

## **PID Readiness to Receive Melamchi Water**

Rapid population growth, lack of adequate and reliable water sources, in-equitable distribution and leakage in pipelines are the major problems in the existing system creating hardship to valley residents. On one hand, it has not been possible to meet the water demand of valley due to lack of sufficient water sources, and on the other, available water cannot be evenly distributed to households in the absence of a systematically laid out distribution network that supports achieving equitable distribution of water supply. As a result, few areas in the valley receive surplus water, whereas, water supply service is not satisfactory in most part of the valley. The existing supply network established during Rana Regime has worn out causing leakage in the system resulting problem in water delivery.

The Government of Nepal is committed to providing reliable, equitable and safe drinking water and sanitation services to the residents of Kathmandu Valley. Government has accorded a high priority to the task of providing safe and adequate drinking water in an equitable manner to the people of Kathmandu Valley. Residents of Kathmandu valley have been suffering from the hardship caused due to lack of adequate and safe drinking water for a long time. With the aim of providing sufficient and equitable distribution of water, the Government started Melamchi Water Supply Project in December 2000, to solve the chronic drinking water shortage in valley on a sustainable manner. Melamchi Project envisages 510 million liter per day (MLD) water to Kathmandu Valley from Melamchi, Yangri and Larke Rivers of Sindhupalchowk District. Phase 1 of the project will bring in 170 MLD by April 2021, when the 26 Km diversion tunnel from Melamchi to Sundarijal will be completed including testing. The water available from this project will be treated at Sundarijal- Water Treatment Plant (WTP) which is ready to provide its services. As per Government plan, the treated water will be supplied to the ten (10) new Service Reservoir Tanks (SRT), located at different places of Valley and 2 existing SRTs; (Anamnagar & Minbhawan) through Bulk Distribution System (BDS). These reservoirs will supply water to household via entirely new distribution system called Distribution Network Improvement (DNI).

Initially, the Melamchi Water Supply Project was designed to implement all the activities under the umbrella of the Melamchi Water Supply Development Board, but later in February 2008, the project was restructured as Subprojects 1 & 2 for its efficient implementation.

PID efforts are aimed at developing water infrastructure necessary to secure safe and sufficient water for every household through a 26-km-long Melamchi tunnel, and ensuring that Kathmandu Rivers flow cleaner and faster through treated sewerage systems with construction of wastewater treatment plants at Guheshwori, Sallaghari, Balkumari (Kodku) and Dhobighat including installation intercepting sewer pipes.

Melamchi water project, with BDS & DNI works and other associated reforms in KUKL are expected to address by in large the above issues and meet the water demand of Valley for a long term on a sustainable manner.

Subproject 1, implemented by Melamchi Water Supply Development Board (MWSDD) covers construction of 510 MLD capacity 26 km Melamchi Tunnel and construction of 170 MLD capacity Water Treatment Plants (WTPs) at Sundarijal.

Sub-Project 2, is being implemented by the Project Implementation Directorate (PID) of Kathmandu Upatayaka Khanepani Limited (KUKL). The development of Water Supply related infrastructures and Sewerage collection and treatment related infrastructures falls under the scope of PID. At PID, multi-diverse professional team is working relentlessly towards completing the construction of water and wastewater infrastructures. In terms of numbers, this entails: approximately 1200 km new water supply pipe network within the ring road in the first phase, 10 new water service reservoirs, 45 km new sewerage interceptors, and 5 new wastewater treatment plants in different locations in Kathmandu valley. This is being implemented under Kathmandu Valley Water Supply Improvement Project (KVWSIP) and Kathmandu Valley Wastewater Management Project (KVVMP) jointly financed by Asian Development Bank and GON. All the construction works are in full swing. New investments

planned in subsequent phases will help expand infrastructure works outside Ring Road and other areas within Kathmandu Valley.

