

Kyrgyz Republic: Sanitation assessment and recommendations for urban upgrading of *novostroykas* in Bishkek and Osh



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Acronyms and abbreviations

ARIS	Community Development and Investment Agency
BAA	Bishkek Architectural Authority
BCSI	Bishkek Centre for Social Initiatives
BGS	British Geological Society
BVK	Bishkek Vodokanal Water and Wastewater Utility
DCC	Department of Capital Construction
DFID	Department for International Development
GENPLAN	Master Plan of City Development
HCE	Housing and Communal Economy
KR	Kyrgyz Republic
LSG	Local self-governance
MLSC	Ministry of Labor and Social Care
MOE	Ministry of Education
MOH	Ministry of Health
NGO	Non-governmental organization
OGUKS	Public-State Department of Capital Construction
PFA	Pulverized fly ash
PHAST	Participatory Hygiene and Sanitation Transformation
PRSP	Poverty Reduction Strategy Paper
RCHP	Republican Centre for Health Promotion
SCAC	State Commission for Architecture and Construction
SES	Sanitary and Epidemiological Services
TAC	Territorial Administrative Council
UNDP	United Nations Development Programme
UKS	Department of Capital Construction
USD	United States Dollar
USSR	Union of Soviet Socialist Republics
WB	World Bank
WSS	Water supply and sanitation

Glossary of Kyrgyzstani terminology

Aiyl kenesh	City Council
Aiyl okmotu	Village administration (in rural areas)
Ashar	Traditional form of mutual self-help
Combinat Blagoustroistva	Municipal enterprise responsible for waste collection
GorRemVodKhoz	Municipal Land Drainage Authority
Gosregister	State Agency for Property Rights Registration
Jogorku Kenesh	National Parliament
Kenesh	Local self-government bodies
Novostroyka	New development
Oblast	Provincial level administration
Perestroyka	Liberalization of political life
Propiska	Resident permits
Rayon	Administrative territorial unit within oblast or city
Territorialnyi-obshestvennyi sovet	Territorial administrative council
Vodokanal	Provider of water supply and sanitation services to urban population

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Currency exchange rate

All prices of goods and services and estimations of investment requirements are quoted in US dollars based upon the Kyrgyz Republic Som using an approximate exchange rate of 40 Som per US dollar (Exchange rate according to the Financial Times 10th September 2005 = 40.95 Som per US dollar)

Executive summary

Background

Over the past 15 years, the cities of Bishkek, the capital of the Kyrgyz Republic, and Osh, the second largest city have witnessed a rapid urban growth on the former agricultural lands on the outskirts of the cities. Initially, the demands for land came from a housing movement from within the cities themselves, who in the climate of the post-Soviet era and the associated *peristroyka* led to government accepting their demands to provide plots of land and assistance to construct houses. The right for private individuals to own land was formalized in the National Constitution of 1998, and this in combination with a collapse of the agricultural and industrial sectors, perpetuated a movement of illegal squatters onto State owned land and created informal settlements,

These irregular housing developments, known as *novostroykas*, were not part of the development plans anticipated by the Master Plans (Genplans) of these cities, but were retrospectively accepted by the government and given formal status. However, the government's policy of appeasement has tended to exacerbate the problems and consequently there have been an increasing number of land invasions from rural migrants with demands that they be allocated a plot of land and allowed to settle. The *novostroykas* are predominantly inhabited by poor rural migrants, but there also are areas where the rich and influential have acquired land to construct large private houses.

Infrastructure and service provision in the novostroykas

Domestic migrants place a strain on existing social welfare infrastructure, especially in health and education, and a significant pressure on housing markets and housing infrastructure. In both Bishkek and Osh, the local Government is officially responsible to provide basic infrastructure and services for the residents, including the legally recognized *novostroykas*. However, because of the lack of financial resources, much of the infrastructure is either incomplete or of low quality. Due to permanent under-financing of the capital investment programs, many *novostroykas* do not have a full coverage of centralized services of water supply and there is a virtual absence of sewerage, limited capacity of the electricity transformer stations, soil or gravel surfaces roads, and shortage of schools and kindergartens.

Environmental health conditions in the novostroykas

The quality of the environment in the *novostroykas* in Bishkek is observed to be compromised by inadequate sanitation, inadequate solid waste management, and in some areas, improper management of various hazardous substances.

When considering environmental quality and health risks associated with sanitation, it is important to acknowledge that the *novostroykas* vary considerably according to socio-economic status and physical conditions. The quality of housing and level of development also varies quite considerably, but virtually all the *novostroykas* lack universal coverage of municipal infrastructure and services, that are found in other parts of the city. There is a considerable backlog of planned infrastructure in all areas but the, due to a lack of financial resources, the municipal agencies that are

responsible for provision of environmental and social infrastructure are unable to respond to the demands for expansion of service coverage.

The situation is becoming an increasing problem for the Government of Kyrgyzstan, which has expressed interest to develop a comprehensive strategy for incorporating *novostroykas* into the formal city area and lead to a pilot investment program in selected *novostroykas*, focusing on upgrading and increase in coverage of a range of different types of infrastructure.

Scope of the assessment

In light of this situation, the Government of Kyrgyzstan requested that the World Bank support an urban upgrading project in the *novostroykas* of Bishket and Osh. In response to this request, the World Bank initiated a study to evaluate the scope for a project in these areas and as part of this commissioned the consultants to assess the sanitation conditions in the *novostroykas* in Bishkek and Osh in terms of available infrastructure and environmental conditions and to subsequently make recommendations as to how best to proceed with project preparation activities.

This report is one of the first attempts to develop a structured understanding of the *novostroyka* phenomenon in terms of access to basic engineering infrastructure services related to sanitation, considering both the barriers and successful cases in service delivery. Based upon site visits and discussions with stakeholders at all levels, the study identified several clusters of *novostroykas*, which are grouped according to various geographic, social, environmental and economic factors, which help to prioritize the different components of infrastructure intervention that are considered to be most appropriate in each specific area.

The assessment focused specifically upon access to and condition of sanitation facilities at the household and communal level as well as the potential environmental impacts of the operation of these facilities. As well as the more obvious forms of sanitation infrastructure, namely household latrines, on-site facilities for wastewater management and sewerage, the assessment included water supply, drainage and solid waste collection as these are known to have a direct effect on environmental health conditions and subsequently the health of resident communities.

Proposed framework for intervention

In this respect, the assessment took a broad perspective of sanitation and also considered the intrinsic linkages between urban service provision and infrastructure development and housing. Thus, the report focuses on how sanitation may be integrated within a broader urban upgrading intervention, incorporating the cumulative benefits of simultaneous interventions in hardware (infrastructure and facilities) and software (use of facilities and other sanitation related hygiene behavior). This approach is recommended as the basis for area-based interventions in the *novostroykas* in which sanitation forms an integral component of the hardware for the proposed urban upgrading project, alongside water supply, solid waste management and drainage and other types of infrastructure which contribute towards improvements in urban environmental health.

Water supply

The assessment indicated that there are some significant deficiencies in water supply, particularly in the most recently established *novostroykas* in the North of the city of Bishkek. It is in these areas where community representatives and residents prioritize water supply to be the most important sanitation related intervention. Although in-house connections are desirable, well-functioning and operational water supply at the yard level is the basic recommended option, as public standposts are frequently seen to be in a poor state of repair and poorly managed. Promotion of improved water storage practices in the home should also form an important part of this component. In response to the poor condition of the water supply standpipes – both in household yards, but particularly in the public spaces – there is also a need to prioritize investments in rehabilitation of the existing water supply systems. Water supply was even more of a priority in Osh, where there is a need for considerable investment to extend coverage and improve the operational performance of the city's water supply system. The priorities in Osh were identified to related to the need for improved water supplies, especially in areas where the water in the irrigation networks is abstracted by local residents for domestic use, which results in outbreaks of waterborne diseases.

Household sanitation facilities

The basic requirement is for all *novostroyka* households to have access to a well-maintained sanitary latrine with facilities for hand-washing to be used after use of the latrine. For the majority of *novostroyka* residents, the dry pit latrine will continue to serve as the most appropriate and effective form of sanitation. However, some simple improvements to the design and construction based upon the Ventilated Improved Pit (VIP) latrine model are recommended for promotion in the *novostroykas* of Bishkek and Osh.

The two main components of the VIP latrine that are recommended as the most important parts of the latrine are the slab, which provides a firm base which is easy to clean and the ventilation pipe, which reduces odors and flies. Both of these can improve the effectiveness of the latrine as a barrier to the transmission of sanitation related diseases as well as the comfort of using the latrine. The project should support the development and distribution of these two hardware components and a regulatory framework for the private sector operations in the supply of these components.

Although subsidies are generally to be discouraged, some subsidy on the slabs and pipes combined with use of project finances to develop technical support for householders expressing interest to upgrade their latrine and also for the development of a more extensive supply chain for the provision of building materials is to be considered. The supply of materials may also be complimented by a micro-finance scheme to enable householders to gain access to small grants to finance improvements to their homes and on-site sanitation facilities.

Households should be provided with technical information and basic training about good practice in latrine construction and, as part of this, it is also recommended that basic hydro-geological parameters are taken into account during construction of on-site sanitation facilities. For example, in situations where the depth to the

groundwater is shallow, the foundation of the latrines can be raised by 30cm so that the bottom of the pit is above the groundwater.

The main focus of the project should be on the promotion of improved household sanitation, but there are also good opportunities to introduce improved sanitation in communal facilities, such as those in schools, health clinics, and bathhouses. These may also serve as demonstration latrines to provide local residents about the benefits associated with a well designed, constructed and managed latrine. Other recommended project components that are relevant to communal latrines are the provision of financial lending instruments to assist with the establishment of more community bathhouses, which include improved washing facilities for personal hygiene and clothes washing.

The increased consumption of water for washing and flushing of toilets will invariably create increasing demands for sewerage, especially in areas where groundwater is high and infiltration is poor. In general, these are in denser urban areas where water consumption is high and particularly where water is used for flushing toilets. This is likely to be most serious in more affluent *novostroykas*, which have better water supplies and use cesspools to dispose of excreta as well as other domestic wastewater. As the cesspools are lined, they fill up quickly and need emptying regularly, which becomes very expensive for the householders. As a result, there are expressed demands from both *novostroyka* residents as well as from government that extension to the sewerage network is the best long-term solution for these problems.

Protection of groundwater resources

Another argument for increasing the area serviced by sewers is to protect groundwater. This is not necessary in all *novostroykas* but some developments in the South-west are located above the aquifer that serves provides the city's drinking water. As all drinking water of Bishkek comes from groundwater, it is important to protect these resources from pollution from on-plot sanitation. Although, the groundwater in these areas is not threatened by microbiological contamination because it is very deep, there are concerns that the level of other chemical contaminants will increase because the alluvial deposits are characterized by high water permeability. In Osh, the situation is somewhat different as only a small volume of the water supply is extracted from shallow aquifers, which is at risk from pollution from sanitation. Therefore, there are areas in both cities where there is a need to invest in sewerage, but it is important not to make generalizations about the need for protection of groundwater without taking all factors into consideration prior to proceeding with a recommended intervention strategy and investments in expensive sewerage infrastructure.

Drainage

Improved drainage of shallow sub-surface water is important as it improves the performance on site sanitation, and reduces damage caused by high groundwater on the structural foundations of buildings in the area. This is particularly important, as *novostroyka* residents are understandably more concerned about the condition of their housing than about poorly operating pit latrines. Much of the drainage infrastructure has been lost and is in need of substantial renovation and partial reconstruction. The drainage infrastructure is also closely linked with the irrigation

network and opportunities to rehabilitate the irrigation channels should also be considered.

Solid waste management and cleaning services

As the *novostroykas* are already served by private sector service providers for solid waste management and cleaning of on-plot sanitation systems, the consultants recommend that strengthening the existing system is more appropriate than attempting to transfer responsibility to the municipal utility. There will be a need to look at ways in which the BVK can work in partnership with these operators to ensure that the regulation of these services is improved.

Led by the TAC, the *Novostroyka* Development Committees can work towards the improvement of solid waste collection systems within their *novostroyka*. The project will promote improved collection systems whereby the *novostroyka* is provided with neighborhood collection containers and also encouraged to introduce recycling and composting of wastes.

Sanitation and hygiene promotion

Although provision of safe water and access to basic sanitation hardware is essential for improvements in health, these need to be complimented by a concerted effort focused on hygiene promotion. To compliment investments in hardware and the framework for promoting demands for improved sanitation is the need an effective strategy to improve hygiene behavior and to encourage better use of facilities.

Hygiene promotion refers to advocating for and supporting behaviors that are known to reduce diarrheal disease, especially amongst younger children. The focus at the household level should be on prevention of diseases via improved use of facilities and hygiene practice, recognizing that the role of water quality in diarrheal disease control is less important than that of sanitation and hygiene.

One of the most important main considerations is the fact that communities in *novostroykas* are diverse and highly heterogeneous. In practice this means that for a successful intervention in the sanitation sector, the approach adopted by the project for effective hygiene and sanitation promotion needs to be flexible enough to cater for the different target groups. Social marketing is recommended as a flexible and sophisticated approach to target a wide variety of stakeholder groups.

In essence, social marketing makes use of marketing principles and strategies to achieve social goals, including those related to better hygiene and sanitation, focusing on upon the benefits of access to sanitation from a perspective of convenience, prestige/status, cleanness, privacy, and safety, in combination with some specific health messages and hygiene awareness focusing on the most important hygiene practices such as hand-washing after use of the latrine. This involves design of a hygiene promotion intervention, which incorporates social marketing techniques, which are targeted towards different stakeholder groups within the community and focusing on specific messages to promote changes in behavior and to stimulate demand for improved sanitation.

Institutional stakeholders and framework for implementation

The assessment of the existing institutional framework and current approaches adopted by the municipal agencies involved in service provision indicated that there is a lack of clarity between the institutional roles and responsibilities of OGUKS and UKS for infrastructure and services delivery. There is therefore a need for some institution restructuring and organizational strengthening. UKS will be responsible for planning and financing of larger, primary infrastructure in all areas, whereas OGUKS will be responsible for the secondary infrastructure and community (tertiary level) infrastructure will be the responsibility of the TACs in collaboration with OGUKS and Novostroyka Development Committees. OGUKS will therefore continue to play an important role in the *novostroyka* development but will require new skills in order to provide increased assistance to the TACs during the planning and implementation of the project.

These agencies are predominantly focused on the provision of infrastructure and therefore sanitation and hygiene practices at the household are not considered under their work area. As many problems related to sanitation fall within the private domain and are related to quality of housing and on-site facilities, it is therefore necessary to focus upon promoting an incentive framework which stimulates the right types of activity at the household and community level. Therefore, both the Sanitary and Epidemiological Services and the Republican Centre for Health Promotion are two government agencies which will play key role in the implementation of the proposed project. The challenge will be to ensure that the 'hardware' and 'software' activities are co-coordinated and for this to be possible, a Project Implementation Unit (PIU) will be housed in the main offices of the municipal administration.

Planning

There is a need for a realistic approach towards infrastructure planning and greater attention to prioritizations of investments. In general, the official procedures adopted by the various government agencies for *novostroyka* development, from the initial stages of land planning, through the stages of allocation of housing plots and implementation of infrastructure improvements, are well elaborated and formalized. However, the relevance of the planning process is lost at an early stage because political decisions that decide upon land allocation for new *novostroykas* with little consideration about physical constraints or the need to consult with institutions such as UKS.

The current master planning approach adopted in Bishkek and Osh is predominantly technocratic and does not response to community demands. In addition, systematic planning approaches are undermined by the government's acceptance of the demands of land grabbers. In addition, the intermittent release of funding from State and municipal coffers for investments in infrastructure results in ad hoc and patchy service provision.

