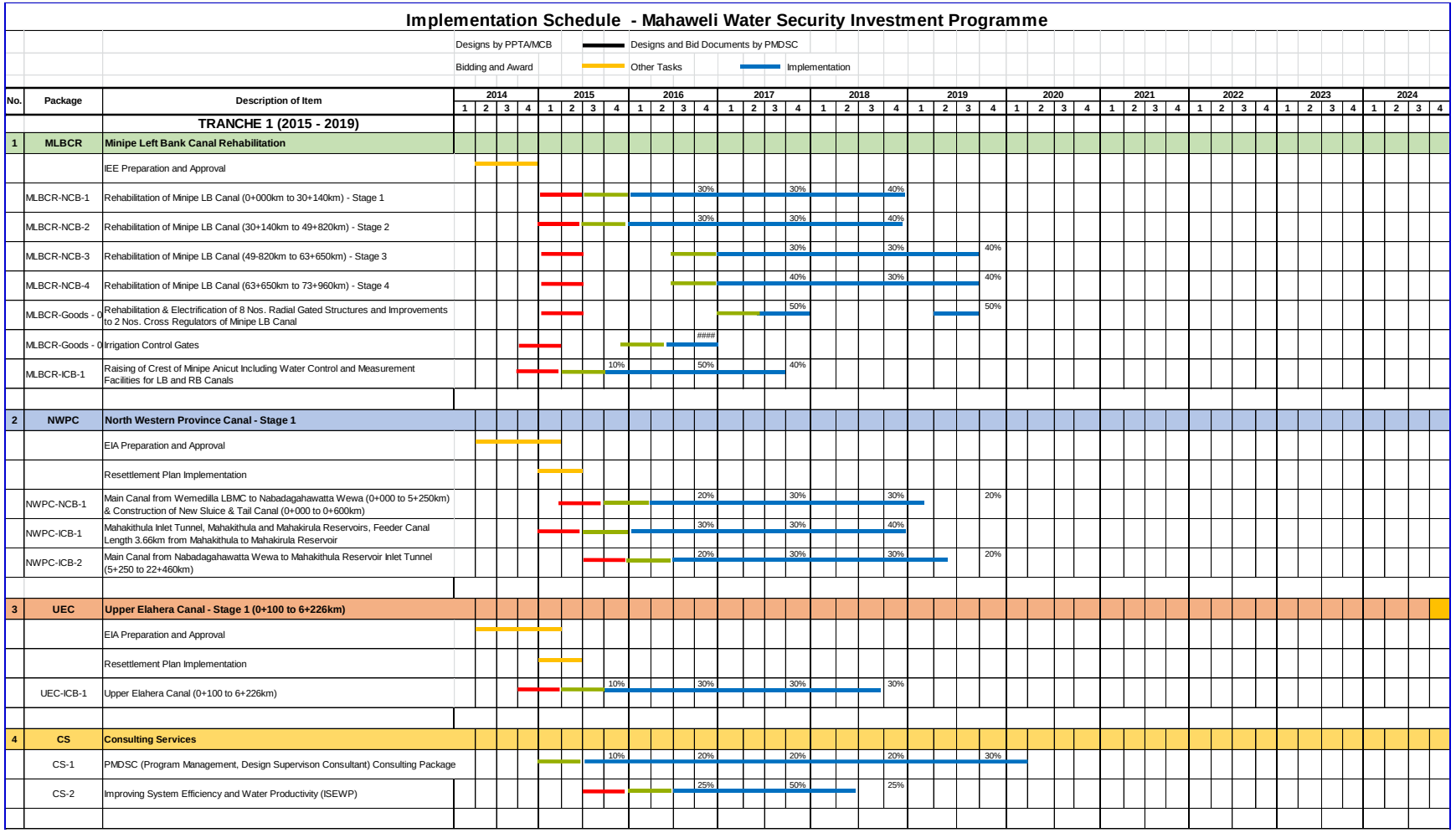
95. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[26]

XII. RECORD OF FAM CHANGES

96. All revisions and updates during the course of implementation will be retained in this Section to provide a chronological history of changes to implementation arrangements recorded in the FAM.

[26] For further information see: http://www.adb.org/Accountability-Mechanism/default.asp.

Attachment 1: Implementation Schedule



No.	Package	Description of Item	2014				2015				2016				2017				2018				2019				2020				2021				2022				2023				2024			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		TRANCHE 2 (2016 - 2024)																																											
5	**UEC**	**Upper Elahera Canal - Stage 2 (27+509 to 54+249km) & KMTC**																																											
	UEC-ICB-2	Upper Elahera Canal (27+509 to 54+249km)																																										
		Geotechnical Investigations																																											
		Design and Finalization of Bidding Documents																																											
		Tendering and Award of Contract																																											
		Manufacture and Shipping of Tunnel Boring Machines (TBMs)																																											
		Establishment On-site Facilities for TBMs (Access/ Shaft/ Adit)																																											
		Establishment and Testing (TBMs)																																											
		Tunneling by TBM (UEC Tunnel 3)												15%				20%				15%				15%				15%				10%				10%								
		Kaluganga - Moragahakanda Transfer Canal (0+292km to 9+161km)																																									60%			40%

No.	Package	Description of Item	2014				2015				2016				2017				2018				2019				2020				2021				2022				2023				2024			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		TRANCHE 3 (2018 - 2024)																																											
6	**UEC**	**Upper Elahera Canal - Stage 3 (6+226 to 27+509) & (54+249km to 65+500km)**																																											
	UEC-ICB-3	Upper Elahera Canal (6+226 to 27+509km)																				20%				30%				30%				20%												
	UEC-ICB-4	Upper Elahera Canal (54+249 to 65+500km)																												33%				33%				33%							
	UEC-ICB-5	Construction of Feeder Canal from UEC to Manankattiya-Eruwewa Stream and widening the Eruwewa-Mahakanadarawa Stream																																33%				33%				33%			
	UEC-ICB-6	NCPCP Water Management Software and Control Center																																				33%				33%			33%
7	**NWPC**	**North Western Province Canal - Stage 2**																																											
	NWPC-NCB-02	Mi Oya RB 1 Canal, Mahakirula Resorvoir to Galgiriyawa (0+000km to 13+731km)																												30%				40%				30%							
	NWPC-NCB-03	Mi Oya RB 2 Main Canal From Galgiriyawa to Kaduruwewa (13+731km to 21+231km)																												30%				40%				30%							
	NWPC-NCB-04	Main Canal from Mahakithula Reservoir to Potuwila Tank (0+000 to 1+491km) and Potuwila Tank to Upper Mediyawa (0+000 to 19+980km)																												30%				40%				30%							
	NWPC-NCB-05	Yapahuwa Canal From Mediyawa Canal (0+000 to 11+200km)																												30%				40%				30%							
	NWPC-NCB-06	Main Canal From Dambulu Oya to Wemedilla LBMC including Dambulu Oya Diversion Structure (0+000 to 8+590km)																				30%				40%				30%															
8	**CS**	**Consulting Services**																																											
	CS-3	PMDSC (Program Management, Design Supervison Consultant) Consulting Package																												20%				20%				20%							20%
	CS-4	Strengthening Integrated Water Resources Management (SIWRM)																																50%				50%							

Attachment 2: Members of Program Steering Committee

The Program Steering Committee will comprise the following positions, subject to appropriate changes during the implementation period:

Position, Organization

1. Secretary, Ministry of Mahaweli Development and Environment
2. Secretary, Ministry of Irrigation
3. Secretary, Ministry of Lands
4. Secretary, Ministry of Power and Energy
5. Secretary, Ministry of Tourism and Sports
6. Chief Secretary, North Central Province
7. Chief Secretary, North Western Province
8. Chief Secretary, Central Province
9. Director General, Department of Irrigation
10. Director General, Mahaweli Authority of Sri Lanka
11. Director General, Department of Agriculture
12. Director General - External Resources, External Resources Department
13. Director General, Department of National Budget
14. Director General, Department of Project Management and Monitoring
15. Director General, Central Environment Authority
16. Director General, Archeological Department
17. Director General, Agrarian Services Department
18. Surveyor General, Department of Survey
19. Director General – Wildlife, Department of Wildlife Conservation
20. Conservator of Forest, Department of Forest
21. Land Commissioner General, Land Commissioner General's Department
22. Chief Valuer, Department of Valuation
23. District Secretary / Government Agent – Anuradhapura
24. District Secretary / Government Agent – Polonnaruwa
25. District Secretary / Government Agent – Kurunegala
26. District Secretary / Government Agent – Matale
27. District Secretary / Government Agent – Kandy
28. Director of Irrigation, Anuradhapura
29. Director of Irrigation, Polonnaruwa
30. Director of Irrigation, Kurunegala
31. Director of Irrigation, Kandy
32. Program Director, Mahaweli Water Security Investment Program
33. Project Director (UEC PIU), Mahaweli Water Security Investment Program
34. Project Director (NWPC PIU), Mahaweli Water Security Investment Program
35. Project Director (MLBCR PIU), Mahaweli Water Security Investment Program
36. Team Leader (PDMSC), Mahaweli Water Security Investment Program

Attachment 3: Program Management Unit and Project Implementation Unit Staffing Requirements

No.	Designation	Officer Class	Quantity	Note
	Program Management Unit			
1	Program Director	1	1	Part-time
2	Director - ISEWP	2	1	
3	ISEWP Project Managers	2	3	Part-time
4	Advisors	1	4	Part-time
5	Procurement & Contract Management	2	1	
6	Environment Specialist	2	1	
7	Resettlement Specialist	2	1	
8	Accountant	2	1	
9	Policy Planning Specialist (Irrigation)	2	1	
10	Senior Engineer	2	1	
11	Human Resources and Office Manager	3	1	
12	Monitoring and Evaluation Officer	3	1	
13	Civil / Irrigation Engineers	3	4	
14	Earth Resources Engineers	3	2	
15	Information and Communication Technology Officer	4	1	
16	Communications Officer	4	1	
17	Documentation Officer	4	1	
18	Procurement Assistant	4	1	
19	Draughtsman	4	1	
20	Management Assistants / Accounts Assistants / Documentation Assistants	-	5	
21	Drivers	-	5	
22	Office Aide / Peon	-	2	
	Total Staff		**37**	
	UEC Project Implementation Unit [a]			
1	Project Director	2	1	
2	Deputy Project Director (Construction)	2	1	
3	Engineers	3	2	Part-time
4	Engineers	3	4	
5	Project Accountant	3	1	
6	Resettlement Specialist	3	1	
7	Senior Draughtsman	3	1	
8	Technical Assistants / EA	4	1	
9	Technical Assistants / EA	4	4	
10	Environment Officer	4	1	
11	Management Assistants	-	4	
12	Drivers	-	6	
13	Office Aides / Peons	-	3	
14	Communications Officer	4	1	
15	Support Staff	-	6	Part-time
	Total Staff		**31**	
	NWPC Project Implementation Unit [b]			
1	Project Director	2	1	
2	Deputy Project Director (Construction)	2	1	
3	Engineers	3	2	Part-time

4	Engineers	3	4	
5	Project Accountant	3	1	
6	Resettlement Specialist	3	1	
7	Senior Draughtsman	3	1	
8	Technical Assistants / EA	4	4	Part-time
9	Technical Assistants / EA	4	4	
10	Environment Officer	4	1	
11	Management Assistants	-	4	
12	Drivers	-	6	
13	Office Aides / Peons	-	3	
14	Communications Officer	4	1	
15	Support Staff	-	6	Part-time
	Total Staff		**40**	
	MLBCR Project Implementation Unit [b]			
1	Project Director	2	1	
2	Deputy Project Director (Head Works)	2	1	
3	Engineers (Irrigation Dept.)	3	2	Part-time
4	Engineers	3	4	
5	Project Accountant	3	1	
6	Senior Draughtsman	3	1	
7	Technical Assistants/EA (ID)	4	4	Part-time
8	Technical Assistants/EA	4	4	
9	Environment Officer	4	1	
10	Management Assistants	-	4	
11	Drivers	-	4	
12	Office Aides/ Peons	-	3	
13	Communications Officer	4	1	
14	Support Staff	-	4	Part-time
	Total Staff		**35**	
	Total PMU and PIU Staff		**139**	

[a] all staff seconded from Mahaweli Authority of Sri Lanka; [b] all staff seconded from Department of Irrigation

Indicative list of vehicles for the PMU and PIUs:

1. Jeeps 06 Nos
2. Double cabs 20 Nos
3. Diesel /petrol cars 05 Nos
4. Mini Bus 02 Nos
5. Bus 01 Nos

Attachment 4: Financial Management Risk Categorization

A. Risk Assessment

Area of Assessment	Risk Rating	Risk Assessment	Mitigation Measures
Country Specific Inherent Risks	M	Most government departments that report to the Treasury, including MMDE, MASL and DOI do not prepare full sets of financial statements.	Treasury has realized the importance of maintaining and preparation of the full sets of financial statements. The Treasury is currently conducting a detailed study with the view of implementing new guidelines albeit it is difficult to predict an exact time frame.
Entity and Project Specific Inherent Risks	M	Even though MMDE, MASL and DOI has implemented foreign-financed projects, lacks the direct expertise in implementing ADB projects.	The ADB investment program requires a detailed Procedure Manual as well as adequate training on ADB's policies and guidelines. Finance Staff and Regional Office staff directly engaged with the ADB project needs additional workshops and training programs.
Overall Inherent Risks			**M**

Area of Assessment	Risk Rating	Risk Assessment	Mitigation Measures
Implementing Agency Control Risks	N	MASL and DOI have implemented foreign projects in the past and it appears that both MASL and DOI have sufficient capacity to implement the proposed ADB investment program.	
Fund Flow Control Risks	S	MMDE has executed large-scale foreign funded projects and both MASL and DOI have previous experience in implementing foreign projects in the past through the use of Imprest Accounts. A similar fund flow process is expected for the ADB investment program. However, as seen in the past, the Treasury has the tendency to re-prioritize projects resulting in delays for planned projects.	It is recommended to obtain a firm commitment from the Treasury to the MMDE, MASL and DOI to release capital funds required by the ADB investment program without any undue delays and to prioritize the ADB investment program for fund disbursements.
Staffing Control Risks	N	MMDE, MASL and DOI including their finance departments and its regional	Training on ADB specific policies and guidelines are required.

Area of Assessment	Risk Rating	Risk Assessment	Mitigation Measures
		offices are adequately staffed to implement the ADB Program.	
Accounting Policies and procedures Control Risks	N	MMDE, MASL and DOI all follow Sri Lanka's Accounting and Auditing Standards which are adequate. However, depreciation is not considered in accounts due to the mix of cash and accrual based accounting methods.	Treasury is currently in the process of addressing this issue. Once the Treasury implements new accrual based accounting system, MMDE, MASL and DOI have expressed the willingness to adopt the new system.
Internal Audit Control Risk	N	MMDE, MASL and DOI's Internal Audit functions well.	Need to ensure Internal Audit's annual audit plan include a separate audit of the ADB investment program. Minimum of 2 spot audits per year and an annual comprehensive audit is recommended at each MMDE, MASL and DOI levels.
External Audit Control Risk	N	AG's office currently conducts MMDE, MASL and DOI's annual audit which is adequate and audit opinions are generally free of any major issues	
Budgeting Control Risk	S	It is evident from past performance that the MMDE, MASL and DOI generally under-spends the capital expenditure budget. One of the reasons is inaccuracy in forecasting capital costs. Other than MASL, MMDE and DOI's 5 year Corporate Plans are not comprehensive and are not updated frequently. Corporate Planning exercise should be done with extensive participation which will improve accuracy of estimates.	MMDE, MASL and DOI need to ensure expenditures are estimated accurately. Recommended to improve the MASL's 5 year Corporate Plan and use as a template for MMDE and DOI to be updated at least annually. This can be done as a training exercise prior to implementation of the ADB investment program.
Reporting and Monitoring Control Risk	M	MMDE, MASL and DOI's reporting and monitoring function does not include comprehensive set of KPIs and does not have the ability to track physical progress of projects and link them to financials. DOI has a separate cost center allocation code by the Treasury. MASL, which is part of MMDE does not have a separate cost center code.	It is recommended to introduce a system to track physical progress of projects and link to financials as well as to introduce KPIs in monthly reports. This can be done as a training exercise prior to implementation of the ADB investment program. Separate note recommended in appropriation accounts to report and monitor the ADB investment program. Similar approach recommended for MASL which will ensure efficient monitoring and planning. This is also enable MASL to approach the Treasury directly

Area of Assessment	Risk Rating	Risk Assessment	Mitigation Measures
			for urgent matters.
Information Systems Control Risk	N	MMDE, MASL and DOI currently operate the CIGAS system, which is employed by departments reporting to the Treasury. This system appears adequate for implementing the ADB investment program and monitoring expenses.	
Overall Risks			**S**

H = High, S = Substantial, M = Moderate, N = Negligible or Low

Attachment 5: Procurement Plan for Project 1

Basic Data

Project Name: Mahaweli Water Security Investment Program - Tranche 1	
Project Number: 47381	**Approval Number:**
Country: Sri Lanka	**Executing Agency**: Ministry of Mahaweli Development & Environment
Project Procurement Classification: Category A	**Implementing Agency**: N/A
Project Procurement Risk: Substantial	
Project Financing Amount: US$ 190,000,000 **ADB Financing:** US$ 150,000,000 **Cofinancing (ADB Administered):** **Non-ADB Financing:** US$ 40,000,000	**Project Closing Date:** 31 December 2019
Date of First Procurement Plan: 20 November 2014	**Date of this Procurement Plan**: 10 February 2015

A. Methods, Thresholds, Review and 18-Month Procurement Plan

1. Procurement and Consulting Methods and Thresholds

Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works		
Method	**Threshold**	**Comments**
International Competitive Bidding for Goods	US$ 2,000,000 and Above	Threshold applies to all unless propriety items are required from overseas (e.g. MLBCR Goods ICB-01).
National Competitive Bidding for Goods	Between US$ 100,001 and US$ 1,999,999	
Shopping for Goods	Up to US$ 100,000	
International Competitive Bidding for Works	US$ 15,000,000 and Above	Except MLBCR-ICB-01
National Competitive Bidding for Works	Between US$ 100,001 and US$ 14,999,999	Except MLBCR-ICB-01
Shopping for Works	Up to US$ 100,000	
Community Participation in Procurement for Works	Up to US$ 20,000	Simple civil works contracts costing less than $20,000 each may be directly awarded to project area community groups / civil society organizations as a community works contract using existing government rates. ADB PAI 5.10 for community participation is followed.
Force Account for Works	Up to US$ 650,000	Includes works and goods. Total amount for entire tranche 1 is $650,000 (this amount includes all contract packages under tranche 1). Existing government rates shall be used. Utility shifting, field office works, and other works by government-owned entities (for activities which cannot be done by competitive contracting such as shifting power and telephone poles, realigning water/drainage pipes, road restoration, cables, cutting trees etc.)

Consulting Services	
Method	**Comments**
Consultant's Qualification Selection for Consulting Firm	
Least-Cost Selection for Consulting Firm	
Quality- and Cost-Based Selection for Consulting Firm	
Quality-Based Selection for Consulting Firm	
Individual Consultants Selection for Individual Consultant	

2. Goods and Works Contracts Estimated to Cost $1 Million or More

The following table lists goods and works contracts for which the procurement activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertisement Date (quarter/year)	Comments
MLBCR-ICB-01	Heightening of Minipe Anicut including water control facilities for LB and RB canals	6,590,000.00	ICB	Prior	1S2E	Q3 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: N Advanced Contracting: Y Bidding Document: Large Works
MLBCR-NCB-01	Rehabilitation of Minipe LB Canal from 0+000 km to 30+140 km - stage 1	2,670,000.00	NCB	Prior	1S2E	Q3 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: Y Advanced Contracting: Y Bidding Document: Small Works
MLBCR-NCB-02	Rehabilitation of Minipe LB Canal from 30+140 km to 49+820 km - stage 2	1,320,000.00	NCB	Prior	1S2E	Q3 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: Y Advanced Contracting: Y Bidding Document: Small Works
MLBCR-NCB-03	Rehabilitation of Minipe LB Canal from 30+140 km to 49+820 km – stage 2	5,230,000.00	NCB	Prior	1S2E	Q3 / 2016	Prequalification of Bidders: N Bidding Document: Small Works
MLBCR-NCB-04	Rehabilitation of Minipe LB Canal from 63+650 km to 73+960 km – stage 4	2,440,000.00	NCB	Prior	1S2E	Q3 / 2016	Prequalification of Bidders: N Bidding Document: Small Works

UEC-ICB-01	Construction of Upper Elahera Canal From 0+100 Km to 6+226 Km	24,740,000.00	ICB	Prior	1S2E	Q3 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: N Advanced Contracting: Y Bidding Document: Large Works
NWPC-NCB-01	Wemedilla LBMC from 0+000 Km to 5+250 Km & new Sluice and tail canal	5,560,000.00	NCB	Prior	1S2E	Q4 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: Y Advanced Contracting: N Bidding Document: Small Works
NWPC-ICB-01	Construction of Mahakithula & Mahakirula tanks, feeder canal of 3.66 km from Mahakitula to Mahakirula and inlet tunnel to Mahakitula tank from Nebadagahawatta diversion canal	47,970,000.00	ICB	Prior	1S2E	Q3 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: N Advanced Contracting: Y Bidding Document: Large Works
NWPC-ICB-02	Construction of Main Canal from Nebadagahawatta Wewa to Mahakitula Wewa inlet tunnel (From 5+250 Km to 22+460 Km)	21,350,000.00	ICB	Prior	1S2E	Q1 / 2016	Prequalification of Bidders: N Domestic Preference Applicable: N Advanced Contracting: N Bidding Document: Large Works
Various lots-1	Office furniture,IT equipment and software (in multiple lots)	1,360,000.00	SHOPPING	Prior	1S1E	Q2 / 2014	Prequalification of Bidders: N Domestic Preference Applicable: N
Various lots-2	Surveys (Environmental Monitoring)	1,000,000.00	SHOPPING	Prior	1S1E	Q4 / 2015	Prequalification of Bidders: N

							Domestic Preference Applicable: N

3. Consulting Services Contracts Estimated to Cost $100,000 or More

The following table lists consulting services contracts for which the recruitment activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Recruitment Method	Review (Prior/ Post)	Advertisement Date (quarter/year)	Type of Proposal	Comments
CS-1	Program Management and Design Consultants	22,630,000.00	QCBS	Prior	Q4 / 2014	FTP	Assignment: International Quality-Cost Ratio: 90:10 Advanced Contracting: Y Comments: As per FAM.
CS-2	"Improving System Efficiencies and Water Productivity" Consultants	1,350,000.00	QCBS	Prior	Q4 / 2015	FTP	Assignment: International Quality-Cost Ratio: 90:10 Advanced Contracting: N Comments: As per FAM.
CS-3	Expert panel and other specialist assistance as required	450,000.00	ICS	Prior	Q3 / 2015		Assignment: National Expertise: TBD Advanced Contracting: N

4. Goods and Works Contracts Estimated to Cost Less than $1 Million and Consulting Services Contracts Less than $100,000 (Smaller Value Contracts)

The following table lists smaller-value goods, works and consulting services contracts for which the activity is either ongoing or expected to commence within the next 18 months.

Goods and Works								
Package Number	**General Description**	**Estimated Value**	**Number of Contracts**	**Procurement Method**	**Review** (Prior/ Post)	**Bidding Procedure**	**Advertisement Date** (quarter/year)	**Comments**
Various	Utility shifting	450,000.00	Many (tbd)	SHOPPING	Prior		Q4 / 2015	

lots-3	and deposit works by government-owned entities							Advanced Contracting: N Comments: Prior review for first shopping only. Force account.
Various lots-4	Community works contracts	180,000.00	Many (tbd)	CPP	Prior		Q4 / 2015	Advanced Contracting: N Comments: Many contracts, each contract not exceeding $20,000. Prior review for first contract. Direct contracting.
Various lots-5	Field office works	140,000.00	Many (tbd)	Force Account	Post		Q4 / 2014	Advanced Contracting: Y Comments: Force Account
Various lots-6	Vehicles	680,000.00	Many (tbd)	NCB	Prior	1S2E	Q2/ 2015	Domestic Preference Applicable: N Bidding Document: Goods
MLBCR NCB-01	Supplying of operation and maintenance equipment	660,000.00	Many (tbd)	NCB	Prior	1S2E	Q1 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: N Advanced Contracting: N Bidding Document: Goods

Consulting Services

Package Number	General Description	Estimated Value	Number of Contracts	Recruitment Method	Review (Prior/ Post)	Advertisement Date (quarter/year)	Type of Proposal	Comments

B. Indicative List of Packages Required Under the Project

The following table provides an indicative list of goods, works and consulting services contracts over the life of the project, other than those mentioned in previous sections (i.e., those expected beyond the current period).

Goods and Works							
Package Number	**General Description**	**Estimated Value**	**Estimated Number of**	**Procurement**	**Review** (Prior/Po	**Bidding Procedure**	**Comments**

		(cumulative)	**Contracts**	**Method**	st)		
None							

Consulting Services							
Package Number	**General Description**	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Recruitment Method**	**Review** (Prior/Post)	**Type of Proposal**	**Comments**
None							

C. National Competitive Bidding

1. General

National competitive bidding shall conform to the provisions for "National Competitive Bidding" as prescribed in the *Procurement Guidelines 2006 for Goods and Works* issued in January 2006 by the National Procurement Agency, and the specific procedures prescribed by the *Procurement Manual* issued on March 2006, with the clarifications and modifications described in the following paragraphs required for compliance with the provisions of the ADB Procurement Guidelines.

2. Registration

(i) Bidding shall not be restricted to pre-registered firms under the national registration system of the Institute for Construction, Training and Development (ICTAD), and such registration shall not be a condition for the submission of bids in the bidding process.

(ii) Where registration is required prior to award of contract, bidders: (i) shall be allowed a reasonable time to complete the ICTAD registration process; and (ii) shall not be denied registration for reasons unrelated to their capability and resources to successfully perform the contract, which shall be verified through post-qualification.

(iii) National sanction lists or blacklists may be applied only with prior approval of ADB.

3. Prequalification

Post qualification shall be used unless prequalification is explicitly provided for in the loan agreement/procurement plan. When used for large or complex Works contracts, *i.e.* turnkey, design and build, or management contracts; or custom-designed equipment, industrial plants, and specialized services, prequalification evaluation shall not include the evaluation of equipment and personnel. This assessment shall be undertaken at the bid evaluation stage. Irrespective of the procedure applied (whether prequalification or postqualification), no domestic or foreign contractor shall be precluded from participation.

4. Advertising

Bidding of NCB contracts estimated at $500,000 or more for goods and related services or $1,000,000 or more for civil works shall be advertised on ADB’s website via the posting of the Procurement Plan.

5. Bidding Documents

Procuring entities shall use standard bidding documents acceptable to ADB for the Procurement of Goods, Works and Consulting Services, based ideally on the standard bidding documents issued by ADB.