KVWSIP includes construction of about 10 service reservoirs at various locations in the Valley (Mahankalchaur, Bansbari, Paanipokhari, Balaju, Khumaltar-2, Arubari, Tigni, Katunje and Kritipur) with total storage capacity is 74,500 m<sup>3</sup> (3000 m<sup>3</sup> to 9500 m<sup>3</sup>), construction of a Bulk Distribution System (BDS) pipelines 77 km (300 mm dia to 1400 mm dia), to supply water from Sundarijal WTP to above said 10 semi-underground SRTs and 2 existing Overhead SRTs (Anamnagar-2700 m<sup>3</sup> & Minbhawan-3200m<sup>3</sup>). Distribution Network Improvement (DNI) works completed so far is about 1200 km and expected household connection will be around 100,000 in first phase.

In addition, four DNI Contract Packages; DNI- Kapan, DNI-pkg 5 (7B), DNI-pkg 6 (7C), DNI-pkg 7 (9A-Mandikatar & Chabahil) and one BDS-05 Pkg are under implementation through GoN funding. Estimated pipe length in these DNI packages is 854 km with 77,172 household connections which are being developed on District Metering Areas (DMAs). The BDS pipeline from Sundarijal to Chabahil Chwok is 11 Km capable to transfer 510 MLD water to be received from Melamchi and Yangri and Larke at the later stage. These packages are expected to be ready to operate by the end of 2023. After the completion of these contract packages, the water from Melamchi will be supplied entirely through the new distribution network within the Ring Road as well as part of the area outside Ring Road.

Further on, design of DNIs covering the area Jorpati north, Jorpati south, Thimi, Bhaktapur, Pepsikola, Gothatar, Kirtipur are under ADB TA review and update. These DNIs will have approximately 700 km serving additional tentative population of 513,932. This is proposed under the Second Kathmandu Valley Water Supply Improvement Project (SKVWSIP) and will be supported by upcoming ADB loan and expected to start from early 2022.

As part of testing & commissioning the new distribution network short run test, currently flushing and disinfection and house hold metering activities are ongoing by using of seepage water coming from the tunnel at Sundarijal. Filling one SRT once in a week and using for flushing of sub-DMAs. In addition, PID is conducting short run test, and leakage identification work as a part of commissioning by using tanker water to make DNIs ready to receive Melamchi water, which seems costly and time taking. PID tried to use monsoon flow of Bagmati River in last two monsoon for the flushing and testing of BDS pipeline and SRTs and succeed to flush and test about 90% of BDS pipeline.

As of now, PID completed commissioning work in Anamnagar area, with 500 plus house hold, and managing existing supply of water regular from Anamnagar Tank in KUKL's schedule with new network. At present, Babarmahal and Thapathali areas are ready for metering and after metering in this area supply can be converted through new system. In Babarmahal area, Durbarmarga and Dallu-Banasthali (inside ring road) areas water meter installation activities are ongoing. Similarly, flushing of sDMAs work is ongoing in Patandhoka, Mangalbazaar, Juwagal, and Pulchwok area. Short run test & leak identification works are ongoing in Narefat, Gwarkhu, Chyasal, Kamalpokhari areas.

Since commissioning and testing of new network with Melamchi water supply will take some time and supply through new network will not be possible immediately and for such areas PID has managed to complete interconnections with existing system wherever possible. These inter connections are: Old Mahankal SRTs through BDS-01 Pipeline 1400mmx500mm, Existing Bansbari from BDS-SRT-01 1000mmx600mm pipeline, Balaju BDS-SRT-02 1000mmx600 mm pipeline, Panipokhari BDS-SRT-02, 500mmx300mm pipeline. In case of Lalitpur area Khumaltar SRTs will be used through the interconnection made recently with existing pipelines at Bhanimandal, Ekantakuna, and Chapagaun dobato, this will serve inside ring road of Lalitpur. While Melamchi water will be available the interconnections will be used and existing reservoirs will get water as much they can use and divert existing sources to the service areas located outside the ring road. Water will be sufficient to supply 24/7 for inside ring road area. Water available in existing sources can be supplied more frequently to the consumer located outside ring road area.

