Demand responsive approaches in water sevices

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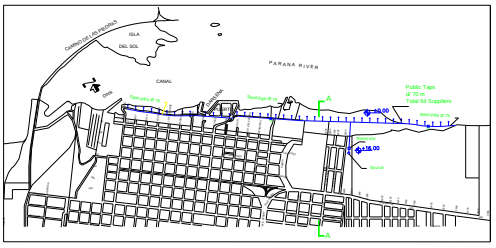
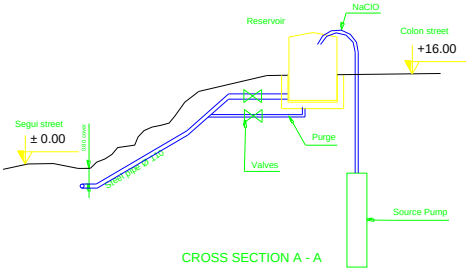
In Villa Constitución city, with a population of around 43,000, there is a low income group that is not served by the water network. This neighbourhood of about 3,000 inhabitants is located near the Parana river in the zone of lowest elevation of the city. The households are supplied by means of illegal connections to the net using flexible hoses. The location allows the whole area to have a very high water pressure at household level compared with the pressure recorded in the medium income houses located about 20 m higher. This situation promotes firstly a risk for public health and secondly a high amount of unaccounted for water. In this manuscript I try to illustrate the best way to resolve this issue, taking into account the concerns of the dwellers, the local authorities and the technicians.

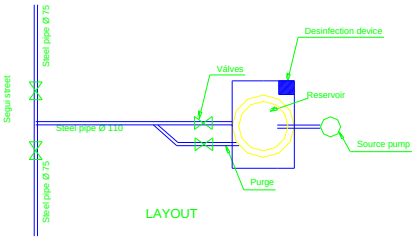
Description of the scenario

The sanitation system for the City of Villa Constitución is run by the Water and Sewerage Municipal Authorities, a city entity. Around 90 % of the population is served by the water works and 75 % by the sewerage system. There are no individual flow meters installed. The charge for the services is calculated proportional to the front length of each house.

The neighbourhood that is the subject of this case study is located on a narrow strip of land close to the river. It is part of a larger unplanned settlement that has reached an overall population of about 3,000. This type of settlement is called an “emergency village” (villas de emergencia). Their creation is a common occurence in Argentina and other developing countries, and although they are usually on public land, local authorities are reluctant to intervene. It is very common that they will create illegal connections to electricity and water networks. Therefore, there is no possibility to measure even an overall amount of water flow. This particular settlement, which is about 20 m below the level of rest of the city, is a typically anarchical urbanization with a poor infrastructure of households.







For the removal of domestic effluents there is a mixed system composed of latrines, pits, gutters and rudimentary pipes sloped into the river. Water demand is high, especially in summer when temperatures reach around 35º C and children use water for recreation. This combination of high demand, topography and low quality materials results in a very large leakage volume.

In such a context there are three issues to be evaluated and resolved:

- Public health
- Water leakage
- Neighbour complaints

The public health concerns involve contamination of the water pipes, which pass through gutters and soil contaminated by domestic effluent. In many cases the pressure inside illegal pipes becomes too low due to temporary cuts produced by other users. It is then possible for contaminated water from gutters and soil to be introduced inside the water pipes.

Water leakage is particularly frequent in this area due to unsuitable materials, and the informal methods used to extend the illegal network.

Neighbour complaints arise among dwellers when illegal connections are added to other illegal connections. The work is done by unskilled labourers with low quality materials, so there is a high amount of leakage inside the neighbourhood and considerable domestic discussion among dwellers trying to save their own illegal connections from others who want to "sting" (puncture) the hose.

In this case study another neighbour complaint problem was clear: people who were paying for their water supply had a very bad service compared with those who were not paying any tax for the service, with both neighbourhoods only a few meters from each other in the same city.

Role of the engineer

From the point of view of engineering this is a rather easy hydraulic problem where the calculation of pipe diameters and materials represents almost the whole work. Moreover, no pumps need to be installed. However, if we accept the problem as a case of Demand Responsive Approach, many tasks must be done that have implications for the engineer. Since I have become an advisor to a Government Water Supply Organization, many things have changed my point of view regarding how to proceed with project works for sanitation.

Apart from performing more and more hydraulic calculations and designs, I have realized the importance of maintaining active dialogs with stakeholders. What I have noticed after many years dealing with government and dwellers is the lack of knowledge of both sectors about appropriate technology. This is not a new situation, but, what is new is the growing degree of mistrust dwellers have in the government's abilities and intentions. Governement arguments regarding particular sanitation problems are systematically rejected by the people who are suffering, and this seems to be even more the case when solutions based on appropriate technology are proposed.