6. Packaging

Slicing or splitting of contracts within a package shall not be used to change the contract sizes and their corresponding methods of procurement as approved in the Procurement Plan.

7. Bid Security

Where required, bid security shall be in the form of a bank guarantee from a reputable bank.

8. Preferences

(i) No preference of any kind shall be given to domestic bidders or for domestically manufactured goods.

(ii) Foreign suppliers and contractors from ADB member countries shall be allowed to bid, without registration, licensing, and other government authorizations, leaving compliance with these requirements for after award and before signing of contract.

9. Procurement of Works

(i) Specifications for works may be based on specifications recommended by ICTAD to the extent possible, but ICTAD approval shall not be required for adoption of specifications in a particular procurement activity.

(ii) The determination of the financial capacity of a bidder for award of the contract in postqualification evaluation shall take into account current contract commitments and shall not be confined, for domestic bidders, to the ICTAD registration.

10. Bid Rejection for Unrealistic Rates

Bids shall not be subjected to a test for unrealistic rates. No lowest evaluated and substantially responsive bid shall be rejected on the basis of comparison to rates, including but not limited to market, historical, or agency established rates, without prior approval of ADB.

11. Rejection of All Bids and Rebidding

Bids shall not be rejected and new bids solicited without the ADB’s prior concurrence.

12. Price Negotiations

Price negotiation shall be allowed only where the price offered by the lowest evaluated and substantially responsive bidder substantially exceeds costs estimates. Approval of ADB is required prior to any negotiation of prices.

13. Participation by Government-Owned Enterprises

Government-owned enterprises in the Democratic Socialist Republic of Sri Lanka shall be eligible to participate only if they can establish that they are legally and financially autonomous, operate under commercial law, and are not a dependent agency of the procuring entity, or the Project Executing Agency or Implementing Agency.

14. Member Country Restrictions

Bidders must be nationals of member countries of ADB, and offered goods, works and services must be produced in and supplied from member countries of ADB.

Attachment 6: Terms of Reference for Program Management, Design and Supervision Consultant

A. Background

1. These terms of reference (TOR) outline the scope of works, deliverables and work program for the Program Management, Design, and Supervision Consultant (PMDSC). The PMDSC will be responsible for assisting the Government of Sri Lanka with implementing the Mahaweli Water Security Investment Program (the "investment program"). The investment program will assist the government in completing outstanding water conveyance investments under the Mahaweli Development Program (MDP). Implementation of MDP began in 1970 and its completion is a key priority of the government. The investment program will support the objectives of MDP to maximize the productivity of Mahaweli River Basin (MRB) water resources by transferring available water to Sri Lanka's northern and northwestern dry zone areas for irrigation, drinking and commercial purposes. This will accelerate local and national economic growth.

2. At the national level, Sri Lanka has abundant access to water resources with about 50,000 million cubic meters (MCM) of annual runoff and an annual per capita endowment (ACE) of 2,500 cubic meters (m^3), well above the 1,700 m^3 threshold defining water stress. However, there are significant spatial and temporal variations; the northern dry zone river basins contribute only about 11% of the country's total runoff volume and only during the December to February period. This amounts to a local ACE of 1,200 m^3 indicating severe water stress which is compounded by regular droughts. Consequently, agricultural productivity in this region lags behind other wetter regions in Sri Lanka with 25% to 30% lower paddy yields and cropping intensities. This stress also impacts water availability for drinking and commercial users. This causes significant constraints for social and economic development which may be exacerbated in the future by anticipated population growth and climate change.

3. Historically, Sri Lanka has addressed these constraints by constructing many small cascade systems of reservoirs and transfer canals. In the 1960s, under MDP, the government decided to augment water within these systems with available water resources in the MRB using large transfer canals and reservoirs. The MRB is Sri Lanka's largest river basin, comprising 18% of Sri Lanka's area and providing 21% of the country's overall runoff. Over time, the government has revised MDP accounting for socioeconomic changes and national development priorities. The government's current priorities and investment roadmap are described in the Public Investment Strategy[1] for the irrigation and water resources sector. These focus on ensuring availability of adequate water quantities for irrigation; improving management, productivity and usage efficiency of water to meet rising demands; and minimizing spatial variations in water availability through implementing trans-basin diversions to divert available water to dry zone areas. The updated MDP will address the government's sector priorities by constructing the North Central Province Canal Program (NCPCP), an outstanding investment component of MDP. NCPCP will be implemented in two sequential phases: Phase 1 will transfer water from MRB to existing reservoirs in the Central, North Central and North Western Provinces; and Phase 2 will extend the transfer of MRB water from the North Central Province reservoirs to existing reservoirs in the Northern Province, and may eventually augment drinking water supplies to Jaffna and Kilinochchi.

[1] Government of Sri Lanka. Ministry of Finance and Planning. 2013. *Mahinda Chintana Public Investment Strategy, 2014-2016.* Colombo.

B. The Investment Program

4. The investment program will implement NCPCP Phase 1 using the Asian Development Bank's (ADB's) multitranche financing facility (MFF) modality, loaned to the government in three tranches. The number of tranches and projects, especially those after Tranche 1 are indicative and are subject to change. Phase 1 comprises three main individual investment projects. These will be constructed in stages under each tranche of the investment program. The three projects are:

(i) The Upper Elahera Canal Project (UECP) comprises two main components. The first component is the 9 km Kalu Ganga-Moragahakanda Transfer Canal [KMTC] (including about 8 km of tunnels) that will convey up to 771 MCM of water annually between Kalu Ganga and Moragahakanda Reservoirs, both of which are currently under construction. The second component is the 65.5 km Upper Elahera Canal (UEC) that will annually convey up to 974 MCM northwards from Moragahakanda Reservoir to the existing Huruluwewa Reservoir, and a further 16.7 km of canals to supply the existing Manankattiya, Eruwewa and Mahakanadarawa Reservoirs; these existing reservoirs supply existing irrigation and water supply schemes. The project is divided into three stages: (a) stage 1 will construct the first 6.2 km of UEC's open canals and associated structures; (b) stage 2 will construct the Kalu Ganga-Moragahakanda Transfer Canal and a 28 km tunnel of the UEC; and (c) stage 3 will construct the remaining 50 km of open and cut-cover canal sections, and four tunnels with lengths ranging from 70 m to 1.7 km.

(ii) The North Western Province Canal Project (NWPCP) will construct 96 km of new and upgraded canals, including a new 940 m tunnel and two new 25 m tall earth gravity dams impounding the planned Mahakithula and Mahakirula Reservoirs to annually withdraw 130 MCM from Dambulu Oya River and the existing Nalanda Reservoir (via the existing Wemedilla Reservoir) to command new and existing irrigation and water supply reservoirs located throughout North Western Province. The project is divided into two stages: (a) stage 1 will construct two new dams impounding the new Mahakithula and Mahkirula Reservoirs, the 26.7 km of open canals between the Wemedilla tank and the new Mahakithula and Mahakirula Reservoirs, and the tunnel; and (b) stage 2 will construct the remaining open canal sections and associated structures.

(iii) Minipe Left Bank Canal Rehabilitation Project (MLBCRP), located downstream of the Mahaweli Hydro Power Complex on the Mahaweli River, will: (a) add upstream storage by heightening the headwork's weir by 3.5 m to regulate generation inflows; (b) construct new automatic downstream-controlled intake gates to the left bank canal; (c) construct new emergency spill weirs to both left and right bank canals; and (d) rehabilitate the 74 km Minipe Left Bank Canal, including regulator and spill structures, to improve conveyance and reliability of service to existing farmers.

5. The investment program will address other key sector priorities through two consulting packages: (i) improving system efficiencies and water productivity (ISEWP) will be under Tranche 1; and (ii) in Tranche 3 strengthening integrated water resources management (SIWRM) consulting package will be undertaken. Further information on these packages is provided in the following sections. The investment program will be implemented over ten years and its tentative structure is shown in Table 1.

Table 1: Investment Program Structure and Implementation Schedule

Project	Subproject	Schedule
Civil Works		
Project 1 (Tranche 1)	UECP Stage 1 NWPCP Stage 1 MLBCRP	Q3 2015 – Q4 2019
Project 2 (Tranche 2)	UECP Stage 2 KMTCP Stage 1	Q1 2017 – Q4 2024
Project 3 (Tranche 3)	UECP Stage 3 NWPCP Stage 2 KMTCP Stage 2	Q1 2018 – Q4 2024
Consulting Services		
PMDSC	Stage 1 (Tranche 1) Stage 2 (Tranche 3)	Q3 2015 – Q2 2020 Q3 2020 – Q4 2024
ISEWP		Q3 2015 – Q3 2017
SIWRM		Q1 2019 – Q4 2020

ISEWP = improving system efficiencies and water productivity, KMTCP = Kalu Ganga-Moragahakanda Transfer Canal Project, MLBCRP = Minipe Left Bank Canal Rehabilitation Project, NWPCP = North Western Province Canal Project, PMDSC = program management, design and supervision consultant, SIWRM = strengthening integrated water resources management, UECP = Upper Elehera Canal Project
Source: Asian Development Bank

6. The investment program will raise paddy production in 32,800 ha of existing command area by increasing cropping intensities from 130% to 180% and yields from about 3 ton/ha to 6 ton/ha. Additional benefits will arise from increased drainage return flows within the existing cascade systems that downstream communities will use. Once NCPCP Phase 2 is completed, the irrigated area commanded by the investment program will increase to 103,400 ha. Cropping intensities, yields and command areas may be further increased through water use efficiency initiatives identified under the ISEWP package, which will also encourage diversification into less water consuming and higher value crops. The NCPCP will also annually convey 92 MCM for non-agricultural users under Phase 1 and a further 70 MCM to the North Province under Phase 2. There will also be hydropower benefits through construction of three new hydropower projects (HPPs) in Phase 2, and optimization of hydropower generation for peak period generation throughout the existing and planned HPPs in the Mahaweli System.

C. Project 1 Investment

7. The first tranche of the investment program will finance Project 1 which will comprise packages for civil works, goods, and consulting services. Indicatively, these will be implemented from Q3 2015 to Q4 2019 and the main works packages are shown in Table 2 along with their status of preparation. Implementation of these packages may possibly start in 2015. The PMDSC will be responsible for reviewing the detailed designs of the advanced packages, recommending improvements where necessary, finalizing the detailed engineering designs for all packages, and finalizing the bidding documents for all non-advance packages.

Table 2: Project 1's Indicative Civil Works Packages

Package	Description	Status
Upper Elahera Canal Project		
UEC-ICB-01	Construction of the UEC from 0+000 km to 6+200 km including sections of open canal, cut-cover canal, an aqueduct, and heightening of level crossings	Advanced

North Western Canal Project		
NWPC-NCB-01	Construction of the LBMC and associated sluices from the Wemedilla Reservoir from 0+145 to 5+250	
NWPC-ICB-01	Construction of the LBMC from Nebadagahawatta to Mahakitulawewa from 5+250 km to 22+500 km	
NWPC-ICB-02	Construction of: (a) the Mahakithula and Mahakirula Reservoirs with all appurtenance structures; (b) the 4 km link canal between the reservoirs; and (c) the 940 m tunnel linking the LMBC to Mahakithula Reservoir	Advanced
Minipe Left Bank Canal Rehabilitation Project		
MLBCR-ICB-01	Heightening the Minipe Anicut using a piano-key style weir, and construction of new intake structure for the left bank canal and upstream emergency overflow weirs for both left bank and right bank canals	Advanced
MLBCR-NCB-01 to 04	Four packages for rehabilitation of the 74 km left bank canal	
MLBCR-NCB-05	Electro-mechanical components of radial gate structures, provision of trash racks for syphons and repairs to Hasalaka Wewa radial gated spillway	

Note: "Advanced" means the detailed engineering designs are near completion, tender documents have been prepared, and the tendering process is underway.
ICB = International Competitive Bidding, LBMC = left bank main canal, MLBCR = Minipe Left Bank Canal Rehabilitation, NCB = National Competitive Bidding, NWPC = North West Province Canal, UEC = Upper Elahera Canal

8. The other main packages included in Project 1 are the: (i) consulting packages for the PMDSC and ISEWP; (ii) training and capacity development of government officers and departments; and (iii) vehicles and office equipment for assisting the government in implementing the investment program.

9. **Improving System Efficiencies and Water Productivity (ISEWP).** This consulting services package will seek to increase water availability to all areas within the NCPCP project area through investigating current water management and application practices, and identifying areas for improvements. The objective is to maximize overall systems efficiencies and productivity of water within the planned, expanded Mahaweli System being financed by this investment program and under Phase 2. The investment program will construct the main conveyance system which supplies water to existing reservoirs that supply the cascade irrigation systems. The cascade systems comprise major and minor tanks supplying distribution and tertiary canal systems which are largely operated by Provincial Councils and Farmer Organizations (FOs). The systems are characterized by predominately paddy rice cultivation, gross water application rates of approximately 30,000 m^3/ha per annum, and distribution efficiencies in the order of 50%. This package will consider how water is managed within these cascade systems. It will study pilot areas and identify options for improvement of the system's infrastructure and management. The approach will be based on benchmarking (water management, yields and local water management institutions) of the pilot areas, analysis of current and future performance (with future changes in water availability), and formulation of options for improvements to infrastructure, management, operation and maintenance. The study will also: (i) review past and ongoing efforts to improve system water use efficiencies and productivity of water, and apply the lessons learned to the study's recommendations; (ii) consider what commercial support and extension programs are required to encourage farmers to adopt water-saving practices (e.g. precise irrigation) and crop diversification; (iii) prepare detailed designs of recommended structural interventions for the project area that will be included in Tranche 3; (iv) prepare guidelines for up-scaling recommendations to the national level; and (v) recommend capacity development programs for government staff and

FOs. The draft terms of reference (TOR) and budget estimate for the ISEWP consulting package have been prepared. The PMDSC will assist the executing agency with finalizing the TOR, recruiting, and managing the ISEWP consultants.

D. Project 2 and Project 3 Investments

10. The remaining civil works will be implemented in Project 2 from Q1 2017 to Q4 2023 and Project 3 from Q1 2018 to Q4 2024. Project 2 will comprise only the tunneling works of UECP–Stage 2. Project 3 will comprise all remaining stages of the investment projects including: NWPCP–Stage 2, and UECP–Stage 3. Feasibility-level designs for these civil works packages are currently being prepared. It will also include the consulting services package for SIWRM which is explained below.

11. **Strengthening of Integrated Water Resources Management (SIWRM).** This consulting services package seeks to promote the strengthening of IWRM principles both within the investment program area and nationally, including recommending and supporting strengthening of water resources management and irrigation sector policies, legislation and institutions. This will be achieved through the review of current policy and legal frameworks, benchmarking of key water sector institutions, and formulation of recommendations and guidelines for improvements to institutionalize IWRM. This activity will also support: (i) updating of current water resources management master plans to include the completed MDP incorporating analysis of climate change impacts and water management practices for dry periods; (ii) possible crop diversification and impacts to scheme designs and management; (iii) assessment of the water demands of, and management of, other major water users including the environment; (iv) design, development and implementation of an IWRM decision support system; and (v) updating and modernizing the Water Management Secretariat under the Mahaweli Authority of Sri Lanka (MASL).

E. NCPCP Phase 2

12. The full benefits of the investment program will only be achieved once Phase 2 is also implemented. Phase 2 will allow transfer of additional excess water (up to 555 MCM/annum) from the Mahaweli River to the Moragahakanda Reservoir. From there, it will be conveyed via the UEC to the planned North Central Province Canal (NCPC). The NCPC will convey 640 MCM/annum to command about 87,000 ha of cascade systems in the North Central Province, and will terminate at the Chemadu kulam Reservoir. From there, about 100 MCM/annum will flow via natural drainage channels to the existing Iranamadu Reservoir for local irrigation and drinking users. Two route options are to be reviewed by the PMDSC before selecting the preferred route and then preparing the associated investments to feasibility level:

(i) Option 1 will transfer water from the Randenigala Reservoir to the Kalu Ganga Reservoir via the planned Randenigala – Kalu Ganga Transfer Canal (RKTC) that will comprise a 40 km long series of open canals and tunnels. This includes two new reservoirs located along the RKTC route at the Hasalaka and Heenganga Rivers. The Hasalaka Reservoir will have a 70 m tall RCC dam and 28MW HPP, and the Heenganga Reservoir will have a 80 m tall dam and 5.5MW HPP. Other associated infrastructure is also included such as access roads and power transmission lines, etc.

(ii) Option 2 will transfer water from Polgolla Barrage to the Moragahakanda Reservoir via a new tunnel and enlarged tailrace canal to the Bowatenna Reservoir. This option

also includes the heightening of the Kothmale Reservoir by 25 m to increase system storage. The existing facilities at the Polgolla Barrage and Bowatenna Reservoir will also require upgrading to manage the increase in flows.

13. Phase 2 investments will also comprise:

(i) Lower Uma Oya Project comprising a 75 m tall roller-compacted concrete (RCC) dam, a 6km tunnel to Randenigala Reservoir, a 10MW HPP, and other associated infrastructures such as access roads, power transmission lines, etc.; and

(ii) NCPCP which is an 80km open canal that will convey water from the UEC to Chemmadu kulam in the Northern Province. This will also include off-takes and feeder channels to nearby major tanks, other control structures, and outlets to the downstream reservoirs.

14. Construction of Phase 2 is not financed under this investment program. However, the PMDSC will be responsible for (i) assessing the two route options; (ii) recommending the preferred option; (iii) undertaking a detailed feasibility assessment of the preferred option; and (iv) preparing all necessary documents for ADB Board consideration for possible future financing.

F. Implementation Arrangements

15. The executing agency for the investment program is the Ministry of Mahaweli Development and Environment (MMDE) under which a Program Management Unit (PMU) has been established to implement this investment program. The PMU is led by the Program Director (PD), who is also an Additional Secretary of MMDE. Under the Program Director are three Project Implementation Units (PIUs), each led by Project Directors, one for each investment project. The PMU will oversee the ISEWP and SIWRM consulting packages. A Program Steering Committee (PSC) will be established to provide overall coordination of the investment program and facilitate interministerial coordination. The PSC will be chaired by the Secretary, MMDE, and the Program Director will be the PSC's secretary; all concerned ministries and agencies will be represented.

16. The PMDSC will assist the PMU and its other advisory sections comprising: (i) a committee that will comprise inter-government department staff who will review designs and documents, and advise as necessary; (ii) an environment and resettlement Safeguards Monitoring and Evaluation Section (SMES) that will monitor, evaluate and report on required safeguard activities; (iii) an Accounts and Finance Section (AFS) that will be responsible for effective account management; (iv) a Communications Section who will lead communication activities; and (v) a Procurement Section that will be responsible for obtaining approvals and issuing bid documents, managing bidding processes until package award, and contract management including contract variations playing the role of the "Employer" during implementation. The PMDSC will furnish PMU and its advisory sections with the relevant project-related information. On the advice of the PMU, the PMDSC will correct, revise, update, and improve its services and outputs comprise this consulting assignment.

17. At the completion of the investment program, the investments will be managed by either the Department of Irrigation (DOI) or MASL.

G. Purpose of Consulting Services

18. The PMDSC will initially support the PMU for five years and the contract will be signed for the same period. While the PMDSC will be financed from Tranche 1, it will support all necessary activities under the subsequent tranches during the five-year period. The PMDSC will be responsible for assisting the PMU to: (i) finalize designs for all packages and the bid documents of the remaining contract packages to be awarded under Project 1, and all contract packages of Project 2 and Project 3; (ii) procure, mobilize, and supervise all Contractors for Projects (tranches) 1 to 3; (iii) recruit, mobilize, and manage the consultant for the ISEWP consulting services package; (iv) finalize the TOR, and recruit and manage a consulting firm to undertake the SIWRM consulting services package; (v) manage and supervise all civil works contracts and act as the "Engineer"; (vi) prepare Phase 2 investments and necessary ADB financing documents; (vii) provide technical and management advice, as required; (viii) manage and administer the investment program; and (ix) prepare draft periodic financing requests for subsequent tranches, and routine reporting requirements of ADB. The PMDSC will also assist MMDE with preparations, logistics and reporting for missions fielded by ADB and other cofinanciers, as necessary, throughout the investment program.

H. Scope of Services

19. The PMDSC has a number of main tasks which are explained in the following paragraphs. In general however, the PMDSC is responsible for ensuring effective and timely implementation of all the investment program's outputs to the highest standards.

20. **Task 1 – Program Management.** The PMDSC will assist with the overall investment program coordination and management through the relevant agencies at national, provincial and local levels. The PMDSC will work closely with the PMU and PIUs to ensure the effective and timely delivery of the project outputs. The PMDSC will maintain liaison with MMDE through PMU and PIU, and with ADB. Other main activities related to program management will include, but not be limited to:

(i) Working with PMU and PIUs to identify project management needs, planning, strategies and schedules for execution;

(ii) The design and establishment of a project performance management evaluation system (PPMES) that will allow PMU to (a) monitor and evaluate implementation of the project; (b) identify performance constraints; and (c) formulate and implement practical measures to address shortcomings. Annual performance evaluations will be carried out based on assessment of the projects. It should include secure financial management and accounting reporting, and be accessible to the PMU and ADB.

(iii) Preparing a Quality Assurance Plan (QAP) that will assist the PMDSC, PMU and PIUs with overall quality assurance. Essential elements of quality assurance for the investment program shall be controlled by the Engineer to ensure quality products are provided in a cost-efficient and timely manner. It will encompass all aspects of the investment program, including control of contractors and sub-contractors, in-process inspections, receiving inspections, production and special process controls, functional testings, control of nonconformities, drawing control, corrective actions, configuration controls, quality assurance records, audits, shipping inspections, and other quality specifications and requirements to meet the needs of the investment program. Contractors' quality assurance operations shall be subject to the Engineer's verification at any time.

(iv) Facilitating the initial establishment of the PSC and thereafter, regular meetings. Preparing briefing materials on progress and issues, and providing general support to the PSC to effectively guide the investment program's implementation;

(v) Maintaining regular communications with all stakeholders to ensure implementation of the investment program and planning for Phase 2 investments so that it follows a participative and integrated planning and management approach;

(vi) Ensuring the actual implementation schedule reflects the design of the investment program and intended implementation schedule. Note that, the government's objective is to expedite completion of the UECP. The PMDSC shall identify the critical paths of investment program activities; critical activities include the planning, detailed design, tendering, award and implementation timing and sequence of packages; consider opportunities for expediting the implementation schedule, particularly for UECP; and recommend improvements wherever possible.

(vii) Preparing a Risk Management Plan (RMP) in coordination with the PMU, PIUs and Contractors. The RMP will consider: (a) risk identification: determining risks may affect the investment program, and documenting the characteristics of each; (b) risk quantification: evaluating risks and risk interactions to assess the range of possible outcomes; (c) risk response: defining enhancement steps for opportunities and responses to threats; and (d) risk response control: responding to changes in risk over the course of the investment program. RMP will assist with proactively identifying potential risks and opportunities and advising and assisting the PMU and PIUs, to take timely actions to enhance project performance and mitigate any adverse constraints;

(viii) Advising and assisting the PMU and PIUs on establishing and maintaining the most appropriate and effective organizational, fiscal, implementation and management arrangements to ensure successful project implementation;

(ix) Establishing an appropriate project performance monitoring, evaluation and reporting systems that keeps project stakeholders suitably informed of project progress and impact, and assist PMU and PIUs to operate, maintain and update the system;

(x) Establishing and maintaining appropriate fiscal management and monitoring systems and assist PMU and PIUs in fiscal management and monitoring project expenditures and disbursements;

(xi) Advising and assisting the PMU and PIUs, and funding agencies in the efficient coordination of the various packages. Ensure that the PMU and PIUs will be well assisted by its services such that all project activities and particularly construction contracts are implemented in a timely and cost effective manner and maintain the highest standards;

(xii) Assisting and advising the PMU and PIUs to enhance human resources management to provide capacity development;

(xiii) Assisting with general project administration, performance and monitoring, and preparation of project reports;

(xiv) Assisting MMDE and ADB prepare the additional financing and necessary project documents for the second and third tranches of the investment program;

(xv) Ensuring timely mobilization and fielding of PMDSC staff, and when necessary, quick replacement of staff following government and ADB requirements;

(xvi) Finalizing the TOR for the ISEWP consultant and supporting the PMU and PIUs by providing guidance to the ISEWP consultant, reviewing their outputs, and recommending improvements, whenever necessary;

(xvii) Finalizing the TOR for the SIWRM consulting package, and assisting PMU with recruiting the consulting firm;

(xviii) Assisting the PMU to tender, evaluate and award contracts;

(xix) Assisting the PMU with planning and implementing any other activity related to design, construction and commissioning the investments, for example and not limited to: (a) planning and establishment of contractor camps with access, utilities etc.; (b) supervising and ensuring compliance of health and safety requirements; and (c) supervising and ensuring compliance of environmental and social safeguard measures, etc.;

(xx) Preparing a Project Completion Report (PCR) for Project 1 in a manner satisfactory to the PMU and ADB, including major project events, performance of Contractors, operation of Project 1, actual and price inflated (to completion year) project cost (foreign and local costs separately) by implementation year, and labor employed by skilled/unskilled and foreign/local categories in person-years. The PCR shall also cover, among other items: (a) the relative successes (problems) in the implementation of each package; (b) an assessment of the impact of the project on the economy and social aspects of the beneficiary areas; (c) "as-built" drawings; and (d) detailed description of all the works by items of technical and non-technical matters;

(xxi) Updating investment program documents as required; and,

(xxii) Supporting visiting missions from ADB and cofinanciers.

21. **Task 2 – Design Review, Detailed Designs and Preparing Contract Documents.** The PMDSC will be responsible for reviewing and finalizing the detailed engineering designs for 'Advanced' packages in Project 1, and conducting detailed engineering designs for all remaining packages under the investment program. Among other activities, this includes: (i) undertaking any necessary additional surveys and laboratory tests (geological, hydraulic, etc.); (ii) preparing detailed engineering design drawings and accurate cost estimates; (iii) providing criteria for evaluation and selection procedures; and (iv) preparing the specifications, bid documents, and construction schedules. The contract packages will comprise of civil works, goods and consulting services. Works will include construction of open and covered canals (both lined and unlined), tunnels, dams, aqueducts, gate structures, electro-mechanical equipment installation, hydraulic steel structures, and all other ancillary and supporting structures, e.g. access roads, cross drainage channels, fences and access gates, etc.