**Risk in distributing Melamchi water through Existing KUKL syatem.**

Few risks are also unavoidable in this process. These risks are listed below;

1. Many and frequent leakages are expected, which need to be addressed immediately,
2. Operation of many valves are essential, which need more manpower to be mobilized. Otherwise, wastage of fully treated water will be more,
3. Road cutting permission (RCP) to be granted without delay,
4. Cleaning of all existing reservoirs before receiving Melamchi water is necessary. Otherwise, fully treated water will be contaminated by dirt/contaminants accumulated in old reservoirs.
5. All valves should be in operating condition to manage distribution of Melamchi water through existing system,
6. Multiple responsive KUKL teams are to be deployed to attend these problems,
7. Multiple responsive KUKL teams needs to be deployed to understand DNI & DMA/sDMA systems and takeover,

#### **PID commissioning plan and expectations from KUKL;**

1. PID will start final flushing of BDS pipeline & new SRTs immediately after receiving Melamchi water and disinfection of BDS Pipelines and SRTs. Estimated time is about 2 weeks. 3 months trial run of major BDS line & SRTs will start immediately after fixing all problems in BDS system. BDS dedicated KUKL team will jointly inspect the above said processes and understand the system and will be ready for takeover.
2. PID needs to receive approximately 10 MLD of Melamchi water in order to expedite commissioning works of DMAs/sDMAs. PID is planning to start operation of new DNIs in sDMA approach. While one sDMA will be ready & brought into operation, planning to start supply from new system. DNI contractors will first start testing supply of water in already metered DMAs/sDMAs with Melamchi water and will start conducting 1 month Non Revenue Water (NRW) work. As per the contract while NRW is satisfied, system sDMA will be ready to handover. Dedicated responsive branch teams should be mobilized to understand DNI & DMA/sDMA systems operation and takeover immediately.
3. DNI contractors will expedite their sDMA commissioning works: leakage identification and short run test with Melamchi water and make ready for supply of water. Multiple sDMs will be ready every month and responsive KUKL teams should be mobilized to understand DNI & DMA/sDMA systems and takeover,
4. A responsive KUKL team need to be deployed to understand BDS pipeline and SRTs systems and takeover,
5. Multiple responsive teams needs to be deployed to understand DNI & DMA/sDMA systems and takeover,
8. KUKL metering and recording units should be ready to facilitate transferring existing meters/consumers into new meters/consumers. Otherwise, process will be substantially delayed,
9. KUKL branches should be ready to disintegrate old system, where new system will start supply of water,

#### **PID appeal to the consumers and public:**

1. PID would humbly request public/KUKL consumers not to be hurry to get Melamchi water from new system. PID is trying its best to expedite and complete the essential work needed to be completed before starting distribution of water through newly installed network system. It has to be ensured that no essential testing steps are missed up before starting new network system, which was not possible before arriving Melamchi water.

2. Despite of PID hard work, people in Kathmandu Valley may have to face some inconvenience during the implementation of the projects. As this is once-in-a-lifetime event, PID humbly requests respected fellow citizens of Kathmandu to bear with these difficulties.
3. PID is trying to disseminate our messages through available public media; print media, newsletters, audio & video, website, Facebook etc. If anyone have any questions we are expecting in our email, feedback, or telephone. We appreciate and look forward to hearing from KUKL consumers.