The deficiencies in the planning process are compounded by a very weak knowledge and database about the existing situation (in relation to demand and current coverage of services). The lack of availability of accurate data in all aspects of service provision planning, design and monitoring severely undermines the effectiveness of the formal planning procedures.

There is therefore a need to initiate some institutional reforms is the need to develop a more demand responsive approach towards planning and prioritization of investments. To assist this process, more systematic approaches towards data collation and sharing between different agencies is required. Investment in a more comprehensive information management system to assist in decision-making, physical planning and design of infrastructure, may offer significant paybacks.

Mobilization of community resources and local level participation

In terms of implementation at the community level, there is scope to adopt appropriate solutions with community mobilization of resources and participation. The project will capitalize upon local availability of resources – skills, labor, time as well as finance – and there is a need for increased focus on a more demand driven approach and community participation during the project cycle. Project implementation will require an increased focus on participatory planning, working with community based organizations and mobilization of local resources (including monetary resources). These activities will require specialist skills and close co-operation with the Territorial Administrative Committees, which will provide the link between *novostroyka* communities and OGUKS during construction of infrastructure, and with the PIU in aspects related to planning and project management.

In the planning and implementation of the area improvement programs that are envisaged to be part of the project, a *Novostroyka development committee* (NDC) will be formed in each target area to facilitate the process. The NDC will be nominated by the *novostroyka* residents to assist the TAC in clear and transparent decision-making during the planning, implementation and subsequent maintenance of community infrastructure and services. Management of community financial contributions should be administered by TAC and agreed with PIU. The TACs will work in close collaboration with the proposed Novostroyka Development Committees, who will be responsible for community mobilization and collection of community contributions

Preface

The Government of Kyrgyz Republic has expressed its interest to address the problems related to deficiencies in infrastructure and services in the urban irregular low income settlements referred to as *novostroykas*¹ in Bishkek, the capital city and Osh, the country's second largest city. As many of the inhabitants of these areas are believed to be of low-income, this intervention is congruous with the most recent World Bank Country Assistance Strategy (2003), which recognizes that *there is an "urgent need to provide services to the poor"*.

In order to help define the strategy, the World Bank initiated a study with the overall purpose to improve the knowledge and understanding of the *novostroykas* in relation to the:

- a) Situation and problems of the settlements, in terms of property rights, and access to basic infrastructure and other essential services.
- b) Institutional, regulatory and financial framework that aims to support the incorporation of these settlements formally into the city.
- c) Living conditions, problems and priorities of the people living in *novostroykas*.

The study aims to make recommendations for possible strategies and cost effective actions to incorporate the *novostroyka* communities formally into the city and improve their living conditions, especially in terms of access to basic infrastructure. The study's recommendations are expected to contribute towards the development of a comprehensive strategy for incorporating *novostroykas* into the formal city area and lead to a pilot investment program in selected *novostroykas*. If successful, it is expected that the approach will be replicated in other *novostroykas* in Bishkek and Osh.

The assessment documented in this report forms a part of this wider study and is one of a series of outputs that are being used to develop an improved understanding of the existing situation, to make recommendations for various improvement strategies and to assess the viability of these strategies.

¹ *Novostroyka* – literally meaning a “new development”, which is used to describe irregular or semi-informal peri-urban settlements that are mainly inhabited by poor rural migrants.

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1.0 Introduction

1.1 Objectives of the assessment

In relation to the overall purpose of the Bank's study described in the Preface the specific objectives of the assignment undertaken by the consultants were to assess the sanitation conditions in the *novostroykas* in Bishkek and Osh in terms of available infrastructure and environmental conditions. The assessment focused upon access to sanitation facilities at the household and communal level and considered water supply, drainage and sewerage, solid waste collection and disposal, as well as household latrines, as the different types of infrastructure that have a direct effect on sanitary conditions and health of communities.

The assessment focused upon infrastructure and services provided by the municipal agencies, but also included the services operated by the private sector. The assessment focused upon access to sanitation facilities at the household and communal level and assessed the conditions of different forms of infrastructure and services in terms of the:

- i) Availability and access to services;
- ii) Adequacy of physical conditions and service quality; and
- iii) Potential environmental impact of their operation.

1.2 Scope of the work

1. Assessment of general living conditions

Based upon site visits to selected *novostroykas*, the consultants undertook a review and evaluation of the existing living conditions of selected *novostroyka* in Bishkek and Osh from technical, environmental and hygiene perspectives. In particular, the assessment considered the sanitary and housing conditions related to their potential environmental and health impacts.

2. Assessment of basic infrastructure services

The assessment focused on residents' access to basic infrastructure and services related to sanitation and the adequacy in terms of physical conditions and technical design. While the specific focus was upon excreta management and hygiene, these conditions are influenced by the nature of available infrastructure (e.g. water supply, drainage, etc.) and these were therefore also taken into consideration.

3. Assessment of adequacy of Government investment program and plans

The assessment included a review of the housing and infrastructure planning process and the investment plans prepared for the *novostroykas* by OGUKS, taking into consideration the adequacy of the plans, in terms of their details, technical parameters, prioritization, and implementation. Specific attention was placed upon a review of those elements of the plans that have the most relevance to sanitary conditions, (e.g. proposed sanitation approach, technology and investment). The

assessment also includes a review of the viability of land reclamation (drainage) plans for *novostroyka* settlements, which will influence the operation of these sanitation facilities.

4. Recommended strategies and possible technical solutions

Based upon a detailed assessment of the existing situation, the study includes recommended solutions to improve conditions related to sanitation and environmental health for inclusion in a broader urban upgrading project for the *novostroykas*. These priority interventions relate to basic sanitary infrastructure and hygiene promotion and consider cultural, physical, and financial conditions of the residents and explore the possibility of using lower cost appropriate solutions, including those that involve community mobilization as well as appropriate operation and maintenance arrangements with residents' participation.

5. Recommendations regarding implementation

The recommendations include the necessary 'next steps' to be taken by the Bank and the national and local governments to improve investment planning and implementation of infrastructure interventions to meet existing demands and anticipated future conditions. These recommendations consider the institutional framework and include appropriate implementation strategies, working with local governments, non-governmental and community-based organizations.

1.3 Methodology and sources of information

The consultants investigated the situation in detail in 7 *novostroykas* (See Annex 12) and made brief visits to the majority of the remaining sites. The settlements selected for a more thorough assessment included the following *novostroykas* : Ak Bosogo, Ak Tilek, Ak Orgo, Ala Too, Bakai Ata, Kalys Ordo, Kelechek.

The following activities were instigated:

- 1) Meetings with infrastructure service providers and government investment agencies in order to understand how services are extended to these new settlements, how basic infrastructure investments are planned, and make an assessment from the technical point of view of the existing planning and implementation arrangements.
- 2) Review of master planning and investment plans and mechanisms of prioritization and administration of investments.
- 3) Consultations with key government officials from relevant agencies to discuss their respective roles and responsibilities in the planning process, and subsequent implementation and operation of infrastructure.
- 4) Consultations with TAC members and community representatives to discuss investment priorities and possible cooperation options between the Government, communities and NGO sector.

- 5) Site visits to observe conditions in the *novostroykas* and to have informal discussions with local residents during transect walks.
- 6) Literature review and communications with authors of relevant papers and reports to discuss key issues described in the report.

The assessment was supported by data collected as part of a household survey commissioned by the World Bank, which was undertaken by Bishkek Centre for Social Initiatives (a local non-governmental organization). The survey covered a total of 9 *novostroykas*: Ak Orgo, Kok Jar, Ak Bosogo, Ala Too, Ak Tilek, Bakai Ata, Archa Beshik, Kasym and Kolmo. All these *novostroykas* were established in the period between 1989 to 1991, and therefore represent already established settlements, compared to the younger *novostroykas* where people are predominantly recent migrants from rural areas.

The survey included household interviews of 493 households using a structured questionnaire and focus group discussions to collect baseline data describing a wide range of socio-economic and environmental factors. Questions during the household survey focused on asking residents about existing infrastructure and services and, using the residents' memory to consider how the situation has changed over a period of the last 3 years.

1.4 Limitations of the assessment

It is important to consider the limitations of the assessment in order to understand where there may be potential gaps in the understanding of the consultants :

Generic limitations relating to the time to visit the novostroykas

There was insufficient time to visit all the *novostroykas*. As mentioned above, it was only feasible to visit 7 for sufficient time to talk to representatives from the Territorial Administrative Council followed by accompanied transect walk around part of the *Novostroykas* to gain a better impression of the environmental conditions in the area, service coverage and expressed priorities. The site visits were the only opportunities to have a closer physical inspection of sanitary facilities, but often it was not appropriate to undertake more detailed investigations whilst in the company of local government staff.

The consultants encountered wide variations in the physical environment as well as the socio-economic status of the residents in the *novostroykas*. This presented a challenge as different technologies and different approaches to implementation might be suitable in one location but not in others.

Although these visits were invaluable for the purpose of the assignment and the assessment and recommendations would not have been possible without these opportunities, much of the information and data gained during these visits was subjective and not necessarily representative of the *novostroyka* as whole. Also, as the site visits were undertaken during the summer season (August), it was not possible to assess directly how sanitation facilities and related behavior are influenced by cold climatic conditions.

Limitations of the scope of the assessment of hygiene behavior

A detailed assessment of hygiene behavior was not feasible given the time and resources available. A considerable amount can be deduced on the basis of field observations, in combination with interviews to clarify and confirm specific issues, but this does not provide the level of understanding that is required to understand hygiene behavior. To do this comprehensively would require household level focus group discussions with experienced social scientists with knowledge of hygiene behavior to facilitate discussions. As this was not feasible, combined with observations from the field visits, the consultants have drawn from their brief discussions with various community representatives, staff from NGOs working in the *novostroyka* areas, CBO activists and territorial village administrations.

Limitations of the data from government agencies

As is described in more detail in the report, the data from various government agencies was limited. There was some doubts about the accuracy of data describing population, registered plots, and service coverage.

It proved particularly problematic to analyze the financial data supplied by OGUKS because of a lack of a systematic recording of expenditures, and the fact that the data that was available was based upon estimated made a long time ago. Although OGUKS has engineering designs for the *novostroyka* infrastructure, these do not have cost estimates. The only costs that are available are for small portions of systems, which are made each year according to the availability of funds. Therefore, the cost estimates are only for approximate estimation of the scale of the required investments and should not be viewed as accurate cost estimates for the potential project implementation.

Data from Sanitary and Epidemiological Services was not sufficiently detailed to enable a quantitative assessment of the sanitation related diseases, and although some data according to age was available for Bishkek as a whole, this data was not available specifically for the *novostroykas*.

Limitations of the data from the household survey

The household survey commissioned by the World Bank did not include all *novostroykas* and only included a limited number of households in selected areas. The 26 out of the total of 37 *novostroykas* (from the start of 2005) were selected on the basis that they have the largest populations. The others are small (just part of the streets in the main city) or are not registered (e.g. Ak Tilek 2).

In general, the data from the household survey reflects the situation in older, more established settlements that are currently facing a different set of development priorities than the newer *novostroykas* such as Kalys Ordo, Dordoi, Tendik, Enesai, which are just at the emergence stage in terms of social neighborhood links, engineering, social infrastructure and adjustment to urban environment. Therefore the statistical data from the household survey does not necessarily accurately portray the problems in all areas and the results should therefore be considered with this in mind.

2.0 Urbanization and the development of the novostroykas in Bishkek and Osh

In order to help understand the existing problems facing the municipal governments in Bishkek and Osh in relation to the provision of urban infrastructure and services, this section describes the background to the *novostroykas* in relation to the historical, political and socio-economic factors that have influenced their development. In addition, it provides an overview of the prevailing physical and socio-economic conditions that are prevalent in these areas.

2.1 Urbanization in Kyrgyz Republic

The majority of the cities and towns in the Kyrgyz Republic are of relatively recent origin. Most urban areas developed either during the time of the Russian Empire during the second half of the 19th century or during the time of rapid economic growth of the Soviet era in 1950-1960s as a result of the development of the industrial and mining sectors.

After independence in 1991, the early 1990s were characterized by economic crisis caused by the collapse of Soviet Union and the removal of its economic linkages and centralized budgetary support. The financial crisis and the land and agricultural reforms, which resulted in the liquidation of collective and State farms caused an immediate loss of permanent employment and social protection in rural areas. At that time, the urban areas were also experiencing the closure of the industries and reduction of employees of the State budget funded sectors.

As a result of the collapse of the agricultural and industrial sectors, a large number of the population migrated away from the rural areas and small towns, which were affected the most. This population either headed towards the major urban centers in search of employment or, where families had international links, left the country to settle overseas. Unlike the smaller urban centers, the largest cities of Bishkek and Osh were considered economically more attractive due to the better employment opportunities. They both act as important trade centers in Central Asian Region. Bishkek serves as trade hub of imported goods (with dominant share of goods from China), and Osh plays an active role in the trade between Uzbekistan and Kyrgyz Republic.

Therefore, the net migration to the largest urban centers of Bishkek and Osh was positive and resulted in population increase in Bishkek of 35-40% and 15-20% in Osh during the period between 1989 and 1996. The official population in Bishkek according to the National Census in 1999 was approximately 800,000, but the actual number of residents within the city boundaries is estimated to be in the region of 1 -1.2 million. However, it is difficult to make a precise estimation due to the continuous unplanned urbanization caused by the land squatting in peri-urban areas. Osh is currently the second largest city and capital of the Osh Oblast. The official population is 268,000, but if the population in the peri-urban areas of Kara Suu rayon, and a share of non-registered population from various parts of the south of the country, are taken into account, it is estimated to be 500,000.

2.2 Phenomenon of the *novostroykas*

The roots of *novostroyka* phenomenon originate in the era of the Soviet administration and the under-funded State housing programs in the Kyrgyz Republic. In the absence of free estate and a land market, the only mechanism for the population to acquire land was via the State social housing programs. However, the rate of provision of housing was much lower than the actual demand and, as a result, people were subscribed to housing lists for many years.

2.2.1 First generation of *novostroykas*

The first generation of the *novostroyka* movement was established during the period between 1989 and 1991 as a result of pressures from a civil society based movement of disenfranchised city dwellers stuck in rented accommodation for too many years without the chance to acquire their own house. The movement came about as a result of political changes that occurred during *perestroika* (political liberalization) at the end of 1980s, which allowed people to raise and discuss their problems more openly. At the same time, shortly after the start of *perestroika*, the economy of the Soviet Union started to decline rapidly, which exacerbated an already problematic situation.

After long debates between the Government and representatives from the *novostroyka* movement, the Government approved a housing support program, through which people were eligible to a plot of land and for interest free loans for housing construction. Initially, these loans were in the form of construction materials in kind but later were offered in monetary form.

Although these incentives did later result in an influx from rural areas, the first generation of *novostroykas* was not as a direct result of housing demands from rural migrants, but mainly from people already living (many of whom were renting for long periods of time) in the city itself. People who received a land plot in the *novostroykas* during this first generation were therefore mainly either from a city background or were from parts of society who were not eligible for State funded housing.

2.2.2 Second generation of *novostroykas*

Later, after gaining independence in 1991, the government initiated an economic and political reform process, which resulted in a transition to a democratic State and free market economy. However, the national economy entered a stage of crisis due to collapse of Soviet Union and the associated loss of centralized administrative and resource allocation. As a consequence, no State assistance to the new individual builders was provided and the nature of the following *novostroykas* became very different.

The new wave of *novostroykas* changed significantly from the initial protests from the urban population in the form of land and housing demands to more recent migrants from rural areas, which have manifested in the form of illegal land squatting activities.

Land squatting can be also linked to the introduction of the free land market and the specification of land titles in the National Constitution of 1998 in which land was pronounced as an asset, either belonging to the State or private property. This was a radical change as, under the communist Soviet administration, all land belonged to the State. According to Constitution, each citizen is entitled once during his lifetime to be

granted a land plot for housing construction, if he lived at least 5 years in the area and has not yet received other land assets from the State.