22. Included within the investment program is about 38 km of tunnels. These will be constructed using tunnel boring machines (TBMs) and drill-and-blast methods. The PMDSC will prepare their detailed engineering designs and contract packages, including providing advice on the contracting modality for procurement of these work packages that will ensure construction quality to the highest standards, expeditious implementation schedules, cost-competitive bids, and minimal risks. As part of these duties, the PMDSC will: (i) review available information and designs; (ii) advise on and then undertake additional necessary surveys, geotechnical investigations, and laboratory tests; (iii) advise on the best procurement procedures and modality; (iv) advise on the construction and contract risks and appropriate mitigation measures; (v) recommend the preferred equipment and construction methods; (vi) advise and accordingly plan as necessary on any other matters related to construction of the tunnels, for example: (a) procurement and mobilization of the equipment to site; (b) auxiliary and ancillary plant requirements; (c) access requirements (including a review of current access routes) and any widening or strengthening of bridges, etc.; (d) contractor's staffing requirements and their living arrangements; (e) associated ancillary works such as staging areas, portals, adits, mixing plants, segment lining factories and storage, and power transmission; (f) environmental impact and management considerations; (g) interfacing considerations with other associated contracts; (h) health and safety considerations; (i) insurance; (j) construction logistics; (k) security; and (l) in-situ stress monitoring. Similarly, the PMDSC will provide similar expert advice and

improvements as necessary, to the designs, and construction and procurement methods, for dams, aqueducts, cut-cover canal sections, and open canal sections being constructed under the investment program.

23. For packages which are already being tendered or have been awarded, the PMDSC will review the designs, specifications, and final design reports previously prepared and satisfy themselves the extent to which the works was defined. Following this review, the PMDSC will prepare a "Tender Design Review Report" which will include, but not be limited to, the following discussion: (i) extent to which the drawings and designs may be insufficient for construction; (ii) identify any additional drawings required and provide schedule of such drawings required; (iii) scope of further surveys, tests, and detailed design calculations; and (iv) identify any implications to the prices and risk profiles of the contracts. Following review and approval by the PMU, the PMDSC undertake the necessary improvements to the surveys, tests, calculations, detailed designs, drawings, etc. and advise the PMU on how the contracts will be improved or varied, if necessary.

24. **Task 3 – Contract Management, Construction Supervision, Commissioning and Operation.** The PMDSC will assist MMDE with overall contract management and administration, construction supervision, and quality control. This includes assisting and advising the PMU and PIUs with smooth execution of all works under the investment program for its timely and successful completion without having cost overruns. This applies to supervising all goods, works, surveys, field studies, investigations, trainings, and consulting services packages under the investment program. The PMDSC shall be responsible for documenting all the design drawings, reports, as–built drawings,[2] and construction monitoring and quality certificates. The PMDSC shall develop an appropriate documentation plan for this purpose. Based on the documentation plan, the PMDSC shall also carry out the actual documentation and filing of the design drawings, reports, any events, as built drawings and quality monitoring certificates.

25. The PMDSC shall act in the capacity of "the Engineer" and represent the Client in the construction contracts. Accordingly, the PMDSC shall have full responsibility and authority for the professional quality and sufficiency of the supervision with respect to progress, quality of materials and work, measurements of quantities, costs, and legal aspects related to the contract. As "the Engineer", the PMDSC will ensure timely progress of the works, initiate laboratory as well as in-situ tests as necessary, enforce specified materials, workmanship requirements and construction methods, and control the overall quality of construction. This includes the assessment of programs, materials, labor, construction methods, and monitoring compliance with specified construction methods. The PMDSC will carry out acceptance tests of equipment in the factory and on-site, including installation and commissioning. It also comprises supervision of contractor's programs, rates of progress, performance testing, compliance with specifications and drawings, and health, safety and environmental requirements. In case of anticipated cost overruns, the PMDSC shall immediately inform the client and suggest mitigation measures wherever possible. Supervision shall be carried out on all sites where works are underway. Prior approval of the Employer is to be obtained by the PMDSC for taking any action under a civil works contract designating the Consultant as "Engineer", for which action, pursuant to such civil works contract, the written approval of the Client as "Employer" is required. Other specific activities will include, but are not limited to:

(i) Establishing a data transfer system for all documents and drawings;

[2] To be supplied by the contractors. This must be included within the scope of the employers requirements for each tender document

(ii) Assisting the PMU and PIUs with bid evaluation and contract negotiations, as necessary;
(iii) Undertaking day-to-day construction supervision and monitoring, collection and checking of documentation, quality control, application of quality assurance procedures, checking the adequacy of contractor's designs, drawings, and method statements, and preparation of progress and other reports;
(iv) Carrying out regular inspections, including sample testing where required, of all materials and workmanship to ensure compliance with the design specifications;
(v) Surveying each of the constructed components to evaluate physical and financial progress of each item;
(vi) Maintaining a photographic and written record of all construction activities and progress;
(vii) Assisting with the design of concrete mixes for concrete segments and shotcrete as per technical specifications;
(viii) Conducting site investigations of construction materials and geotechnical investigations including laboratory testing and analyze investigation results;
(ix) Assessing the quantities of spoil materials and the capacity of the spoil areas, and help identify additional spoil areas, if necessary, within the vicinity of the project area;
(x) Monitoring the construction works and laboratories for quality assurance;
(xi) Ensuring that works are being implemented as per the contract specifications;
(xii) Providing sound and timely advice to resolve problems that arise during construction;
(xiii) Holding regular site meetings with Contractors and preparing minutes of such meetings (based on agreed standardized format), and proactively managing the execution of agreed actions;
(xiv) Instructing the Contractors to submit corrective measures or revised programs, as necessary, to keep pace with the anticipated progress and construction standards, and inform the PMU and PIUs on measures adopted;
(xv) Providing designs services for works during construction in order to completely and efficiently respond to meet changing site and ground conditions as construction work progresses. Issuance of instructions and additional or modified drawings and specifications to the Contractors which may be necessary for the execution of the works and remedying of any defects, and inform the PMU and PIUs accordingly;
(xvi) Issuing interim payment certificates after final measurements for consideration to PMU and the PIUs;
(xvii) Examining contractor's claims on justification and quantities; deciding on claims that fall within the authority of the Engineer; making recommendations for the claims to be considered by PMU and the PIUs;
(xviii) Examining the need for contract variations; deciding on contract variations with the delegated authority of the Engineer, and for all other variations make recommendations to the PMU and the PIUs;
(xix) Monitoring compliance of environmental management plans (EMPs) by the contractors. This will include: (a) monitoring the Contractor performance on meeting provisions of tender documents and approved EMP; (b) monitoring the effectiveness of the mitigation measures; and (c) instructing the Contractors on needed actions and corrective measures to comply with the EMP;
(xx) Monitoring compliance of health and safety plans for all activities related to implementation of the investment program;
(xxi) Monitoring the preparation and timely submission of as-built drawings as well as final reports by contractors;
(xxii) Preparing partial, substantial and final completion certificates for consideration by PMU and the PIUs; and

(xxiii) Preparing regular progress reports highlighting the current progress, problems encountered, tests conducted, adopted corrective measures and estimate of likely completion time.

26. During the defect liability period for each package, the PMDSC will carry out the following functions: (i) monitoring the functional as well as structural performance of the investments and report to the PMU; (ii) preparation of the inventory of the defects/damages rectification/repair works, if any, to be done by the Contractors as per the provisions of their contracts; (iii) evaluation of the design, drawing and construction methodology for rectification/repair works proposed by the Contractors and make recommendations to the PMU and PIUs; (iv) supervision and checking of the quality of the defect/damage rectification/repair works; and (v) assisting the PMU and PIUs with contract management and finance related issues related to the individual works contracts. The PMDSC will also assist PMU, MASL and DOI with commissioning and operation phases. It will involve building capacity within MASL and DOI to manage the project facilities. Commissioning covers initial operation to identify and rectify any construction faults prior to the contractor's official handover of completed systems to MASL and DOI. Commissioning will be progressive over the final year of individual project implementation. The PMDSC will identify specific facilities needed, expertise and staffing requirements, and prepare detailed management, operation and maintenance (MOM) procedures, including those relating to minimizing social and environmental impacts of all infrastructure developed under the investment program. This will be supported by preparation of comprehensive MOM manuals for each Project. The MOM procedures should be developed in consultation with all stakeholders.

27. **Task 4 – Capacity Development and Training Implementation.** The PMDSC will provide support for a broad program of institutional development as well as informal and formal training of key stakeholders. The PMDSC will undertake a Training Needs Assessment (TNA) of the MMDE, MASL and DOI to identify gaps and opportunities for raising their capacity in support of the investment program and implementation of Phase 2, including aspects of tunnel and dam design, procurement, contract management, construction supervision, water management, and management, operation and maintenance of the NCPCP. Upon approval of the TNA from the PMU and ADB, the PMDSC will assist MMDE with developing and implementing the training program, including programming, scheduling and managing logistics of the training, institutional development and awareness programs. Training programs will be financed by the investment program under a separate budget.

28. **Task 5 – Communications.** The PMDSC will support MMDE and PMU with managing communications during implementation of the investment program and preparation of Phase 2. This includes regularly updating the existing strategic communications program and supporting its effective implementation. It also includes establishing and operating a central grievance redress mechanism within the PMU to respond to stakeholder enquiries. Main activities will be, among other activities:

(i) Assisting and advising MMDE to develop and manage an effective public relations plan and to implement such developed plan;
(ii) Assisting MMDE in establishing a proactive informative campaign and dialogue with supporting and opposing stakeholders;
(iii) Promoting the benefits of the investment program and disseminating information to the project affected people, associated project stakeholders, general public and nongovernment organizations (NGOs) on how well social and environmental aspects are taken care of, how proper compensation is made to the affected people, what

additional support the project provides to the people in investment program's beneficiary areas, and what benefits are attributed to the poor community;

(iv) Proactively organizing public relations events;

(v) Assisting MMDE with developing and maintaining an investment program website to disseminate information and implementation progress, and also provide a feedback and communication system for stakeholders and general public; and

(vi) Preparing a photographic and video diary of the construction works throughout the entire duration of the investment program. This should show construction activities, progress, and interviews with MMDE, PMDSC specialists, contractors, government staff, and stakeholders. It will be prepared to a high professional standard.

29. **Task 6 – Preparing a Strategic Environment Assessment (SEA).** For the NCPCP, the PMDSC will prepare the SEA taking into account the NCPCP and other ongoing and planned investments in the Mahaweli river basin, expanded Mahaweli System, and northern dry zone region (mainly comprised of North Central, Northern, North Western and Eastern Provinces, and parts of Central Province). The PMDSC will undertake a desk study of available literature that will include among others: (i) the SEA prepared for the Northern Province by the Central Environment Agency and the Disaster Management Centre; (ii) the two SEAs prepared for the Mahaweli System and for National Level Water Resources Planning which were both prepared for MMDE's Dam Safety and Water Resources Planning Project; (iii) the environmental impact assessments (EIAs) and initial environmental examination (IEE) reports prepared for this investment program; and (iv) any other relevant studies and stakeholder consultations. If necessary, the PMDSC will initiate additional surveys and consultations. The SEA will include, among other items:

(i) The main objectives of the planned NCPCP and ultimate completion of the MDP, and assess linkages to any other relevant ongoing and planned developments or programs in the NCPCP's and MDP's beneficiary areas. The SEA will broadly consider the cumulative impacts of these combined programs.

(ii) The relevant aspects of the current state of the environment and its likely evolution in absence of the investment program.

(iii) Socio-environmental characteristics of the area to be affected by completion of the NCPCP and MPD.

(iv) Any significant environmental issues relevant to the NCPCP, or any areas of particular environmental importance within the area.

(v) Likely impacts on the environment, including biodiversity, land use, hydrology, flora and fauna, climatic factors, land use soil, cultural and archaeological heritage, population, human health, water quality, etc.

(vi) Recommended initiatives that will prevent, reduce, and if possible, offset any significant impacts. These should include a scope of the initiatives, preliminary designs, and estimates for the implementation and recurring costs.

30. **Task 7 – Preparation of Phase 2.** The PMDSC will assess the route options for transferring water from the Mahaweli River to Moragahakanda Reservoir. The assessment will be based on: (i) consultations with all stakeholders (government, nongovernment, upstream and downstream users, etc.); (ii) detailed daily, monthly, and seasonal water balance assessments of the MDP and NCPCP based on the modeling of long-term observation records and anticipated climate change; (iii) current and planned water management practices; (iv) impacts on hydropower generation; (v) environmental, social and resettlement safeguards; and (vi) technical and economic feasibility. Once the preferred route is selected, the PMDSC will: (a) undertake all necessary surveys, geological investigations and laboratory as well as in-situ

testing;[3] (b) prepare feasibility designs and cost estimates; (c) undertake necessary institutional, financial, procurement, environmental and social safeguard assessments; (d) assess the economic benefits and viability; and (e) prepare the feasibility and financing documents that meet both the government's and ADB's approval requirements. This includes preparing necessary ADB documents for: (i) using a project design advance to finance the detailed engineering design of Phase 2; and (ii) Board consideration for possible financing.

31. **Implementation Schedule.** The investment program is for ten years, however the government seeks to expedite its completion as soon as possible, particularly for the UECP and preparation of Phase 2 investments. The PMDSC should recommend in their proposal, viable options for achieving these goals.

I. Consulting Services

32. The Project Management, Design and Supervision Consultancy (PMDSC) will be for a period of five years.[4] Recruitment will be undertaken in accordance with ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time).[5] Firms will be recruited using quality- and cost-based selection (QBCS) method with a 90:10 quality-to-cost ratio. This ratio is justified as the priorities for the PMDSC are high-quality outputs including designing and supervising the construction of specialized dams and tunnel investments. A full technical proposal is required.

33. The PMDSC must have extensive experience with planning, designing and supervising the construction of large scale civil engineering works comprising tunnels (using both TBMs and drill and blast methods), dams and canals; experience with preparing hydropower projects is also necessary. The PMDSC must also have extensive experience in preparing contract documents, supervising construction works, and administering contracts under the International Federation of Consulting Engineers (FIDIC) Conditions of Contract for Construction for Building and Engineering Works designed by the Employer.[6]

34. The PMDSC will be engaged under a time-based contract with a lump-sum component, reimbursable component, and contingency for the time-based component. The time-based component applies to Tasks 1, 3, 4, 5 and 7. The lump-sum component applies for Tasks 2 and 6. Payment for the time-based component will be made upon submission of Monthly Progress Reports by the PMDSC which include detailed time-sheets for the individual specialists and summary of activities undertaken; the content of the Monthly Progress Reports will be agreed during the inception period of the assignment. Payment for the lump-sum component will be based on the schedule shown in Table 8. Tables 3 to 5 provide a list of key and non-key specialists to undertake all seven tasks of the PMDSC's scope of work, along with minimum inputs for the time-based components.

35. **Time-Based component.** The total minimum inputs for international key experts will be 244 person-months (pm), for national key experts will be 689 pm, and for the national non-key experts will be indicatively 1,628 pm. The cost of non-key experts must be included in the

[3] The PMDSC will be responsible for: (i) preparing the terms of reference and subcontract documents for these surveys and laboratory tests; (ii) procuring the services and studies following ADB's requirements; (iii) supervising and monitoring the subcontracts; and (iv) ensuring all subcontract outputs meet required expectations.

[4] The PMSDC contract may be extended for subsequent tranches of the investment program, at the request of the executing agency or the government, subject to satisfactory performance of the team.

[5] Available at: http://www.adb.org/Documents/Guidelines/Consulting/Guidelines-Consultants.pdf.

[6] Multilateral Development Bank Harmonized Edition, June 2010.

financial proposal. However, their CVs are not required in the technical proposal since they will not form part of the technical evaluation. CVs for non-key experts will be evaluated during contract negotiations with the highest-ranked firm and they will be accepted on a pass or fail basis.[7]

36. **Lump-Sum component:** CV's for the key experts shown in Table 5 must be included in the technical proposal and they will be evaluated. Preferably, only one expert is to be nominated for positions common to more than one task (time-based and lump-sum). In the technical proposal, the firm should also include a list of proposed additional non-key positions (international and national), provide justification for their inclusion, and include the CV's for proposed experts for each of the positions.[8] The proposed additional non-key positions and CV's of the additional non-key experts will be evaluated during contract negotiations and will be accepted on a pass or fail basis.[9] For the purpose of preparing the lump-sum financial proposal, it is assumed that the services of both key and additional non-key experts will be undertaken within the project offices in Sri Lanka. During contract negotiations the PMDSC may propose alternative arrangements for the work locations for the additional non-key experts, which, subject to assessment and approval of the PMU and ADB, will provide services of an equivalent or better quality. Associated cost savings will be reflected in the agreed lump-sum contract amount.

Table 3: Summary of Key Experts and Inputs for Time-Based Tasks

Position	Person-Months	
	International	National
Team Leader and Chief Design Engineer*	44	-
Deputy Team Leader and Program Management Specialist	-	55
Monitoring and Evaluation Specialist	-	12
Procurement and Contracts Specialists	15	50
Environment Specialists*	9	30
Social and Resettlement Safeguards Specialists	6	14
Sociologist	-	6
Communications Specialists	6	34
Institutional Strengthening Specialists	6	12
Financial Management Specialists	4	8
Chief Design Engineer (Tunnels)*	4	-
Senior Design Engineers (Dams and Tunnels)*	18	30
Senior Design Engineers (Canals)*	-	28
Rock Mechanics Engineers*	10	40
Senior Structural Engineers*	6	22
Senior Engineering Geologists*	10	24
Senior Mechanical Engineer (TBM)*	12	-
Mechanical Engineers (Gates and Hydropower)*	1	2
Senior Electrical Engineers (TBM)*	2	6
Senior Electrical Engineers (Gates and Hydropower)*	2	2
Hydraulic Structures Engineers*	2	4
Water Resources and Irrigation Planning Specialists*	6	10
Modeling Specialists	10	20
Agriculture Specialist	-	6
Economists	4	10
Chief Resident Engineer	55	-
Senior Construction Engineer	-	55

[7] Non-key experts should be budgeted under the remuneration section of the time-based financial proposal.
[8] If selected, and unless there are significant mitigating circumstances, nominated additional non-key experts must join the PMDSC to undertake the role.
[9] Additional non-key experts for the lumpsum component should be budgeted under the lumpsum financial proposal.

Position	Person-Months	
	International	National
Resident Engineers (3 persons)	-	150
Tunnel Construction Engineers	12	50
Dam Engineer*	-	9
Total	**244**	**689**

TBM = tunnel boring machine.
* These experts are also included in Table 5 as key experts for lump-sum tasks. Preferably, only one expert is to be nominated for each position.

Table 4: Indicative Summary of Non-Key Experts for Time-Based Tasks

Position	Person-Months	
	International	National
Concrete Engineers (3 persons)*	-	90
Senior Surveyors (3 persons)*	-	90
Quantity Surveyors (3 persons)*	-	90
Health and Safety Officer*	-	50
Senior Draftsperson*	-	50
Assistant Design Engineers (8 persons)	-	192
Engineer Assistants (Construction Supervision) (12 persons)	-	600
Assistant Mechanical and Electrical Engineers (4 persons)	-	92
Survey Assistants (6 persons)	-	270
Draftspersons (4 persons)	-	104
Total		**1,628**

* For guidance, the tasks for these specialists are shown in Section K.

Table 5: Summary of Key Experts for Lump-Sum Tasks

Position	CV Required*	
	International	National
Chief Design Engineer	Yes	
Environment Specialists	Yes	Yes
Chief Design Engineer (Tunnels)	Yes	
Senior Design Engineers (Dams and Tunnels)	Yes	Yes
Senior Design Engineers (Canals)	Yes	Yes
Rock Mechanics Engineers	Yes	Yes
Senior Structural Engineers	Yes	Yes
Senior Engineering Geologist		Yes
Senior Mechanical Engineer (TBM)	Yes	
Mechanical Engineers (Gates and Hydropower)	Yes	Yes
Senior Electrical Engineers (TBM)	Yes	Yes
Senior Electrical Engineers (Gates and Hydropower)	Yes	Yes
Water Resources and Irrigation Planning Specialists	Yes	Yes
Hydraulic Structures Engineers	Yes	Yes
Dam Engineer		Yes

* Only provide CV's for experts not proposed for positions in Table 3.

J. Individual Terms of Reference for Key Experts (time-based component)

37. **Team Leader and Chief Design Engineer: International (minimum 44 pm for time-based tasks)**. The expert must be an experienced civil engineer, preferably with a Master's degree and about 15 years of work experience out of which about 10 years should be related to project management of large construction projects similar to the investment program that include multiple concurrent works activities and construction of tunnels in soil and rock, earth and concrete dams, large canals, and large gated hydraulic structures. The expert should have

demonstrated experience of leading design and implementation teams, and working in complex projects in similar geographical and topographical settings. The expert should be competent in planning, design, contract management, quality assurance and quality control, safety, compliance with safeguards, etc. pertaining to construction of similar projects. The expert must have excellent verbal and written communication skills in English. The expert will have prior experience of leading similar projects in countries with similar geographic conditions. The expert will be responsible leading and contributing to all tasks and for undertaking the following activities, among others:

(i) Setting-up an effective organizational structure for the PMDSC. Preparing and implementing all administrative systems and procedures needed to ensure the effective design and supervision of the contract works in accordance with the scope of works with acceptable international standards;
(ii) Being responsible for overall direction of the PMDSC team, coordination of inputs, and management of individual specialists;
(iii) Being responsible for the overall management of the planning, design and engineering team and their activities. Providing expert advice as required. Review and ensure outputs are complete, well prepared using consistent formats, and their content are prepared to the highest standard;
(iv) Having overall responsibility for the timely delivery and quality of all outputs, including those listed in Table 6, in formats that are acceptable to the government and ADB;
(v) Managing the relationships with the government, PMU, PIUs, ADB, and all other stakeholders;
(vi) Carrying out a comprehensive review of the feasibility studies and detailed designs done to-date and draw attention to changes which may have become necessary since their preparation;
(vii) Advising on construction and contracting methods, and performing a comparative analysis of options, benefits, risks, mobilization, and implementation schedules;
(viii) Assisting the PMU and PIUs to prepare invitation for tender; preparing bid evaluation criteria, initially evaluating and providing advice to the PMU on alternative proposals, and elaborating on recommendations with a ranking of all contractors concluding with a suggestion of the technically and economically qualified bidder;
(ix) Identifying important technical and managerial issues which affect progress, safety, quality and compliance with safeguards;
(x) Reviewing the construction schedule of the tunneling methods and recommending the most optimal solutions, and reviewing the dam designs with the construction schedule;
(xi) Reviewing mobilization of the Contractor's resources (experience of the personnel, equipment, machines, quality and quantity of materials, funds, etc.) and recommending additional resources to be mobilized;
(xii) Guiding, coordinating and supporting program activities and providing overall guidance and direction and ensure that the PMDSC works in harmony with other ongoing and planned programs;
(xiii) Advising the Program Director in coordinating the planning, management, monitoring and reporting of all project activities including supporting the development and implementation of progress monitoring systems;
(xiv) Advising the Program Director in planning, and coordinating inputs particularly for physical interventions under Tranches 2 and 3. Oversee selection, field investigations, feasibility studies and detailed designs of Phase 2 investments;
(xv) Planning and coordinating project designs and other requirements for subsequent tranches of the investment program in accordance with ADB's requirements. These

should all be based on relevant international and regional experiences and best practices;
(xvi) Supporting PMU and PIUs with packaging contracts and finalizing tender documents;
(xvii) Coordinating with and assisting PMU on any relevant activities for river basin planning in relation to the investment program and Phase 2;
(xviii) Supporting visiting missions from ADB and cofinanciers; and
(xix) Supporting PMU with preparing periodic financing requests for subsequent tranches.

38. **Deputy Team Leader and Program Management Specialist: National (55 pm).** This expert will support the Team Leader with overall management duties of the team, help lead the design process, and liaise with the main government and project stakeholders. Preferably, the specialist will have a Master's in Civil Engineering or Agricultural Sciences, with 15 years of experience in preparing and implementing large irrigation and water resources projects, preferably with dams and canals; and previously co-led international donor-funded development projects. The main activities of the specialist will be, among others:

(i) Support the Team Leader in managing the overall assignment and be responsible for the national consultants' outputs;
(ii) Collect and compile all relevant studies including designs, drawings, survey information and data for all projects under Tranches 2 and 3 and Phase 2;
(iii) Maintain proper filing and reporting systems. Coordinate with the PMU and PIUs on management information system (MIS) procedures, website information, and records maintenance;
(iv) Support development of an MIS for the investment program that addresses among other things, individual and overall contract implementation schedules and budgets (planned and actual), project operational performance, operation and maintenance, safeguards and human resource development. Update the MIS at least monthly to support reporting requirements and for PMU, PIU, ADB and general public knowledge;
(v) Develop and deliver training materials on technical aspects including the MIS;
(vi) Review role of and interrelationship among important stakeholders and suggest ways to improve liaison, cooperation and coordination among them to achieve improved pace and quality of implementation;
(vii) Support the timely submission of all deliverables;
(viii) Support the necessary approval processes of deliverables;
(ix) Work closely with the Team Leader to guide the management and coordination with the government, and other stakeholders including the facilitation of regular management dialogue between the PMU, PIUs, other associated agencies and stakeholders at central and project levels;
(x) Support the establishment and guide the activities of the PMU, PIUs, the PSC, and other proposed institutional arrangements, as necessary; and
(xi) Support the PMU and PIUs in the liaising, coordinating and supervising of the contractors and other consultancies, and panel of experts hired by PMU.

39. **Monitoring and Evaluation Specialist: National (12 pm).** The specialist will have a civil engineering degree and preferably with 10 years of experience on monitoring and evaluation (M&E) of large-scale water resources infrastructure projects, preferably with tunnels and dams. The specialist will work closely with the Team Leader and PMU to ensure that proper systems are established, the investment program is implemented in accordance with the program design and monitoring framework (DMF), and that issues arising are quickly identified and brought to the attention of the government and ADB for prompt resolution. Other activities will include, but not limited to:

(i) Carrying out a review of the project preparation documents with regard to project M&E and drawing attention to changes which may have become necessary since their preparation;
(ii) Support the Team Leader and PMU in ensuring that the project is implemented in accordance with the investment program's and project's DMF and that issues arising are quickly identified and resolved;
(iii) Set up M&E frameworks and the PPMES for overall project activities. The PPMES will include a participatory baseline survey to be conducted within the first year of the Project with follow-up surveys to evaluate any changes. Surveys will target direct and indirect stakeholders and beneficiaries. Monitoring and evaluation of pro-poor effects of the project will also be integrated into the PPMES;
(iv) Prepare evaluation criteria for each activity, and role and tasks of the agencies;
(v) Work with government experts and other specialists in the team to develop: (a) indicators that are objective, obvious and effective; (b) databases for effective data collection and management; (c) methods for evaluation and analysis; and (d) procedures for audit and control;
(vi) Prepare the necessary guidelines for M&E consistent with project documents (report and recommendation of the President [RRP], the Loan Agreement, facility administration manual [FAM], environmental assessment and review framework [EARF], IEE/EIAs and EMP, resettlement framework [RF] and resettlement implementation plans [RIPs], summary poverty reduction and social strategy [SPRSS], etc.), ADB's requirements, and regulations of the government;
(vii) Set up standards, contents and schedules for assistance to the PMU and PIUs for M&E to ensure the project components are implemented as scheduled and outputs are as specified in the Loan Agreement;
(viii) Prepare M&E and PPMES manuals for monitoring and assessment and ensure that relevant agencies comply with these manuals;
(ix) Develop a community participation process within the M&E systems;
(x) Collect necessary data, monitor and routinely evaluate project implementation results and impacts as part of the MIS;
(xi) Support the team in the preparation and organization of training and workshop programs on data management and using M&E for the PMU, stakeholders, and other government staff;
(xii) Prepare standardized reporting formats and templates; and
(xiii) Assist the Deputy Team Leader to take over managing and updating the M&E, MIS and PPMES.