### **DNI under ADB financing (Nearly completed)**

<b>D NI</b>	<b>DMA</b>	<b>Location</b>	<b>Length of Pipe (m)</b>	<b>House connection (Nos)</b>
1	1.1 1.2 1.3 1.4 1.5	Narahiti,, Naxal, Charkhal, Dilibazar, Putalisadak, Kamaladi, Baghbazar, Trichandra, New road, Sundhara, Tripureswor, Teku, Lagan, Jaisidebal, Singhdarbar, Maitighar, Thapathali, Bagmati, Humat etc	103,012.01	<b>10,901</b>
2	2.1 2.2 2.3 2.4	Bhatbhateni, Hadigaou, Dhobikhola, Kalopul, Setopul, Ghattekulo, Putalisadak, Dillibazaar, Charkhal, Jainmandir, Police HQ, Ratopul, Gausala, Tilganga, , Bhaktekopul, Purano baneswor, Setopul, etc	114,682.00	<b>9,575</b>
3	3.1 3.2 3.3 3.4 3.5	Setopul, Puranobaneswor, Bhatkekopul, Tilganga, Airport, Sinamangal, Gairigaun, Tinkune, Newbaneshwore, Bijulibazaar, Devimarga, Setopul, lakhechour, Devkota Sadak, Milan Chw, Bhimsengola, Parliament H, Prayag Marg, etc	132,436.94	<b>11,671</b>
4	4.1 4.2	Singhdarbar, Ghattekulo, Anamnagar, Maitiogar, Babarmahal, Thapathali, Bagmati corridor etc	29,069.28	<b>1,623</b>
5	5.1 5.2	Balkumari, Gwarko, Paran Sundhara Durbar square, Kumbreshwore, Manohara Corridor, Mahapal, Pulchowk, Kupandol, UN Park, Juwagal, Kumbeshore, Mangalbazaar etc	98,642.02	<b>12,587</b>
6	6.1 6.2	Mangalbazar, Pulchowk, Jawalakhel, Ekantakuna, Mahalaxmishan, Gwarkho Sundhara, Krishnamandir	84,878.00	<b>8,619</b>
7	7.1 7.2 7.3 7.4	Naya Bazaar, Khusibu, Indrayani, Parapokar, Basantapur, Newroad gate, Birhospital, Bhotahiti, Jamal, Kesharmahal, Lainchore, Thamel, Shorakhutte, etc	118,009.50	<b>15,520</b>
8	8.1 8.2	Ekantakuna Jawalakhel, Pulchowk, Kupandole, Bagmati coridor, Sanepa, Dhobighat, Jhamsikhel, Bhanimandal, Ekantakuna, etc	92,587.50	<b>11,038</b>
9	9.1 9.2	Bhatbhateni, Koteswor,, Panchal Mahadev, Jadibuti, Dovan, Phulbari, Chautarphi, Police station, Tinkune,, Munibhairab, Peris danda etc	68,579.00	<b>6,009</b>
10	10.1 10.2	Banasthali, Chamati, Bhagawan Pau, Bijeswori, Dallu Awas etc	69,955.74	<b>2,793</b>
11	11.1 11.2	Kalimati/Bishnumati, Ravi Bhavan, Kalanki, Kuleshwor, Khasi Bazaar, Balkhu, Kuleshwor etc	61,120.30	<b>11,458</b>
<b>Demo Projects</b>		Kalopul, Baneswor, & Kusanti	<b>08,170.00</b>	<b>6,216</b>
<b>Total of nearly completed &amp; completed works</b>			<b>1,081,142.29</b>	<b>108,010</b>

## **SCADA contract- DBO (Design phase-Just starting)**

The Contract for New Water Network of Kathmandu Valley using Hydraulically Controlled Valves Actuated with Supervisory Control and Data Acquisition (SCADA) has been signed in September, 2020 and the contractor is mobilizing. The contract period is 21 months for Design & Build period and the Operation & Maintenance (O & M) period is 33 months in total. It is expected that the SCADA will come into operation by the end of 2022.

### **Key activities**

1. **Review and update of the water supply master plan** for Kathmandu Valley, including short and long-term goals, investment programs and operational plans for all the Valley, including the old networks and the areas outside the Ring Road
2. **Installation of sensors and advanced flow and pressure control valves** with related pipes/accessories to manage the network, especially the BDS, Service Reservoirs (SRTs) and DNIs
3. **Implementation of a SCADA system** that allows supervising and controlling remotely the above (valves and sensors) from a network operation center at KUKL offices
4. **Implementation of a Network Analysis System (NAS)**, linked to the new SCADA and its operation center/s, in order to take full advantage of the new operational data and foster a KPI-based management of KUKL
5. **Implementation of an Automated Meter Reading (AMR) System** for a pilot sector to be defined by KUKL, with around 1000 smart meters
6. **General training and support to KUKL**, in order to address the current and coming challenges