Thus, the mechanisms of obtaining a land plot from the State has changed from an act of protest and political dialogue to process of illegal land grabbing in which the perpetrators initiate constructions without any official recognition.

As described in further detail in Annex 3, the scenario of *novostroyka* establishment in Osh is similar to that in Bishkek. The first demonstrations demanding land plots for housing construction took place in 1990. Since that, the land squatting process has been roughly in a parallel to the events in Bishkek described above. The first recipients who were from rural Osh oblast areas have since sold their land plots to people from Osh. This was legally possible even before the liberalization of the land market, as the owner could sell the housing estate when at least 11% of planned construction was completed. As a result, according to Osh municipality, about 70% of the residents of the Osh *novostroykas* originate from Osh city itself.

2.2.3 Recent developments

The issue of *novostroyka* has become even more urgent for the Kyrgyz Government after the “Tulip Revolution”² in March 2005 that ousted the former President Akaev. Shortly after the coup, a further 50,000 migrants from rural and small towns illegally squatted on the agricultural land plots on the outskirts of Bishkek. However, an increasing number of *novostroykas* have emerged as a result of land squatting shortly after the recent “Tulip Revolution” and the process of chaotic land squatting is ongoing.

According to the latest data, during the period between April - August 2005, the government has permitted 16 new *novostroykas*, of total area of 767 ha, of which 693 ha is arable agricultural land. Altogether, the government plans to allocate 9700 lots for housing construction.

During September and October 2005, there have been ongoing land invasions on privately owned agricultural land near *novostroyka* Kok Jar. The Government is involved in negotiations and mediation of the conflict between the legal owners of the land and land squatters. On October 3, The Government has issued the decree of 60 ha of the agricultural land from Sokuluk village administration to be transferred to the residential areas, and to be split between citizens of Sokuluk and Bishkek.

However, the allocation of land plots by government to the land grabbers continues to create political tensions and opposition to further developments, particularly from

² The Tulip Revolution refers to the overthrow of President Askar Akayev and his government after the parliamentary elections of February 27 and of March 13, 2005. The revolution sought the end of rule by Akayev and by his family and associates, who in popular opinion had become increasingly corrupt and authoritarian. Following the revolution, Akayev fled the country. On April 4 he signed his resignation statement in the presence of a Kyrgyz parliamentary delegation in his country's embassy in Moscow, and on April 11 the Kyrgyz Parliament ratified his resignation. Ref http://en.wikipedia.org/wiki/Tulip_Revolution

the old population, who used to manage the land (mainly for agriculture) and had the control over housing construction in these areas.

2.3 Socio-economic characteristics of *novostroykas*

The social profile of the first *novostroyka* residents is predominantly based on urban types of employment and a higher level of education than those in the more recent *novostroykas*. The first *novostroykas* have a higher proportion of educated professionals whereas the more recent *novostroykas* are inhabited by people from less economically developed rural areas, who are experiencing the most severe problems. Together with people coming from remote rural areas in order to find work, these can be considered from the point of view of education, skills, and incomes as vulnerable population.

2.3.1 Employment and income generation

The most typical type of employment for migrants settled in *novostroykas* are various forms of trade. Most of the people from rural backgrounds living in Bishkek are involved in unskilled labor or small-scale market trading. Migrants put additional pressure on the local labor market, as most come to the urban areas in search of jobs. In addition, newcomers are generally willing to accept any jobs, including those in the informal sector, which do not pay taxes and undermine existing legitimate businesses and the rise of a shadow economy.

Although the opportunities for work are considered better in urban areas compared to rural areas, unemployment and low-income are the most common reasons that *novostroyka* residents are associated with poverty. In relation to social welfare, residents stated that the generation of job opportunities and the creation of conditions for entrepreneurship would assist them improve their livelihoods.

According to the Ministry of Labor and Social Protection (MLSP), the Government ministry responsible for the welfare of poor people throughout the Kyrgyz Republic, the majority of people who live in *novostroykas* areas are poor. On average, a poor family's income is approximately US\$15 per month. Poverty subsidies are given if income per capita in household is less than US\$3.5 per month.

According to the household survey, net incomes (less expenditure) of households vary considerably from US\$4 - US\$350 per month (average approximately US\$ 250). There are enormous disparities - the average income of the 20% of richest quintile of *novostroykas* is almost ten times as high as average income of the poorest quintile. However, as mentioned in the introduction, the household survey focused on the more established *novostroykas* from the first generation. These are characterized by a higher level of socio economic development and therefore the income data quoted above is probably considerably higher than those in the newer *novostroykas* where levels of poverty are more apparent.

2.3.2 Prevalence of poverty

The literal translation of a *novostroyka* as being a “new development” does not correspond to the apparent level of poverty or the perception that *novostroyka* are slums. Although many of the residents of the *novostroyka* are poor, there is

considerable variation in the prevalence of poverty according to the *novostroyka*. In fact, it is not uncommon to see more affluent houses in the *novostroykas* of the first generation such as Ak orgo, Kok Jar, Yntymak. However, Yntymak is not covered by this report nor by household survey report as it has developed into a middle to upper class housing area. This observation is further reinforced by the findings from the household survey undertaken in various *novostroykas* of Bishkek.

Based on the survey results, although 54% considered their neighborhood as a whole to be a poor area, only 21.5% of respondents stated that they perceive their situation as being “negative” and only 34% of households considered themselves “poor”. Out of these “poor” households 59.2% indicated a combined income of between US\$122 and US\$244 *per month*, whereas 23.1% earn more and only 17.8% earn less. The duration of poverty was not well-defined by respondents; only 7.1% indicating that poverty was recent, the remaining giving answers which are not easy to interpret. The quality of housing in some *novostroykas* suggests some significant investments made by private developers and where affluent communities are resident. Although some *novostroykas* are recognized for their apparent level of wealth (or alternatively their poverty,) many of them have a wide variety of different levels of socio-economic status within the *novostroyka*.

2.4 Key features of *novostroykas* in Bishkek and Osh

According to municipal authority estimates, approximately 200,000 people live in 27 *novostroykas*. In total, the *novostroykas* consist of 27,406 land plots and cover 3,210 hectares. The common feature of all *novostroykas* is that they are developed on a former agricultural land. As shown in Figure 2.1, the majority are located on the periphery of the city, but some (notably Kolmo, Burdinskyi, Madaniyat) have occupied the open spaces between the residential areas, near the old city’s boundaries and therefore, are better integrated into the city’s engineering and social infrastructure.

The first *novostroyka* was established in 1989, and the last in the beginning of 2005. The oldest *novostroykas* of Bishkek are these of first generation and they have already existed for 15-16 years (Orok, Kok Jar, Ak Orgo). The most recent are Kalys Ordo (established in 2003), which is just at the beginning of housing construction, and Ak Orda (the land was provided in the early 2005 and is still essentially agricultural land with no housing development as yet). In terms of size, the first ones are generally the largest but there are many variations in physical characteristics as shown in Table 2.1)

In general, despite various infrastructure problems, Osh *novostroykas* are not in general characterized by high levels of poverty and low quality of life that is seen in Bishkek. In Osh, it is in the inner city where the some of the poorest communities are found (although these are not a large proportion of the urban population). An example is the former dormitories of the Cotton Mill of Osh, located in the northern part of the city as described in Annex 3.

In Bishkek, Dostuk Novostroyka is an exception amongst these 27 as it is not a case of housing development on agricultural land, but a case of squatting of uncompleted three storied apartment buildings. These apartment buildings were designed as a residential district in the west of the city for employees of various industries, located in Bishkek. The construction has started at the end of 1980s, and was frozen due to the lack of funding. In 1995, a few more completed houses, which had water supply, sewerage

and electricity mains, were squatted. Up to now, these apartments have not been legalized (see BCSI 2005). Thus, there are some areas where the concentration of high quality housing is significantly higher than in others and these areas are more attractive for housing investments. As a consequence, the range of land prices among the *novostroykas*, studied in this report, varies between US\$200 (Ak Tilek) to US\$ 1000 per 100m² (Ak Orgo)³.

Table 2.1 Physical characteristics of the Bishkek *novostroykas*

	min	av	max
Establishment year	1989	1993	2005
Occupied area. ha	3	113	795
Number of lots	41	1065	4800
Size of one lot. ha	0.03	0	0.38
Number of developed lots	40	906	4500
Number of registered lots	0	84	395
Share of registered lots in % to number of allocated lots	0	9	38.3
Total population	630	12688	47900
Adult population	460	9212	34200
Children under 16	170	3477	13700
Share of children under 16. in %	6	27	29.1
Calculated density of population. man/sq.km	1148	24763	240000

Table 2.2 Basic profiles of *novostroykas* in Bishkek (covered by the assessment)

Total population	200,000 (est.) approximately 20 % of the total population
Number of settlements	27
Number of properties	27,406 (24,609 as of mid-2003). Not including any new unregistered properties since 2003
Total size	3,201 hectares
Land title (as of mid-2003)	55% official registered; 40% assessed with cadastre plan but not registered due to lack of legal documents; 5% no assessment, no title.
Age of settlements	1-15 years

³ considering *novostroykas* of first generation (established in 1989-1991) but the land prices in Kok Jar are believed to even higher than US\$ 1000 per 100 m²

3.0 Assessment of existing framework for infrastructure and service provision

This section describes the institutional stakeholders and their roles in relation to the provision of infrastructure and services related to sanitation in the *novostroykas*. It provides the background to the assessment of the institutional framework for service delivery and the recommendations for improved planning and budgeting that are considered to be necessary for future initiatives. It also provides an overview of the procedures that define the process through which a household acquires a plot of land in a *novostroyka* and subsequently acquires access to municipal services.

3.1 Governmental institutions involve in urban planning and infrastructure and service delivery in the *novostroykas*

3.1.1 Urban planning and management

Bishkek Architectural Authority (BAA), which is part of the State Committee for Architecture and Construction, is responsible for land use planning and the development and regulation of the Bishkek Master Plan of City Development (GENPLAN). BAA is also responsible for regulation of land use, housing and other types of development and issuance of permits for construction.

3.1.2 Infrastructure planning and implementation

Department for Capital Construction (UKS)

UKS has the responsibility for capital investment for the whole city. The budget of UKS is based on new construction, infrastructure upgrading and rehabilitation, which is planned with the participation of relevant utilities that are subsequently responsible for operation and maintenance. At an operational level, the activities of UKS are distinct from OGUKS, but there is some overlap of responsibilities in some areas⁴.

Public State Department of Capital Construction (OGUKS)

OGUKS was established in 1990 as a separate department within the Municipality of Bishkek. Its mandate is to administer State capital investment projects in the *novostroykas* and is responsible for capital construction of social and engineering

⁴ For example, 40 hectares of the Novostroyka Kokjar falls under UKS's area of jurisdiction.

infrastructure⁵ in all legalized *novostroykas*. The majority of OGUKS staff are former members of the housing movement, which resulted in establishment of the first generation of the *novostroykas* and many of them are still residents of these areas.

3.1.3 Land drainage and reclamation

The Municipal Land Drainage Authority (*Gorremvodkhoz*) is responsible for the operation of flood protection infrastructure along the Ala Archa and Alamedin Rivers, as well as the major canals and primary irrigation channels.

The plans for capital construction of city's drainage infrastructure are based on the most urgent needs and municipal funds are divided between UKS and OGUKS. The budget of *Gorremvodkhoz* has grown from US\$ 32,500 in 2003 to US\$ 37,500 in 2004, and US\$ 50,000 in 2005. *GorRemVodKhoz* currently maintains a total of 32 km of open drainage canals in the main city and 11 km of closed (underground) land drainage in *novostroykas* of Bakay Ata, Ak Tilek and Kolmo. The services of *Gorremvodkhoz* are paid for by the municipality and depend on the actual amount of works undertaken⁶.

The management of the secondary irrigation (*aryk*) network is the responsibility of the municipal enterprise responsible for solid waste management (*Combinat Blagoustroistva*), and the tertiary irrigation mains are the responsibility of the relevant housing maintenance companies (former *domoupravlenie*) in areas of multi-storied buildings.

3.1.4 Other governmental agencies

Other governmental agencies involved directly or indirectly in sanitation related activities in urban areas (including but not specifically *novostroykas*) include:

Sanitary and Epidemiological Services (SES) - Ministry of Health

Sanitary and Epidemiological Services (SES) is responsible for water quality surveillance and statistics about infectious diseases and regulation of sanitary conditions in public facilities, such as health facilities and schools. The check of health facilities involves a detailed inspection carried out on average once every three months by specialist staff, who check the sanitary conditions of health

⁵ Infrastructure investments normally include: roads, water supply systems, electricity supply, telephone services, gas supply, schools, kindergartens, open space areas etc.

⁶ The basis for estimating the cost of services is the cost of cleaning of canal: it cost US\$ 0.0725 to clean 1m³ of the open drainage canal. More complicated works, requiring specific equipment are contracted by *Gorremvodkhoz* to private contractors.

facilities, including overall cleanliness of the facility, conditions of the toilets and procedures for disinfection.

National Statistics Committee of Kyrgyz Republic

The National Statistics Committee (NSC) is the State agency, which operates at the level of central government. At the operational level, such as in Bishkek, Osh and other urban areas, statistical data are collected and processed by the city branch offices of the NSC.

Ministry of Health

Health care services are provided by the *novostroyka* health posts, which are operated under the Ministry of Health. These only provide primary health care services. In other cases, where people need more experienced medical assistance, people must attend the main clinics and hospitals in the main city.

3.2 Land planning and registration procedures in novostroyka areas

3.2.1 'Regular' process of land registration

All agricultural land areas are part of the rural areas, under administration of the oblast/raion and village administration. The Central Government, at the level of Prime Minister is responsible for issuing decrees on the transfer of land from "agricultural" category to "settlements" category. Subsequently, after a decree is issued, the State Agency for Property Rights Registration (*Gosregister*) provides land titles for residents, including those in *novostroykas*, based upon a cadastral plan with borders of each land plot prepared by Bishkek Architectural Authority (BAA), which is part of the State Committee for Architecture and Construction (SCAC) (See **Annex 9** for an example of a housing and infrastructure plan for Ak-Tilek).

After the Government awards the land, the management of the *novostroyka* becomes the official responsibility of the municipal authorities and the land either remains under the ownership of the State or is transferred to private land-owners. To obtain and officially register a housing plot, the applicant must collect a set of documents from the relevant agencies in accordance with the regulations on the provision of land plots. Every property must subsequently be able to show their registration folder, which includes a set of official *Gosregister* documents including a indexation map designating the border of the land plot.

There are some exceptions to this practice in the allocation of land amongst Bishkek *novostroykas*. For example, the land plots of Orok Novostroyka were officially provided by the State to the employees of the Kyrgyz Railway Company in 1987 and 1988. In this case, the governmental procedures of land distribution was different because the government based the distribution of land in accordance with the official housing lists. The reason that Orok is classified as a *novostroykas* is because it faced the same problems of settlement development and infrastructure provision as the other new settlements.

3.2.2 'Irregular' process of land registration

The land plot distribution in the first *novostroykas* was regularized by the Government and therefore the process was consistent with the official procedural requirements described above. But, many of the more recent *novostroykas* (or parts of) have not followed these official procedures. The developments in these areas are characterized by land grabbing and illegal housing construction, which have been legalized retrospectively.

Thus, although there are housing regulations, these are generally not followed by individual developers who are responsible for the majority of private housing constructions. The poor quality of construction generates a number of problems, which affect the residents as well as the government agencies who have responsibilities within the *novostroykas*.