40. **Procurement and Contracts Specialists: International (15 pm) and National (50 pm).** The experts, preferably with a degree in Civil Engineering or equivalent and with 8 years of experience on similar development projects in countries with similar geographic conditions. The experts should have demonstrated profound knowledge of contract management, international contracts for construction works (i.e. FIDIC), and experience with procurement processes for externally-financed projects, mainly those funded by ADB or World Bank. The experts will have considerable experience in preparing bid documents, evaluation of bids, negotiations, etc., and should be well informed on major pitfalls related to large-scale contracting and construction issues. The experts will have extensive experience in assessing claims of contractors with respect to the specifications, plans, and conditions of contracts under FIDIC guidelines. The expert's main activities include, but are not limited to:

(i) Reviewing the procurement plan and contract packages in the FAM with regard to procurement and financial management and draw attention to changes which may have become necessary since their preparation;

(ii) Assisting the PMU and PIUs with procurement of Tranche 1 outstanding contracts, review their progress, recommend adjustments, and identify lessons learnt that can be applied to procurement of all other remaining packages in the investment program;
(iii) Preparing detailed procurement plans for Tranches 2 and 3 incorporating the procurement requirements for all necessary goods, works, consulting services packages, etc.;
(iv) Annually updating the Procurement Plans according to actual implementation schedule and agreed changes, accounting for content, schedule, resources, contract awards and disbursement;
(v) Advising on procurement strategies in accordance with the government's and ADB's Procurement Guidelines (2013, as amended from time to time);
(vi) Preparing a Program Procurement Handbook in accordance with ADB's procurement policies and guidelines and government regulations. The handbook should include guidelines for effective implementation of the investment program including, but not limited to, providing guidance on bid notification and bid submission, bid evaluation and contract award, contract supervision, and payments;
(vii) Undertaking a capacity assessment of the PMU and PIUs to assess what supplementary personnel and resources are required to ensure satisfactory implementation of the investment program;
(viii) Guiding, supporting and monitoring the PMU and PIUs in procurement and financial management in accordance with the Program Procurement Handbook;
(ix) Work with the engineers in finalizing cost estimates, tender documents, and bill of quantities (BOQ); preparing procurement documents for all remaining packages to be contracted under the investment program and also the advance packages for Phase 2, in accordance with ADB's *Guidelines on the Use of Consultants* and ADB's Procurement Guidelines;
(x) Advising on the timelines for procurement and developing strategies to ensure the optimum phasing of the start-up of the various packages;
(xi) Assisting the PMU and PIUs with reviewing contents of packages and the procurement plan and updating as necessary of tender documents in accordance with ADB policy and government regulations (including forms of payment, audit procedures, disbursement and preparation of reports related to financing activities);
(xii) Assisting the PMU and PIUs to prepare and review necessary procurement notices;
(xiii) Assisting the PMU and PIUs with advance procurement and recruitment where necessary. This applies to packages under the investment program and advance packages under Phase 2 should it proceed during the time of this consulting package;
(xiv) Preparing standard criteria and checklists for evaluation of the tenders and assist the PMU and PIUs in preparation of the bid evaluation reports and assist them in reviewing the selection process of bidders;
(xv) Supporting the PMU and PIUs with all procurement activities for national competitive bidding (NCB), international competitive bidding (ICB), shopping for goods and works, community works contracts, use of force accounts, and selection of consultants according to the ADB's guidelines and government regulations;
(xvi) Assisting the PMU and PIUs with contract negotiations, preparation of contracts and contract awards;
(xvii) Maintaining complete and updated files on all contractual issues including submittals, securities, insurance, and related documents;
(xviii) Supporting specific actions for integrity, ease of fund flow, and transparency;

(xix) Examining consultant and contractor claims and support the construction supervision specialists, PMU and PIUs with determination of need for contract variations, etc.;
(xx) Coordinating with the M&E Specialist in setting up a monitoring system on procurement and contracts for the whole program from central to local level in a unified framework in accordance with the monitoring framework and project design;
(xxi) Supporting the Team Leader, PMU and PIUs in ensuring that the project is implemented in accordance with the FAM to ensure that management and operation mechanisms will be effective, obvious and sustainable, and that issues arising are quickly identified and resolved;
(xxii) Assisting the project implementation officers of the PMU and PIUs in preparing and delivering on-the-job training programs related to procurement, contracts, financial management and disbursements;
(xxiii) Updating, monitoring and evaluating the payment and disbursement of all packages in the project and identifying the causes of existing problems, delays and propose remedial measures;
(xxiv) Assisting the PMU and PIUs in preparing monthly reports for procurement and contract awards, contract management and performance of each contract package;
(xxv) Providing advice as required helping resolve contractual matters. Advising on and mediating disputes, as necessary, between the Contractors and PMU, should they arise; and
(xxvi) Supporting preparation of Phase 2 by: (a) updating the Procurement Capacity Assessment of MMDE, MASL, DOI, and national contractors; (b) preparing the procurement plans for the Phase 2 investments; and (c) advising on procurement arrangements and formats of the bid documents, taking into consideration lessons learned during implementation of this investment program.
(xxvii) The national expert will support the international expert, resident engineers and team leader.

41. **Environment Specialists: International (minimum 9 pm for time-based tasks) and National (minimum 30 pm for time-based tasks).** Preferably, the specialists will have a Master's degree in environmental sciences, environmental engineering, or similar. For the international specialist, 10 years of experience undertaking similar assignments, preferably in countries with similar geographic conditions is an advantage. The national specialist, preferably with 8 years of experience, should have worked on two or more assignments financed by ADB or other multilateral agencies. The specialists will be responsible for three main tasks: (i) preparing the SEA; (ii) updating the environmental assessments and EMPs, and ensure their effective implementation by the contractors; and (iii) preparing the necessary environmental assessments for the Phase 2 investments that will be included in the overall feasibility and preparation of Phase 2. In summary, the tasks of the specialists will be, among other activities:

(i) Preparing the SEA;
(ii) Updating the EIAs and IEE, and the respective EMPs based on final detailed designs;
(iii) Training and building capacity of PMU and PIU staff on environmental management, supervision, reporting, and monitoring of implementation of EMPs;
(iv) Orienting contractors on implementation of the EMPs;
(v) Reviewing the environmental method statements provided by contractors and guide them on any revisions required;
(vi) Monitoring implementation of the EMP and recommending any corrective actions on any unforeseen environmental impacts;
(vii) Taking the lead in preparing environmental monitoring reports for PMU, ADB and Central Environmental Authority (CEA); and

(viii) Preparing separate EIAs for: (i) the North Central Province Canal Project; and (ii) the Lower Uma Oya Project combined with the Randenigala-Kalu Ganga Transfer Canal Project. The EIAs will meet the requirements of both ADB's Safeguard Policy Statement (2009) and that of government's CEA. They will in general cover: (a) a description of the projects including alternatives considered; (b) policies, legal and administrative frameworks relevant to the projects and environmental assessments, (c) descriptions of the existing environment which will include the physical, biological, and socioeconomic conditions of the study areas; (d) anticipated environmental impacts and mitigation measures which will include the positive and negative, direct, indirect, and cumulative impacts to the physical, biological and socioeconomic environments, and the physical cultural resources in the area of influence and associated mitigation measures; (e) descriptions of the information disclosures, consultation and participation plans; (f) descriptions of the grievance redress mechanisms; and (g) environmental management plans which will identify the mitigation and monitoring requirements including the implementation arrangements and associated costs. To support preparation of the EIAs, the Environment Specialists may need support from the other PMDSC specialists (engineers, geologists, water resources specialist, etc.) and additional national specialists such as ecologists, agronomist, sociologist, and archeologist. The Environment Specialists will prepare TORs and budgets for the additional roles, for approval by the PMU.

42. **Social and Resettlement Safeguards Specialists: International (6 pm) and National (14 pm).** Preferably, the specialists will have a degree in social sciences with 10 years of experience undertaking similar assignments, preferably financed by ADB or other multilateral agencies. The specialists will assist the PMU with implementing the resettlement activities for the investment program, and help prepare the appropriate safeguard documents for Phase 2 investments. Other main activities of the specialists will include, but are not limited to:

(i) Updating the approved RF of the investment program, as necessary;
(ii) Updating resettlement plans for Tranches 2 and 3, as necessary;
(iii) Designing, commissioning, and supervising the implementation of appropriate socioeconomic surveys for Tranches 2 and 3 and Phase 2 investments; and provide all necessary inputs for the preparing the associated social and resettlement activities including the social impact assessments, safeguard planning documents such as RIPs, SPRSS, and gender action plans;
(iv) Proposing practical and implementable options for improving resettlement implementation. Draw lessons to be learned from comparable projects and propose practical and implementable options for improvement in resettlement implementation;
(v) Preparing MMDE's capacity assessment and involuntary resettlement training programs if gaps are identified;
(vi) Assisting PMU in: (a) identifying affected persons and the impact of the project on them; (b) making a detailed inventory of assets; (c) making swift payments of compensation and the provision of other resettlement assistance, along with other relevant agencies; and (d) keeping detailed records of progress on resettlement implementation;
(vii) Providing or organizing training programs or other forms of support for income restoration and improvement; and
(viii) Planning and implementing consultations with affected persons in accordance with the consultation plan.

43. **Sociologist: National (6 pm).** The specialist will have a post-graduate degree in sociology or equivalent, preferably with 10 years of experience in planning development projects

in the water resources management or irrigation sector. The main tasks of the specialist will be supporting the investment program and preparing Phase 2. Other main activities will include, but not limited to:

(i) Collecting information and undertaking surveys to support the following studies;
(ii) Assessing the social dimensions and dynamics within the completed Mahaweli System for every system area and disaggregated for social dimensions such as, but not limited to: age, gender, income, employment, ethnicity, and religion;
(iii) Assessing how the above dynamics affects water management now and possibly in the future taking to consideration planned investments under Phase 1 and 2;
(iv) Contributing to the planning and design of investments under Phase 1 and 2;
(v) Supporting the Communications Specialists in preparing and implementing communication activities; and
(vi) Supporting the Social and Resettlement Safeguards Specialists with undertaking their activities.

44. **Communications Specialists: International (6 pm) and National (34 pm).** Preferably, the specialist will have Master's degree in communication or equivalent with 10 years of successful experience in planning and implementing communication plans for development projects, preferably in the water resources sector. The tasks of the specialists will be supporting the investment program and preparation of Phase 2. Other main activities will include, but not limited to:

(i) Reviewing, updating, and improving the investment program's communications strategy and plan;
(ii) Identifying Media, NGOs or other communications agencies that can efficiently support and implement the investment program's communication plan;
(iii) Preparing the project communications campaigns and communications materials;
(iv) Supervising the design and development of the investment program's website;
(v) Preparing a video and photographic diary on the implementation of the investment program;
(vi) Training the PMU communication specialists; and,
(vii) Preparing a communications plan for Phase 2.

45. **Institutional Strengthening Specialists: International (6 pm) and National (12 pm).** Preferably, the specialists will have 10 years of experience in institutional strengthening and capacity development in water resources and irrigation projects. The specialists should have a Master's degree or equivalent in civil engineering, water resources management, institutional strengthening, or financial management. Experience in Sri Lanka, or other countries with similar geographic conditions, is preferred for the international expert. Responsibilities will include, among others:

(i) Prepare a training needs assessment and design a training program to strengthen the staff of the PMU and PIUs, and from other relevant agencies, in matters related to the investment program;
(i) Provide advice and guidance on the implementation of the training program which may include short- and long-term courses, national and international courses, and study tours;
(ii) Assist the PMU and PIU's with implementing the training program by providing logistical support;
(iii) Prepare institutional and staff long-term development plans for MMDE that will support long-term management of the entire MDP and NCPCP;
(iv) Review policies, laws, regulations, agreements, frameworks and mechanisms currently being used to govern the management of water resources in Sri Lanka and

that enable interagency coordination for its development and management. Advising on strengths, weaknesses and opportunities to improve these under the investment program and subsequent Phase 2;

(v) Review the current institutional arrangements within MMDE, MASL and DOI, and advise strengths, weaknesses and opportunities to improve these agencies under the investment program and subsequent Phase 2; and

(vi) With the Water Resources and Irrigation Planning Specialist, update and finalize the TOR for the SIWRM consulting package. Support the PMU with their recruitment, and assist the PMU with monitoring and advising on the outputs of the SIWRM Consultant.

46. **Financial Management Specialists: International (4 pm) and National (8 pm).** Preferably, the specialists will have an advanced degree in accounting or finance or equivalent and 10 years of experience in undertaking financial analysis, preferably in multilaterally-financed projects or in the public and private sector. The main activities of the specialists will be, among others:

(i) Support the PMU in establishing and using proper project financial management and accounting systems to support financial management of the investment program and adopting the financial management improvement proposed in the FAM;

(ii) Support preparation of the Phase 2 investments by: (a) updating the Financial Management Assessment of MMDE, MASL and DOI; (b) preparing the financial evaluation and analysis of the Phase 2 investments which will include both non-income generating components (irrigation and bulk water supply) and income generating components (hydropower). The formats of these assessments will follow ADB requirements.

(iii) Prepare and revise the project cost estimates, financial monitoring and financial analysis;

(iv) Prepare a Financial Management Handbook for the investment program and provide training to the PMU and PIUs as necessary on the handbook, project accounting and ADB procedures for disbursements;

(v) Assist the PMU in setting up the overall financial management, i.e., disbursement of funds, review of withdrawal applications, monitoring of project and counterpart funds, etc.;

(vi) Assist the PMU in implementing improvement measures recommended by the PPTA financial management assessment, and update the FAM accordingly;

(vii) Assist PMU staff in the preparation of project accounts in a format suitable for both ADB and national requirements;

(viii) Assist PMU staff in developing a system of internal control to ensure accurate and reliable financial information; and

(ix) Assist the Team Leader and Deputy Team Leader in timely preparation of reports.

47. **Chief Design Engineer (Tunnels): International (minimum 4 pm for time-based tasks).** Preferably, the expert will have a Master's degree in civil engineering, with specialization in all kinds of tunneling works in soil and rock. The expert should have demonstrated experience of more than 12 years working in complex projects in similar geographical and topographical settings. The expert should be competent in planning, design, cost estimate, tendering, contract management and controlling, quality assurance and quality control, safety compliance and construction of tunnels, shafts and/or caverns as well as risk management. The expert has to review and comment on alternative proposals. The expert must have profound knowledge about electronic data processing and software like AutoCAD, etc., and must have excellent verbal and

written communication skills in English and ideally will have prior experience of leading similar projects. The activities will include, but are not limited to:

(i) Studying the alignments of mechanized (TBM) and conventional (drill and blast) tunnels in soil and rock, and find optimum solutions for either structure to fit the program time and cost constraints;
(ii) Preparing tender drawings for all tunnels including the respective cost estimates, and construction schedules;
(iii) Elaborating on the best suited cross section of the conventional tunnels, and determining the minimum longitudinal distance between face heading and bench blasting in the tunnels;
(iv) Checking the rock mass parameters for a stability assessment of portals and tunnel portions with low rock cover in collaboration with the Rock Mechanics Engineer;
(v) Selecting the locations of the temporary tunnel portals in close cooperation with the Engineering Geologist;
(vi) Designing the tunnel between temporary and final portal as cut-and-cover sections;
(vii) Elaborating on the excavation classes on the basis of rock mass rating (RMR) together with the Rock Mechanics Engineer and Engineering Geologist; assigning each excavation class the advance rate and the respective excavation diameter;
(viii) Determining the pay-line for the excavation in collaboration with the Engineering Geologist and Rock Mechanics Engineer;
(ix) Designing the support classes by means of RMR and excavation classes in cooperation with the Rock Mechanics Engineer; elaborating on the best suited support system for TBM, i.e. segmental lining or reinforced shotcrete with rock bolts;
(x) Designing permanent support for all underground excavations and being responsible for reviewing and approving the Contractor's temporary support proposals;
(xi) Develop a dewatering system in detail for the entire length of each of the tunnels including the portals, select the capacity of the pumps and determine the size of the retaining basin(s);
(xii) Developing the optimal requirements of important equipment for critical activities of TBM, drilling and blasting; permanent support works (e.g., lining, shotcrete, etc.) headworks; etc.;
(xiii) Advising on construction methods;
(xiv) Providing overall management of the tender design review, detailed designs and preparation of "for construction" drawings for the tunnels;
(xv) Advising on contractual issues and the use of land for the start-up installation and for dump of tunnel muck;
(xvi) Updating the schedules for mobilization, implementation, construction, and commissioning;
(xvii) Evaluating the total cost of each tunnel based on the geotechnical findings and the selected TBM, independently from the existing available estimates;
(xviii) Advising on additional tests or investigations, if deemed necessary; and
(xix) Supporting preparation of Phase 2 investments.

48. **Senior Design Engineers (Dams and Tunnels): International (minimum 18 pm for time-based tasks) and National (minimum 30 pm for time-based tasks).** The experts must be civil engineers, preferably with a Bachelor's degree and about 10 years of work experience out of which about 7 years should be related to design and construction of dams with hydropower facilities and tunnel projects preferably in countries with similar geographic and climatic conditions. Experience with planning and design of earth gravity dams and roller-compacted concrete (RCC) dams is required. The international expert must have ample experience with dams and TBMs, and excellent verbal and written communication skills in

English. The experts will review and finalize the designs of the dams that will be constructed under the investment program (Phase 1). The experts will also plan and prepare feasibility designs, cost estimates, draft specifications for the dams and tunnels to be constructed under Phase 2, along with preparing the TOR for their detailed engineering design. The following activities apply to both this investment program and preparing Phase 2. They will include, but are not limited to:

(i) Supporting the Chief Design Engineers with the design works including preparing the detailed engineering designs, cost estimates, construction schedules and tender documents;
(ii) Reviewing of the updated seismic hazard analyses;
(iii) Reviewing and commenting on the available designs and construction details for two dams, one saddle dam of NWPC; assess the costs and elaborate tender documents with the construction schedule;
(iv) Checking the height of the freeboard and the size of the rip-rap with the Water Resources and Irrigation Planning Specialists;
(v) Working with the Engineering Geologists to establish the criteria for dam foundation in general and in particular the foundation of the clay core, treatment measures and the availability of suitable local dam construction materials in close vicinity and selecting the appropriate material parameters to be applied in the dam analysis/design;
(vi) Working closely with the Engineering Geologists, deciding on locations of borrow areas for construction materials from the reservoirs based on the results from the site geotechnical drilling/testing and investigation programs;
(vii) Designing the spillways and associated appurtenances in close cooperation with the Water Resources and Irrigation Planning Specialists, Modeling Specialists and Hydraulic Structures Engineers; to ensure the dams safely pass design flood events, outflows are easily managed, erosion on the embankments is prevented in case of spilling, and providing gated bottom outlets to release the water into the canals and pass sediments;
(viii) Firming-up the dam layouts and details including the foundation treatments, embankment zoning, seepage control measures, toe drainage, rip-rap protection of the embankment dam and slopes in the reservoir;
(ix) Carrying out dam stability analysis with the soil parameters gained from laboratory tests;
(x) Designing a monitoring system for the dams as part of a permanent monitoring and safety system;
(xi) Preparing BOQs, cost estimates, and construction schedule;
(xii) Providing overall management of the tender design review, detailed engineering designs, and preparation of “for construction” drawings for the dams and canals;
(xiii) Elaborating on a comprehensive list of machines and equipment; specifying details of TBM as well as drill-and–blast technology;
(xiv) Reviewing requirement of important equipment for critical activities of TBM, drilling and blasting, temporary and permanent support works (e.g., shotcrete, rock bolts, steel arches, etc.), and for the tunnel sections in cut-and-cover; assessing the Contractor’s approach to dam construction, borrow areas and sealing measures; reviewing mobilization, quality and quantity of the contractor’s equipment and suggesting additional equipment for the optimized construction;
(xv) Checking the quality and quantity of construction materials in the borrow areas for the dam sites; in case the necessity arises develop an investigation program for the proof of suitable and sufficient core, filter, embankment and rip-rap material;

(xvi) Investigating and commenting on the quality and quantity of the tunnel muck to be used as rip-rap and/or as concrete aggregates as well as evaluate haulage and storage cost; arrange the construction schedules of dams and tunnels to fit the muck for immediate use;
(xvii) Selecting temporary storage areas for the different types of construction materials preferably in the reservoir; optimize the excavation and the filling of the embankment in order to reduce the number and size of the storage facilities;
(xviii) Checking the stability of the slopes in the reservoir against erosion by wave action or rapid drawdown;
(xix) Being responsible for the design of permanent support for all underground excavations and responsible for reviewing and approving the Contractor's temporary support proposals;
(xx) Providing continuous representation during the construction of the tunnels and dams.
(xxi) Monitoring the tunnel support progress and selection of supports based on actual site conditions. Advising the other specialists on progress status and obtaining assistance when needed;
(xxii) Monitoring and reporting on the works including soil excavation, shotcreting, rock-bolting, etc.;
(xxiii) Reviewing and reporting on any Contractor initiated proposals for design modifications;
(xxiv) Checking working drawings for conformity with approved designs;
(xxv) Participating in the preparation of reports, certification of progress payments, etc.;
(xxvi) Monitoring the construction works from the point of view of conformity with the quality, works measurement, record keeping, contract interfaces and progress; issuing field instructions as necessary to ensure that the Contractor remedies the defects; and monitoring the remedial actions;
(xxvii) Ensuring that safety and environmental measures are strictly followed by the Contractors. Coordinating with site staff and report accordingly;
(xxviii) Supervising and monitoring the advance rates, and providing weekly progress reports of the tunneling works;
(xxix) Reviewing works to confirm that the quality of the performed works is according to contractual specifications;
(xxx) Maintaining accurate records on measurement of the quantity of different items of the works;
(xxxi) Participating in the checking and verification of payment certificates;
(xxxii) Contributing to the preparation of progress reports; and
(xxxiii) Providing training to the PMU, PIU and other national staff on matters relating to dam and tunnel construction, to include safety, quality assurance and control, risk management, selection of materials and supports, monitoring performance, etc.

49. **Senior Design Engineers (Canals): International (no time-based tasks) and National (minimum 28 pm for time-based tasks).** The experts must be civil or irrigation engineers, preferably with a Bachelor's degree and about 7 years of work experience out of which about 5 years should be related to design and construction of new and rehabilitated large-scale canals, preferably in countries with similar geographic and climatic conditions. The activities will include, but are not limited to:

(i) Reviewing the alignment and the design of headworks, canals, aqueducts, level crossings, regulators, and the feeder structures at the dams;
(ii) Checking the hydraulics and the capacity of the canals and improving the design of all structures if deemed necessary;

(iii) Elaborating on and proposing as necessary model tests or any other investigations for the benefit of the structures;
(iv) Advising on lining materials and types that will best suit the canals;
(v) With the Hydraulic Structures Engineer, advising on cross drainage and flow control structures;
(vi) Advising on construction methods including methods and equipment required for lining of the canals;
(vii) Preparing detailed engineering designs, cost estimates and tender documents;
(viii) Estimating the requirement of contractor's resources (personnel, equipment, machines, materials, funds, etc.) and recommending additional resources to be mobilized to complete the canals and appurtenant structures within the contract periods;
(ix) Providing continuous representation during the construction of the tunnels and dams;
(x) Support the health and safety engineer at each of the construction sites; and
(xi) Support preparation of Phase 2 investments.

50. **Rock Mechanics Engineers: International (minimum 10 pm for time-based tasks) and National (minimum 40 pm for time-based tasks).** Preferably, the experts shall have a Master's degree in civil engineering, specializing in rock mechanics and about 12 years of work experience out of which 8 years should be related to the design and construction of underground structures, e.g. galleries, tunnels, shafts, caverns in countries with similar geographic conditions and similar tropical climate. The experts shall be familiar with the various types of rock and their parameters and also with the technologies of conventional and mechanized tunneling works, the respective machinery, the auxiliary equipment and the varieties of construction materials. They should be competent in tunnel planning, design and construction. The experts shall have excellent verbal and written communication skills in English. The experts will assess the stability of all tunnels in close collaboration with the Engineering Geologist followed by stability analyses for each rock class in order to define the respective support measures. They will also define the sections for convergence measurements, obtain the records and evaluate the deformations over the time. Other main activities include, but are not limited to:

(i) Examining the tunneling methods (TBM, drill and blast) and recommend appropriate tunneling method to fit the program time and cost constraints;
(ii) Undertaking prime responsibility for supplementary field investigations (if necessary), design, tender drawings, BOQ and cost estimates for the tunnel components;
(iii) Analyzing the use of explosives in tunnel excavation and suggest mechanism to rationalize and optimize the use of explosives;
(iv) Analyzing the issue of compatibility of drilling and shotcrete equipment with the tunnel cross section and suggest the most optimal solutions for drilling and shotcrete;
(v) Developing the optimal requirement of important equipment for critical activities of TBM, drill and blast; permanent support works (e.g., shotcrete); headworks; etc.;
(vi) Estimating requirement of Contractor's resources (personnel, equipment, machines, materials, funds, etc.) and recommend additional resources to be mobilized to complete tunnels within contract periods;
(vii) Reviewing the alignment and design of the tunnels in relation to the type of rock and the thickness of the burden; comment on the geological documentation; and recommend design and construction methods as necessary;
(viii) Reviewing the available investigation results on their reliability, completeness and representativeness, and recommend and oversee additional laboratory and/or in-situ tests, if deemed necessary;

(ix) Reviewing the hazards for all tunnels with regard to low or insufficient rock cover, deep-seated tropical weathering, and karstification; comment on countermeasures and recommend and oversee additional investigations, if necessary; elaborate cost estimates, supervise and evaluate the findings; and improve the heading works accordingly;
(x) Assessing the likelihood or presence of primary stress in tunnels with high rock cover of 100m to 370m (RKTC, KMTC, UEC); if positive, recommend in-situ tests for execution; supervise the tests and evaluate the recorded results. If the primary stress exceeds a tolerable limit, inform the PIU, PMU, Contractor, and the manufacturer of the TBM accordingly;
(xi) Recommending sections for convergence measurements in all tunnels and evaluate the deformations on a graph and comment;
(xii) Providing continuous representation during the construction of the tunnels and dams.
(xiii) Checking the Contractor's equipment, all machines and respective personnel and recommend additional resources;
(xiv) Checking the Contractor's support materials on quality and quantity; perform acceptance tests for anchors, rockbolts, shotcrete, etc.;
(xv) Inspecting the supporting works and organize performance tests on a regular basis;
(xvi) Review and comment on the Contractor's blasting schedule with regard to the prevailing rock strength; supervise the blasting results and comment as necessary; and
(xvii) Checking the dewatering facilities in the tunnels and advise for improvement of the water load; initiate regular monitoring of the yield. Inform PIU and PMU about potential water loss by leakage from the tunnel.

