

This item was submitted to [Loughborough's Research Repository](#) by the author.
Items in Figshare are protected by copyright, with all rights reserved, unless otherwise indicated.

Urban environmental sanitation improvements in Vientiane

PLEASE CITE THE PUBLISHED VERSION

PUBLISHER

© WEDC, Loughborough University

VERSION

VoR (Version of Record)

PUBLISHER STATEMENT

This work is made available according to the conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) licence. Full details of this licence are available at:
<https://creativecommons.org/licenses/by-nc-nd/4.0/>

LICENCE

CC BY-NC-ND 4.0

REPOSITORY RECORD

Keosithamma, Bounchanh. 2019. "Urban Environmental Sanitation Improvements in Vientiane". figshare.
<https://hdl.handle.net/2134/31644>.

Urban Environmental Sanitation Improvements in Vientiane

B. Keosithamma, Lao PDR

Vientiane is the largest city and capital of Lao People's Democratic Republic (Lao PDR). The total population in Vientiane is estimated around 331,000, with population density around 134 persons per km². The city is lacking a proper sanitation network, which is seriously threatening the health situation of the population due to discharge of wastewater into low-land areas. Therefore, the Department of Communication, Transport, Post and Construction (DCTPC) under Vientiane Capital City, initiated an Urban Environmental Sanitation Project for the improvement of the Vientiane urban environment, supported by Danish International Development Agency (Danida). This paper briefly highlights the basic objectives, major accomplishments and learning from this on-going project.

Background

Vientiane Capital City of the Lao People's Democratic Republic is situated on an alluvial plain extending along the east bank of the Mekong River. The administrative area of Vientiane is about 3,920 km². The ground elevation ranges from 160 meter to 170 meter above sea level. The area designated for urbanization extends along the east bank of the

Mekong River and occupies an area of 210 km².

Within Vientiane, the water supply is drawn from the Mekong River. The water is treated prior to distribution and the quality and reliability of water supply is generally considered to be good. Table 1 shows a summary of the water demand projection for Vientiane.

The urban area of Vientiane is located between the Mekong River and a hinterland of swamps and ponds. The wastewater from individual households in Vientiane discharges into open drains along the roads and into natural wetlands in and around the city. The high water table and low soil permeability in Vientiane creates further difficulties for drainage. The poor drainage of wastewater and septage from septic tanks and poorly designed on-site sanitation creates a major concern for public health, causing widespread pollution of surface water and groundwater. An example of disposal of the wastewater situation from households in Vientiane is shown in Table 2.

The infrastructure development of Vientiane is generally managed by the Vientiane Urban Development Adminis-

Table 1. Water Demand Projection for Vientiane

	Unit	2000	2005	2010
Population	Person	599,000	687,084	788,165
Served Population	Person	215,522	275,567	370,269
Service Ratio	%	36.0%	40.1%	47.0%
Population in Service Area	Person	297,575	380,342	499,737
Number of Domestic Connections	Nos.	34,210	43,741	58,773
Number of Non-domestic Connections	Nos.	5,095	6,340	7,889
Total Number of connections	Nos.	39,305	50,081	66,662
Per capita consumption	Lpcd	174	172	170

The urban population in Vientiane was 331,000 or 63% of the capital city population in 1995. Vientiane has a population density of 134 persons per km², which is higher than the national average of 19 persons per km².

Table 2. An example of wastewater disposal

Wastewater discharge to	Some Wards ¹ in Vientiane			
	Sihom	Muang Va Thong	Nong Duang Thong	Si Muang
Open drain	75%	30%	35%	31%
Road	6%	5%	29%	44%
No drainage	13%	55%	24%	0%
Other	6%	10%	12%	25%

trative Authority (VUDAA). However, in this case for the planning and implementation of the sanitation network system, the responsibility was assigned directly to the District Department of Communication, Transport, Post and Construction (DCTPC) of Vientiane.

In this background, as requested by the Government of Lao PDR, the Danish International Development Agency (Danida) agreed to support DCTPC of Vientiane for the improvement of the environmental sanitation situation in Vientiane through a project, named as 'Urban Environmental Sanitation Improvements in Vientiane'. The project was initiated in the middle of year 2000 and will be continued up to the first quarter of 2005.