The resultant poor quality of houses and lack of compliance with basic engineering design and safety standards initially created the problem of non-acceptance of these houses by BAA. As a result, until recently, almost half of the houses in *novostroykas* were denied housing permits as they failed to meet the seismic norms set by the SCAC and regulated by the Architecture and Construction Examination Commission. Without these permits, the residents were also denied *propiskas* (resident permits), which in turn denies them the opportunity to apply for formal jobs or social security benefits.

In addition, many of the original recipients of land in *novostroykas* have illegally sold the land to a third party who subsequently do not have legal documentation to certify official ownership of the land. As a result, according to BAA data, from mid-2003, only about 55% of the properties in *novostroykas* are registered with official legal documentation as compared with 90-95% in the rest of Bishkek.

In 2003, due to the problem of residence permits, Bishkek Architectural Authority agreed to consider those houses as temporary premises and subsequently issued residents with residence permits. This change in the regulation procedure, driven under political pressure, allows residents to receive temporary housing permits from Bishkek Architectural Authority for substandard houses, with which they can apply for *propiskas*. Even so, many of the houses are so precarious that they do not even qualify for temporary permits.

A particularly critical situation exists in Ala Archa Novostroyka, which was built on the area of tectonic fault and in close proximity and below the operating cemetery and is therefore highly prone to seismic activities. For a number of years, the State did not allow these houses to be legalized but in 2005, due to the risks of political instability in the country, residents of Ala Archa received the official legal documents for their properties.

There are also areas which are unsuitable for residential housing due to health concerns caused by various environmental factors as described in Section 4.9; notably in the case of Bakai Ata Novostroyka, located in the area of fly ash of the Bishkek Power Plant and Kelechek Novostroyka, which is affected by the emissions from an asphalt manufacturer and is in the area of shallow ground water and below the cemetery and therefore prone to pollution from ground and storm water pollution.

3.3 Planning approaches towards infrastructure development

3.3.1 Bishkek Master Plan for City Development (GENPLAN)

The last Bishkek Master Plan for City Development (GENPLAN) was prepared in 1970 and covered the period until 1995. It is predominantly a planning document, which is developed in coordination with infrastructure development authorities to be used as a guidance document for land use and infrastructure and service coverage expansion. The Genplan is a general spatial plan, which does not represent specific investment plans, sequencing or prioritization, or instruments for implementation.

A new master plan, has been under development to cover the period up until to 2025, but due to a lack of resources, the city has not been able to finish it. The situation in Osh is similar in which the most recent Master Plan was developed in 1975. The Municipality of Osh has also initiated the development of a new Master Plan and has contracted a private consulting company⁷ to prepare it. However, the ongoing preparation of the plan is also temporarily frozen due to funding problems.

3.3.2 Novostroyka development planning procedures

The first step in the formal establishment of a *novostroyka* is a Decree from Central Government as described above. Once the *novostroyka* has received official recognition, the next stage is the preparation of a land use plan of the settlement by Bishkek Architectural Authority (See example of Ak-Tilek land use plan in **Annex 8**). This plan is used as the basis for design and planning of all other types of communal infrastructure as described below.

Theoretically, BAA should develop local use plans in close coordination with all service providing agencies in order to prevent possible infrastructure conflicts. In reality, the land for *novostroykas* is often annexed from neighboring agricultural land, which were previously administratively classified as rural areas, and were under different administrations and service providers. In such situations, often the layout of existing infrastructure are lost and no data on the existing infrastructure such as land drainage are incorporated in the plan.

The size of the residential plots in the *novostroyka* are decided in each case by the local government but tend to be 300 – 500 m². All 27 *novostroykas* are administratively recognized as urban areas, even those located in a close vicinity to rural settlements. Therefore, the land plots should not exceed 500 m². However, in Kalys Ordo (year of establishment is 2003), the special decision of the central government was to provide each household with 600 m².

The *novostroyka* development plans consist of a set of documents, including engineering design details and construction plans for each of the major

⁷ Bishkek and Osh based company NIPI Gradostroitelstva

infrastructure types. These are attached to the land use layout of the area and are used as the main guide for the investment planning. This set of documents is updated according to the availability of funds and OGUKS subsequently adds to these folders new designs and cost estimates.

The *novostroyka* development plans are defined by the State approved standards and norms and are mainly driven by the opinions of *rayon akimats* and OGUKS. However, part of this process may involve visits by Bishkek Architectural Authority staff to the *novostroyka* areas, in order to discuss with the communities the land use plan parameters such as the definition of open spaces or social infrastructure and routes for the access roads *etc.*

According to the Bishkek Architectural Authority⁸, whereas communities from older *novostroykas* demonstrate their interest in ensuring that their areas have sufficient space for social infrastructure and are willing to regulate public space, residents from more recent *novostroykas* show less interest and are generally more interested in acquisition of private land.

Once the land use plan has been completed, it is used by the rayon administration to keep a record of plots that are occupied. Occasionally, Bishkek Architectural Authority is requested to update the plan by order from OGUKS where there is a need to amend the previous pattern due to demand for new infrastructure and availability of funding from the Municipality.

3.3.3 The role of the Territorial Administrative Councils

The majority of *novostroykas* are represented by a Territorial Administrative Council (TAC), although some smaller *novostroykas* that are more integrated in the city (e.g. Kasym and Kolmo) are unified under one TAC. Each TAC reports to one of the 4 rayon⁹ administrative councils within Bishkek, which together form part of the municipal administration.

Each TAC is comprised of a Chairman, administrative staff and heads of each quarter committee, each of who is elected by the *novostroyka* residents according to the Law on Local Self Government in Kyrgyz Republic. The TAC staff receive their salaries¹⁰ from the rayon administration and act as representatives from their *novostroyka* within the system of local governance. Apart from the salaries and the budget for administrative operations, the TAC does not have access to or control of any other financial resources. The main responsibilities of TAC are to:

⁸ Mrs M. Kutatelanze, Department of Architectural Planning – 9/20/05

⁹ The 4 rayons in Bishkek are Pervomaiskiy, Ochybrskiy, Sverdlovskiy and Leninskiy.

¹⁰ US\$ 20 per month for TAC head, and US\$ 12.5 per month for quarter committee head in Bishkek. In Osh, the salaries are lower – approximately US\$ 17.5 per month for TAC head.

- i) Facilitate the implementation of State programs in the *novostroykas* in collaboration with OGUKS.
- ii) Manage community driven and co-funded infrastructure projects.
- iii) Assist the collection of demographic data for the city branch of the statistics committee.

3.4 Planning, design and financing of infrastructure

3.4.1 Planning and design of infrastructure

After the land use plan is finalized and approved by BAA, OGUKS contracts engineering companies to develop the detailed design of infrastructure services according to specific priorities. In the early days of the *novostroyka* developments, the first schematic plans were undertaken by engineering institutes and private companies as ordered by the government via OGUKS. In 1997, in order to systemize the approach, the government requested that Bishkek Architectural Authority take on this task.

The first priorities are generally given to electricity and water, and then roads and social infrastructure (schools, kindergartens, health posts). If funding permits, the next priorities are telephone services, sewerage, playgrounds, irrigation and land drainage infrastructure, and greening (planting trees etc) of open space.

Investment programs are based upon engineering cost estimates of projects, proposed for individual *novostroykas* using the land development and infrastructure plan to estimate the demand. OGUKS then applies to the Municipality of Bishkek for the next year's funding. Design engineers are contracted to provide detailed drawings, specifications, and cost estimates for the projects. Based on this data, OGUKS conducts tenders for procurement of civil works, supply and installation services for required infrastructure. The tender is conducted in accordance with the National Procurement Law and is open to private and State contractors. Construction supervision is also part of the OGUKS responsibilities.

The basic input parameters used by BAA for land use plan development are the total size of the area and standard size of individual land plots. Through these 2 parameters, the maximum number of plots is estimated, and through it the design population is estimated by multiplying the maximum number of plots by the average household size. Inaccurate estimates of these two parameters has implications on the social services requirements (day-care centers, schools etc) and the sizing of infrastructure (including water supply lines and sewers).

The average household size (family index) is assessed officially by the National Statistics Committee of Kyrgyz Republic for each region of the country. The total design population gives the estimate for the capacity of different forms of infrastructure. However, observations from the site visits and discussions with community representatives suggest that occupancy per plot is often more than 4. As shown in Table 3.1, this observation is also reinforced by the data from the World Bank's household survey (2005).

Table 3.1 Occupancy in residential properties in the *novostroykas* (BCSI 2005)

Household size	Number	Percentage (%)
1	11	2
2	25	5
3	87	18
4	132	27
5	147	30
6	55	11
7	23	5
8	10	2
9	3	1
Total	493	100

However, it is difficult even for the head of each quarter to provide an accurate estimation of the actual number of population, due to high number of people renting rooms, and unregistered temporary workforce, including those who are officially registered in provinces, and ethnic Kyrgyz people from Tajikistan, applying or planning to apply for Kyrgyz citizenship.

In addition, many residents in *novostroykas* rent part of their premises to people from rural areas who come to Bishkek to seek temporary or permanent employment. This results in seasonal variations in the population and during the summer months, the total actual population of *novostroykas* is greater than in winter.

Thus, the official *novostroyka* population data, produced by National Statistics Committee using data of officially registered households does not accurately portray the actual population.

3.4.2 Financing instruments for infrastructure development

There are 3 main source of financing for infrastructure development:

- i) **Municipal budget** - Up until 1995, the municipal budget was the only financial source for investments, but since then the central government has been allocating funds for *novostroyka* development.
- ii) **State finance** - The *novostroykas* are the official responsibility of the municipality, but Central Government remains a key stakeholder in the development of the *novostroykas*, via the provision of grants for financing of capital investments in infrastructure and operations of the State owned facilities (e.g. schools, kindergartens, and health posts).
- iii) **Community co-financing** - Most engineering infrastructure projects are implemented with co-financing of residents and often with co- financing from various donors funds (e.g. project of local NGO Arysh as described in Annex 4). In the case of telephone services, only the telephone stations are covered by the State budget, and all cabling

works are paid by customers. In the case of water supply and sewerage, OGUKS pays only for primary and secondary mains, whereas tertiary mains and yard connections are paid for by households.

3.5 Service providers

After completion of construction, infrastructure assets are transferred to the relevant operators. The following service providers are involved in sanitation sector in the *novostroyka* areas:

3.5.1 Bishkek Vodokanal - water supply and sewerage

Provision of water supply and sewerage services (where applicable) is the responsibility of the municipal utility Bishkek Vodokanal. In the absence of water consumption meters (for majority of residential consumers), the fees are based upon standard consumption norms according to the level of services, and the number of persons in the household. The arrangement with the municipal utility (Gorvodokanal) whereby the utility installs the main line and standpipes and the households are then responsible for constructing the household connection is common.

The risks of these projects are related to adopted design parameters. Currently, the primary objective is to supply water to all areas at least at the level of public standpipes, and yard connections to those who can afford the connection. The estimated consumption in such cases varies from 35 l cap⁻¹ day⁻¹ to 60 l cap⁻¹ day⁻¹, but in the future when more and more people are willing to pay for in-house connections, the per capita consumption will increase.

3.5.2 Combinat Blagoustroistva – solid waste management

In the main city, solid waste collection services are provided by municipal service provider *Combinat Blagoustroistva*). However, solid waste management (waste collection and transportation) in all *novostroykas* is organized independently and the fees for these services are set and collected locally.

3.5.3 Private sector operators

In the absence of centralized sewerage services in *novostroykas*, some households with house connections use individual cesspools¹¹. These cesspools should be lined with concrete, but are often constructed with no lining. In case of concrete lined cesspools, the households use private pump truck services for cesspool emptying. Currently these operators are neither directly licensed with SES, nor fall under the jurisdiction of the State Environmental Authority (formerly Ministry of

¹¹ often incorrectly referred to as septic tanks by residents

Emergency and Environment). In addition, there is no professional license for their operation but they are registered as small business with tax authorities.

3.6 Assessment of Government investment plans for investments in infrastructure in the *novostroykas*

Although the official planning process appears to be well-established and the procedures clearly defined, in many instances, there is not possibility to implement these plans. As a result, the resultant implementation of construction of infrastructure is an ad hoc procedure responding to demands from *novostroyka* residents and irregular disbursements from State or municipal coffers.

The planning process is constrained by an inadequate database. There is therefore a need for improved spatial and physical maps for these settlements, as well as collection of detailed data on present situation in relation to the coverage and quality of services. To get a more accurate estimate of the service coverage and investment requirements would require a more detailed study. This should also involve collection of data from those *novostroyka* that were not covered in the household survey.

The overall process of development of the *novostroykas* and infrastructure planning is often undermined by political decisions that pander to the demands of land grabbers. This makes the process of long term investment planning extremely difficult.

In addition, the following observations were made. :

- There is a lack of clarity between the institutional roles and responsibilities of OGUKS and UKS for infrastructure and services delivery
- The current planning approach is predominantly technocratic which is not responsive to community demands.
- Systematic planning approaches are undermined by the government's acceptance of the demands of land grabbers.
- The intermittent release of funding from State and municipal coffers for investments in infrastructure results in *ad hoc* and patchy service provision.
- The current level of data about the existing situation (in relation to demand and current coverage of services) is extremely weak and there is a lack a of comprehensive information management system to assist in decision-making, physical planning and design of infrastructure.

Due to overall limited financial resources from the municipal and State budgets, OGUKS budget requests are under-financed and the funds are insufficient to meet construction demands in all *novostroykas*. Partly as a result of this, although there are official approaches for the planning and design of *novostroyka* infrastructure, due to lack of funds, the implementation approaches are based upon a more ad hoc set of decisions. Because annual budgets are insufficient to cover all

novostroykas equally, OGUKS together with the TACs makes decisions annual on an *ad hoc* basis and for the schemes that are considered to have the highest priority.

Due to lack of funding, the GENPLAN has not been updated since 1970. As the master plan did not foresee the expansion of the city boundary of such magnitude, the old plan is of little value. Therefore, Bishkek Architectural Authority prepares a housing and infrastructure plan each time a new settlement is created, but there is never sufficient money available for the completion of the implementation of the plan.

Investments required for the construction of infrastructure are therefore based upon estimates which are presented annually to the Mayors office by the different agencies (notably UKS and OGUKS). As a result, there is inevitably some competition for limited resources, which does not promote a healthy relationship between these 2 agencies. There is an apparent institutional overlap of responsibilities between UKS and OGUKS which is particularly inappropriate for networked systems in which there is a need for close co-ordination for activities at all levels.

Annex 10 shows the size of total State expenditure for the period between 1991 and 2004 for water supply system in various *novostroyka*. In case of water supply system, the general plan as a total index takes into account the consolidated unit of lineal km of the network, but doesn't indicate the level of services, actual coverage, and quality of services. Reporting on water supply construction only indicates the length of pipes as a proportion of total planned length, but doesn't indicate whether the total length includes all streets within the *novostroykas*, whether the streets have a connections or the quality of service in terms of the volume of water supplied or the hours per day when the water is supplied.

Another weak point in this system of budgeting and monitoring of investments relates to the fact that expenditure does not reflect the system performance, nor does it reflect the coverage of constructed assets in relation to demand. The weakness of current planning and monitoring practices, related to capital investments are clearly illustrated by the data from OGUKS. The reported capital investments figures are not informative, as they are presented as proportion of total estimated needs in the *novostroyka* development plan.

Annex 11 shows OGUKS investment plan for the years 2005–2009. A problem relates to the fact that by the time the funding is approved, any plans or designs are completely out of date, which essentially means that the planning process is often a fruitless exercise and there is no incentive to ensure that formal procedures are followed.

4.0 Assessment of sanitation infrastructure and hygiene related practices

Based upon site visits to selected *novostroykas* in Bishkek, this section focuses on an assessment of infrastructure coverage, quality of services and related environment conditions and hygiene related activities in the *novostroykas*. In the absence of full coverage of fully operational municipal services, local communities have responded in various ways to these deficiencies, sometimes with the help of international agencies and local NGOs.