51. **Senior Structural Engineers: International (minimum 6 pm for time-based tasks) and National (minimum 22 pm for time-based tasks).** The experts shall be civil engineers, preferably with a Master’s degree in structural engineering. They must have about 12 years of work experience out of which 8 years should be related to the design and construction of sluices, weirs, aqueducts, canals, dams and underground structures in countries with similar geographic conditions and with similar climate. The experts shall have excellent verbal and written communication skills in English. The activities will include, but are not limited to:

(i) Reviewing and advising on, and undertaking if necessary, the stability calculations for all structures to be constructed under the investment program and planned in Phase 2;
(ii) With the other design engineers for the canals, aqueducts, dams and tunnels, finding the most economical solution for each structure;
(iii) Designing and computing the details for the reinforcement of the segmental lining in TBM tunnels, all hydraulic structures, and all associated civil structures, as necessary;
(iv) Supporting as necessary the Engineering Geologists and the Tunnel Construction Engineers for designing the cut-and-cover section of the canals;
(v) Providing continuous representation during the construction of the tunnels, dams, aqueducts and other major civil structures;
(vi) Checking the Contractor’s fabrication and shop drawings, including structural design, as and when needed;
(vii) Reviewing modifications to the structural design as a result of changes in ground and other conditions;
(viii) Regularly reviewing the structural engineering aspects of the works and report accordingly; and

(ix) Reviewing and reporting on any contractor initiated proposals for modification of the structural designs.

52. **Senior Engineering Geologists: International (minimum 10 pm for time-based tasks) and National (minimum 24 pm for time-based tasks).** The experts will have degrees in geology or engineering geology, preferably with 12 years of experience in design and construction of dams, tunnels and other similar civil structures related to this investment program. Experience shall include planning, implementing and analyzing the results of geotechnical drilling/testing investigations for dams, tunnels, and aqueducts. They will be familiar with geological documentation, sealing works, monitoring and evaluation of piezometer or deformation readings. Preferably, the international expert will have experience of working in countries with similar geographic conditions. Preferably, the national expert will have experience of working on similar projects, either in Sri Lanka or abroad. The experts shall have excellent verbal and written communication skills in English. The experts will be responsible for planning the investigation program, supervision of its execution and evaluation the findings. They will also support preparation of Phase 2. As such, their responsibilities will be to lead and execute all of the activities related to geology. They will be responsible for, among other activities:

(i) Managing and control of the in-situ investigations;
(ii) Logging of drill holes and trenches to international best practice standards;
(iii) Inspecting, photographing and ensuring proper storage of drilled cores;
(iv) Selecting drilled core samples to undergo laboratory testing;
(v) Supervising in-situ testing;
(vi) Evaluating and commenting on the results of laboratory and in-situ tests;
(vii) Deciding when the required maximum drilling depth has been reached;
(viii) Mapping rock outcrops with tectonic logging of discontinuity planes;
(ix) Evaluating all findings and establishing geological sections for each structure with the results of tectonic logging and permeability testing;
(x) Carrying out geological and geotechnical mapping and analysis;
(xi) Incorporating the results of geophysical exploration into the geological sections;
(xii) Drawing conclusions and writing a final report about the geotechnical conditions;
(xiii) Advising on proper support and lining methods as well as drainage and seepage issues, and applicable management options;
(xiv) Evaluating and commenting on Contractor's tender documents with respect to geotechnical aspects, i.e. foundation levels, dewatering, quality and quantity of construction materials, slope stability, sealing works, advance rates, and support in tunnels;
(xv) Commenting on Contractor's personnel and equipment;
(xvi) Assisting the Tunnel Construction Engineers in the design of permanent ground support and review of Contractor’s temporary support proposals;
(xvii) Recording rock and soil conditions as the work progresses;
(xviii) Inspecting the probing and exploratory drilling works. Advising on the need for and scope of grouting works;
(xix) Monitoring all instrumentation and permeability testing activities, and reviewing the results and the degree of structural dilation, as required;
(xx) Regularly review the geological and geotechnical conditions at the sites; and
(xxi) Supporting the preparation of Phase 2 investments by planning, managing and advising on the results of all necessary borehole investigations, in-situ and laboratory tests, for the planned dams, tunnels and other major civil structures.

53. **Senior Mechanical Engineer (TBM): International (minimum 12 pm for time-based tasks).** The expert will have a Master’s degree in mechanical engineering, preferably with 10

years of experience with the construction or performance of different types of TBMs for soil and rock. The expert shall be familiar with the technology in general, and the hydraulic functions of cutter heads and other auxiliary systems in particular. The expert must be able to assess the drillability of the rock based on the specific parameters gained from the site and from the laboratory. The expert will cooperate with the Chief Design Engineer and Rock Mechanics Engineer to select the most appropriate and economic TBM for all tunnel works. The expert should also advise the pre-qualification criteria for the selection of experienced contractors, if necessary. The expert will review and finalize the designs of the tunnels that will be constructed under the investment program (Phase 1) and will also support preparation of the Phase 2 investments including supporting preparation of feasibility designs, cost estimates, draft specifications for the tunnels to be constructed under Phase 2, along with preparing the TOR for undertaking the detailed engineering designs. Other main activities are, but not limited to:

(i) Reviewing the geological conditions along the tunnel alignments and the tunneling concept for TBM drive of KMTC and UEC tunnels;
(ii) Advising the PMU and PIU on the preferred type of TBMs, their procurement and mobilization, the costs of machines and backup/support systems, as well as possible modalities of financing;
(iii) Performing acceptance tests in the course of construction of the TBMs, in the assembly as well commissioning phase;
(iv) Commenting on the staffing and equipment of the Contractor's TBMs; and
(v) Assisting the Contractor to overcome technical problems with the TBM and/or backup system.

54. **Mechanical Engineers (Gates and Hydropower): International (minimum 1 pm for time-based tasks) and National (minimum 2 pm for time-based tasks).** Preferably, the experts will have a degree in mechanical or electrical engineering and 10 years of experience in designing and implementing similar projects. The experts should be competent in planning, design, cost estimate, tendering, contract management and controlling, quality assurance and quality control, safety compliance and construction. The experts must have profound knowledge of data processing and software like AutoCAD, etc. as well as excellent verbal and written communication skills in English. The main activities of the experts will include, but not limited to:

(i) Preparing the assessment, planning, detailed engineering designs, BOQs, cost estimates and tender documents for the mechanical and electrical aspects of all three projects under the investment program, and advising on the requirements and associated costs for investments under Phase 2;
(ii) Coordinate with the state electricity supplier to keep them informed and engage support for the proposed extensions of the electrical distribution system to energize tunneling equipment, gates etc. Prepare the associated detailed engineering designs, BOQ, engineering cost estimates, specifications, and contract documents;
(iii) Liaise with and support PIUs with the electrification work;
(iv) Assessing the requirements for gate rehabilitation and modernization, where necessary;
(v) Supporting preparation of MOM manuals for all mechanical items installed or that are associated with the investment program; and
(vi) The national specialist will support the international specialist.

55. **Senior Electrical Engineers (TBM): International (minimum 2 pm for time-based tasks) and National (minimum 6 pm for time-based tasks).** Preferably, the experts will have a degree in electrical engineering and 10 years of experience in design, construction and implementing TBMs on job sites preferably in similar countries with similar climate. The experts must be familiar with the capacity and infrastructural measures for the external power supply as

well as the power distribution within the construction site. The main activities of the experts are, but not limited to:

(i) Reviewing the existing plans and designs, recommending improvements, and assessing or updating the cost estimates;
(ii) Assisting the PMU and PIU with the supply of required power to the TBM sites;
(iii) Checking the existing capacities of transmission lines and substations, and where necessary recommending improvements and extensions along with preparing designs, quantities and cost estimates;
(iv) Carrying out acceptance tests with the manufacturer;
(v) Checking the construction and power distribution on the various sites in cooperation with the health and safety engineer;
(vi) Advising on all matters relating to the tunnel and site lighting, air handling, ventilation, dewatering, etc. Reviewing submittals and processing accordingly;
(vii) Providing support to preparing Phase 2 investments, as necessary; and
(viii) The national specialist will support the international specialist.

56. **Senior Electrical Engineers (Gates and Hydropower): International (minimum 2 pm for time-based tasks) and National (minimum 2 pm for time-based tasks).** Preferably, the experts will have a degree in electrical engineering and 10 years of experience in design, construction and implementing of HPPs and power transmission, preferably in similar countries with similar climate. The experts must be familiar with the planning, cost estimate, tendering, contract management and controlling, quality assurance and quality control, safety compliance and construction. The experts must have profound knowledge of data processing and software like AutoCAD, etc. as well as excellent verbal and written communication skills in English. The experts will support the designs of electrified gates and systems under this investment program, and the preparation of Phase 2 investments which include three new HPPs. The main activities of the engineers will include but are not limited to:

(i) Reviewing the existing power transmission systems within vicinity of the planned electrified gates and HPPs and advising on optimum connection points, and what new infrastructure will be required;
(ii) Preparing the feasibility designs for power generators, control systems, switchyards, substations, power transmission lines, preparing cost estimates and draft specifications;
(iii) Preparing the TOR for undertaking detail engineering designs;
(iv) Prepare the designs, specifications and bidding documents for the electrical gates and systems under the investment program; and
(v) The national specialist will support the international specialist.

57. **Hydraulic Structures Engineers: International (minimum 2 pm for time-based tasks) and National (minimum 4 pm for time-based tasks).** Preferably, the experts will have a Degree in civil engineering, or an equivalent qualification, with 10 years of design and implementation experience, preferably on large water projects within geographically similar regions. The experts will have profound knowledge of hydraulics and experience of designing major hydraulic structures. The experts will support the Water Resources and Irrigation Planning Specialist and Design Engineer and lead preparation of the detailed engineering designs for all hydraulic structures in the investment program, and those planned under Phase 2. Activities will include, but are not limited to:

(i) Working with the Water Resources and Irrigation Planning Specialists to prepare a Hydraulic Structures Design Manual that incorporates international best practices and standards for canal design, the hydraulic design of gates and measurement

facilities. The manual will be specific for the needs of the investment program and Phase 2 investments.

(ii) Support the other PMDSC design experts with improving designs of all hydraulic structures to ensure they are easily manageable, minimize head losses, convey the required design flows, pass the design sediment loads, are low maintenance, and are safe. This applies to the dams, spillways, regulators, outlets, transitions, cross drainage structures and all other flow control structures.

(iii) Support the team with preparing feasibility studies, detailed engineering designs, cost estimates, specifications, and the TOR for Phase 2 consultants; and

(iv) The national specialist will support the international specialist.

58. **Water Resources and Irrigation Planning Specialists: International (minimum 6 pm for time-based tasks) and National (minimum 10 pm for time-based tasks).** Preferably, the experts will have a Master's degree in civil or water resources engineering or similar subject, and have 12 years of experience in hydrological analyses, water resources planning, and planning, designing and management of irrigation schemes, preferably in geographically similarly regions. The experts should also have experience with assessing and incorporating anticipated climate change impacts into their analyses and designs. The experts' activities will include, among others tasks:

(i) Reviewing the available water balances for the investment program and Phase 2 investments, and update them as necessary taking into account any new additional information or planning decisions made that may affect the analysis. This applies to updated flow records, changes in climate change projections, changes in existing and planned cropping patterns, changes in projected population and socioeconomic scenarios, and changes in development scenarios and associated water demands and management requirements;

(ii) Supporting the design teams with providing design flow information where needed;

(iii) Supporting preparation of Phase 2 investments, as necessary;

(iv) Supporting the M&E Specialist to assess the outcome and impact of the investment program;

(v) Supporting the PMU and PIUs with advising the ISEWP consultant by providing guidance, reviewing their outputs, and recommending improvements whenever necessary;

(vi) Review current and planned flow monitoring and control systems for the ultimate developed Mahaweli System and recommend improvements as necessary for implementation of a comprehensive SCADA system. This includes recommending locations for flow monitoring and mechanized gates, communication and operating systems, etc. Prepare a TOR and specifications for recommended system;

(vii) Prepare reservoir management operating guidelines including planning and preparing the detailed engineering designs of flow and reservoir monitoring system;

(viii) With the ISEWP consultant, incorporating the recommendations into the design of Tranche 3 and Phase 2 investments. This includes guiding the other PMDSC experts to prepare detailed engineering designs, cost estimates and updating bidding documents as necessary;

(ix) Supporting preparation of the MOM manuals for each Project;

(x) With the Modeling Specialist and ISEWP consultant, reviewing current models and water management monitoring and control systems used in Sri Lanka and particularly within the Mahaweli System then providing advice on improvements to the models and systems, including equipment and software. Prepare detailed TOR and/or specifications, cost estimate, and tender documents for the improvements which will be implemented by the SIWRM consulting package; and

(xi) The national specialist will support the international specialist.

59. **Modeling Specialists: International (minimum 10 pm for time-based tasks) and National (minimum 20 pm for time-based tasks).** Preferably, the specialists should have 10 years of experience in planning, developing, implementing, and using hydrologic, hydraulic, and river basin models. The specialists should have a Master's degree or equivalent in civil engineering or water resources. The specialists will support the Water Resources and Irrigation Planning Specialist by reviewing and updating the existing water balance models for the Mahaweli System and provide design flow data. Other main responsibilities will include, but are not limited to:

(i) Developing a detailed and calibrated hydraulic model of the main conveyance systems of the fully developed Mahaweli System that will support planning, design, and management of the entire system. It should include accurate representation of all features including gates, weirs, reservoirs, and main outlets to the cascade systems. The model should extend down to the head regulators of secondary canals within each system;

(ii) Developing a detailed and calibrated rainfall-runoff model of the complete Mahaweli System that can accurately model spatially and temporally variable rainfall and crop water requirements. The model should provide upstream and downstream boundary conditions to the hydraulic model. Ideally the two models would be linked, however they should also operate as standalone models;

(iii) Operating the above models for various time-steps ranging from hourly to monthly time-series. The results of these models will be used to finalize the designs of Phase 1 investments and for selecting and finalizing the Phase 2 investments. The models will also be used by MMDE and other stakeholders for routine water management.

(iv) Training to MMDE and other stakeholders on how to update and operate the models, including preparing detailed operating manuals.

(v) Assisting MMDE and other stakeholders to use the models for water management for at least 1 year to ensure effective handover of the tools.

(vi) Developing dam break models of the planned reservoirs for the investment program and Phase 2 using appropriate software, and assess the risk of dam break on downstream river channels, flood plans, infrastructure and communities. Liaise with the Dam Engineer and Hydraulic Structures Engineers to develop mitigation measures;

(vii) Use the models to support other PMDSC specialists undertake their work, as necessary; and,

(viii) Prepare user manuals for the models and provide training to MMDE, MASL, and PMU staff in operating and updating the models.

60. **Agriculture Specialist: National (6 pm).** The specialist must have a background in Agronomy or related field/discipline and a Master of Science in Agro-economics or related field/discipline. Preferably, the specialist must have twelve years of experience in agro-economics/agronomy with two or more successful agriculture development projects. The specialist should have experience in the development of irrigated agriculture projects, economic value chains and market-based crop production analysis. The specialist should have experience working in multidisciplinary teams. The specialist's main responsibilities will include, but are not limited to:

(i) Providing detailed assessment of current farming practices in Mahaweli System areas (including those that will come under the command of the Mahaweli System after Phase 2) and recommending opportunities for improving on-field water management and crop diversification;

(ii) Assessing the constraints and opportunities for farmers to grow higher value crops during the Yala season including risks, markets, etc.;
(iii) Supporting the PMDSC with finalizing the ISEWP TOR; and,
(iv) Supporting other team members in preparing the water balances for the investment program and Phase 2 investments.

61. **Economists: International (4 pm) and National (10 pm).** Prefarably, the economists will have a Master's degree in economics with 12 years of experience in undertaking economic appraisals in the water resources and agricultural sector, preferably with experience of working in similar geographical regions, with relevant ADB or other multilateral development bank (MDB) project experience. An understanding of econometrics and economic surplus analysis is important, as well as experience in impact evaluation, drinking water and hydropower valuation. Activities for the specialists include, but are not limited to:

(i) Preparing detailed cost tables and investment plan for Tranches 2 and 3, and Phase 2;
(ii) Collection of appropriate available survey data from the government or other institutions, for example "cost of cultivation" survey or other regular data collection, and undertaking either cross-sectional analysis with control for selection/placement bias (e.g. Propensity Score Matching, endogenous switching regression, etc.) or panel analysis using fixed effects models. The methodology of the analysis will be agreed with PMU and ADB prior to initiating the analyses;
(iii) Using collected data in an econometric analysis that effectively isolates the effect of irrigation development from covariates, including factors conditioning program placement and farmer participation, so as to rigorously predict the effects of irrigation expansion on cropping intensity, yields and variable production costs (methods may include Propensity Score Matching, endogenous switching regressions, instrumental variables or other control function approaches);
(iv) Analysing the current and future farm budgets;
(v) Reviewing project agricultural, water supply and hydropower benefits, and undertake economic appraisals for Tranches 2 and 3, and Phase 2 projects, including estimated cash flows and economic internal rate of returns, in accordance with ADB's *Guidelines for the Economic Analysis of Projects* (1997);
(vi) Identifying the economic and financial risks associated with the projects and carry out sensitivity and risk analyses;
(vii) With the support of the Social Specialists, identifying the beneficiaries and undertaking a distribution analysis of project benefits and a poverty impact analysis of the projects consistent with ADB guidelines; and
(viii) The national specialist will support the international specialist.

62. **Chief Resident Engineer (CRE): International (55 pm); Senior Construction Engineer (SCE) and Resident Engineers (REs): 4 National (SCE: 55pm and REs total 150 pm).** The experts must be civil engineers, preferably with a Bachelor's degree and about 15 years of work experience out of which about 10 years should be related to project management of mega-projects that include tunnels in soil and rock, dams, and large canals. The experts should have demonstrated experience of working in complex projects in similar geographical and topographical settings. The experts should be competent in contract management, quality assurance and quality control, safety, compliance with safeguards, risk management, project controlling, claim management, etc., pertaining to construction of similar projects considering the requirements of National Sanctuaries in Sri Lanka. The experts must have profound knowledge of data processing and software like PRIMAVERA as well as excellent verbal and written communication skills in English. The international expert will have prior experience of

leading similar projects within similar geographic regions. The national experts will have worked on similar scale projects in Sri Lanka, or abroad. The experts will be responsible for undertaking the following activities, among others:

(i) The CRE will have overall responsibility for supervising and monitoring construction activities and leadership of the construction supervision team and Contractors.
(ii) The SCE will support the CRE and REs as required and coordinate with the design team, PMU, PIUs, key stakeholders, and affected people.
(iii) The RE's will assist the CRE and SCR.
(iv) Managing and supervising Contractors in the role of the owner's Engineer;
(v) Undertaking daily construction supervision and monitoring of quality control;
(vi) Checking of materials for quality and quantity and ensure they meet specifications;
(vii) Issuing interim payment certificates;
(viii) Supporting the Procurement and Contracts Specialist with examining contractor claims and providing advice to the PMU and PIUs as necessary;
(ix) Examining the needs for contract variations;
(x) Monitoring compliance with environment management plans;
(xi) Monitoring preparation of as-built drawings;
(xii) Preparing partial, substantial and final completion certificates;
(xiii) Supervising and monitoring of the local consultants and contractors; and
(xiv) Training of PIU and PMU staff.

63. **Tunnel Construction Engineers: International (12 pm) and National (50 pm).** The experts must have a Bachelor's degree in civil engineering, preferably with 12 years of work experience out of which 8 years should be related to construction of tunnel projects. They should have demonstrated experience of working in complex tunnel projects in soil and rock, and in similar geographical and topographical settings, and using similar construction methods (TBMs and conventional drill-and-blast). They should be competent in work planning, tunnel construction supervision, cost and time control, contract management, quality assurance and quality control, safety control, compliance with safeguards, risk assessment, etc. pertaining to the construction of different types of tunnels. They must have excellent verbal and written communication skills in English. Their activities will be, but not limited to:

(i) Identifying the important technical and managerial issues in construction of tunnels which are affecting the progress, safety, quality and compliance with safeguards;
(ii) Carrying out a quick time-motion analysis and recommend the most optimal solutions to reduce the blasting cycle time and to ensure efficient utilization of resources;
(iii) Analyzing the use of explosives in tunnel excavation and suggest mechanism to rationalize and optimize the use of explosives;
(iv) Developing the optimal requirement of important equipment for critical activities of drilling and blasting; permanent support works (e.g. reinforced shotcrete, rock bolts, steel arches, etc.); headworks; comparing mobilization of the contractor's equipment with expected levels and suggesting additional equipment for the optimized construction in the given circumstances;
(v) Examining the preparedness of the contractor for the tunnel headworks and suggest ways to expedite the activities with quality;
(vi) Reviewing the mobilization of the Contractor's resources (personnel, equipment, machines, materials, funds, etc.) and recommending additional resources to be mobilized to complete the tunnels according to the implementation schedules and to the required specifications;
(vii) Having regular meetings with the Contractor, the Engineer and the PIUs to operationalize all recommendations in an efficient and effective manner; and
(viii) The national specialist will support the international specialist.

64. **Dam Engineer: National (minimum 9 pm for time-based tasks).** The expert must be a civil engineer, preferably with a Master's degree and a specialization in soil mechanics and dam design. The expert must present about 12 years of work experience out of which 8 years should be related to the design and construction of zoned rock- or earth-fill dams in countries with similar geographic conditions or at least in countries with similar tropical climate. The expert should be competent in planning, design, cost estimate, tendering, contract management and controlling, quality assurance and quality control, safety compliance and construction. The expert must have profound knowledge of data processing and software like AutoCAD, etc. as well as excellent verbal and written communication skills in English. The expert must also be familiar with the various types of construction materials, their parameters, occurrence and exploitability as well as their treatment on the site, mode of compaction and monitoring of their behavior before and after impounding. The main activities of the expert are:

(i) Supporting the Chief and Senior Design Engineers, as necessary;
(ii) Reviewing the available dam designs, stability and seismic hazard analyses, and comment on the various types of construction materials. If necessary, undertake additional stability analyses and improve the design for technical and/or financial reasons;
(iii) Working with the Engineering Geologist, establish the need for dam foundation treatment measures and the availability of suitable local dam construction materials and select the appropriate material parameters to be applied in the analysis and design of the dams;
(iv) Establishing a mass balance for construction materials to be exploited from borrow areas or quarries with regard to the quantities required for construction. Search for sufficient materials for each type and make sure that at least 150% of the required material is exploitable. Recommend and supervise laboratory and in-situ compaction tests for both core and embankment materials, and determine the density at optimum water content for each fill material;
(v) Designing the filters according to the filter criteria and make sure that the Contractor provides ample quantities;
(vi) Investigating the necessity of placing geotextiles and select the proper type of fabric to fit the purpose;
(vii) Firming-up the dam layouts and details including the abutment and foundation treatments, embankment design and zoning, seepage control measures, etc.;
(viii) Working with the Hydraulic Structures Engineer on the engineering of the diversion facilities, water outlet works, spillways and associated appurtenances;
(ix) Preparing the detailed engineering designs, BOQs, cost estimates, construction schedule, and tender documents;
(x) Checking the Contractor's equipment, machines and personnel and recommend additional resources as needed;
(xi) Checking the Contractor's screening plant on proper grain size gradations and high efficiency, as well as sufficient storage facilities;
(xii) Ensuring that the Contractor keeps the core material at optimum moisture content before and during filling and compacting;
(xiii) Checking the obtained densities after compaction in regular intervals and guiding the Contractor to correct their process, if the specified criteria are not obtained; and
(xiv) Recommending and supervising the installation of settlement gauges and other monitoring devices for the safety of the dam; collect the readings in regular intervals and evaluate them for stability reasons.

K. Indicative Terms of Reference for Some Non-Key Experts (time-based component)

65. **Concrete Engineers: 3 Nationals (Total 90 pm).** Preferably, the experts must have a Bachelor's degree in civil engineering and a specialization in concrete technology with 10 years of work experience, of which about 5 years should be related to construction of canals, dams and tunnels. The experts should be competent in mix designs for shotcrete, concrete, mortar and grouting works as specified in the tender documents on the basis of international standards. This includes quality assurance and safety control in compliance with safeguards. They should have demonstrated experience of working in projects in similar geographical and topographical settings. Specific activities for the experts include, but are not limited to:

(i) Checking the Contractor's laboratory facilities for storing, curing and testing concrete, shotcrete, mortar and grout samples;
(ii) Investigating different types of cement and select the most suited for each purpose i.e. structural concrete, lining concrete, shotcrete, and grout;
(iii) Inspecting the quality and efficiency of the screening and batching plants including the cooling facilities;
(iv) Taking samples of aggregates and instructing the Contractor to investigate their alkali silica reaction;
(v) Elaborating on design mixes for concrete with plasticizer, shotcrete with accelerator, mortar and grout with plasticizer and filler;
(vi) Performing acceptance tests for each of the mixes and selecting the ones best suited for the respective purposes;
(vii) Checking the early strength of the shotcrete from test panels on regular basis;
(viii) Undertaking regular and intermittent sampling of concrete, mortar and various grout mixes to perform laboratory tests as part of the quality control;
(ix) Drilling cores of shotcrete from tunnel walls to check its thickness and test the strength in the laboratory for quality control;
(x) Inspecting each concreting stage; checking the slump of each batch, the temperatures of the concrete, and the efficiency of the vibrators;
(xi) Commenting on the skill and professionalism of the Contractor's personnel;
(xii) Checking daily reports and test results from the laboratory; and
(xiii) Examining and commenting on contractor claims.

66. **Senior Surveyors: 3 Nationals (Total 90 pm).** The experts will be qualified, licensed surveyors, preferably with 10 years of experience, of which 5 years should be on setting out and monitoring construction projects, including canals and dams. The experts will review contractors' survey controls and quality assurance program including benchmarks, survey control points, laser equipment use and calibrations procedure, and will periodically review the field verification program. Other main activities will include, but are not limited to:

(i) Checking the setting out of all works, confirming control points are accurate and not disturbed throughout the construction works;
(ii) Ensuring all alignments are in accordance with the approved plans;
(iii) Ensuring that the surveying process and equipment used conform to the specifications. Maintain records of calibration and equipment used;
(iv) Checking all survey data from excavations and embankments, verify results and records and ensure they are within the specified permissible error ranges;
(v) Verifying the survey equipment calibration process; and
(vi) Participating in the measurement of the completed works and review of as-built drawings.