Urban environmental improvements in Vientiane

The objectives of the Urban Environmental Sanitation Improvements in Vientiane Project (the Project) are:

- National, municipal, district and wards (or Ban) authorities working with other stakeholders towards sustainable planning and management of the green and brown environment,
- Replicable demonstration projects in environmental planning and management linking green and brown environmental issues.

To reach the above objectives, the Project focuses on the following activities:

- Assist villagers to reduce the wastewater around their house and neighbourhood,
- Contribute to environmentally sustainable management aspects of the Nongchan wetland and livelihoods for the people living surrounding of the wetland,
- Reduce nutrient load on the That Luang Marsh and eventually on the Mekong River,
- Provide a demonstration project for domestic wastewater handling in low income areas.

The Project (for its proposed sanitation network) clusters the urban settlements in Vientiane into six sections (refer Figure 1) to receive all wastewater from Vientiane through a sanitation network.

Major accomplishments

The major accomplishments for the last four years are summarized below.

1. Strengthening institutional capacity:

The Project for the first time initiated a consultative process (refer Figure 2) to introduce and discuss on the development of environmental sanitation concepts with communities. The dialogue helped communities to understand about the project and also helped project staff in planning and designing of the wastewater network

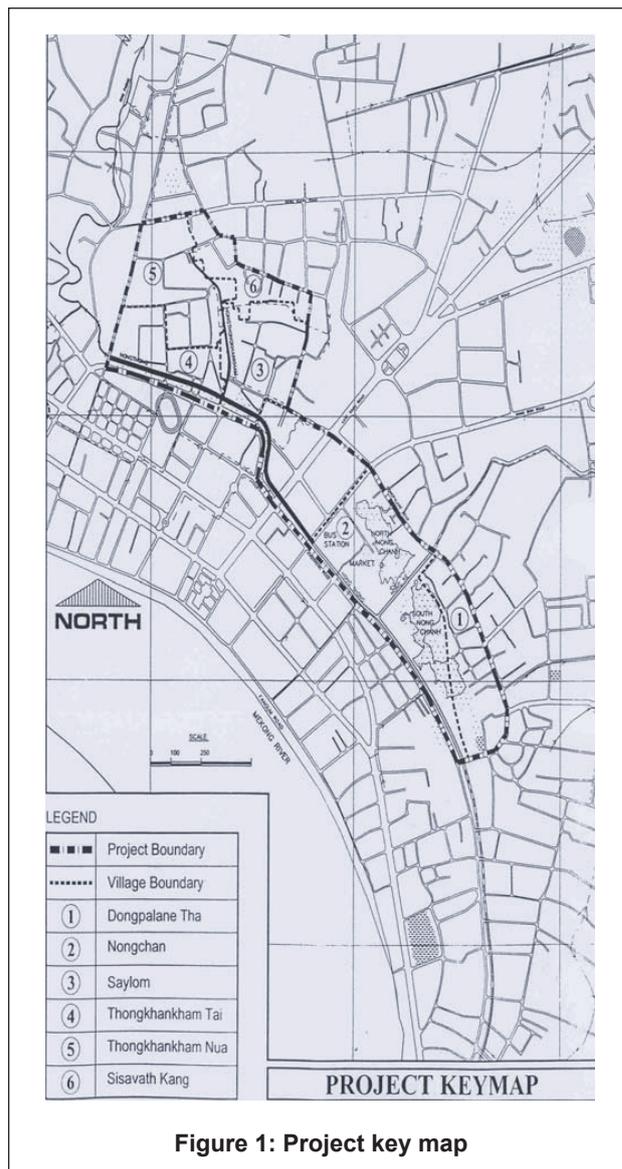


Figure 1: Project key map

for the urban sanitation more effectively. The Project also works close collaboration with other line agencies including VUDAA.