4.1 Impacts on health related to housing and urban environmental quality

A combination of factors affects the health status of *novostroyka* residents, particularly the poorer households who often bear the health consequences of low environmental quality more dramatically than other urban residents. This is often due to the fact that the poor are often of lower nutritional status and have less capacity to pay for medical treatment when they fall sick. However, in addition they lack sufficient resources to invest in improvements for housing and on-site facilities related to sanitation, and therefore live in areas of greater environmental risk.

Illness caused by poor environmental quality leads to a loss of valuable workdays, which reduces family income with which families need to buy food and other necessities. Concurrently it increases expenditures by both households on medical treatment and also by government for the provision of public health care facilities. In addition, poor environmental quality reduces the ability of children to learn, which can subsequently lead to a decreased earning capacity as adults.

The main illnesses and diseases related to sanitation reported by SES to be prevalent in the *novostroykas* are those related to ingestion of pathogens that cause diarrhea and gastro-enteritis (see Annex 5). The most common pathogens (bacteria, viruses or protozoa) in the fecal-oral transmission route are pathogenic *e.coli.*, but there are also risks for outbreak of other diseases such as cholera, typhoid and hepatitis¹².

However, as the transmission routes of these pathogens are highly complex, it is not possible to identify if the specific causes of these diseases are related to the provision of sanitation hardware. The diseases may be related solely to poor sanitation, but are also likely to be related to the provision of water and hygiene behavior and in relation to the use of facilities.

¹² These are more common in Osh than in Bishkek and are believed to be due to the fact that is common for residents to obtain water from irrigation canals for drinking

4.1.1 Housing conditions and impacts of health

In general, construction of private houses is made by *ashar* method - a traditional form of mutual self help originating in rural societies, which relates to an informal type of construction, without involvement of professional architects, engineers and construction workers. Almost 80% of construction works are done in this way - framework, walls, etc. whereas the rest is usually made by owner himself or by contracting local builders. As a result, much of the housing constructed in the *novostroykas* violates construction standards set by SCAC resulting in potential housing safety problems, especially in areas that are located in area prone to seismic activity or in areas that are prone to soil subsidence.



Figures 4.1 and 4.2 Typical housing in peri-urban *novostroykas*

In addition to structural deficiencies, there are health concerns related to housing, which as summarized below, can have various impacts on environmental health conditions and subsequently the health of residents.

4.1.2 Space and overcrowding

Although it is difficult to define explicitly (due to additional confounding factors related to poverty such as poor nutritional status) enteric¹³ diseases have greater opportunities for transmission in situations where housing is overcrowded. This is due to the fact that there are increasing opportunities for pathogens to transfer between humans. Overcrowding is also frequently linked to transmission of respiratory infections such as tuberculosis (TB) and bronchitis.

Although overcrowding is not observed to be a serious problem, the density of inhabitation is higher than that recognized by the Statistics Committee Bishkek Office (as noted previously in Section 3), especially in some parts of some *novostroykas* where higher residential population densities are raised significantly by the sub-letting of land to poor tenants. These tenants generally live in sub-standard housing and lack access to the same amenities as the permanent

¹³ relating to or inside the intestines

residents. As a result, housing conditions in these areas result in the types of squalid and unsanitary conditions, which lead to the proliferation of disease.



Figures 4.3 and 4.4 Living conditions in sub-letted housing in Kelechek *novostroyka*

4.1.3 Health impacts related to climatic conditions

It is important to consider the impacts on health related to climatic variations and associated changes in temperature and rainfall both of which may influence the incidence of illnesses and disease related to poor sanitation in the *novostroykas*. Although there is no data available to demonstrate these variations, bacterial infections tend to be worse during warmer months (as bacterial activity and multiplication increase with temperature), whilst viral infections (hepatitis, rotavirus) are often worse in the colder months.

Dampness

Dampness is a particular a problem in *novostroykas* in the North of the city where groundwater levels are high, which is more pronounced during the winter months. This results in rising damp due to the lack of an effective barrier between the water in the ground and the walls of the home. Another potential problem is caused by penetrating damp in which rainwater and melting snow enters the structural fabric of the home through unsealed joints and cracks in the walls and roof. In addition to contributing to the survival of enteric pathogens, persistent dampness and mould in the home caused by poor drainage can cause respiratory illnesses (such as cough, wheeze, asthma, and bronchitis) as well as arthritis and rheumatism.

Cold weather

The lack of adequate heating and poor insulation in poor quality housing in the *novostroykas* has a significant impact on health of low-income residents. Inhabitants of the *novostroykas* are likely to suffer from hypothermia, rheumatism and arthritis and respiratory illness as well as a significantly greater risk of cardiovascular conditions – such as high blood pressure, which if untreated, increases the risk of coronary heart attack and stroke.

4.2 Hygiene related practices

The household survey commissioned by the World Bank undertaken by BCSI concluded that *novostroyka* residents are not generally aware of the importance of adopting good hygiene behavior and often do not pay proper attention to household practices which may affect their health (BCSI 2005).

Awareness of health risks is an important factor, which influences hygiene behavior. However, environmental and physical conditions are also important contributory factors that affect hygiene behavior. By observing the physical and environmental conditions related to housing and access to water supply and sanitary facilities, we are able to infer about the types of behavior related to sanitation that influence the transmission of enteric pathogens in the home and in the community.

As the source of the drinking water is virtually outside of the home (yard taps or communal stand-posts), there is a risk of contamination of water between the source and point of use). The level of risk depends upon the type of container used for collection and storage and the level of care and attention taken by the user to hygienic practices to reduce the risk of contamination.

The lack of provision of hand-washing facilities outside latrines will mean that users are unlikely to routinely wash their hands after defecation. This invariably results in unhygienic practices and the proliferation of sanitation related diseases. It is very normal to have a potty for small children, which can be emptied in the pit latrine.

It was not possible to obtain an accurate assessment of handwashing and use of soap, but based upon brief discussions with *novostroyka* residents, it is believed that many households have soap but this is not necessarily used regularly for handwashing after defecation. According to Birnan *et al* (2005) who undertook a detailed survey in rural areas, laundry soap is the most widely used but the primary purpose is for washing clothes. The use of soap for washing hands is seen as being of secondary importance and soap is often only used if hands are visibly dirty such as with dust or oil, because soap is considered to be expensive. Therefore, many families periodically have no soap because they cannot afford it and people try to use soap sparingly. In the poor *novostroyka* communities, similar behavior regarding use handwashing and use of soap is to be expected, as many of them are rural migrants. However, due to the heterogeneous nature of *novostroyka* communities, it cannot be assumed that will be the case in all situations.

As mentioned previously, climatic factors will also influence hygiene behavior. For instance, if residents (especially children) experience discomfort caused by freezing temperatures, they are much less likely to wash their hands. The lack of adequate lighting in the latrines may also contribute towards the lack of good hygiene practice.

4.2.1 Washing facilities (personal hygiene)

Household washing facilities

Private bathhouses are rarely part of house constructions in the *novostroykas* and many low-income households do not have access to their own private washing facilities. However, some households are observed to construct a rudimentary shower facility, consisting of an enclosed space for washing with a raised container of water, which enables the user to have a shower (See Figures 4.5 and 4.6). Evidently, these are important for personal hygiene but construction is rudimentary and there is usually no provision for drainage of washwater.



Figures 4.5 and 4.6 Household washing facilities

Communal bathhouses

Communal bathhouses are a traditional feature of residential areas, which were introduced during the Soviet era as a cost-effective means for the State to promote improvements in personal hygiene and therefore public health. Due to poor management and lack of attention to operation and maintenance, these public facilities tended to dilapidate over time and therefore became used less frequently by local residents. However, these are seen to be reemerging in some residential areas in Bishkek and Osh due to local entrepreneurial initiatives, some of which have been supported by funding from UNDP-LIFE (**see Annex 4**).

The registered bathhouses have water supply and sewerage connections and pay for the water consumed according to meter readings. These bathhouses are observed to be well managed and provide communities with an important asset for hygiene. However, there are also unregistered bathhouses in which the sanitary conditions are questionable and there is a danger that a bathhouse may become a locus for infectious disease transmission if not regulated by the SES health checks, which aim to ensure the conditions are safe from the sanitary point of view (see Section 3.1.4).

Although the quality of these facilities varies considerable, the charge to use a bathhouse appears to be fairly uniform. The baths are not cheap (generally US\$0.50 for an adult and US\$0.25 for a child), and are therefore not affordable for the poorest residents. For less poor households who can afford to use the bathhouses regularly, the frequency of use is reported by bathhouse staff to be once per week, but more during the cold winter months due to the lack of hot water in private houses and apartments (based upon information from Osh).

4.3 Domestic water supplies

4.3.1 Water supply coverage

The household coverage of water supply in Bishkek is estimated by BVK to be approximately 80-85%. The majority (if not all) the remaining 15-20% unserved are in the *novostroykas* and these are concentrated in a few particularly poorly served areas. Therefore, averaged figures obscure the fact that some *novostroykas* have an acute problem related to the lack of centralized water supply.

Table 4.1 shows that there is significant variation in coverage data between different *novostroykas*. In some cases, the household survey indicates less than the 50% coverage of water supply, whereas the OGUKS data suggests 100% service coverage. In the most extreme case, in Bakai-Ata, OGUKS data indicates 100% coverage of water supply, whereas the household survey suggests that the coverage is much lower, potentially as low as 24%. This is assumed to be due to the fact that OGUKS data is based on the construction of secondary mains in the area whereas results from the household survey data indicate the extent of household connections to the water supply network.

Table 4.1 Variation in water supply coverage between OGUKS data and BCSI (2005)

	OGUKS estimate	BCSI (2005)
	%	%
Ak-Bosogo	30	41
Kolmo	92	89
Kasym	100	59
Ak-Orgo	84	40
Archa-Beshik	26	79
Ala-Too	64	79
Bakai-Ata	100	24
Ak-Tilek	100	67

Water supply problems are particularly apparent in Ak Bosogo¹⁴, where drinking water problems are of top priority for local residents due to water shortages for the past fifteen years. A total of 14 km of pipes were laid in 1993 and 1994, but there still remains a chronic lack of water and consequently, as reported by community representatives, some local residents drink water from the irrigation system, either unaware or disregarding the potential risks to their health. Other *novostroykas* which are identified to have similar problems are Ak Orgo¹⁵ and Kok Jar¹⁶.

¹⁴ the novostroyka development plan indicates that a total of 45 km of pipe is required but to date only 7.5 km has been constructed

¹⁵ the novostroyka development plan indicates that a total of 50 km of pipe is required but to date only 20 km has been constructed. where 63 km should be by plan and 36 km are available actually

In Ak Bosogo and Ak Orgo, residents also expressed their concern about the lack of irrigation water for plants for urban greening and kitchen gardens. In Ak Orgo they irrigate with tap water and complain about reduced soil fertility due to high concentration of salinity (chlorides). Usually to irrigate with tap water in Bishkek doesn't provide any significant negative impacts, but in Ak Orgo they are close to one of the wellfields, where the treatment plant with chlorine is located and therefore when the water reaches Ak Orgo the residual time is short, and therefore, the concentration of active chlorine is still high.

As shown in Table 4.2, the majority of households (86 %) have an individual connection, and out of these only 24 % have an in-house connection with the rest (62%) having a connection in the yard. On the main roads, households tend to have yard connections, whereas in the smaller streets, households are more likely to use communal standpipes. However, only 8% collect water from public stand posts. The distance to these standpipes is generally less than 200 meters although some have to walk up to 500 m. Imported water (carried in tanks) and water from open reservoirs is only used by less than 2% of residents.

Although not mentioned in the survey, it is known that some households (mainly those in the Chui oblast) still use handpumps, which abstract water from shallow groundwater. This water provides a supplement to the water supplied from the BVK system as well as providing a back-up supply in times when the BVK system is not functioning. These water sources may be subject to pollution from latrines as discussed in Section 4.6.

Table 4.2 Types and location of water supply facilities

	2002 %	2005 %
Yard standpipe	52	62
In-house connection	23	24
Public standpipe	9	8
Transported water	10	2
Other	< 2	< 2

The household survey suggests that almost 10% of imported water users have gained access to piped water since 2003 and a trend away from shared street tap towards increased household connections. This situation has also resulted in a decrease in the number of waters users with water sources located outside their houses (from 21% to 16%), while the rest have water sources in their houses (19%) or in backyards (65%).

¹⁶ the novostroyka development plan indicates that a total of 50 km of pipe is required but to date only 20 km has been constructed.

4.3.2 Quality of service

In general, where residents have access to water supply connections, they report that the quality of service is reasonably good in terms of quality (although this cannot be quantified as there is no routine physio-chemical and bacteriological testing of the water by SES at the point of consumption).

In terms of quantity, almost 40% stated that they have never been cut off and less than 30% stated that cut off occurs only several times per year (although no indication of the length of cut off). However, the frequency of regular interrupts in water supply in some *novostroykas* is higher than in others.

Table 4.3 Frequency of water cut-off

	2002	2005
	%	%
Never	36	38
Several times per year	25	27
Once per month	3	5
Once per week	4	4
Several times per week	5	6
Daily	2	2
Don't know	4	1

Water consumption data is very limited due to lack of metering. Therefore, the following standard consumption data from Osh VodoKanal¹⁷ are quoted for the purpose of estimation of water use in residential properties:

- 35 l cap⁻¹ day⁻¹ for houses, using street standpipes
- 60 l cap⁻¹ day⁻¹ for houses, using yard connections,
- 100 l cap⁻¹ day⁻¹ for house connections with no other services (*novostroykas* are not connected to hot water supply, gas, and most of the households are not connected to sewerage)
- 170 l cap⁻¹ day⁻¹ for apartments without hot water supply but with sewerage

¹⁷ Although some fluctuations are expected from one city to another, it is assumed that the values in Bishkek are similar as they originate from the same design standard.

However, these design values may be exceeded considerably due to the fact that there is no control over the use of standpipes or yard connections and many *novostroyka* communities who originate from rural areas traditionally use water for irrigation. As much of the irrigation systems that originally served the agricultural areas have been lost as new constructions have filled in irrigation channels, the residents resort to use of piped water for irrigation. This excessive use of water places an unnecessary burden on the water utility and contributes to water shortages. The wasteful use of water is partly due to the fact that there is no culture of paying for water and without metering, BVK has no mechanism for making consumers of water accountable for their use of water.

In order to provide water for irrigation and for making adobe clay bricks, many standpipes are observed to be deliberately tampered with to enable a continuous flow of water even when the standpipe is not in use for its designed purpose (see Figure 4.7). As the standpipes have limited provision for drainage of unused water, there is a tendency for undrained water to accumulate around the standpipe. This undrained water may contribute to the transmission of water related diseases (see Figure 4.8).



Figures 4.7 and 4.8 Communal water supply standpipes

4.3.3 Water supply costs

Vodokanal water tariffs for residential customers in Bishkek are US\$ 0.028 m⁻³ according to the water consumption estimated by norms quoted above. Institutional State building (e.g. schools, hospitals, State office buildings etc) are charged at a higher tariff; US\$ 0.061 m⁻³, and water for all other consumers is charged at a higher rate of US\$ 0.10 m⁻³.

In the household survey, a considerable number of respondents found it difficult or refused to answer the question about payment for water use. Answers from the 55.6% of respondents who did answer the question are rather evenly distributed: 16.6% pay less than US\$ 0.5 USD per household month; 19.7% pay between US\$ 0.5 – US\$ 4; 19.3% pay more than > US\$ 4. The share of those paying more than US\$ 2 for water use has grown 8% as compared to findings of the previous survey.