67. **Quantity Surveyors: 3 Nationals (Total 90 pm).** The experts will be qualified, licensed surveyors, preferably with 10 years of experience, of which 5 years should be in performing the role of quantity surveyor on major construction projects. The experts will manage all costs

relating to building and civil engineering projects, from the initial calculations to the final figures, while seeking to minimize costs, enhance value for money, and achieve the required standards and quality. Amongst other tasks assigned by the CRE, the experts will support preparation of BOQs and cost estimates; provide advice on contract claims; maintain cost control on all civil works packages; support preparation of progress reports; valuing completed works and supporting with payment arrangements; etc.

68. **Health and Safety Officer: National (50 pm).** Preferably, the officer will have a Bachelor's degree in engineering or similar, and 5 years of experience, preferably with assignments financed by ADB or other donor agencies. The main activities of the officer will be, among other tasks:

(i) Preparing a health and safety manual for the investment plan that includes guidelines, requirements, procedures and protocols, etc. that will guide and support safe practices on all construction sites, camps, officers and transport routes. Updating the manual from time-to-time to account for the changing needs of the works, and to incorporate lessons learned during implementation;
(ii) Providing regular training based on manual to the other PMDSC experts, PMU, PIUs, and contractors;
(iii) Assisting the PMU and PIU with monitoring and enforcing health and safety requirements by undertaking regular and intermittent inspections of all construction sites, camps, offices to ensure health and safety rules, regulations, procedures and measures are being correctly implemented;
(iv) Liaising regularly with the contractor's health and safety experts to ensure complete understanding and concurrence of all obligations;
(v) Maintaining monthly health and safety reports that document incidences on the construction sites and related to the investment program. The reports should describe the incidents and recommend measures to prevent them from occurring again. These should be used to update the manual;
(vi) Supporting the CRE with issuing temporary stop-work notices if safety requirements are not met, and providing advice on necessary corrective measures;
(vii) Reviewing and improve the contractors' program to safeguard healthy conditions on the site for all staff, visitors and all abutting owners;
(viii) Inspecting the working conditions of all laborers on site, in particular in deep pits and in the tunnel; checking the guidelines of a safe construction site with e.g. protected scaffolds, safe and new tools, provision of proper overalls, safety equipment like shoes, gloves, goggles, ear protection, safety belts, warning vest, etc., inspecting the lighting conditions in the tunnel, controlling the speed of all vehicles and the correct loading of trucks on the site and in particular in the tunnels;
(ix) Checking the design and inspecting the construction of bunkers for the storage of explosives and detonators in close cooperation with the national authorities of Sri Lanka; develop a safe system for transport of explosives and detonators to the site as well as collection of non-used material and return to the bunkers;
(x) Inspecting the health conditions of the food, kitchens and kitchen staff, clean-up facilities, latrines, and living quarters, in regular and intermittent intervals and ensuring adequate hygiene and sanitary conditions are maintained; and
(xi) Providing regular training and advice on minimizing the risk of exposure to communicable and infectious diseases.

69. **Senior Draftsperson: National (50 pm).** The expert will have an appropriate diploma or certificate qualification in drafting, and preferably with 15 years of practical drafting experience, of which 5 years will have been leading a team of draftspersons. The expert must have

profound knowledge and experience of data processing and using drafting software such as AutoCAD. The expert will be responsible for the overall quality and delivery of drawings prepared by the PMDSC. The main activities, among others, will be:

(i) Establishing a secure and backed-up database system for managing all documents, drawings and software used by the PMDSC;
(ii) Establishing a comprehensive indexed drawing and document numbering system;
(iii) Establishing templates, protocols, and drawing standards that are to be used for all drawings and presentations;
(iv) Leading the drafting team and coordinate their work with the other PMDSC specialists on drawing related matters; and
(v) Reviewing and maintaining quality assurance on all drawings prior to release to contractors, PMU, PIUs, and others; and
(vi) Providing training as necessary to the drafting team and other relevant staff members of PMU and PIUs.

L. Office Support Staff and Logistical Arrangements

70. PMDSC shall provide the entire administrative, technical professionals, and support staff needed to carry out their services. An adequate number of suitability skilled office support staff will be required to meet the needs of the Colombo and field offices, and all associated logistics of the consulting assignment. Suggested positions, qualifications, and number of staff in each position are shown in Table 6. However, the positions and actual numbers at the discretion of the PMDSC and will cost them accordingly as out-of-pocket, fixed-rate expenses in their time-based financial proposal. The PMDSC is not required to submit CVs for supporting staff as part of their technical proposal since they will not be evaluated as part of the expert team.

Table 6: Indicative Office Support Staff

Position	Indicative No.	Qualification/Experience	Activities
Office Manager	1	Preferably, 10 years of good office management experience preferably with an international company for international development projects	Office management, team logistics, support for field trips, preparation of workshops, etc.
Accountant	1	Degree in accounting, or equivalent with 5 years book keeping experience. Preferably will have similar experience working on ADB projects.	Maintaining project financial statements and submission of invoices and payment requests to the PMU according to government and ADB's standards.
Assistant Office Manager / Secretary	4	Good English and national languages and computing skills (with appropriate certificate)	Office support, data entry, preparing letters, organizing printing. There will be one position in each office at Colombo and field.
Computer Operators / Office Assistants	8	Good English and national languages, computing skills (with appropriate certificate)	Support the Office Manager, Secretary and Accountant. There will be one position in each office at Colombo and field.
Office Caretaker / Messenger / Guard	8	Good English and national languages and previous experience	Maintaining the office, carrying messages, and other minor tasks. There will be one position in each office at Colombo and field.
Drivers	12	Good English, and national languages, driver's license, with 10 years of driving experience, an advantage	Driving within Colombo, in the project areas, and between offices

71. Other out-of-pocket expenses the PMDSC will be responsible for include: (i) all other necessary facilities and logistic support for its staff including living accommodation and per diems; (ii) international and national travel, and miscellaneous transportation; (iii) day-to-day office communications, utilities and other miscellaneous costs which may be required for carrying out the services as per the requirement of the Contract; and (iv) printing, publishing and transmittal of all reports and deliverables (excluding specific communication outputs related to Task 5 which may be funded under provisional items).

M. Procurement of Additional Studies, Equipment and Training

72. Goods and works for ADB-financed contracts will be procured in accordance with ADB's *Procurement Guidelines* (March 2013, as amended from time to time). Consultants will be recruited in accordance with ADB's *Guidelines on the Use of Consultants* (March 2013, as amended from time to time). Provisional sums have been included in the consultancy agreement for procurement of various requirements that will support the project. The PMDSC will be responsible for preparing the exact implementation arrangements, TORs, specifications, and detailed cost estimates of the procurement which will be approved by the Program Director before initiating procurement. Procurement procedures will follow ADB's Procurement Guidelines. The tentative scopes of provisional items are summarized in Table 7.

Table 7: Indicative Provisional Items

Item	Description
Vehicles and motorcycles	Up to 12 vehicles may be purchased or leased for national transport needs between project offices, construction sites, and for meetings in Colombo and the project areas. Up to 16 motorcycles may be purchased to support construction supervision activities between the project site offices and construction sites.
Surveys and Studies	Supporting surveys and specific studies including topographic surveys, geotechnical investigations, laboratory tests, flow monitoring, and resettlement and socioeconomic surveys.
Office Equipment	Procurement of office equipment including computers, printers, photocopiers, GPS power inverter, etc. for central and field offices using the shopping procurement method.[10]
Meetings, workshops and training	For routine meetings, workshops and training sessions convened by the PMDSC.
Communication Materials	Publishing of communication materials and media including the video diary of the investment program and development and hosting of the website.

N. Work Plan and Reporting

73. **Deliverables.** The list of main deliverables by PMDSC is summarized in Table 8. Unless otherwise agreed, all deliverables are to be submitted as drafts for review and comment by the PMU and ADB, and thereafter amended and submitted as final versions. Other occasional deliverables maybe required from time to time on an informal basis. The number of printed copies of each report is also shown in Table 8. In addition, electronic copies will be provided for each document and the PMDSC will maintain an electronic safe backup of all contract related documentation. The PMDSC will be responsible for maintaining the official record of all correspondence relating to the works and consulting services packages under the investment program.

[10] All PMDSC key and non-key experts are responsible for providing their own computers or be supplied by the PMDSC firm. This provisional item is only for providing computers for the office support staff and providing general office IT equipment.

Table 8: List of Main Deliverables, Payment Schedule for Lump-Sum Component, and Indicative Number of Reports

No.	Item	Description	Due Time [a]	% of the Lump-Sum component [b]	Number of copies for PMU	Number of copies for ADB [c]
Task 1 – Program Management						
1.1	Inception Report	The inception report will: (i) confirm, elaborate on, and adjust as necessary the consultant's approach, methodology and work plan based on information received during the inception phase; (ii) provide a detailed plan of the consultant's activities and confirmation and adjustment to the tasks of each expert with further elaboration as required; (iii) provide an updated procurement plan and detailed implementation plan for the project's activities; (iv) discuss any issues identified during the inception phase; (v) outline the planned implementation of the provisional items with scopes and costs; and (vi) the contents of the PPMES and the MIS. This inception report will be for Tasks 1 to 5. Tasks 6 and 7 will have separate inception reports (see below).	2nd month	-	4	2
1.2	Updated TOR and RFP for ISEWP Consultants	Update and finalize the TOR for the ISEWP consultant and prepare other "request for proposal" documents necessary to meet ADB requirements.	3rd month	-	2	2
1.3	MEM, QAP and RMP	The MEM will set out how the investment program will be monitored and evaluated. This supports preparation of the PPMES. It includes the QAP and RMP, and will be updated routinely as necessary.	4th month, updated routinely	-	4	2
1.4	Procurement Handbook	The Procurement Handbook shall be aligned with ADB and government procurement regulations. It will include program specific guidelines for procurement plan updates, and processes for procuring works, goods and services.	4th month	-	4	2
1.5	Financial Management Handbook	The Financial Management Handbook is to be specific to the investment program and aligned with ADB and government financial management requirements. It will include procedures for project accounting and meeting ADB requirements for disbursements.	4th month	-	4	2

1.6	MIS	The MIS will detail how all information related to the investment program will be structured, managed, and secured. It will include a secure filing system for printed material and a secure and backed up server for electronic material. It will be accessible from all project offices. The MIS will also include the public website for the investment program.	6th month	-	4	2
1.7	PPMES	Design of the PPMES appropriate for the investment program. The content of the PPMES should be discussed in the inception report and agreed with the PMU and ADB prior to developing the system. The system should be flexible to allow routine changes as necessary and it should be accessible from all project offices. A manual will be prepared that shows users how to update and use the system.	6th month	-	4	2
1.8	Mid-term Report (the number of versions of this report will depend on how many mid-term review missions are fielded by ADB)	Scheduled approximately half way through the consultancy period and should be produced prior to the ADB mid-term mission (note that the number and schedule of missions may vary). The contents would include, but not be limited to: (i) summary of the progress including issues, confirmation elaboration and/adjustments to the consultants program; (ii) progress against the loan and the DMF; (iii) updated detailed implementation plan; (iv) status of loan covenants; (v) updated FAM; and (vi) summary and discussion of all specialist aspects of the project including construction, capacity building, social and environmental safeguards, together with conclusions and any recommendations for adjustment. The content of the report will be agreed with the PMU and ADB prior to its preparation.	25th month, however timing and number to be agreed with PMU and ADB	-	4	2
1.9	Final Report	The Final Report will be submitted one month after issue of the Performance Certificate for the last civil works contract or in the 57th month, whichever happens earlier. The Final Report will present a summary of all aspects of project implementation and comparison with the expectations of the loan (or as subsequently adjusted) and of the DMF. The report will summarize and discuss the results of specialist aspects of the project including construction, capacity building, social and environmental safeguards, together with conclusions,	58th month	-	4	2

		recommendations and lessons learned for future projects. The content of the report will be agreed with the PMU and ADB prior to its preparation.				
1.10	Monthly Reports	Concise mainly tabular report with 4-page maximum summarizing monthly progress of the project, implementation status and highlighting any critical issues that require government or ADB support with resolving. On agreement with the PMU and ADB, these may be submitted electronically only.	Monthly, by the 7th day of each following month	-	4	2
1.11	Quarterly Reports	Concise reports giving more details of the project and key issues. For every year, the first two reports will be incremental reports detailing activities, progress and issues during the previous trimester, and planned activities for the next trimester. These reports must present all the findings related to procurement and to monitoring requirements identified in the DMF, including progress on delivering the outputs. The reports will also summarize the results of relevant data collected. The forth report (which will become the Annual Report) will be cumulative for the full year period. The Quarterly Report is to include that month's Monthly Report (no separate monthly report).	Quarterly, by the 15th day of the following month	-	4	2
1.12	Briefing Reports	Special briefing reports as requested by the PMU and/or ADB.	As required	-	4	2
1.13	Draft PFR	Project documents for the subsequent tranches including technical, safeguards, economic, social due diligences based on standard ADB format including the cost estimates and financial management assessment. These are necessary for processing of the second and third tranches of the investment program.	As required	-	2	2
1.14	Environmental Monitoring Reports	Requirements are described in the EARF document. Generally, the reports are to: (i) capture any environmental safeguards issues and their resolution; (ii) the compliance by contractors of EMPs are to be reported; and (iii) a summary of environmental parameters monitoring to be presented.	Submit semiannual monitoring reports as per guidance provided in the EARF	-	4	2
1.15	Resettlement Monitoring and	Requirements are described in the RF. Generally, the reports will discuss the quality and progress of resettlement plan	Initially submit	-	4	2

	Evaluation Reports	implementation, and any issues and remedies suggested to be presented. Status of resettlement including physical progress and financial expenditure to be stated.	reports every 3 months for first year and then every 6 months thereafter			
1.16	PCR	The contents of the report shall be as agreed between the PMU, PMDSC and ADB. It will focus on the individual tranches and generally it will follow standard ADB format.	Last month of loan closure for each tranche	-	2	2
1.17	Special Reports	The PMDSC will prepare and submit any other report related to the investment program as requested by the PMU and ADB.	As required	-	4	2
Task 2 – Design Review, Detailed Designs and Preparing Contract Documents (Portion of Lump-Sum Amount: 85%)						
2.1	Hydraulic Structures Design Manual	The Hydraulic Structures Design Manual should incorporate international best practices and standards for designing all hydraulic structures specific for the needs of the investment program and Phase 2 investments. The design of all hydraulic structures under the investment program will follow this manual. The Manual may be updated from time to time as required.	3rd month	2.5%	4	2
2.2	Tender Design Review Report	As described in the above text for already tendered Tranche 1 projects.	3rd month	5%	4	2
2.3	SCADA system	TOR and specifications for implementing a SCADA system for the complete Mahaweli System	12th month	5%	2	2
2.4 – 2.6	Detailed Design Reports	Separate reports and drawings will be prepared for each of the three tranches. They will include technical, economic, social, financial, and environmental feasibility analysis; survey results; detailed design calculations and drawings sufficient for construction purposes; detailed cost estimates; and implementation arrangements and schedules. The reports should be structured in a way that they can be merged into single documents for each individual project, for example: a complete report for the UECP Stages 1-3.	As required to meet implement-ation schedule	20%	4	2
2.7	MOM manuals	For each investment project, a MOM manual will be prepared	48th month	15%	4	2

		that includes information from the contractors and suppliers. It will contain sections describing, among others which will be agreed with the PMU: (i) the operation of the system to ensure the desired amount of water is conveyed through the investments as planned and designed; (ii) the operation of the system in the event of anomalies (floods, droughts, power failures, etc.); (iii) routine and infrequent system maintenance; (iv) system trouble shooting; and (v) required O&M staffing and annual expenditures.				
2.8 -	Tender Documents	To be prepared for all outstanding works and goods packages under the investment program following PMU and ADB procurement requirements and formats.	As required to meet implement-ation schedule	37.5%	4	2
Task 3 – Contract Management, Construction Supervision, Commissioning and Operation						
3.1	Construction Supervision Manual	The Manual will outline the PMDSC's approach to contract management and construction supervision. The format and contents of the Manual will be discussed and agreed with the PMU and ADB however in general it will show the management and reporting structure, team organizations, logistical arrangements, report and certificate templates, etc. It will be updated from time-to-time to suit the needs of the investment program.	2nd month	-	4	2
3.2	Health and Safety Manual	The Health and Safety Manual will include guidelines, requirements, procedures and protocols, etc. that will guide and support safe practices on all construction sites, camps, officers and transport routes. It will be agreed by all Contractors and updated every year.	3rd month			
3.3	Shift Reports	To be prepared by the resident engineers for each contract. It shall include, among any other relevant information as deemed necessary, the weather conditions, crews and equipment working, works executed and tentative quantities, resource allocation, compliance with approved procedures, and any special or unusual occurrences experienced in each shift.	Per Shift	-	4	-
3.4	Weekly Reports	To be prepared by the resident engineer for each project. It shall summarize the shift reports highlighting progress during the week, resource allocation, problems or hindrances, any specific problems encountered, action taken and any other	Weekly	-	4	-

		matter deemed necessary.				
3.5	Monthly Progress Reports	The monthly report shall be prepared by the Chief Resident Engineer, within one week of the end of the report period. It shall provide, among other items: (i) progress during the month on a quantitative and cost basis with appropriate graphical presentations comparing progress with program and giving reasons for any discrepancies with proposed remedial measures; (ii) cumulative expenditure record and estimated quantity at completion of each BOQ item, variation order and claim for the construction and equipment contracts; (iii) record of variation orders issued and being prepared; (iv) claims received, under consideration and settled; (v) comments on the quality of the month's work; (vi) a record of climatic conditions, and if appropriate, river flow conditions; (vii) any other matters which are deemed necessary by the PMU, PMDSC and contractors; and (viii) details of non-conformance works, recommendations and actions taken for rectifications.	Monthly	-	4	2
3.6	Annual Progress Reports	Highlighting the main features of the construction activities and other activities under consulting services contracts, in the previous fiscal year. The PMDSC shall prepare and submit the annual report within fifteen days of the end of the Fiscal Year.	Annually	-	4	2
3.7	Health and Safety Reports	Specifically report every health and safety incident (including near misses), provide recommendations for improvements, and document responses of project management (Contractors, PMU, PIU and PMDSC) to control and contain them.	Monthly	-	4	-
3.8	Claim Reports	For every claim, individual claim reports will include an analysis of the claim, the Engineer's recommendation as to whether the claim should be accepted, partly accepted, or rejected and the Contractor's entitlement under the contract.	Every claim	-	4	-
3.9	Contract Completion Reports	This shall be prepared at the end of each works / goods contract. The report shall incorporate as-built records and drawings, details of construction methodology, concrete quality, hydrological, sedimentation, geological, and geotechnical condition, etc. The report will also include: a record of changes of design criteria or of design with reasons, records of labor used, and progress records for different types of works. The contents of the report shall be as per the standard for this type	Completion of each works contract	-	4	2

		of the contract and as agreed between the PMU and PMDSC.				
3.10	Certificates	These will include the Statement of Completion Certificates, Taking Over Certificates, and Performance Certificates.	As required	-	4	2
3.11	Final Reports	The Final Report will be submitted one month after the issue of the Performance Certificate for each civil works contract. The report will contain details of remedial works carried out by the Contractors to rectify defects found during the Defects Liability Period. The report will also contain a summary of Final Statements.	Completion of each works contract's Defects Liability Period	-	4	2
3.12	Technical Review Reports	The PMDSC will prepare and submit review reports on design reports submitted by Contractors, such as for the design and assembly of the TBMs, segment lining design and fabrication facilities, conveyor systems and power, etc., gates and other electro-mechanical equipment, etc. The review report shall be submitted within the period mutually agreed between the PMU and PMDSC.	As required	-	4	2
3.13	Special Reports	The PMDSC will prepare and submit any other report related to contract management and construction supervision as requested by the PMU and ADB.	As required	-	4	2
Task 4 – Capacity Development						
4.1	Training Needs Assessment and Training Plan	Institutional review and training needs assessment of MMDE, MASL, DOI, the PMU and PIUs to support their needs for managing both implementation of the investment program and its subsequent MOM. The plan will provide an agreed detailed training program comprising local, international and on-the-job training. Among other agreed items, it will also present implementation arrangements including training institutions and programs, implementation costs, logistical arrangements.	6th month, annual revisions every year	-	4	2
4.2	Training Completion Report	A report summarizing the individual and institutional achievements and results from implementing the training plan. The report will discuss lessons learned, recommend improvements for future training programs, and recommend additional training for future consideration.	58th month	NA	4	2
Task 5 – Communications						
5.1	Updated Communications	Reviewing, improving and routinely updating the investment	3rd month, annual	-	4	2

	Strategy and Plan	program's communications strategy and plan.	revisions every year			
5.2	Media publications	As requested by the PMU and ADB. This applies to all forms of media. Drafts must be reviewed and approved by the government and ADB prior to release.	As necessary	-	4	2
5.3	Website	Professional and user friendly website where all project reports, information, photos and video links are available to users. Website to be routinely updated as required.	Operational by 6th month	-	-	-
5.4	Video presentation	Maintain a video diary of the implementation of the investment program. Annually, prepare an edited highlight of physical project progress snippets and capacity building initiatives (workshop, training, consultation, communication etc.) of approximately 1 hour duration with footage of construction activities and interviews with stakeholders, as necessary. The production will be prepared to the highest professional standards.	Annually	-	4	2
Task 6 – Strategic Environmental Assessment (Portion of Lump-Sum Amount: 15%)						
6.1	Inception Report	The SEA inception report will outline the planned work approach.	4th month	2.5%	2	2
6.2	Interim Report	Report presenting the interim findings in preparing the SEA.	8th month	2.5%	2	2
6.3	SEA Final Report	Comprehensive final SEA report covering all requirements as describe in the main text above.	10th month	10%	2	2
Task 7 – Preparing NCPCP Phase 2						
7.1	Inception Report	Report that outlines the scope of Phase 2 investments and describes, amongst others: (i) the PMDSC's methodology for undertaking the task; (ii) planned work and staffing schedule; (iii) planned site investigations, surveys and studies with scope of works and cost estimates; (iv) an indication of the categorization of the investments for environmental, involuntary resettlement, and indigenous peoples; and (v) outline of all reports to be prepared under this task.	4th month		4	2
7.2	Route Selection Report	Report describing the activities undertaken for assessing the routes with recommendation of the preferred route.	8th month		4	2
7.3	Interim Report	Report describing the interim progress for the undertaking this task and preparing the following documents.	16th month		4	2

7.4	Feasibility Design Report for Phase 2	Comprehensive report that describes work undertaken for this task to assess the feasibility of Phase 2 investments. It will comprise, amongst others: (i) the technical evaluation of all features of the Phase 2 investments; (ii) all necessary reports and frameworks for environmental, involuntary resettlement, and indigenous peoples safeguards; (iii) economic and financial assessments; and (iv) updated financial and procurement assessments.	20th month		4	2
7.5	PDA documents	The necessary ADB documents for obtaining government and ADB approval for the PDA which will finance the detailed design of Phase 2 investments prior to its loan approval.	22th month		4	2
7.6	ADB loan documents	This includes draft versions of the Report and Recommendation of the President, and all required linked documents and supplementary appendices.	24nd month		4	2

ADB = Asian Development Bank, BOQ = bill of quantities, DMF = design and monitoring framework, EARF = Environmental Assessment and Review Framework, EMP = environmental management plan, DOI = Department of Irrigation, FAM = facility administration manual, ISEWP = improving system efficiencies and water productivity, MASL = Mahaweli Authority of Sri Lanka, MEM = Monitoring and Evaluation Manual, MIS = Management Information System, MIWRM = Ministry of Irrigation and Water Resources Management MOM = management, operation and maintenance, O&M = operation and maintenance, PCR = project completion report, PDA = Project Design Advance, PFR = periodic financing request, PIU = project implementation unit, PMDSC = program management, design and supervision consultant, PMU = program management unit, PPMES = Program Performance Monitoring and Evaluation System, QAP = Quality Assurance Plan, RF = resettlement framework, RFP = request for proposal, RMP = risk management plan, SEA = strategic environment assessment, TBM = tunnel boring machine, TOR = terms of reference, UECP = Upper Elahera Canal Project.

[a] The due date applies to submission of draft versions for those reports which require both draft and final versions.
[b] Payment will be on approval of final versions.
[c] For the ADB reports, one copy is to be delivered to the ADB Sri Lanka Resident Mission and one copy sent to ADB Headquarters in Manila. At least one more copies should be prepared and sent to each cofinancing partner, as required during the subsequent tranches.

O. Client's Input and Counterpart Personnel

74. The PMU shall provide the PMDSC with all documents, drawings, maps and other contract related documents that are available and at the disposal of the investment program. All the requirements needed to carry out the consulting services, unless otherwise mentioned in these TOR, shall be the responsibility of the PMDSC. While no government staff will be deployed to work under PMDSC, at Colombo and the three PIU locations, adequate PMU and PIU counterpart staff will be in place to work with PMDSC. A complete list of PMU and PIU positions will be available to short-listed firms. All the equipment, goods and materials procured under the consulting services contract are the property of the Project and shall be returned to the government after the completion of the services in good working condition. Furnished and air-conditioned working office spaces will be provided by the PMU in Colombo and at the three project sites. The PMDSC shall take responsibility for office maintenance, consumables and upkeep. The PMDSC will be responsible for providing appropriate living accommodation for the PMDSC staff.

P. Available Data for Proposal Preparation

75. The PMU and ADB have prepared documents and drawings to support the preparation of this investment program. Shortlisted firms may review the reports and all available information, at the PMU office in Colombo with prior appointment. Similarly, shortlisted firms may also download copies of available digital reports and documents of the project which are accessible through: http://www.adb.org/projects/44167-013/main. Further details on the available reports and download website will be provided to the shortlisted firms.

Q. Specific Requests for Proposal Information

76. In addition to the information required by the Request for Proposal, and any other relevant information the firm wishes to submit, the proposals for the PMDSC should also ideally provide the following information:

(i) The lead firm's experience with: (a) implementing design and build contracts where careful management and programing has been required for undertaking design work, contract preparation and bidding, and supervising construction activities; (b) supervising multiple construction packages being implemented concurrently; (c) managing multidisciplinary teams located across multiple offices; (d) assisting the executing agencies with implementing environmental and social measures, including involuntary resettlement, ensuring the safeguard policies/requirements of the government and externally aided agencies are met; and (e) having overall responsibility for project implementation management.

(ii) The firms' experience with supervising the construction of large-scale civil works contracts (i.e. larger than $100 million in capital budget) as the 'Engineer' under FIDIC contracts. The works must have included: (a) large diameter tunneling (i.e. diameter larger than 4 meters) using construction methods of both "shielded tunnel boring machines" and "drill and blast;" (b) construction of earth gravity dams; and (c) construction of large canals including cut-and-cover sections. If the lead firm does not have experience in any particular types of works then there must be a joint venture agreement with the suitably experienced partner firm.