### **Major Components in SCADA Program are:**

#### **I. Reservoirs Management System:**

- **9 nos.** in new reservoirs (electric grid)
- **6 nos.** in old reservoirs

#### **II. Outlet Management System:**

- At selected points of the primary distribution networks
- Control and monitoring of the flow in DNIs 1-11
- **41 nos.** with Pressure Sustaining / Flow Control valves
- **5 nos.** with Pressure Reducing / Flow Control valves

#### **III. Air Management System:**

- **49 nos.** on BDS (70km of pipelines)
- **55 nos.** on primary pipelines (DNIs 1-11)
- **36 nos.** on secondary pipelines (DNIs 1-11)

**Contracts under GoN Funding (ongoing)**

S. N.	Contract Packages	Coverage	Pipe length (Km)	House connection (HC)
1	DNI-Pkg Kapan (9a-Kapan)	Kapan, Arubari & Tinchule	150	11000
2	DNI-Pkg 5 (7b)	Gangabu, Balaju Chwok, Shyambhu, Chhauni, Dallu, Bafal, Kalanki,	251	24000
3	DNI-Pkg 6 (7C)	Basundhara, Samakhusi, Maharajgunj, Dhobikhola, Bhatkekopul, Bishalnagar, Baluwatar, Gairidhara, Lajimpat, Lainchour, Galkakha.	303	27974
4	DNI-Pkg 7 (9a-Mandikatar-Chabahil)	Golfutar, Mandikatar, Sukedhara, Kumarigal, Gaurighat, Maijubahal and Pashupati.	150	14198
			<b>854</b>	<b>77172</b>

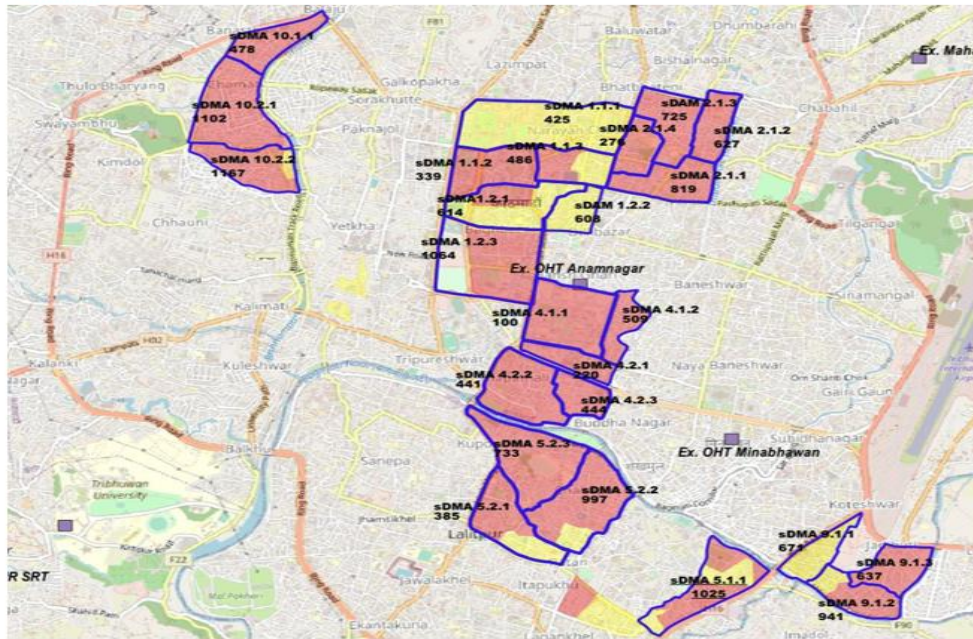
**Programs expected from upcoming ADB fund**

Summary of 7 Packages (DNI 8,9,10)

S.N	Package no	Present Population (2020)	Remarks
1	KUKL/DNI/8/Kirtipur	44738	Kirtipur, Tyangala Phat,
2	KUKL/DNI/8/Thimi	103131	Thimi, Bode, sanothimi, Lukunthali, Kausaltar
3	KUKL/DNI/8/Bhaktapur	74665	Bhaktapur core Market area
4	KUKL/DNI/9/Jorpati S	59167	Jorpati,
5	KUKL/DNI/9/Jorpati N	67922	Jorpati, Boudha
6	KUKL/DNI/10/Pepsicola	71,234.00	Pepsi, jadibuti Koteswor
7	KUKL/DNI/10/Gothatar	93075	Gothatar
	<b>Total</b>	<b>513,932</b>	