Table 4.4 Payment for water (BCSI 2005)

	2002	2005
	%	%
< US\$ 0.5	9.3	17
US\$ 0.5 – US\$ 4	15.2	20
> US\$ 4	41	38
Don't know	34	25

4.4 Household sanitation and latrines

4.4.1 Access to sanitation

Open defecation was not reported to be practiced in the *novostroyka* communities during any of the site visits and observations made during these visits also confirmed this finding. In the majority of cases there is no provision for hand washing facilities next to the latrines. In most situations, water is not used to flush the toilet and paper is the most common type of material used for personal hygiene purposes.

The use of pit latrines has considerable implications on the transmission of enteric pathogens as the containment of feces in a pit in the ground significantly reduces the incidence of diarrhea and other illnesses causing gastro-enteritis.

According to the World Bank's household survey, the majority of households have access to their private toilet and virtually all of these are on plot pit latrines located in the yard (See Table 4.5). In a few situations, where households are sub-letted, the latrines for these renters and are sometimes located off the plot in public space, but this is not a common situation.

As a result, in the vast majority of cases, a toilet is used by only one household (97.4%). According to the household survey, only very few (1.8%) in the house and 1.0% using a toilet located in the street with only 2.6 sharing with others (the shared use of toilets has decreased from 4.1 % over the past 3 years).

Table 4.5 Location of toilet (BCSI 2005)

	2002	2005
	%	%
In-house	3	2
In-yard	96	97
At the street	1	1

4.4.2 Types of latrine and construction

It is almost universal practice for households in the *novostroykas* to construct pit latrines. Even the poorest households are seen to invest in digging a pit and

rudimentary construction of superstructure. Only a small minority have a flush toilet connected to either lined or unlined cesspools (3%) and even fewer have a connection to a sewerage system (1%) (Table 4.6)

Table 4.6 Toilet type

	2002 %	2005 %
With individual sewerage system	4	3
Pit-latrine	95	96
Other	1	1

The estimated length of usage of a pit is between 2 and 5 years depending on the size of the pit, the level of usage and the depth of groundwater. There are no standard design dimensions, but frequently about 2 m square and 1.5 – 2.5 m deep, depending on the depth to groundwater.

In the *novostroykas* in the north of the city, the performance of pit latrines is adversely affected by the shallow groundwater. The fact that households have to move their latrines regularly is reflected in the types of superstructure observed in different *novostroykas* as shown in Figures 4.9, 4.10, 4.11. Where households have to frequently move (less than 1 year) the location of the latrine as the pit becomes full, the superstructures are observed to be more temporary. On the other hand, in areas where groundwater is lower, latrine superstructures are more likely to be constructed from adobe brick.

In cold conditions, several factors influence the rate at which the volume of sludge accumulates in pit latrines. During the winter months from November - March, both aerobic and anaerobic biological processes, which normally reduce the volume of sludge and will effectively halt in sub-zero temperatures. In addition, when the soil is frozen, it becomes largely impermeable and the liquor from the sludge in the pit is not able to soak away (although this will not affect lined pits).

The construction of the pits is essentially the same (unlined) but the slab and types of materials used for the superstructure vary enormously. The quality of these latrines is generally very poor. The following observations were made by Birnan *et al* (2005), but based upon observations made site visits, many of the latrines in the *novostroykas* of Bishkek are of similar construction and quality:

- Pits are unlined and covered with two parallel logs supporting a floor of rough wooden planks with a central hole.
- The tops of the pit are not sealed in any way and there are gaps between the floor and the pit and also between the planks of the floor.
- Latrine superstructures are made of materials that included corrugated asbestos, wooden planks, logs, reeds and jute sacks.
- Gaps in the walls and roof (and also some with no roof)

In addition, many latrines appear to be

- a) structurally unstable
- b) uncomfortable – offering little protection from the cold weather and

- c) difficult to clean, their surfaces being rough and absorbent.

4.4.3 Household expenditure on sanitation

Capital expenditure on household sanitation varies considerably and it is difficult to provide a guideline value. For comparative purposes, the richest households may pay in the region of US\$ 1500 to install a bathroom with domestic sanitary appliances including a flush toilet. In addition, these households also need to install a sealed septic tank. As these tanks are filled quickly, the tanks must be emptied regularly at a cost of US\$ 20-30 (for 3m³ of the emptied volume).



Figures 4.9 and 4.10 and 4.11

Examples of different types of pit latrine construction illustrating poor, medium and good quality construction practices



However, by far the majority of the poorer *novostroyka* residents, do not pay for sanitation as it costs next to nothing to dig a pit and the materials for the superstructure cost very little— the adobe bricks can be made on site using locally available soil and other structural items can be scavenged or bought cheaply. But this will depend on the choice of materials for the superstructure.

Examples of different types of pit latrine construction illustrating poor, medium and good quality construction practices are shown in Figures 4.9 and 4.10 and 4.11. The design of the best quality latrine in Figure 4.11 was unique and influenced by a rural sanitation program promoting VIP latrines and cost approximately US\$ 50 although the householder could not affirm this more precisely. It is estimated that the medium quality latrine probably cost in the region of US\$ 15 whereas the

materials and cost of construction for the lowest quality latrine is not more than US\$ 5.

4.5 Sewerage and wastewater management

4.5.1 Pit latrine and cesspool emptying

Privately operated pit latrine and cesspool emptying services work with private and institutional clients in Bishkek and their fees vary quite considerably according to the location of the client and the type of sanitation. Residential properties with bathrooms and kitchens only connected to cesspools are charged less than those that also have toilet connections. Lined pits also have a different charging mechanism because they often required considerable amounts of water to flush out the pits. The volume of each truck is 2.5 - 3 m³ and the smallest charge of the private operator is US\$11.25 per trip.

The operator is expected to discharge the septage¹⁸ into the wastewater treatment works and in the locations where no wastewater treatment works are available to a special discharge station of BVK, which is connected to centralized sewerage and wastewater treatment plant.

In Bishkek, the truck operator informs BVK about the volume of septage and name of the client and BVK then proceeds to bill to the client for treatment of discharged wastes. The residents are charged, through a system of coupons, submitted by operator to the discharge station, where the name and address of the client are indicated. The tariff for treatment is US\$ 0.0725 m⁻³, which is the same rate as for sewerage services for commercial sector entities. In Osh, there is a different system where the cost of discharge to the wastewater treatment plant is paid for by the truck operator. In order to avoid payment, there is anecdotal evidence which suggests that some private truck operators discharge sewage illegally into centralized sewerage mains. This was reported in Osh, and was not confirmed for Bishkek.

4.5.2 Sewerage connections and treatment of wastewater

In the majority of *novostroykas*, the current practice is to dispose of gray water onto the ground in the areas surrounding the house. This is not perceived to have significant impacts relating to sanitation due to the relatively low consumption of water and the relatively good infiltration capacity of the soil. However, this is more problematic when the ground is frozen during winter months and increasingly becomes a problem in higher density areas and where water consumption increases.

¹⁸ Septage is the contents of septic tanks or cesspools that is removed by the vacuum trucks

As shown in Table 4.7, almost 90% have no connection to any drainage or sewerage system, although 10 % mentioned a private connection to household cesspool.

Table 4.7 Type of connection to sewerage

	2002	2005
	%	%
No sewerage connection	88	89
Private connection to household cesspool	9	10
Connection to centralized sewerage system	3	1

The data supplied by OGUKS is not representative of the number of household connections because most of the tertiary connections have been constructed by residents without involvement of OGUKS and State funds. For example, in Kelechek, a group of residents from one of the lanes initiated activity to collect money and started installing a tertiary sewer. However, they were unsuccessful in completing their micro-project due to the fact that not all residents has the money to contribute (or were not willing to pay) and the attempts to obtain permission from *Gorvodokanal* for the sewer connection were also not successful.

In relation to wastewater management, BVK Wastewater treatment plant consists of full biological treatment with activated sludge and an outflow into the River Chuj. Vodokanal water tariffs for residents for residential customers in Bishkek are US\$0.010 m⁻³ of wastewater. The design capacity of the plant is 380,00 m⁻³ day⁻¹ and the current load is between 250,000 and 280,000 m⁻³ day⁻¹. As mentioned by the Director of BVK, there is considerable spare capacity due to the industrial decline and decreasing discharge of industrial wastewater and therefore there is opportunity to increase the wastewater loading into the BVK system without any investment in the primary network.

4.6 Groundwater quality and risks from pollution

4.6.1 Sub-surface hydrogeology in Bishkek

Bishkek is located on alluvial sediments and the majority of its water supplies come from groundwater aquifers underlying and to the south of the city. The municipal utility Bishkek Vodokanal supplies water from boreholes located within the city and also from a major well field at Orto-Alysh (50% of the produced water) in the foothills about 8 km south of the center.

Current water table, of the catchments area is about 40 m deep, but the soil of the catchments area is quaternary alluvial sediments, which are highly permeable. As the alluvial systems contain several aquifers at various depths, which are often hydraulically interconnected, in the course of time water movement from one aquifer to another will occur due to the downward vertical gradient of water.

Therefore, deeper aquifers can be vulnerable to pollution due to leakage of polluted shallow water induced by deeper pumping. In addition, extensive urban and peri-urban pumping for city use has induced deep infiltration of recharge into the aquifer system and the decreasing filtering area caused by the city development decreases the groundwater reserves.

In spite of its inter-granular nature and great thickness, according to a study carried out by the British Geology Society (BSG) in collaboration with The Kyrgyz Scientific, the Bishkek aquifer system is, in contaminant vulnerability terms, a rapid response system. The absence of extensive low-permeability horizons that would protect underlying aquifers is implicit in these findings. Fortunately, so far, the urban aquifer seems to have escaped major water quality deterioration, partly because the quantity and quality of surface water recharge has been high and partly because contaminant loadings appear to have been relatively light. Were either circumstance to change, if for instance the Ala Archa catchment became urbanized or winter road de-icing were introduced, the impact on potable water quality would start to be felt after only a very few years, even in deep boreholes (Morris *et al* 2005).

4.6.2 Risk from pollution from on-plot sanitation

Microbiological contamination of shallow groundwater is a concern where communities drink water from these sources, but as most of the groundwater in Bishkek comes from deeper groundwater, the water supply is considered to be relatively safe as far as microbiological contamination is concerned.

Although contamination is not generally considered to be of serious concern in the areas with a deep water-table, the BSG vulnerability assessment carried out a research study using environmental tracers which showed that recharge enters the saturated zone at fast rates in the coarse piedmont deposits, possibly at up to 10m/year on the piedmont. This may not be a problem for most pathogens of fecal origin but there are some relatively persistent pathogens (Cryptosporidium, possibly Giardia, and some viruses) may potentially be a health concern.

In addition, as the travel time from surface to deeper aquifer is typically years to decades, it is the non-biodegradable persistent contaminants (nitrates or chlorides) rather than micro-biological pathogens that are likely to pose the most significant problem in the future if the number of unlined cesspools is not controlled.

According to BVK, the concentration of nitrates at the source of ground water for Bishkek has already reached the level, close to maximum, permitted by the national standards. These concerns were expressed by the manager of BVK, in relation to the intensive development of the land in the area, close to the catchments of the ground water source of Bishkek (Orto Alysh and Ala Archa wellfield). In particular, this refers to *novostroykas* of Ak Orgo, Archa Beshik, Orok, and Ala Archa where the potential threat of nitrate contamination in the raw ground water is of concern, especially as current water treatment technology does not remove nitrates.

4.7 Drainage of surface and sub-surface water

In addition to sanitation related problems – notably as a result of mixing of water and excreta which mobilizes pathogens – there is a range of environmental health issues (see section 5.2) as well as structural damage to buildings caused by inadequate drainage of sub-surface groundwater and surface water (rainwater and melting snow).

4.7.1 Surface drainage

Although not directly associated with sanitation per se is malaria, which although generally associated with rural areas, is an increasing problem in peri-urban areas. As mosquitoes that transmit malaria breed in clean water, poor drainage of unpolluted runoff is important for mosquito breeding sites. In the *novostroykas* of Kalys-Ordo and Kelechek there are anecdotal reports of malaria outbreaks from local residents.

4.7.2 Sub-surface drainage

Drainage problems are widespread in the north of the city, especially in *novostroykas* were allowed to develop in areas where the groundwater level is very close to the surface, especially during the autumn-winter season when the phreatic surface rises.

Many agricultural fields originally have open or underground land drainage infrastructure. The layouts of such infrastructure often are not traceable, due to liquidation of the previous owner (State or collective farm). However, agricultural fields converted to *novostroykas* in the northern parts of the city were originally not covered by the land drainage infrastructure (former lands of the Sovkhoz Mayskyi). Consequently, the level of shallow ground water in these areas is an average of 0.5m below the surface.

Ignoring of existing land drainage infrastructure has led in some cases to its demolishing and abandonment through construction of houses on the top of manholes, using land drainage as gray water drainage and etc. This is particularly the situation in the *novostroykas* where the agricultural fields originally had special deep underground drainage system to allow for the structural loadings from agricultural machinery.

The consequences of water logging vary from damage to the house stability, sanitation facilities, roads, to wetland development and potential spread of such infectious diseases as malaria. In addition, it becomes more difficult and costly to build land drainage after the houses were constructed.

In response to the need to rehabilitate and expand the land drainage system in Ak Bosogo. The NGO Bishkek Centre for Social Initiatives acquired funding via GTZ US \$2500 to improve the system. With community labor in kind, the project was able to contribute towards improved drainage and a reduction in the level of ground water and decrease in areas of water logging.

4.8 Solid waste collection and disposal

In all *novostroykas* in Bishkek and Osh, solid waste collection has become the responsibility of local residents as these areas are not served by municipal services. Solid waste management is an area in which some *novostroykas* are seen to be very active and were seen to have developed their collection systems without any external support. These systems have all been initiated by the Territorial Administrative Councils with support from their constituent communities.

Due to a shortage of containers and vehicles, solid waste collection in the *novostroyka* areas are not served by the municipality. Therefore, in all the *novostroykas*, the residents are responsible for making their own arrangements and in the majority of situations, the territorial administration is responsible for collecting the payments for individual household.

Solid waste collection services operating in the *novostroykas* have been increasing in recent years. As shown in Table 4.8, the services are operated by various private companies which collect the waste usually once per week (51.7%) although some less frequently (13.8% once per month). According to the household survey, 66.3 % stated that waste is picked up by truck, which is an increase of approximately 25% from 3 years ago. There has been a definite improvement since 3 years go, both in terms of the trend towards truck collection systems and the increasing frequency of collection.

Table 4.8 Frequency of waste pick-up (BCSI 2005)

	2002	2005
	%	%
Once per week	32.5	52
Once per month	8	14
Once per quarter	0.5	0.5
Don't know	59	33.5

Although most of these appear to be reasonably successful, the TACs report that not all households participate and are willing to pay and the collection ratio of these services varies from 40 to 70%. More recent *novostroykas* are generally less organized than those established in the first wave, but some more established *novostroykas* Such as Ak Tilek, Ala Too, Archa Beshik still have fairly poorly developed solid waste collection systems mainly due to the problems of collecting the money from the local residents.

People, who are not paying either dump their wastes illegally in nearby open spaces within the *novostroyka* (often areas near houses spreading odor and unsanitary conditions) or they burn or bury the solid wastes in their yards (see Table 4.9).

Table 4.9 Method of solid waste disposal (BCSI 2005)

	2002	2005
	%	%
Picked up by truck / container	42	66
Burnt	13	8
Buried	19	13
Dumped	21	16



Figure 4.11 Lack of solid waste containers **Figure 4.12 Burning refuse**

In different *novostroykas*, collection and transportation of solid wastes is organized differently in various *novostroykas*. As none of the *novostroykas* have containers for intermediary collection, the waste is either dumped at the agreed collection point or households leave it at the side of the road carriageway on an agreed day of the week, depending on the arrangement agreed with the private waste collection company in each *novostroyka*.