2. Identifying the source of pollution in the Nong Chanh Wetland:

It was observed that the wastewater from the Khouadine Market flows into the Nong Chanh Wetland. A thorough investigation was also made to identify the source of pollution from all industries within the Nong Chanh areas. To address the existing problem, two kinds of measures were taken - immediate solutions and longer term solutions.

Within immediate solutions, the project designed an earthen drain to rectify the existing problem temporarily. In addition, domestic black and grey wastewater is collected and channeled to existing waste stabilization ponds through small bore sewers that were earlier executed through another



Figure 2. Community consultation

project, financed by the European Union.

The current project initially planned to focus on all six sections of the proposed sanitation network for Vientiane. However, due to a reduction in funding the project is now focusing only on section 1, section 2 and half of the section 3. Therefore, for the longer term solutions, DCTPC of Vientiane is now exploring to look for additional funds to support the remaining sections of the planned network.

3. Restoration of Nong Chanh Wetland and Hong Thong Green Area:

The restoration of the Nong Chanh Wetland has been completed by re-establishing the waste stabilization ponds with a final water depth of about 1 – 1.5 meter. Three timber weirs were also constructed to stop floating materials entering into the Nong Chanh Wetland. A 1.8 meter wide and 3 kilometer long foot path and side drain was constructed for restoration of the Nong Chanh Wetland. In addition, indigenous trees were planted to improve the landscape of the wetland (please refer to Table 3).

The Hong Thong Green Area, which is around 30,000 square metres, was also restored to improve the landscape of the city. The work involved for re-establishing the Hong Thong Green Area includes the following activities:

- The improvement of the landscaping of the area, followed by the laying of turf and planting trees.
 - Development of low-cost access tracks giving access to those properties of Thong Khan Khom Tai, Sailom and Hatsady wards (or Ban), which are adjoining the Green Area.
 - Improvement of the drainage system including the construction of stone masonry for erosion protection.
 - Removal of redundant concrete structures that were remaining from the previous construction work and blocking the flow of wastewater.
4. Construction of appropriate sanitation infrastructure in demonstration area:
The sanitation network system has been designed consisting of household connections, small bore sewers, brick/

Table 3. Examples of trees being planted in Nong Chanh and Hong Thong Areas

Lao name of tree	Scientific Name	English Name	Numbers of trees planted/ planned for planting
May Khom Kha Dao	<i>Azadiracta indica</i>	Neem	500
May Ngang	<i>Dipteracarpus alatus</i>	Hairy Leafed Apitong	294
May Bak	<i>Anisoptera costrata</i>	-	300
May Dou	<i>Pterocarpus macrocarpus</i>	Burma Pandak	100

concrete manholes, secondary sewers, communal septic tanks, pumping stations and waste stabilization ponds. The wastewater is collected (commissioning of household connections are still on-going) through a small-bore sewer system, secondary sewers and communal septic tanks and pumped into waste stabilizations ponds for final treatment and discharge to the Mekong River through That Luang marsh.

A schematic diagram of the wastewater system is shown in Figure 3. The communal septic tanks serve 20-30 families each and have approximate dimensions of 8 m x 3 m x 3.5 metres. The design prepared indicates there will be about 12 pumping stations in the entire area to pump the waste into stabilization ponds (total six in number). A total of 7.2 km of small bore sewer, 10.4 km secondary sewer, 840 secondary brick/ concrete manholes, 114 small bore sewer manholes and 1,187 house connections are in the process of commissioning under this activity. The activity will be completed early in 2005.

5. Establishing financing mechanisms for connections, operation and maintenance of the sanitation system:

Individual households are consulted for their house connection to small-bore sewer system through willingness-to-connect surveys. An agreement is also signed between the household owner and the Project, prior to start the laying of sewer networks. A special emphasis was given to develop a comprehensive financial system to record the financial transactions. Periodically, information will also be shared with communities to encourage transparency in the system.