(iii) The firm's experience in preparing detailed engineering designs, cost estimates and contract packages, for: (a) large diameter tunneling (i.e. diameter larger than 4 meters) using construction methods of both "shielded tunnel boring machines" and "drill and blast;" (b) construction of earth gravity dams; and (c) construction of large canals including cut-and-cover sections.

(iv) The firms' or proposed experts' experience in: (a) preparing and implementing environmental and involuntary resettlement plans; (b) preparing and implementing communication plans for similar large scale construction projects; and, (c) preparing strategic environmental assessments in the water resources sector, or similar.

(v) The firms' experience in planning, preparing feasibility assessments, and undertaking ADB project preparatory technical assistance projects (or similar) in the water resources and/or energy (hydropower) sectors. This applies particularly for preparing feasibility designs for planned large diameter tunnels (TBM and "drill and blast"), high dams (roller compacted concrete and similar), hydropower facilities, and large canals. This includes preparing and supervising site investigations, surveys and studies, and preparing ADB loan documents.

(vi) The lead firm's experience of undertaking similar projects with tunnel, dam and canal components in Sri Lanka should be highlighted. However, for the lead and joint-venture partner firms, similar experience in other developing countries (including Africa and Americas) should also be highlighted, along with any other particular experience relevant to the nature of the proposed investment plan in developed countries.

(vii) Practical recommendations for expediting the overall implementation schedule for the investment program, particularly the UEC Project.

(viii) Submission of CVs in Tech-6 of the technical proposal: please ensure they are presented in the same order as the positions listed in Tables 3 and 5.

Attachment 7: Terms of Reference for Improving System Efficiencies and Water Productivity Consultant

I. OVERVIEW

1. The overall goal of the Mahaweli Water Security Investment Program is to improve water productivity in the agricultural sector in Sri Lanka. The investment program includes significant investments in water infrastructure for the transfer of water from the south-central 'wet' zone to the northern dry zones, construction of storage reservoirs, construction of major conveyance canals and tunnels, and the rehabilitation of existing irrigation infrastructure to improve water supply to existing irrigation systems (major and minor cascade systems). These systems currently suffer from water shortages, particularly during the Yala season resulting in low cropping intensities, and thereby reducing yields and farm and household food security and incomes.

2. However, the existing irrigation systems are often characterized by high application rates which can be symptomatic of low application efficiencies due to high conveyance and operational losses. Water delivery service is sub-optimal. Crop yields are below genetic potential and cropping patterns dominated by relatively low return crops, particularly paddy. As a result water productivity in terms of yield and returns are well below potential levels.

3. Climate change may also adversely impact on irrigated agriculture in Sri Lanka. Higher temperatures may lead to a reduction in paddy yield and an increase in irrigation water demand, and changes in the timing and intensity of seasonal rainfall may further contribute to water shortages. These are potential risks to not only the sector but more specifically to systems within the investment program, and may adversely impact on system and project performance.

4. The investment program represents a significant investment in the sector and as such is a major opportunity to improve production of irrigated agriculture. However, to fully realize the potential for improved agricultural productivity, enhanced food security and poverty reduction, it will be necessary to improve the current performance of irrigation systems and the associated farming systems. To do this there is a need for a better understanding of the current constraints and opportunities to improve the productivity and returns within cascade irrigation systems, and how to better optimize returns to the most limiting resource, water. There is also a need to better understand and quantify the climate change risks and identify suitable adaptation measures.

II. OBJECTIVES

5. This Terms of Reference (TOR) is for the Improving System Efficiencies and Water Productivity (ISEWP) consultancy package under the investment program. The goal of ISEWP is to prepare a strategy for the improvement of cascade irrigation system efficiency and water productivity. The strategy would include measures to improve the efficiency and effectiveness of water delivery service through physical and non-physical improvements (i.e. both infrastructure and operational aspects) and farm production and returns (both on- and off-farm measures). An integral part of ISEWP requires that irrigation and agricultural improvements be demonstrated in selected areas as the first step in scaling-up process of improving the regional productivity of irrigation water and in demonstrating the long-term viability and sustainability of irrigated agriculture in the face of changing climate.

III. SCOPE OF WORK

6. **Overall Scope:** The overall objective of the ISEWP is to analyze and demonstrate sustainable increases in irrigation system efficiencies and water productivity (in both yields and returns) that can be readily adopted for systems and farms within the Mahaweli System.

7. **Pilot Demonstrations:** It is proposed to demonstrate these improvements through application on case irrigation systems and pilot farms. The case systems include: (i) a minor system within North West Province Canal Project (NWPCP)
8. [1] which is to be selected; (ii) a sub-system within the Minipe Left Bank Canal Project (MLBCP)[2], and (iii) the Huruluwewa Irrigation System.[3] Within each of these systems pilot areas will be developed for application of improved irrigation management and increased crop production and diversification. These systems and farms will serve as practical examples of the approach to and results of improving productivity and returns to land and water for dissemination to stakeholders at levels.

9. **Irrigation Systems:** Within the irrigated areas of the investment program, the irrigation systems are often a hydrologically interlinked cascade system of major and minor tanks (reservoirs) with associated irrigation command areas, canals and drains. Water sources include both surface water from external transfer and from local rainfall runoff, reuse of drainage water and shallow groundwater sources. While water use is principally for irrigation, it is also of importance to domestic and livestock consumption and for aquaculture.

10. **Farming Systems:** The farming system is predominately small holdings producing paddy to meet household food needs. However with more secure and reliable water supplies, particularly during the Yala season, as well as increased inputs and knowledge there are also opportunities for production of higher value other field and vegetable crops to increase returns and improve household security. The project will review the existing farming systems and evaluate opportunities and constraints for farmers to diversify into higher valued crops, including reviewing and recommending improvements to supply and market chains.

11. **The Approach:** The approach is in two interrelated parts, Part 1 – case study irrigation systems and Part 2 - pilot demonstrations, as outlined below.

12. **Timeframe:** The total study duration is 22 calendar months, inclusive of mobilization, surveys, stakeholder consultations, assessments, intervention design, implementation, monitoring and evaluation, workshops and reporting. The monitoring and evaluation period for both Parts 1 and 2 should be concurrent, and cover two consecutive irrigation seasons.

13. **Part 1 – Case Study Irrigation Systems:** The purpose is to recommend improvements to irrigation system operation to increase water delivery efficiencies, both conveyance and operational efficiencies. As outlined below this will be achieved through assessment of current levels of system performance and then the implementation and monitoring and evaluation of recommended changes to system operation.

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[1] An alternative or additional system could be the Huruluwewa System which is also a water short system and the primary target area for the Upper Elahera Canal (UEC) under Phase 1 development.

[2] While the MLBCP is a not a typical cascade system it is included in the study as it is part of the current investment program and has significant potential for improved water use efficiency.

[3] System within command of the Huruluwewa Reservoir that will receive water from the UEC.

14. **System Inventory:** (3 months) The GIS-based inventory will establish for each system the following (at a minimum): physical extent of command and irrigated areas, engineering parameters and condition of the key irrigation infrastructure, past and current cropping patterns and productivity, and survey and data requirements for the assessment phase. The inventory will be implemented in consultation with key stakeholders - Mahaweli Authority of Sri Lanka (MASL), Department of Irrigation (DOI), Department of Agrarian Development, Farmer Organizations, and farmers. Specific activities include: (i) delineation of the system including a base map of the command area, inventory of the principal irrigation infrastructure including tanks, main and distributary canals, main control structures, and drains; (ii) crops and cropping patterns: summary of seasonal crops and cropped areas for the past five years (Yala and Maha seasons) and reported productivity and returns for paddy and other field crops, including any relevant information associated with agronomic and agricultural aspects that strongly links to water use and management; and (iii) water deliveries: summary of water deliveries over the past five years (Yala and Maha seasons) per month and season.

15. **Performance Benchmarking:** (3 months) The preparation of an irrigation system benchmark assessment, including using FAO's Rapid Appraisal Process (RAP) to determine current level of performance and to identify constraints and opportunities to improving delivery efficiencies. The activity includes: (i) preparation of system water balance, (ii) determination of current levels of productivity, (iii) assessment of institutional adequacy and performance, and (iv) assessment of system efficiencies.

16. **Assessment of Opportunities for Growing High Value Crops:** (1 month) Studying the existing supply and marketing chains for produce within Sri Lanka and assess the opportunities and constraints for encouraging farmers to grow higher value crops, particularly during the Yala season.

17. **Operational Plan:** (1 month) The preparation of updated operational plans for the selected systems setting out the necessary organization and procedures for improved system operation. This includes: (i) improvements to flow control and measurement at key system nodes; (ii) improvements to the organizational aspects of system operation; and (iii) preparation of updated seasonal operation plans.

18. **Monitoring and Evaluation:** (12 months) The purpose of the monitoring and evaluation is to verify the performance of the systems, in terms of delivery efficiencies over two consecutive irrigation seasons (Yala and Maha). The activities include:

- Flow monitoring: the measurement of system flows at key nodes to determine distribution within the system and validate existing water records. This may require the installation or upgrading of, measurement and maintenance of flow and water level measurement at key system nodes such as reservoir outlets, and at the headings of main canals and distributary canals.
- Demand monitoring: the determination of crop water demands based on localized weather information. This may require the installation, calibration, measurement and maintenance of an automated meteorological station.
- Productivity monitoring: the determination of system crop productivity based on interpretation of satellite imagery and associated crop records and field surveys.
- Field surveys: sample area surveys to field-validate irrigation infrastructure and operation and crop types.

- Stakeholder consultations: facilitated discussion group meetings with key stakeholders to identify, analyze and document issues and constraints to system operation and farm productivity.
- Institutional assessment: evaluation of the current systems' institutional capacities and support provided to the farming operations.
- System assessment: preparation of system-level water balance assessments to benchmark levels of performance, efficiency and adequacy, and water productivity.

19. **Part 2 – Pilot Demonstrations:** The purpose is to demonstrate improvements to current farming systems to increase farm productivity and returns to both land and water.

20. **Rationale for Initiating Demonstration Areas.** Short-term financial considerations of individual farmers invariably take priority over long-term strategic water management objectives. Therefore, measures to address water efficiency (conservation) and productivity must be demonstrated to be economically feasible, or at least to incur no financial penalty to the operating farmers. The framework required for a demonstration projects in the investment program is to initiate a package of comprehensive water management interventions in a cluster of farms, with managerial assistance from their Farmer Organizations (FOs), and with technical assistance, mainly in the form of international and national consultants working cooperatively with MASL's and DOI's field offices. This initiative requires capacity building within MASL and DOI so that they are adequately resourced and technically grounded to facilitate multi-stage expansion of these proven water management measures upon closure of the 'demonstration phase'. The goal is to step-wise up-scale the recommendations of the project, ultimately comprising major system-wide water savings, across the entire Mahaweli System by 2025 at the latest. Selection of specific interventions or the project activities at different levels of the system, will be guided by such factors as their overall effectiveness in the quantities of water saving, ease of implementation and operation, cost effectiveness, contribution to increasing water productivity, benefits to farmers, minimum effects on environment, sustainability and national policy directions. This will be achieved through the application of a range of intervention on pilot farms with the above irrigation systems. The specific activities are outlined below.

21. **Pilot Farm Selection:** (3 months) The selection of pilot farms within the above case study irrigation systems for the purpose of demonstrating improved farming and on-farm irrigation methods and management. It is envisaged that there will be 3 to 4 pilot farms/fields per irrigation system, selected to represent the range of water supply conditions (eg, upper, middle and lower areas) within the canal system. Specific activities include: (i) stakeholder consultations to present the proposed program; and (ii) farm surveys and preparation of detailed farm maps.

22. **Interventions Design:** (2 months) The planning and design of proposed intervention to increase production and returns, and on-farm water use efficiencies. It is envisaged that interventions will include changes to current farming systems such cropping patterns and varieties, advanced irrigation management such as Alternate Wet and Dry (AWD) and Shallow Water Depth (SWD) for paddy, irrigation methods such as pressure irrigation and/or improvement of on-farm canals, and infrastructure control and monitoring improvements within the main and distributary canal systems to the pilot areas. The proposed interventions will be presented to the stakeholders for endorsement prior to implementation.

23. **Implementation Program:** (4 months) The above interventions will be implemented in preparation for the next irrigation season. The timing and during of which is dependent on the nature of the intervention, for example physical works need to be implemented prior to season

commencement. The project will identify the proposed implementation mechanisms for provision of physical (on-farm works and inputs) and non-physical (services) works. The project will also provide technical support to all stakeholders with implementing the recommendations during the trial period.

24. **Monitoring and Evaluation:** (12 months) The purpose of the monitoring and evaluation is to determine the impacts of the above interventions to increase farm productivity and water use efficiencies. This will be conducted over three consecutive irrigation seasons, (Yala, Maha and Yala). The activities per pilot farm includes: (i) measurement of water deliveries (volumetrically) and drainage volumes; (ii) measurement of crop yields (total and marketable); (iii) recording of returns for marketed crop yields; and (iv) determination of water productivity and water use efficiencies.

25. **Dissemination Program:** On completion of the above tasks (Parts 1 and 2) a program for the extension of the field-proofed interventions will be prepared, including a detailed program for extension to irrigation systems within the MDP, and pilot demonstrations within these systems. This will include detailed descriptions of the physical and non-physical works and services, cost estimates and an implementation schedule. This will be presented in the Final Report.

26. **Outputs and Reports:** The study outputs and reports include:

(i) Inception Report: within 1 month of commencement a report presenting an initial assessment of the cascade irrigation systems and pilot farm selection, including proposed selection of irrigation system sub-section areas (distributary canal level) and the local and extent of pilot demonstration farms, as well as an updated work program.

(ii) Interim Report: within 7 months of commencement presenting: (i) Part 1 findings and recommendations for cascade irrigation systems; system inventories, performance bench marking and operational plan and (ii) Part 2 findings and recommendations for the pilot demonstrations including; farm selection, intervention designs and implementation program.

(iii) Monitoring Reports (2): within one month of conclusion of each irrigation season presenting the results and recommendation of the monitoring and evaluation of the cascade irrigation systems and pilot demonstrations.

(iv) Draft Final Report: within 20 months of commencement presenting the study findings and recommendations, along with dissemination program of interventions for improved irrigation system performance and improved farm production and water productivity within the MDP.

(v) Final Report: within 22 months of commencement and inclusive of responses to ADB and Government of Sri Lanka comments on the Draft Final Report presenting the study findings and recommendations and the proposed dissemination program.

(vi) Workshops including:

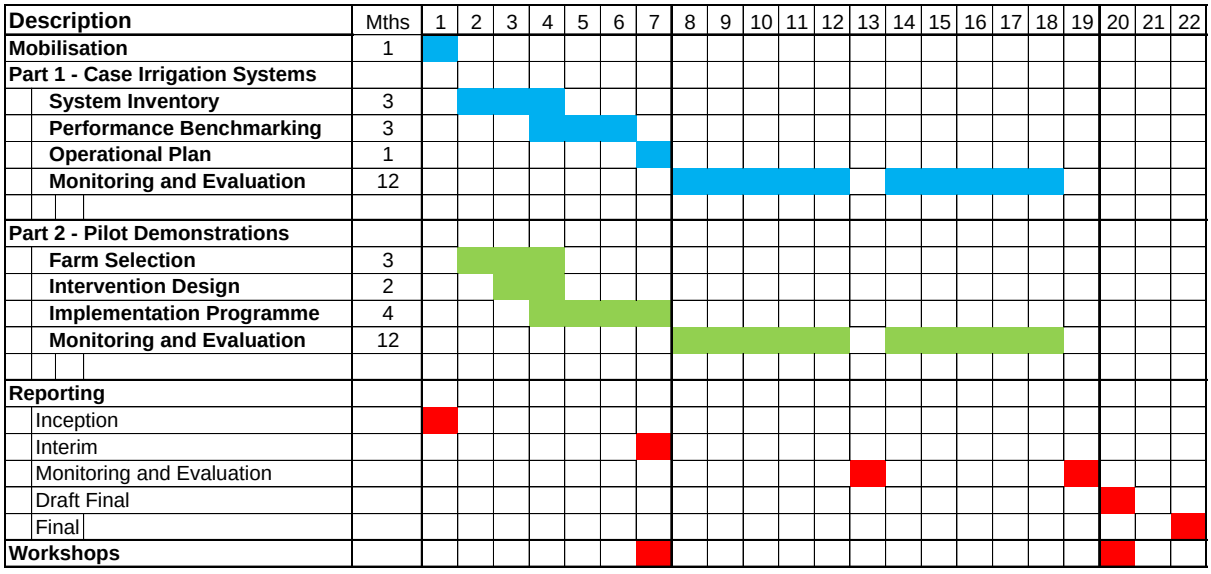
a. Stakeholder Workshops: in addition to stakeholder consultations during field surveys, two stakeholder meetings will be conducted, the first prior to the first irrigation season, the purpose of which is to consult with stakeholders on planned interventions for pilot demonstrations, and the second after the second irrigation season presenting the findings of the monitoring and evaluation over both seasons..

b. Final Workshop: after approximately 20 months at the end of the second irrigation season presenting the results of the monitoring and evaluation of the study and recommendations for the dissemination program. The

workshop will seek stakeholder comment and recommendations for the program.

27. **Schedule:** The overall work schedule is presented in **Figure 1**. Based on a commencement in the second quarter of 2016, the first irrigation season would be Maha 2016/17 (November to February). Parts 1 and 2 are synchronized and run concurrently. The program is organized into three phases: Phase 1 (7 months) including mobilization and assessment to implementation of interventions (on both cascade systems and pilot demonstrations); Phase 2 (12 months) including monitoring and evaluation over two consecutive irrigation seasons; and Phase 3 (3 months) including the preparation of project reports and final workshop.

Figure 1: ISEWP Work Program



28. **Cost Estimate**: The total cost of the program is approximately $2.5 million of which approximately $1.0 million is for interventions on the cascade irrigation systems ($0.3 million) and for pilot demonstrations ($0.7 million). The balance of the cost is for the recruitment of consultancy services, national and international, and for associated services.

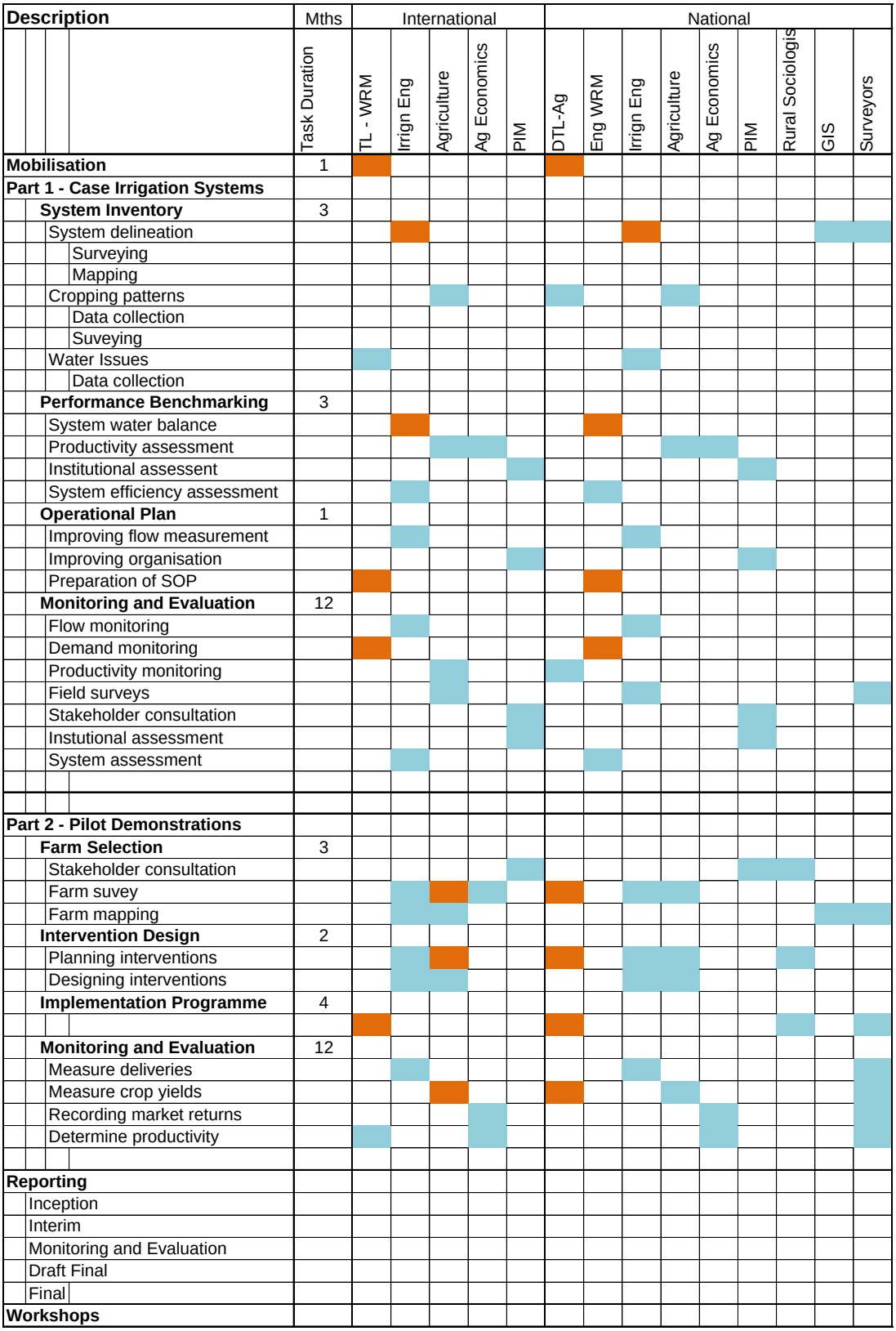
IV. SUMMARY OF CONSULTANTS TERMS OF REFERENCE

29. Table 1 summarizes the proposed consulting services in person-months inputs. The total input is 145 person-months of which 30 and 115 are international and national, respectively. Figure 2 shows the staffing task matrix, with main and contributing responsibilities (dark and light shading, respectively).

Table 1: Proposed Consulting Services

International Specialists	**Person-months**
Team Leader and Water Resources Management	10
Irrigation Planning and Design	6
Agriculture	8
Agricultural Economics	2
Participatory Irrigation Management	2
Subtotal	**30**
National Specialists	**Person-months**
Deputy Team Leader and Agriculture	20
Water Management	15
Irrigation Planning and Design	15
Agriculture	15
Agricultural Economics	4
Participatory Irrigation Management	12
Rural Sociology	4
GIS	6
Surveyors	24
Subtotal	**115**
Total	**145**

Figure 2: Staffing and Task Matrix



30. **Team Leader and Water Resources Management (International, 10 person-months):** with at least MSc or equivalent in agricultural water resource management and at least 15 years of relevant experience, including the role of team leader in similar programs. The Team Leader is principally responsible for overall program management and liaison with the ADB and Government, and including specific tasks of:

(i) Organize the work and supervise the inputs of all consultants
(ii) Manage the relationship with ADB, the government, and other stakeholders
(iii) Recommend specific practical innovations for improvement of water productivity at cascade system and farm levels
(iv) Supervise preparation and implementation of the monitoring and evaluation of Part 1 – Case Irrigation System and Part 2 – Pilot Demonstrations.
(v) Preparation and presentation of the program workshops, and coordination and liaison with key stakeholders; ADB, MMDE, MASL, DOI and FOs.
(vi) Timely delivery of the program reports including: Inception, Interim, Monitoring and Evaluation and Final.

31. **Deputy Team Leader and Agriculture Specialist (National, 20 person-months):** with at least the equivalent of an MSc in tropical agriculture, and at least 10 years of experience in tropical agriculture and including at least 5 years in the management of agriculture development projects/programs in Sri Lanka. The principal role of the specialist is to support the Team Leader in implementation and reporting on the program, and specifically the implementation of the Pilot Demonstrations (Part 2). In addition specific tasks include:

(i) Liaison with MMDE, MASL, DOI, and key stakeholders at local, district and national levels
(ii) Supervision of the Pilot Demonstrations, and in particular the Farm Selection and Intervention Design elements, and their implementation
(iii) Assisting the Team Leader in preparation of workshops and program reports

32. **Irrigation Planning and Design Engineers (International, 6 person-months; National, 15 person-months):** with at least the equivalent of an MSc in irrigation engineering or similar, and at least 10 years relevant experience, including cascade irrigation systems and preferably country experience. The main role of the engineers is the assessment of irrigation components of both Parts 1 and 2, and formulation of irrigation intervention for improvement of irrigation deliveries and infrastructure maintenance. The specific tasks include:

(i) Supervision of the irrigation system inventories
(ii) Supervision of the irrigation system performance benchmarking
(iii) Contributing to the formulation of irrigation interventions at both system and farm levels
(iv) Contributing to the irrigation elements of the monitoring and evaluation program (Parts 1 and 2), including process and method for data acquisition and analysis
(v) Preparation of the relevant irrigation elements of program reporting including workshop and reports

33. **Agriculture Specialists (International, 8 person-months; National, 15 person-months)**: with at least the equivalent of a MSc in agriculture, and at least 10 years' experience in tropical agriculture, including paddy and other field and vegetable crops. Experience in programs for improved paddy production, with SRI and AWD and other water conservation techniques preferable. The role of the specialists is to support the development and implementation of interventions to improve farm crop production and productivity (both yield and returns), with specific tasks of:

(i) In collaboration with the DTL supervision of the Farm Selection element of Part 2, including stakeholder consultation, farm surveys and mapping
(ii) Identification of appropriate intervention, including alternative cropping regimes and cultivation methods, inputs and harvesting
(iii) Contributing to the preparation and implementation of the monitoring and evaluation for Part 2, including process and methods for data collection and analysis
(iv) Contribution to the program reporting including workshops and reports

34. **Agricultural Economists (International, 2 person-months; National, 4 person-months)**: with at least the equivalent of a MSc in agricultural economics or equivalent and 15 years relevant experience, particularly in the development programs. The role of the agricultural economists is to support and develop those elements of the program related to determination of water productivity, including those within system performance benchmarking and monitoring and evaluation. It is also to contribute to program outputs including workshops and reports.

35. **Participatory Irrigation Management (PIM) Specialists (International, 2 person-months; National, 12 person-months)**: with at least the equivalent of an MSc in agricultural and/or irrigation extension and at least 10 years program relevant experience. The PIMs are responsible for those program elements related to institutions, both irrigation and agriculture, at local and district levels, and for the assessment and development of institution reforms to improve water and land productivity.

36. **Rural Sociologist (National, 4 person-months)**: at least an MSc or equivalent in rural sociology and at least 10 years of relevant experience in rural extension and communications. The main role of the Rural Sociologist is to support program elements related to stakeholder, farmer mainly, communications and contributions to the program workshops and reports.