In some of them (e.g. Bakai Ata, Ak Bosogo, Ak Orgo) the truck passed along a defined route through the *novostroyka* once per week according to an agreed schedule and each family, paying for the services has a possibility to dispose the waste. In Kelechek, Ak Tilek the wastes are dumped in several places within the *novostroyka*, and when the place is full, TAC hires a private truck for solid waste transportation.

The fees for solid waste collection services vary from approximately US\$ 0.1 per person per month to US\$ 0.5 per household per month. Various types of eligibility are applied. In some *novostroykas*, only adults are charged, in others children are charged from the age of 7 upwards.

4.9 Other environmental health concerns

One of the problems of several *novostroykas* is the ecological condition of the environment. Although these are not related to sanitation, they are considered to be important public health threats, which are evidently of greater importance to the local residents than other environmental health problems such as those related to sanitation.

Asphaltic concrete plant

Kelechek *novostroyka* is located in the northern part of the city, initially formed by spontaneous self-acquisition of land, but later formally approved as an area for housing by the municipality. However, the settlement is very close to an asphalt plant (as the area initially was not planned to be developed into residential district) and during the spring-summer-autumn seasons, waste products from the plant are constantly blown into air causing a wide range of health problems for local residents.

Ash disposal areas of Bishkek coal-fired power station

Bakay-Ata *novostroyka* is located near the disposal area for fly ash from the Bishkek Power Plant. The Pulverized Fly Ash (PFA) is transported through a transmission pipeline and is then dried on the disposal site. Part of the ash is transported away by trucks for construction purposes (making of concrete-ash blocks). The site causes intensive localized air pollution, which is generated by passing trucks and even relatively light winds raise ash into air. The ash is deposited throughout the whole residential area and residents have to close windows with cellophane to stop the ingress of gray sediment into their homes. Of greater concern are the health impacts. The dust particles in the air make breathing more difficult and cause chronic diseases related to pulmonary and respiratory health.

Cemetery

The *novostroykas* of Kelechek and Ala Archa are located in close proximity to the Bishkek city cemetery, which is at higher elevation than the settlements. The *novostroykas* are also in the area of shallow ground water, and some households rely on individual handpumps, which risk contamination from the sub-surface flow from the cemetery.

Burial ground for dead cattle - Anthrax

In the area surrounding anthrax disposal site (*Ala Too Novostroyka*), the State has permitted housing construction on the territory of the protected area (about 100 m radius) and this has facilitated the further ongoing land squatting in a closer radius to the center of the disposal site.

In the centre of *Ala-too Novostroyka*, there is a burial ground of cattle deceased from anthrax, which was formed at the end of 1940s. During the first self-acquisition of lands at the end of 80s-90s people started to build their houses on the territory close to the burial ground. Since the lands self-acquisition process was arbitrary and even aggressive, the people didn't react to the bans, explanations, persuasions that it could lead to bad ecological consequences.

Officially, there is a sanitary protection zone around the burial but this is ignored by squatters and the structural condition of burial sarcophagus is also worsening.

Therefore, the threat of anthrax agent's penetration into the living area is increasing (anthrax agents can persist for up to 100 year period).

This year, the problem has attracted sufficient attention from Bishkek City Council (*Kenesh*) and deputies for the issue to be discussed at one of its sessions. However, there is still no final decision on the construction of the reinforced fencing surrounding the protection zone and other required mitigation measures.

5.0 Recommended interventions for sanitation improvements

This section describes the recommended interventions for improved sanitation conditions and hygiene practices in the *novostroykas*. It focuses on the need for extended service coverage and physical infrastructure and facilities in order to achieve improvements in environmental health. It also emphasizes the need for a concerted approach to promote improved hygiene behavior required to bring about improvements in the health of *novostroyka* communities.

5.1 Strategic objectives and priorities for intervention

There are 3 main underlying objectives of the proposed project interventions related to sanitation and hygiene behavior:

- i) Protect public health by reducing the transmission of water and sanitation related diseases.
- ii) Improve access (especially for women and children) to secure, private and convenient sanitation facilities.
- iii) Mitigate pollution of the environment and protect the quality of natural water resources (both ground and surface water).

There is a need for improvements in many areas, but due to the widespread variability in *novostroykas* it is important to note that not all the proposed interventions described below will be required in all areas. In addition, due to limitations of available funds there is a need to develop a more systematic procedure for prioritization of funds which respond to local demands and willingness to pay for services.

The recommended intervention strategy for improved sanitation and hygiene in the *novostroykas* recognizes this wide diversity of conditions – both physical and socio-economic – in accordance to the observations made during the site visits and the assessment of existing conditions described in Section 4. Consequently, the following factors are taken into consideration in the assessment of priorities and the recommended strategies for intervention:

- i) *Existing coverage of services* –a lack of services will influence the demands from local residents for investments, bearing in mind that different types of service will be prioritized differently according to the location and the needs of the community itself.

- ii) *Current sanitation related and environmental health conditions* – in *novostroykas* or areas of *novostroykas* where there are particularly poor environmental conditions which are affecting the health of the local population, there is an obvious need for priority investments.
- iii) *Location in relation to infrastructure networks* – for connections to water supply, sewerage or drainage, the location in relation to infrastructure networks and therefore the possibility to connect to the centralized system will be an important consideration.
- iv) *Willingness to pay* - willingness to pay, especially for operational costs, is a key factor affecting the choice of the location and the type of technology.

In Table 5.1, the interventions are focused on 6 clusters (Group A – F) of *novostroykas*, which were identified to have similar characteristics and are therefore used for the basis for identifying priority interventions. Also, see annex 12 for a map of these clusters.

It is also important to recognize that there is a wide range of priorities that influence the interest from *novostroyka* residents in improved sanitation. For example, residents generally perceive the quality of housing to be of greater importance than the quality of their latrine. Therefore, interventions that focus solely upon sanitation improvements without considering household interests to improve their housing are likely to have less of a successful uptake.

Residents frequently prioritize improved employment opportunities to generate income, better schooling, health facilities and public transport etc and all of these compete for the interests of *novostroyka* community members and influence the resultant demand for sanitation. It is therefore also important to recognize these priorities as otherwise the success of interventions, which are designed to improve hygiene behavior and sanitation will be limited.

Table 5.1 Description of main physical features of each *novostroyka* cluster

Cluster	Name and reference number of each <i>novostroyka</i>	Key characteristics
Group A	Kalys-Ordo (1), Tendik (8), Ak-bata (23), Dordoy (5), Enesay (14)	<i>Novostroykas</i> of the most recent generation. Characterized by the lowest state of infrastructure development, and the lowest quality of the housing (predominantly adobe bricks).
Group B	Kelechek (21), Ak-tilek (24)	<i>Novostroykas</i> of the first generation. Problems due to lack of sufficient land drainage. Medium quality housing, using a variety of materials (adobe bricks, bricks, concrete, and concrete-ash blocks) for construction
Group C	Altyn-Beshik (12), Keremet (16), Kolmo (18), Madaniyat (19), Burdinsky (22), Kasym (20) Salam-alik (25), Askatash (26)	<i>Novostroykas</i> of the first generation. Located inside the main city, and therefore could be easily integrated in city infrastructure, due to proximity of the primary mains and support the demand for centralized sewerage.
Group D	Ala-too (9), Ak-bosogo (10), Bakay-ata (15),	<i>Novostroykas</i> of the first generation. Ak Bosogo is in the area of high ground water and lacks irrigation infrastructure. Ala Too has weak infrastructure services, Some areas in both <i>novostroyka</i> are not covered by water supply. Houses are predominantly from adobe bricks.
Group E	Ak-orgo (11), Orok (13), Archa-beshik (4) Ala-archa (6)	Ak Orgo and Archa Beshik are the largest in terms of population. A part of Ala Archa is located in the environmentally sensitive areas due to its location in relation to the cemetery. Experience some problems related to water supply, lack of sewerage, but high demand and willingness to connect.
Group F	Kokjar (7), Karak-Jigach (2), Uckkun (3)	These are amongst the best amongst the <i>novostroykas</i> from an environmental health perspective. Mixture of affluent, medium and low quality housing and medium state of infrastructure services.



Figure 5.1 Clustering of novostroykas according to physical characteristics and service coverage

Table 5.2 Prioritization of investment requirements according to cluster

Cluster	Water supply	Sewerage	Drainage
Group A	HIGH	NONE	NONE
Group B	MEDIUM	HIGH	HIGH
Group C	LOW	HIGH	MEDIUM
Group D	MEDIUM	NONE	MEDIUM
Group E	MEDIUM	MEDIUM	LOW
Group F	LOW	LOW	LOW

5.2 Framework for intervention

An integrated approach towards sanitation is recommended, which incorporates the cumulative benefits of simultaneous interventions in water supply, sanitation and hygiene promotion. This forms the basis for area-based interventions in the *novostroykas* in which sanitation forms an integral component of urban upgrading.

The main consideration is the fact that communities in *novostroykas* are diverse and highly heterogeneous. In practice this means that for a successful intervention in the sanitation sector, the approach adopted by the project for effective hygiene

and sanitation promotion needs to be flexible enough to cater for the different target groups.

Although public utilities play an important role, sanitation is essentially part of the household domain. Therefore, external interventions can only be successful where complemented by attention to the practices at the household level. There is a wide range of factors that affect health and a number of different sanitation related transmission routes that may cause illness. It is therefore problematic to differentiate between them and identify which ones are explicitly related to which component of sanitation infrastructure and which are related explicitly to behavior.

The Hygiene Improvement Framework (see Figure 5.1) provides a comprehensive approach to diarrhea prevention. As well as a need for strengthening of the enabling environment, which is discussed in Section 6, the two main interventions described below are those that are designed to improve access to water and sanitation “hardware”; and promote better hygiene practices. The most successful interventions are recognized to include a combination of hardware (infrastructure and facilities) and software (use of facilities and other sanitation related hygiene behavior) involving:

- i) proper hand hygiene which focusing specifically on handwashing with soap at critical times.
- ii) safe disposal of feces and effective use of sanitation
- iii) ensuring provision of safe household drinking water and safe storage of water for drinking and preparing food.

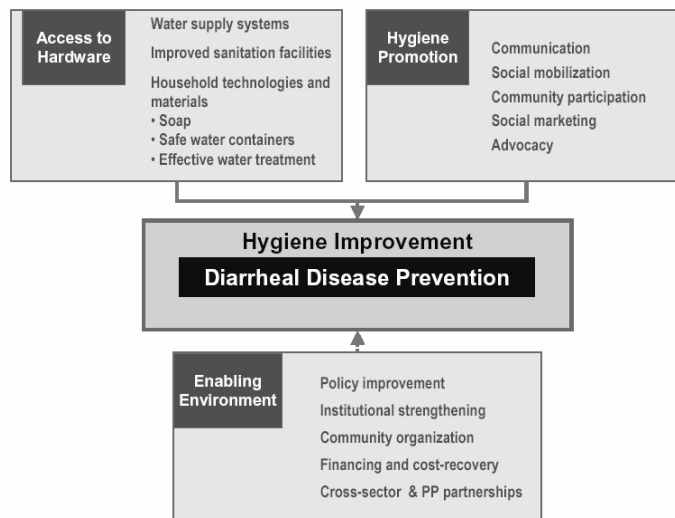


Figure 5.2 Hygiene improvement framework (Storti 2004)

5.2.1 Access to hardware

The following hardware requirements are considered to be necessary for improvements in sanitary conditions and environmental health in the *novostroykas*:

- i) Water supply systems to address both the water quantity and quality issues. Although in-house connections are desirable, well-functioning and operational water supply at the yard level is the basic option, as public stand-posts are frequently in a poor state of repair and poorly managed. Promotion of improved water storage practices in the home should also form an important part of this component.
- ii) Sanitation facilities to dispose of human excreta in ways that safeguard the environment and public health. The basic requirement is for all households to have access to well-maintained sanitary latrines with facilities for hand-washing to be used after use of the latrine.
- iii) Access to communal sanitation facilities – in schools, health clinics, bathhouses etc.
- iv) Access to improved washing facilities – both private and affordable public bathhouses with facilities for personal washing and washing cloths.
- v) Provision of sewerage for collection and disposal of domestic wastewater in higher density residential areas with poor on-site drainage
- vi) Improved drainage of shallow sub-surface water
- vii) Solid waste collection service at least once per week

5.2.2 Improved hygiene behavior

Although provision of safe water and access to basic sanitation hardware is essential for improvements in health, these need to be complimented by a concerted effort focused on hygiene promotion. Hygiene promotion refers to advocating for and supporting behaviors that are known to reduce diarrheal disease. The focus at the household level should be on prevention of diseases via improved use of facilities and hygiene practice, recognizing that the role of water quality in diarrheal disease control is less important than that of sanitation and hygiene.

Improving water quality at source does not guarantee a reduction in the transmission of water-related diseases. It is therefore important to consider hygiene behavior related to water collection, storage and usage in the home because contamination of drinking water after collection may pose a greater risk for diarrhea than contamination of the water at source.

Hygiene promotion is based on a good understanding of how behaviors in households and communities contribute to diarrhea - particularly that which results in morbidity in children. Therefore, of critical importance is the need to focus on key messages, such as the need for handwashing, which is recognized as the most effective intervention related to hygiene behavior to reduce sanitation related diseases. These key messages should be the most critical aspect of behavioral change to focus on as part of a hygiene promotion campaign.

5.3 Social marketing approach towards hygiene and sanitation promotion

Hygiene promotion is important to generate demand for sanitation, but it is important to recognize that there are other drivers, which encourage investments in sanitation. The recommended approach towards hygiene promotion incorporates social marketing techniques, which are targeted towards different stakeholder groups within the community and focus on specific messages to promote changes in behavior and to stimulate demand for improved sanitation.

One approach that has been widely adopted in sanitation projects is the Participatory Hygiene and Sanitation Transformation (PHAST) Approach. The PHAST approach is based upon principles of adult learning and community development and encourages local participation in defining problems and solutions related to water, sanitation and disease control. In the PHAST process, the community members analyze their own beliefs and practices and then determine their own priorities for disease prevention and identify appropriate barriers to block disease transmission.

Although the PHAST approach is recognized to have resulted in considerable gains on the DFID Rural Water Supply and Sanitation Project, it is not considered to be so appropriate for an urban upgrading project in the *novostroyka* communities. This is because the communities are less established in the *novostroykas* than in rural areas and many lack the time that is required to be engaged in extensive PHAST participatory planning activities, because they have greater interests to be involved in economic generating activities. There is also a risk that only a small cross-section of the community will be reached and requires considerable inputs from skilled personal to facilitate community discussions and participatory planning in small groups, which is resource intensive, and therefore expensive from a project perspective, which limits the potential for scaling up.

A social marketing approach is therefore recommended as it is more flexible, and to a certain extent more sophisticated, to be able meet a wider variety of target groups (which is certainly necessary in the *novostroykas* of Bishkek). Social marketing makes use of marketing principles and strategies to achieve social goals, including those related to better hygiene and sanitation. The emphasis to stimulate demand for latrines via sanitation promotion focusing upon the benefits of access to sanitation from a perspective of convenience, prestige/status, cleanness, privacy, and safety (concentrating especially on encouraging women to voice their demands) as well as more obvious health-based messages.

According to DFID (1999), the key components of social marketing are:

- systematic data collection and analysis to develop appropriate strategies;
- making products, services, or behaviors fit the felt needs of the consumers/users;
- strategic approach to promoting the products, services, or behaviors;
- methods for effective distribution so that when demand is created, consumers know where and how to get the products, services, or behaviors;
- improving the adoption of products, services, or behaviors and increasing the willingness of consumers/users to contribute something in exchange; and

- pricing so that the product or service is affordable.

5.3.1 Hygiene promotion

The successful implementation of hygiene improvement is dependent upon an effective communication strategy that raises awareness of hygiene facilities and practices, shares information, and promotes behavior change. The identification of the potential channels for communicating with key target audiences and seeking appropriate and effective ways of working with them on hygiene promotion should be a priority.