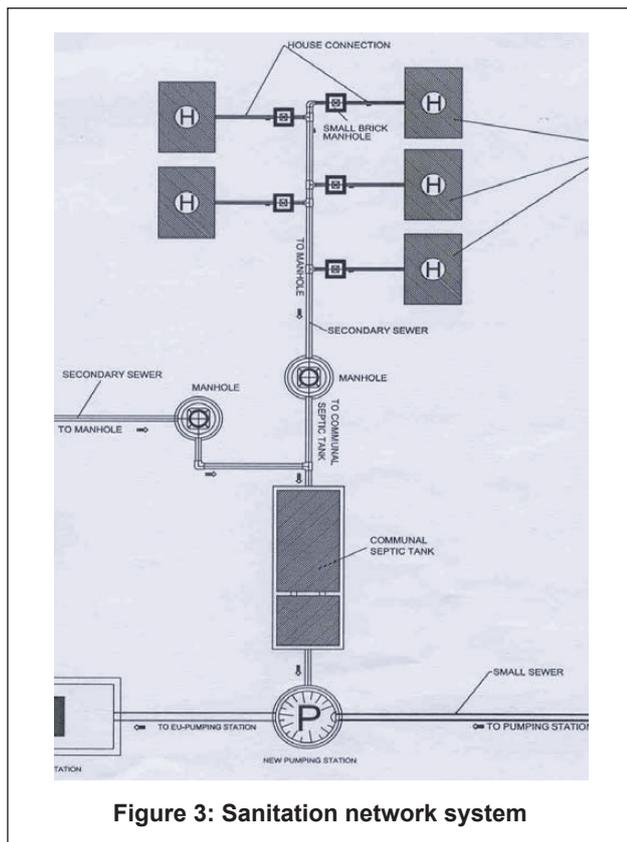


Figure 3: Sanitation network system

Learning and steps forward

In Lao PDR, less attention has been paid to the sanitation sector than for other sectors. Therefore, this project can be treated as a milestone for the urban sanitation sector in Lao PDR, and for raising issues on urban sanitation.

The learning can be summarized as follows:

- Participatory consultation approaches take time to build the climate where users feel more confident to share their own opinions. This is a continuous process and therefore, it's important to go back to communities at certain intervals to revalidate their decisions. This consultation process needs to be supported by an effective communication strategy, which needs to be further improved for the urban sanitation project to create awareness building on the overall project objectives and its approaches.
- The local government staff lack skills on communication aspects and require specialized training to raise their confidence on knowledge sharing and communication related to operation, maintenance and future extension of the sanitation network in Vientiane.
- The small-bore sewer and application of waste stabilization pond is a new concept in Lao PDR. Therefore,

information dissemination needs to be further improved to make sure that participating households understand the new concept well.

- The operation, maintenance and desludging of communal septic tanks are also new techniques to the local government agencies involved in this project. Therefore, it is essential that the responsibility for operation and maintenance is clearly vested with one organization, which is sufficiently staffed, equipped and has the mandate to work for urban sanitation.
- Incentives to government staff have been discussed, but this could not be addressed by the project since it was outside the mandate of the funding agency. However, this incentive issue needs to be addressed in the near future to make the programme more effective.

Concluding remarks

The Department of Communication, Transport, Post and Construction within Vientiane Capital City is satisfied so far with the progress of implementation of the urban environmental sanitation project. It is hoped that after fully commissioning of the sanitation network there will be a model for replication by other districts and provincial centres in the country.

References

- Semi-annual Report (2004) Improvements of the Vientiane Urban Environment, MCTPC, and Danida.
- The Study on Vientiane Water Supply Development Project in Lao PDR (2004) Final Report, Nihon Suido Consultants Co., Ltd., JICA.
- Final Report (2001) Sanitation, Drainage and Wastewater Management, GHK International Ltd, London, UK.
- Draft Project Document (2000) Improvement of the Vientiane Urban Environment, Carl Bro International a/s, Lao PDR and Ministry of Foreign Affairs, Danida.

The author acknowledges the back-up support provided by Santanu Lahiri, WSP-EAP Lao PDR Country Office, and the Urban Environmental Sanitation Improvements Project Team to prepare this paper for the 30th WEDC Conference.

Contact address

Bounchanh Keosithamma,
Project Director,
Urban Environmental Sanitation Improvement Project for Vientiane,
Department of Communication, Transport, Post and Construction of Vientiane Capital City.