Attachment 8: Terms of Reference for Individual Consultants for Expert Panel

A. Objective and Purpose of the Assignment

1. The aim of the consultancy is to strengthen the design and implementation of the Mahaweli Water Security Investment Program (MWSIP) by providing expert technical advice and guidance to the Ministry of Mahaweli Development and Environment (MMDE) and ADB. The Independent Review Panel (IRP) will comprise of a group of individually recruited consultants that will oversee the integrity of the program and ensure the highest quality standards in engineering and construction are met.

B. Scope of Work

2. The independent consultants will have postgraduate-level degrees (MSc or PhD) and will have extensive experienced exceeding 20 years in their respective specified science or engineering fields. They shall be internationally renowned experts in their field. Tentative members of the IRP shall include a senior dam specialist, a senior tunnel specialist, a senior geologist and a senior contract management specialist. Additional experts may be recruited for specific issues on request of MMDE or ADB. Either the senior tunnel specialist or senior contract management specialist will chair the panel.

3. The IRP will be responsible for advising MMDE's Program Management Unit (PMU) for the investment program by examining and validating that all the appropriate information and investigation results have been included in the design and engineering of each project; exploring alternate design possibilities; identifying any gaps with current international best practices; and providing expert recommendations. Special consideration will be given to opportunities that will expedite implementation of the investment program, reduce costs, simplify construction, and mitigate risks.

4. The IRP will convene and meet in person or through conference calls as needed to conduct their duties, review relevant data and information, discuss findings and structure and prepare the report(s). Meetings may be open or closed-door at the discretion of the IRP. When necessary, the IRP or individual members will visit project offices and sites. The panel may also hold meetings with key stakeholders to consult them, as might be needed and useful. The panel will consult relevant project documents and other literature on subject(s) to ensure its assessment and findings are well-informed and based on consideration of the best available scientific/engineering knowledge and information. The panel will be provided with all relevant documents by the PMU.

5. Findings and recommendations of the IRP must follow the requirements of the government's laws and regulations, and the safeguard policies and procurement guidelines of ADB, as well as international best practices. The reviews of the panel will be undertaken in consultation with government agencies and stakeholders.

C. Detailed Tasks and/or Expected Output

6. The IRP will report to the PMU and ADB, and will work with all entities engaged under the investment program including consultants, contractors and suppliers. The principal activities of the IRP will be as follows:

Activity 1: To assess, investigate and report on selected topics at the request of either MMDE or ADB on:

(i) Potential risks and impacts of proposed designs, construction techniques and other related aspects including identifying the key gaps in information that limit the IRP's ability to adequately assess potential impacts;

(ii) The extent to which targets and milestones are being met and will continue to be met during the remaining implementation period;

(iii) Opportunities to reduce costs or simplify designs while maintaining quality standards;

(iv) Key technical and contractual elements are being properly handled during the design and investigation periods before large civil works packages are tendered, and thereafter, as required during construction and commissioning stages.

Activity 2: To assess and interpret the results of any field investigations and surveys and to draw attention to unsatisfactory results and information gaps, if necessary.

Activity 3: To conduct independent third-party reviews of the outputs from MMDE, consultants, contractors, and other concerned parties including in particular an assessment of the geotechnical standards, design parameters, interpretations of investigation and survey results, construction techniques, maintenance requirements, running costs, and other matters the panel deems appropriate.

Activity 4: To detect general problems, including those not brought to the panel's attention by MMDE or ADB, and identify any other issues involved in program implementation, and to make recommendations on measures for improving designs, processes and practices, as appropriate.

D. Deliverables

7. The IRP and member individual consultants shall provide reporting as follows:

(i) Inception Report: Within one week of the commencement of each assignment, the relevant individual shall prepare a brief Inception Report. Based on the output of discussions with the PMU and field visits, the relevant panel member shall review and verify the content of the tasks required. The report shall also elaborate in detail: (i) overall assessment of the tasks, (ii) work plan, and (iii) program for delivery of required reports.

(ii) Individual Consultant Reports: Based on the results of their review and visits to project offices and worksites, the relevant specialist shall prepare a report presenting a summary of the topic of review, analysis and findings, together with their conclusions and recommendations. These reports will be prepared on an ad-hoc basis as needed for topic-specific activities. These reports should contain the background information and data relevant to the underlying assessments.

(iii) Final IRP Reports (semi-annual): Final Reports will be prepared on a semi-annual basis covering all the panel's activities during the previous 6-month period. These reports will present all the findings related to the panel's review and as appropriate consider the wider context in which the recommendations of individual specialists on the panel are to be integrated and employed into overall program implementation.

8. When the situation is sufficiently urgent, oral advice and recommendations will be given, but this will be followed-up in each case by written confirmation of the advice.

9. For each report, 6 hard copies in English are to be submitted (three hard copies to ADB and three hard copies to MMDE). In addition to hard copies, one digital electronic copy shall also be submitted to the PMU and ADB. At the end of the contract, a digital copy of all documents relevant to the IRP shall be compiled in an orderly manner on a CD/DVD and be submitted to the PMU and ADB.

10. Members of the IRP will be bound by a confidentiality agreement that ensures sensitive or confidential information (e.g. proprietary commercial information) is kept within the panel; however, the agreement will not preclude the panel from reporting any conclusions relevant to their review that may draw from such information, providing none of the sensitive or confidential is disclosed in such conclusions, whether they be verbal or written.

E. Schedule and Places of Assignment (Indicative)

11. The duration of each consultancy is shown in Table 1 to be undertaken intermittently during implementation and will be a mix of home-office in the expert's country and field-work in Sri Lanka.

Table 1: Independent Review Panel Consultants – Indicative Personnel Schedule

Year	Dam Specialist	Tunnel Specialist	Geologist	Contract Management Specialist
2015	2	2	2	1
2016	2	2	2	1
2017	2	2	2	1
2018	2	2	2	1
2019	2	2	2	1
2020		2	2	1
2021		2	2	1
2022		2	2	1
2023		2	2	1
2024		2	2	1
Total	**10**	**20**	**20**	**10**

F. Minimum Qualification Requirements

12. The Dam Specialist will have a postgraduate degree in civil engineering or related field and a minimum of 20 years of work experience in designing and implementing earthen and concrete dams, preferably within the South Asia region. The specialist should be competent in planning, technical designs, dam construction supervision, contract management, quality assurance and quality control, safety, compliance with safeguards, etc. pertaining to dam construction.

13. The Tunnel Specialist will have a postgraduate degree in civil engineering or related field and a minimum of 20 years of work experience in designing and implementing tunnel projects, preferably within the South Asia region, including using tunnel boring machines and drill and blast methods. The specialist should be competent in planning, technical designs, tunnel

construction supervision, contract management, quality assurance and quality control, safety, compliance with safeguards, etc. pertaining to tunnel construction.

14. The Geologist will have a graduate degree in geology or related field and a minimum of 20 years of work experience in geotechnical work for the construction of foundations and other structures and facilities for large civil works projects. The Geologist will ensure that required geotechnical investigations are done properly and the data collected are interpreted in accordance with recent industry standards and practices.

15. The Contract Management Specialist will have a graduate degree in construction management/civil engineering or related field and a minimum of 20 years of work experience in procurement and contract management of large infrastructure projects, preferably within the South Asia region, with at least 10 years of demonstrable experience supporting management of contracts in the role of Engineer. The specialist must have expert knowledge and experience of FIDIC contracts.

Attachment 9: Design and Monitoring Framework for the Investment Program

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Improved agricultural production and sustained economic growth in the North Central Province, Central Province, North Western Province and Eastern Province	By 2030: Annual growth of at least 8% in provincial GDP (baseline: 9.7% weighted average in 2010-2012). Agricultural production increases from SLRs270 billion in 2012 to SLRs575 billion (in 2012 prices).	Central Bank of Sri Lanka Annual Report Department of Agriculture and MASL annual reports	**Assumptions** Government completes NCPCP Phase 2 and associated command area improvement, and implements programs to improve productivity of water Government continues to maintain irrigation infrastructure in the investment program's beneficiary command areas
Outcome Secured access to water resources for agricultural and drinking purposes in project areas	By 2024: 974 mcm/year of water available from the Mahaweli System in North Central Province, inclusive of 70 mcm/year of raw water for 358,000 people (baseline = 60 mcm/year with 0 mcm/year for drinking in 2014) 130 mcm/year water available from the Mahaweli System in North Western Province (baseline= 0 mcm) Storage capacity of Minipe Anicut is increased to 1.25 mcm (baseline= 0.18 mcm in 2014) Irrigated area serviced by Mahaweli System increases to 162,000 ha with cropping intensity of 191% (baseline = 146,000ha and 188% in 2014)	For all indicators: MASL and DOI annual reports	**Risks** Climate change impacts on water availability and water demand by crops exceed projections
Outputs 1. New and improved water conveyance and storage infrastructure constructed	By 2024: Kalu Ganga - Moragahakanda Transfer Canal (9 km) and Upper Elahera Canal commissioned (82 km) By 2024: North Western Province Canal (96 km),	For all indicators: MASL and DOI progress reports	**Assumptions** Cofinancing will be secured on time. **Risk** Unexpected ground conditions cause

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	two new reservoirs, and associated infrastructure commissioned By 2019: Minipe Anicut Heightened by 3.5 m, and Left Bank Canal and associated infrastructure rehabilitated (74 km)		implementation delays
2. Systems for improving water resources management and productivity developed	Recommendations from ISEWP plan implemented during 2019 to 2024 Recommendations from SIWRM plan approved by the government by 2024	MASL and DOI project and investment program progress and completion reports MMDE Annual Reports	
3. Multi-disciplinary investment program management operational	Timely submission of periodic financing requests for subsequent tranches Program outputs delivered on time and within budget	For all indicators: MMDE financial records and progress reports	

Activities with Milestones	Inputs
1. New and improved water conveyance and storage infrastructure constructed 1.1 For tranche 1, finalize detailed designs, and procurement documents, and award first contract of tranche 1 works package in Q4 2015 and last works package by Q1 2017 1.2 Commence works for tranche 1 in Q4 2015 1.3 Tender and award of tranche 2 works package in Q4 2016 1.4 Complete construction of tranche 1 works by Q4 2019 1.5 Tender and award the first works packages for Tranche 3 by Q4 2017 and last works package by Q4 2021. 1.6 Complete construction of tranche 2 works by Q4 2021 1.7 Complete construction of tranche 3 works by Q4 2024 **2. Systems for improving water resources management and productivity developed** 2.1 Award ISEWP consulting package and mobilize consultants by Q3 2016 2.2 Complete ISEWP consulting package by Q2 2018 2.3 Award SIWRM consulting package and mobilize consultants by Q4 2020 2.4 Complete SIWRM consulting package by Q4 2022	**Asian Development Bank: $453 million** **Government: $108 million** **Cofinancing: $114 million to be confirmed**

Activities with Milestones	Inputs
3. Multi-disciplinary investment program management operational 3.1 Mobilize PMDSC by Q3 2015 3.2 Prepare the detailed designs, cost estimates, and contract documents for Tranche 2 and 3 packages by December 2016 3.3 Finalize the feasibility study for NCPCP Phase 2 and prepare necessary documents for possible funding by Q2 2017 3.4 Finalize documents for consulting services package for SIWRM by Q4 2019 3.5 Prepare necessary reporting documents to the government and ADB (continuous)	

ADB = Asian Development Bank, DOA = Department of Agriculture, DOI = Department of Irrigation, EMP = environment management plan, GDP = gross domestic product, ISEWP = improving system efficiencies and water productivity, km = kilometer, m = meter, MASL = Mahaweli Authority of Sri Lanka, MCM = million cubic meters, MMDE = Ministry of Mahaweli and Environment, NCPCP = North Central Province Canal Program, PFR = periodic financing request, PMDSC = program management, design and supervision consultant, PMU = program management unit, PPTA = project preparatory technical assistance, RP = resettlement plan, SIWRM = strengthening integrated water resources management, SLRs = Sri Lankan rupees.
Source: Asian Development Bank.

Attachment 10: Design and Monitoring Framework for Tranche 1

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Improved agricultural production and sustained economic growth in the North Central Province, Central Province North Western Province and Eastern Province	By 2024: Annual growth of at least 8% in provincial GDP (baseline: 9.7% weighted average in 2010-2012). Agricultural production increases from SLRs270 billion in 2012 to SLRs450 billion (in 2012 prices).	Central Bank of Sri Lanka Annual Report MMDE and DOA annual reports	**Assumption** Government maintains irrigation infrastructure in the investment program's beneficiary command areas
Outcome Secured access to water resources for agricultural and drinking purposes in project areas	By 2019: 30 MCM/year water available from Mahaweli System to North Western Province (2014 baseline = 0) Storage capacity of Minipe Anicut is increased to 1.25 MCM (2014 baseline = 0.18 MCM)	For all indicators: MASL and DOI annual reports	**Risks** Climate change impacts on water availability and water demand by crops exceed projections
Outputs 1. New and improved water conveyance and storage infrastructure constructed	By 2019: 6.2 km of Upper Elahera Canal constructed Two new reservoirs and 27 km of the North Western Province Canal and associated infrastructure commissioned Minipe Anicut Heightened by 3.5 m, and 74 km of the Left Bank Canal and associated infrastructure rehabilitated	For all indicators: MASL and DOI progress reports	
2. Systems for improving water resources management and productivity developed	Recommendations from ISEWP plan approved by 2018	Project Progress Reports	

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
3. Multi-disciplinary investment program management operational	By 2017: Timely submission of PFRs for Tranches 2 and 3 Tranche 1 outputs delivered on time and within budget NCPCP Phase 2 investments planning documents are approved by MMDE.	For all indicators: MMDE financial records and progress reports	

Activities with Milestones	Inputs
1. New and improved water conveyance and storage infrastructure constructed	**Asian Development Bank: $150 million**
1.1 Finalize detailed designs and procurement documents, and award the first construction contract packages by Q4 2015 and the last construction package by Q1 2017	**Government $40 million**
1.2 Commence works for Tranche 1 in Q4 2015	
1.3 Complete construction of Tranche 1 works by Q4 2019	
2. Systems for improving water resources management and productivity developed	
2.1 Award ISEWP consulting package and mobilize consultants by Q3 2016	
2.2 Complete ISEWP consulting package by Q2 2018	
3. Multi-disciplinary investment program management operational	
3.1 Mobilize PMDSC by Q3 2015	
3.2 PMU prepares necessary reporting documents to the government and ADB (continuous)	
3.3 PMU establishes and operates a Program Performance Monitoring and Evaluation System (continuous)	
3.4 PDMSC supports PMU with preparing the detailed designs, cost estimates, and contract documents for Tranche 2 and 3 packages by December 2016	
3.5 PMDSC supports PMU with finalizing the feasibility study for NCPCP = North Central Province Canal Program Phase 2 and preparing necessary documents for possible funding by Q2 2017	

ADB = Asian Development Bank, DOA = Department of Agriculture, DOI = Department of Irrigation, EMP = environment management plan, GDP = gross domestic product, ISEWP = improving system efficiencies and water productivity, km = kilometer, m = meter, MASL = Mahaweli Authority of Sri Lanka, MCM = million cubic meters, MMDE = Ministry of Mahaweli Development and Environment, NCPCP = North Central Province Canal Program, PFR = periodic financing request, PMDSC = program management, design and supervision consultant, PMU = program management unit, PPTA = project preparatory technical assistance, SIWRM = strengthening integrated water resources management, SLRs = Sri Lankan rupees.
Source: Asian Development Bank

Attachment 11: Communications Strategy Matrix

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
1. Build a supportive stakeholder base for the project	People directly affected by the project could protest against the project leading to project delays	Project Affected People who will be resettled or compensated in the UEC and NWPCP canal areas (474 households)	Accept resettlement and compensation	Technical details on how they will received compensation Compensation will follow SL government and ADB guidelines and will be provided in a timely manner. Grievance mechanisms will be in place	Direct through project authorities (MMDE) Face to face	Tranche 1 of project. Re-evaluation prior to each tranche and annual.	PMU with PIU support	Please see Budget in Section VI of main document	Please see M&E framework in Section IV of the main document
		People affected by project construction	Unaware/ Aware of issues and mitigations accept disruptions	Specific to each group and problem when they arise. But in general The project has taken every precaution to ensure that construction is done in a way to have minimal impacts on people. MMDE will share construction timetables and other information about potential impacts	Website <u>Media</u> Lanka Deepa Thinakaran Sunday Observer Hiru Shakti Srya Neth FM City FM Local meetings Local Economic Dev. and Ag. Ext. workers MMDE providing information				
		Downstream water users affected by the dams	Unaware of the potential impacts/ Aware and accept	Need specific technical information on the impacts Need for continued	Community meetings and consultations				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
		(Mahakithula and Mahakirula Reservoirs)	mitigation	consultation with the community to ensure their feedback <u>Message</u> Water flow will only be impacted during dam construction and impoundment. Better water management will result from dam construction	Radio Posting printed notices in villages Local officials providing information				
		Divisional <u>Secretaries</u> Elahera Medirigirya Galenbidunuwewa Palugaswewa Dambulla Galewela Polpithigama Mahawa Eheluwewa Abanpola Galgamuwa Naula Minipe Hasalaka Laggala Pallegama Wigamuwa	Minimally aware of project and safeguard related issues/ Aware and supportive	Need specific technical information on impacts and mitigation Messages: The project will manage all environmental and project risks and eventually local areas will see improvements in economic development and water security	Local advertising Briefings Regular updates Project and gov't web sites				
	Politicization of the project and protests by current users against water transfers	Office of the President	Completely aware and strongly supportive	- This projects is a high priority for the government -The project has the potential to bring economic benefits in the North and East which will benefit the entire country. -There will be increased	Tours Press conference and media releases Govern't web				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
	derail project			water access in all project areas not just the Northern zones. -MOUs and other provisions have been established to ensure current water rights and availability will not be reduced - All safeguard and other policies have been put in place including special attention to human wildlife conflicts and CKD	sites Briefings Testimony to Parliament Progress reports Media advertising around some issues (e.g. construction, bidding, resettlement, water use issues)				
		Parliamentary committees Parliamentarians from project areas	Awareness varies generally supportive but could use for political purposes/ Aware constantly informed supportive	See above	See above				
		Ministry of Irrigation Water Resources Management (MRWIM) Ministry of Mahaweli Environment and Development (MMDE)	Completely aware and strongly supportive Somewhat aware but not of details/ Aware and strongly supportive	See above	See above				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
		Mahaweli Authority of Sri Lanka (MASL) Divisional Secretaries	Completely aware and strongly supportive Somewhat aware but not of details/ Aware and strongly supportive	See above	See above				
		Current water users in the South affected by water transfers	Unaware/ Aware and local groups along canal route supportive	There will be increased water access in all project areas not just the Northern zones. -MOUs and other provisions have been established to ensure current water rights and availability will not be reduced. - Economic benefits will accrue to people in project areas and the country as a whole. Strong environmental safeguards have been put into place including attention to wildlife and CKD	Media Local Economic Dev. and Ag. Ext. workers Community meetings Gov't briefings Project and Gov't web sites Dramas, concerts, cultural shows where relevant and effective				
		Farmers groups	Unaware/ Aware and local groups along canal route supportive	See above					
		<u>Civil society:</u> NGOs who have attended consultations (e.g,	Generally aware of project and supportive but lack faith	There will be increased water access in all project areas not just the Northern zones.	Direct email Briefings				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
		Environmental Foundation LTD,Centre for Environmental Justice, Federation of Environmental Organizations SL, etc).	safeguards plans will be implemented Could protest and delay project. Specific individual NGOs will have questions about specific aspects of project/Fully aware of project, fully informed throughout	-MOUs and other provisions have been established to ensure current water rights and availability will not be reduced**.** - Economic benefits will accrue to people in project areas and the country as a whole. -Strong environmental safeguards have been put into place including attention to wildlife and CKD. -Transparent policies in place and CSOs to be involved in monitoring	Project tours Project and gov't web sites Brocures and Fact sheets Consultation Progress and monitoring reports				
		NGOs who have not yet participated in consultations (including both wildlife and social development organizations)	Unaware/ Fully aware of project, fully informed throughout	See above	See above. Also individualized meetings/ outreach to key organizations.				
		Media	Some aware/ Aware able to cover issue with knowledge. promote positive outcomes of project	The project has the potential to bring economic benefits in the North and East which will benefit the entire country. -MOUs and other provisions have been established to ensure current water rights and availability will not be reduced. -Strong environmental safeguard provisions have	Briefings Field trips Press conference Regular information updates				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
				been put into place -PAPs are being treated fairly and beyond the current SL requirements -Bidding and awards; project impacts on people; construction progress and problems will all be transparent					
	Beneficiaries not aware or supportive of benefits question project and costs expectations high	Office of the President Ministry of Mahaweli Environment and Development (MMDE) Mahaweli Authority of Sri Lanka (MASL) Divisional Secretaries	Fully aware of project and providing strong political and public support for project	- The project has the potential to bring economic benefits in the North and East which will benefit the entire country. -There will be increased water access in all project areas not just the Northern zones. -The project has a long time frame of at least 10 years and construction be phased so benefits will accrue over this time frame and beyond	Media Parliament meetings Public events Community events in project areas				
		Farmers groups In project area	Aware of project but do not know all benefits/ Fully aware and supportive of project advocating for completion	There will be increased water access in all project areas zones which will help with better water management; the delivery of quality water; and the potential for strong economic benefits -The project has a long time frame of at least 10 years and construction be phased so benefits will accrue over this time frame and beyond	Local Economic Dev. and Ag. Ext. workers MMDE outreach programs Media Community Meetings				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
					Dramas, concerts, cultural shows where relevant and effective Brochures and fact sheets				
		<u>Business Community</u> Chambers of Commerce Board of Trade	Aware of project not public advocates/ Fully aware and informed about project believe in outcomes publicly supportive	The project has the potential to bring economic benefits in the North and East. This will not only help boost development and employment but will bring new and better business and service to the area. This development will benefit the entire country -MOUs and other provisions have been established to ensure current water rights and availability will not be reduced. -Strong environmental safeguard provisions have been put into place - Mitigation for wildlife issues and CKD have been into place -PAPs are being treated fairly and beyond the current SL requirements -The project has a long time frame of at least 10 years and construction be phased so benefits will accrue over this time	Media Specialist trade publications Seminars and conference Internal web sites Briefs to Parliament Brochures and fact sheets Regular consultations timed to project updates Involve in monitoring process Website Direct through email lists				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
				frame and beyond	Brochures and fact sheets FAQs on project details, implementation benefits, procedures etc.				
		<u>NGOs</u> NGOs who have attended consultations (e.g, Environmental Foundation LTD,Centre for Environmental Justice, Federation of Environmental Organizations SL, etc).	aware of project and supportive but lack faith safeguards plans will be implemented could protest and delay project/Fully aware of project, fully informed throughout	See above	See above				
		NGOs who have not yet attended consultations	Unaware//Fully aware of project, fully informed throughout	See above	See above				
	Environmental impacts not mitigated leading to political concerns and civil society protests	Mahaweli Authority of Sri Lanka (MASL MMDE	Aware and supportive of project advocates for project	This project has gone beyond the environmental measures required by Sri Lankan law to take proactive steps to enhance stakeholder consultation and to address	Media News Conferences and results Progress reports Consultations				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
					Project and Gov't web sites Briefings Field trips				
		Civil Society	Aware and generally supportive of project but skeptical that environmental plans will be mitigated. Some specific NGO concerns about CKD and human wildlife interactions	The project values the feedback from NGOs and encourages NGOs with comments or concerns to contact the Program Director at any time	Direct email Briefings Project tours Project and gov't web sites Brocures and Fact sheets Consultation Progress and monitoring reports				
		Media	Some aware/ Aware able to cover issues of environment wildlife and CKD issues with knowledge. promote positive outcomes of project		Editorial Board meetings Briefings New releases Media tours				
	CKD	Ministry of Health (MOH) MMDE	Fully aware of CKD issues and promoting project	Many factors contribute to CKD and none are part of this project The project has the potential to	-Local health workers, doctors, clinics				

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
			strategies to mitigate including pointing project actions and benefits of more better quality water to North and East	mitigate some of the factors through the provision better quality water	Local Economic Dev. and Ag. Ext. workers MMDE Dramas, concerts, cultural shows where relevant and effective				
		Local communities in project area	Concerned that project might increase incidences of CKD/ Aware of projects impacts and mitigation on issue. Reassured or neutral Fully aware and supportive of project and the wildlife issues act as information sources and advocates						
	Wildlife issues	Civil Society Ministry of Wild Life Resources and Conservation (MWRC) MMDE		Project has taken pro active steps to address the potential human elephant conflicts in the project area including initiatives to develop an action plan with local					

	Strategic Elements					Work Plan Elements			Evaluation
Communications Objective	**Key Risks**	**Audience/ Stakeholder**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels /Activity**	**Timing**	**Responsibility**	**Resource Needs**	**Expected Outcomes**
				government agencies and national and international environmental and wildlife organizations. In some cases forest preserves have been expanded					
		Civil Society Wildlife and Naturalist organizations Local communities in affected areas	Strongly aware of wildlife issues and human interactions/ believe project is doing all it can to mitigate negative human/wildlife interactions	Project has taken pro active steps to address the potential human elephant conflicts in the project area including initiatives to develop an action plan with local government agencies and national and international environmental and wildlife organizations. In some cases forest preserves have been expanded					

Communication Objectives	**Risks**	**Audiences/ Stakeholders**	**Current and Desired Behavior**	**Messages/ Information Needs**	**Channels/ Activities**	**Timing**	**Responsibility**	**Budget Needs**	**Expected Outcomes**
2. To deliver an effective external communication program that minimizes project risks	Weak EA capacity to implement communications program leads to poor project outcomes	Ministry of Mahaweli Environment and Development (MMDE) ADB project team	Motivated to establish team/ Establishing strong team and monitoring outputs	A strong communication team is essential to project outcomes and reputational risk management	Face to face Internal meetings Establishment of communications officers in PMU and PIU				

	Internal government conflicts driven by poor communication delays project	MMDE Ministry of Finance and Planning (MFP) MWRC MOH Mahaweli Authority of Sri Lanka (MASL) Office of the President Divisional Secretaries	Roles and responsibilities unclear so mixed messages given and information flows weak/ Unified messages given All internal stakeholders fully informed and promoting project	A united message and position on the project will lead to the best outcomes. Information related to the project's implementation must be shared across all government stakeholders	Briefings Internal meetings Web site Progress reports FAQs and talking points Trainings and briefings for spokespersons interfacing with media and/or affected people				
	Insufficient information about projects leads to perceptions of negative impacts on operations and projects	Multilateral and bilateral aid agencies with related projects : World Bank IFAD FAO WHO JICA USAID AFD	Aware of project/ Fully aware of project details and impacts on their operations. Satisfied meets all financial and other safeguards requirements Supportive of project.	The project meets all safeguards and financial requirements. Project is conducted in an inclusive and transparent manner and information is freely available. Fully informed about potential impacts on other agencies projects	Briefings Web Sites Progress Reports Field Trips				