## Following sDMAs are targeted to be ready by the time of Melamchi water

### sDMA to be READY WHEN MELAMCHI ARRIVES in VALLEY



### Remaining Activities in Each sDMA to MAKE READY WHEN MELAMCHI ARRIVES in VALLY

S. NO	Package	DNI	DMA	sDMA	Pipe Len (m)	HC numbers	Activities Remain	Place name	Serving SRT
1	DNI Package 3	10	10.1	10.1.1	1190	478	Disinfection	Chamati Area, Chamati Marg, BALAJU	BALAJU SRT
				10.2.1	20100	1102	Metering / Disinfection	Khushibhu / Chamati Arca / Shova Bhawati Arca	
				10.2.2	11760	1167	Metering / Disinfection	Bijeswori Area / Sanik Awas area / Bajra Hotel Arca	
		9	9.1	9.1.1	6700	671	SRT* / Flushing / Metering / Disinfection	Nare Phat Arca	KHUMALTAR SRT
				9.1.2	8500	941	SRT* / Flushing / Metering / Disinfection	Nare Phat Arca	
				9.1.3	6600	637	SRT* / Flushing / Metering / Disinfection	Nare Phat Arca	
Sub Total				54850	4996				
2	DNI Package 1	1	1.1	1.1.1	7253	425	SRT / Flushing / Metering / Disinfection	Narayanhitthi / Naxal	PANIPOKHARI SRT
				1.1.2	5477	339	Metering / Disinfection	Jamal / PheraDurbar / Durbar marg	
				1.1.3	5212	486	SRT* / Flushing / Metering / Disinfection	Jain Mandir / Kamal Phokhari	
				1.2.1	9675	614	SRT* / Flushing / Metering / Disinfection	Kamaladi	
				1.2.2	5242	608	SRT / Flushing / Metering / Disinfection	Dhobi Dhara Marg	
				1.2.3	10708	1064	SRT* / Flushing / Metering / Disinfection	Pradarsani Marg / Bagbazar	
		2	2.1	2.1.1	11532	819	Flushing / Metering / Disinfection	Gyaneswar / Ratepul	NEW MAHANKAL SRT
				2.1.2	8607	627	Flushing / Metering / Disinfection	Handigaon / Kalapool	
				2.1.3	8762	725	Flushing / Metering / Disinfection	Malligaon / SanoGaucharan Area	
				2.1.4	4978	276	Flushing / Metering / Disinfection	Naxal	
Sub Total				77446	5983				
3	DNI Package 2	4	4.1	4.1.1	6894	506	All Complete	Ghatekulo/Anamnagar Area	ANAMNAGAR OHR
				4.2.1	5237	220	All Complete	Hanumanthan/CDO office Area / Maitighar Area	
				4.2.2	8825	441	Metering / Disinfection	Babarmahal Area / Kurtya Gaon Area	
		5	5.2	4.2.3	5344	444	Flushing / Metering / Disinfection	Bagmati Corridor side/Prasuti Area/Thapathali	KHUMALTAR SRT
				5.2.1	6494	385	SRT* / Flushing / Metering / Disinfection	Pulchowk-Patan Dhoka Area / Harihar Bhawan / Krishna Galli	
				5.2.2	15408	997	SRT* / Flushing / Metering / Disinfection	SwothaNaryan / Sankhamul / Patan core / Un- Park	
			5.2.3	12645	733	Flushing / Metering / Disinfection	IOE / Jwagal -UN Park Area / Chokupat / Kupondolr East / Patan campus		
Sub Total				60937	3729				
4	DNI Package 4	5	5.1	5.1.1	13919	1025	SRT* / Flushing / Metering / Disinfection	Gwarkho Chok / Tyagal / Balkumari / Patan Core South / Chaysal part	KHUMALTAR SRT
Sub Total				13919	1025				
G Total				207152	15733				