In this context my first task was to formulate the key issues, based on a preliminary interview with neighbourhood representatives and municipal authorities:

How to deal with local authorities, low income groups and technicians to solve sanitation problems.
How to explain that appropriate technology is not a "second-rated technology" or in other words "technology for the poor".

Many problems arise when there is a lack of knowledge not only at citizen level but in government circles as well. We technical experts are equipped with the tools for arriving at appropriate solutions, but often the right method for explaining them to potential users, and convincing them of their merits, is what is lacking. Unfortunately when it comes to appropriate technology, even governments are not knowledgeable enough of their use. The government is not confident about appropriate technology, and dwellers believe that this kind of technology is non-reliable and is being offered just because it is the cheapest.

The questions that arise at this point are:

- Why would the dwellers in the low income group be interested in paying for a service that is already available for free, at least at the illegal level? What should be the income model: free service as usual; a tax based on specific cost analysis; or just a minimum tax to promote awareness among dwellers?
- What kind of service are they willing to pay for?
- Is the government ready to set up a water supply system that is not a traditional one? How to ask for funds to construct a system which is radically different from the traditional household connection based model?
- Would this system be sustainable?

I felt confident when I realized that the questions above are very much in line with the definition of Demand Responsive Approach quoted on page E4 of my IHE Handbook of Project Management (Deverill, 2000). Most of these questions can be answered by the stakeholders, but there are no formal means available to facilitate obtaining the answers. The best possibility is to ask the "right person". To reach this objective there were some meetings with representatives of the dwellers, and the answers obtained can be outlined as follows:

- The dwellers are willing to contribute for the service to avoid problems of illegal connections, like lack of guarantee of safe water, leakage and vandalizing in the neighbourhood. However, they feel that they are in a position to pay only a minimal fee for the services they obtain.
- They are not able to pay for a typical house-connection-based service, but the cost of maintaining a "public tap" would be supported by the neighbourhood.
- Initially the government was not ready to set up this kind of service, but the time to start had come. The government did not know that the answers to the questions mentioned above were given by representatives of the group. So as soon as we convinced the government that it was the decision of the dwellers the funds were released.
- Since the group was involved in the technical solution, and showed willingness to pay for the improvement, the system began to be sustainable.

The technical aspects regarding construction, measurement, recording of the flow delivered, installation of taps with limited flow, number and location of public taps, etc., are the responsibility of those of us who are the technical experts. I am confident that this kind of system will be beneficial in terms of health, the delivering of safe water, and solving the problem of inequity.

Technical solution

Finally, a series of public taps were designed. There were two main pipelines made of steel to prevent illegal connections. The pipes were buried as deep as possible, again as a measure against vandalism. One main transports water from the top and the other is beside the main road where the taps will be installed.

Meetings

So far two meetings where carried out between local authorities, neighbourhood representative and me as advisor to the Water Supply and Sewerage service provider. Another two meetings were arranged for me to explain to local the authorities and Mayor the advantages of

designing this kind of service and how to involve the consumers in this process.

Lesson learnt

Often, the governments' view of urban water supply projects is associated with expensive designs, and as a result authorities can be reluctant to go ahead with projects due to concerns over the ability to provide funding. Low-income neighborhoods that do not fit into this cost model are often considered as a threat to the stability of society. On the other hand, over time the low-income dwellers have grown wary of governments' lack of efforts to provide services.

I consider that the first step for breaking this vicious cycle is to consider the neighbours. Secondly we have to discover to what extent they are willing to contribute to the costs of the construction or operation of the services. It is not the rule that low-income dwellers are not willing to pay for services. What is important is to arrive at reasonable goals that are acceptable for them in terms of service and expense and are affordable in the long-run. Once we agree with the neighbourhood regarding technical and financial aspects, then we present the solution to the government to obtain funding for the development.

Technical experts who act as the link between government and dwellers in a water supply project can contribute to increasing the chances of sustainability.

The role of engineers in Demand Responsive Approach is not only to provide information to consumers on the options available, but to provide information to local authorities as well. Probably this task is the most relevant since, as is usual in developing countries, funds rarely arrive from technical channels; they arrive from political sources where the decision makers are not aware of possible alternatives, ranges of solutions available, and what is sustainable.

Final Comment

In this case study I have attempted to illustrate the role of all stakeholders in arriving at the best solutions. And I have focused on the lack of information on the side of government, which sometimes misunderstands the aspirations and abilities of the communities, and ends up implementing expensive, financially unsustainable systems. This case of a solution based on public taps was presented as a representative example; and there are many.

References

Deverill, P (2000). Designing Water and Sanitation Projects to Meet Demands; The Engineers Role, Unpublished background paper, WEDC Loughborough University, Loughborough, UK.

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