In this respect, strategies to promote hygiene practices include social mobilization, communication, social marketing, and community participation. The main target groups should be with women and children, but hygiene promotion campaigns should also include men wherever possible.

Program communication strategies that may be developed as part of the project include:

- *Interpersonal communication training*: Strengthen the ability of government and NGO fieldworkers to reach target beneficiaries and to promote sanitation and hygiene. Address interpersonal communication skills and the quality of available support materials.
- *Mass media*: Build on existing policies and strengthen government and private-sector capacity for creative presentation of standardized messages.
- *Print media*: Promote the development and dissemination of a clearly defined printed material to build awareness about hygiene and sanitation, using billboards, posters, site-signs etc.
- *Community-based media*: Use local-level media, e.g. public address systems, and employ traditional, community-based entertainment artists, e.g. popular folk singers, dramatists, and poets, and use their talents through the mass media.

School hygiene promotion

If sanitation facilities in schools are badly maintained and used, schools become places of risk where diseases are transmitted creating health hazards for the children and teachers as well as for the community at large. It is therefore vitally important that schools have adequate water supply and proper sanitation facilities and an important activity should involve a combination of software and hardware to promote improved hygiene behavior amongst pupils.

There are good reasons to focus on schools as focal points for health awareness campaigns and sanitation promotion. In addition, after the family, schools are most important places for learning and behavioral change and children can be highly effective as stimuli within the community as they have a direct influence on their family, both existing and in the future. Schools can also influence communities through outreach activities, since, through their students, they are in touch with a large proportion of the households in a community.

School hygiene education is a specific form of the wider school health education. It deals not only with water and sanitation-related health problems in and around the school and concerns all activities that promote health and reduce health risks of school children. According to Birnan (2005), the education and health services can also play an important part in supporting and sustaining an intervention, which focuses on sanitation. However interventions that rely solely on education, as the key to motivating behavior change may not fully appreciate the many routes through which the school experience might impact on children's behavior.

5.3.2 Sanitation promotion

Social marketing for sanitation promotion is an approach to encourage those who are selling sanitation components and construction material to be actively involved in the marketing. The logic for this argument is that it is the private sector that is in the best position to market sanitation because of the inherent incentives for the successful implementation caused by the profit motive.

Demonstration latrines

An important aspect in sanitation marketing is the use of demonstration models of technological options to stimulate demand. These should be installed primarily in schools and community centers, health posts. Where sanitary facilities in schools are available, they can act as a model, and teachers can function as role models. Schools have a central place in the community and are therefore ideal locations for demonstrating latrines, which in principle can stimulate interest within the community and encourage local residents to construct their own household latrines.

Although household latrines and hygiene behavior in the home environment are the cornerstone of a good sanitation strategy, the potential contribution of communal sanitation should not be overlooked. These facilities can provide a good focus for hygiene promotion and demonstration of good sanitation practice and form an essential component of a comprehensive sanitation intervention, providing a) the increased opportunity for residents to use improved sanitation facilities and b) demonstrative latrines.

The potential sites for demonstration sanitation include:

- Schools
- Health Clinics
- TAC posts
- Community centers
- Bathhouses (including improved sanitation)

In each case, the relevant authorities, should contribute to capital costs, which will increase their sense of ownership and responsibility for the facilities and also increase the number of locations that receive financial support. Operation and maintenance costs should remain the responsibility of relevant authorities.

Development of the private sector and community managed systems

Therefore the 'marketing' of sanitation to compliment the hygiene promotion should be upon the development of the 'supply chain' of components and building materials for sanitation facilities. The key actor at the local level is therefore the supplier of the latrine components to households (where latrines are considered as a "private good" and households as customers). This will involve the encouragement of the private sector to be active in the marketing of sanitation components.

Stimulation of the supply chain for materials for latrine construction should involve identification and training of local artisans in the local maintenance groups and pilot demonstration centers.

In the case of bathhouses, sanitation forms part of a combination of sanitation and washing facilities (both personal hygiene and clothes washing). There are a number of potential management options including the community and private sector management. These facilities are seen to be well-managed by the private sector in Osh (see Annex 3) have also been the focus on a number of successful local initiatives supported by the UNDP – LIFE programme (see Annex 4). The latter provides an example for how the bathhouses can be managed in a way, which ensures that the poorer households of the local community are not excluded from the benefits that the facilities offer, in terms of both employment and concessions for use.

5.4 Water supply

5.4.1 Extension of service coverage to underserved areas

The assessment indicated that there are some significant deficiencies in water delivery in the most recently established *novostroykas* in the North of the city. It is in these areas (which did not form part of the household survey) where community representatives and residents prioritize water supply to be the most important sanitation related intervention.

The *novostroykas* which were identified by the assessment to be particularly deficient in water services are Kalys-Ordo, Dordoy, Tendik, Enesay, Ak-bata, but also in Ala Too, Ak Bosogo, which are large areas only partially covered by water supplies. Many local residents also referred to a need for improved irrigation water in addition to the need for water supply.

In areas where water supply coverage is limited or supplies are intermittent, then improved water supply will invariably be a priority. The design of the system should be sufficient for yard connections for 100% of households. Therefore, at the design stage, the parameters of the system should be set at the level of maximum service level (house connections), that will allow gradual upgrade of water supply services by individual households. The distribution should be gradually improved in *novostroyka*, moving from standpipe, to yard post and finally to in-house connection.

5.4.2 Rehabilitation of the system including standpipes

The condition of the water supply standpipes – both in household yards, but particularly in the public spaces – indicated a need to prioritize investments in

rehabilitation of the existing water supply systems. Therefore, special attention should be placed upon the following:

- i) Rehabilitation of leaking pipework.
- ii) Installation of a new type of standpipe with a robust valve mechanism that cannot be tampered with so as to ensure that water is not left running when not in use.
- iii) Installation of a concrete apron around the standpipe and a drainage system that conveys the water, either to an infiltration soakaway or to a surface water drainage channel¹⁹.
- iv) Installation of areas for washing in the yard – both for personal hygiene and for clothes – including provision of drainage of wastewater.

5.4.3 Water storage in the home

As water is not piped directly into the home, it is inevitable that water is stored in containers in houses for convenience and to provide water during times of disruption to the supply. Although the potential health risks cannot be accurately quantified as part of this assessment, it is generally accepted that it is during the transport and storage of water when contamination can occur²⁰.

According to the World Health Organization, key factors in the provision of safe household water include the conditions and practices of water collection and storage and the choice of water collection and storage containers or vessels. These are important because inadequate storage conditions and vulnerable water storage containers are factors which contribute to increased microbial contamination and decreased microbial quality compared to either source waters or water stored in improved vessels. In particular, higher levels of microbial contamination and decreased microbial quality are associated with storage vessels having wide openings (e.g. as buckets and pots), vulnerability to introduction of hands, cups and dippers that can carry fecal contamination, and lack of a narrow opening for dispensing water (WHO 2002).

In addition for the need for “hardware” interventions including covered water containers with narrow necks, which can be promoted using similar social marketing techniques for sanitation components, there is a need to include a “software” component, which promotes good practices related to use of facilities, and the appropriate use of water with a focus on improved hygiene behavior.

¹⁹ Note : there should be good drainage so that water does not collect and provide a sanitary hazard - particularly in relation to the breeding of *anopholes* mosquitoes which transmit malaria.

²⁰ This has already proven to be an important component of the DFID funded hygiene promotion campaign in the World Bank’s Rural Water and Sanitation Project.

5.5 Sanitation technologies

5.5.1 Factors influencing choice of sanitation technologies

Given the heterogeneous nature of the *novostroykas*, it is not feasible to suggest that one type of latrine will be suitable for all households in all communities. The success of sanitation interventions will depend upon promoting the right type of latrine in the right situation.

The main factors that are considered important in the identification of the most appropriate type of sanitation for the peri-urban communities residing in the *novostroykas* include the following:

- Water consumption
- Housing density
- Climatic conditions
- Protection of groundwater quality
- Capital and maintenance costs

These factors are discussed in detail below:

Water consumption

If water is not used for flushing, then a dry sanitation system is the most appropriate solution. If on the other hand, water flush toilets²¹ are installed, then there will be a need to construct either septic tanks or some form of sewerage to drain the wastewater and convey to the treatment plant. Water consumption is therefore the key factor in the decision to invest in sewerage infrastructure.

Housing density

In highly dense residential areas, on plot sanitation is not viable simply due to the lack of space to install latrines. However, the housing density in the majority of *novostroykas* permits the continued use of on-plot sanitation, but other physical conditions such as the shallow groundwater and increased water consumption means that on-plot sanitation is not viable in all locations.

²¹ The volume of water depends upon the type of flushing system employed. Although more affluent households aspire to install full flush water closets, pour flush toilets use considerably less water (1-2 liters per flush as oppose to between 6-8 liters for a full flush).

Climatic conditions

In addition, due to the freezing weather during winter, pour flush toilets are not recommended²². During the freezing conditions during winter months, latrines that use water for flushing excreta (such as pour flush latrines and water closets) will freeze unless they are insulated from the cold and housed in a heated building. As this is considered to be unlikely for poor households in the *novostroyka* areas, flush toilets are considered inappropriate and not recommended.

During the summer months from July-August, when ambient temperatures are greater than 20°C, which is a good temperature for rapid digestion of excreta in the pits of the latrines, there are problems of flies and smells. It is therefore necessary to consider an appropriate design, which minimizes discomfort whilst using the latrines in these conditions and mitigates health risks associated with the transmission of disease via flies.

Protection of groundwater quality.

In the areas of shallow ground water, it is important that latrine pits are lined according to SES regulations, especially if households use water for yard handpump. In areas which are situated above deep aquifers that are used for water supply, there is also a need to line the latrine pits and cesspools in order to reduce the risk of the pollution of groundwater sources.

Capital and operation and maintenance costs.

In terms of connecting to the sewerage network in *novostroykas* is heavily dependent of the collective factor. In bringing sewerage primary and secondary mains to the area, more households need to contribute in order to reduce the individual costs. Therefore, centralized sewerage is an option applicable to areas where significant part of households are willing and able to pay for these investments.

²² It is important to note that as water supplies improve, there is likely to be a trend towards increased demand for sanitary appliances, which use water to flush excreta into waterborne sanitation.

5.5.2 Recommended sanitation technologies

Taking the above factors into consideration, the following recommendations are made regarding the design and construction of household sanitation in the *novostroykas* of Bishkek.

Ventilated Improved Pit (VIP) latrine

For the majority of low-income *novostroykas* residents, the most appropriate type of household latrine is the Ventilated Improved Pit (VIP) latrine. As described in Annex 6, the VIP is an improvement on the conventional pit latrine. The VIP latrine has an offset pit that permits the installation of a vertical ventilation pipe (or structure) beside the latrine. The design of the VIP latrine causes air to flow down into the latrine pit through the latrine squat hole and up out of the ventilation pipe, thus removing odors from the latrine. Flies are always attracted by the smell from latrines, but in a VIP latrine they are attracted to the top of the vent-pipe rather than to the latrine squat hole. There they are prevented from entering the vent-pipe by a fly screen fixed across the top of it.

The VIP has been adopted by the World Bank's Rural Water and Sanitation Project (See Annex 6) As the cost of an individual latrine is estimated to be approximately US\$ 200 per latrine, this will be prohibitive for many lower-income households unless heavily subsidized. Therefore, there is a need to promote a lower cost version that is more affordable for the households in the *novostroykas* using lower cost materials for the superstructure.

In addition, the project should support the development and promotion of a sturdy and safe latrine slab, which can be easily cleaned, and ventilation pipes. Although the moulds for making the slabs are not expensive to make, they are not used in Kyrgyzstan. Therefore, the project should distribute moulds and instructions as to how to make a good concrete mix for latrine slab. As there are no significant transportation cost such as those associated with rural water and sanitation projects, this option seems highly viable in Bishkek and Osh.

These components can be provided at a subsidized cost and the householders can then be responsible for investing in the superstructure and encourage to adopt good practice in construction to ensure that the latrine is built in a way that promotes good sanitation: e.g. the latrine should be dark. The project will also support the distribution of good quality materials and ensure that those who construct latrines have access to advice and technical support to construct good latrines and to maintain them.

According to SES regulations, all pit latrines should be lined²³. If the pit is fully sealed, then the operation of pit latrines in areas of shallow groundwater should not be a problem as is currently the case in most of the areas in the novostroykas in the north of the Chuy irrigation channel. However, in practice it is unlikely that household latrines will be watertight and it is necessary to consider ways in which the problems associated with shallow groundwater can be alleviated.

A raised latrine may be the most simple and cost effective solution for on-site sanitation where there is a high water table. The excavated material can be used to raise the latrine and the lining is extended above ground level to provide the required pit volume. The pit for a raised pit latrine should be dug at the end of the dry season to maximize the available depth of unsaturated soil.

In the areas where there is no connection to sewerage there is a need for installation of household infiltration pits (soakaways) for disposal of greywater, provided the hydraulic capacity of the soil is favorable.

Flush toilets and on site wastewater management systems.

Toilets that use water to flush excreta will freeze during the winter months and are therefore not recommended for promotion by the project. However, more affluent households will install flush toilets. The majority of these will be of the water closet type, which use between 6 – 9 liters per flush.

There are various options for low-flush toilets that may be utilized by these households. The benefits of these are that the volume of wastewater is reduced and therefore, if the toilet discharges to a septic tank or cesspool, then the frequency, and therefore the cost of operation, is reduced. However, these technologies are not known in Kyrgyzstan and would need to be promoted through the market rather than through the project.

If the water consumption is low then it is not advisable to construct sewers as they are expensive to construct as well as difficult to operate and maintain (especially if wastewater treatment costs are included in the financial analysis). If water is not used in sufficient quantities, then sewerage systems will not operate effectively and will quickly become unsanitary.

Alternatively, the toilets may be connected to a communal septic tank which then has an overflow connected to the BVK sewerage via a small-diameter overflow pipe. However, there is an issue of management of a communal septic tank, which would need to be the responsibility of BVK for operation and maintenance.

²³ The pit should be lined with appropriate, locally available materials such as fired clay bricks, blockwork, porous concrete, large stones or pieces of rock, precast concrete rings or ferrocement.

It is unrealistic to expect that all residents in areas which use flush toilets will automatically adopted sewerage as there may be technical and financial reasons which it is not possible. Therefore, the

5.6 Sewerage and wastewater management

Recommendations for investments in sewerage infrastructure primarily dependent upon the following physical parameters:

- Level of development measured in terms of housing density
- Water consumption, and
- The hydraulic capacity of the soil to absorb wastewater discharged on site.
- Protection of groundwater.

In addition to these physical parameters are the financial considerations related to willingness to pay from local communities. Willingness to pay will be related to the first three factors mentioned in the above list.

As BVK has stated that there is plenty of capacity in the primary sewerage system, there is not need for further investment in primary infrastructure – only the secondary and tertiary infrastructure.

The *novostroykas* with immediate sewerage needs are those where it is apparent from site visits and discussions with stakeholders that there are a) physical requirements for sewerage and b) local demands express in terms of willingness to pay. The *novostroykas* that satisfy these criteria are those in Groups B, C and F as defined by Table 5.1 and Ak orgo, Kok Jar, and Archa Beshik are identified to be the areas, which should take first priority. Kelechek and Ak Tilek, Kasym and Kolmo are also can be in among the first.

However, there is also an additional consideration for sewerage in the areas that fall into the aquifer protection zone, which will require more detailed assessment of the sensitivity of the 30 well field in Bishkek. Although sewerage does not necessarily provide a totally secure solution to groundwater protection if it is not well-maintained, but according to SES is required as a more appropriate form of sanitation in these areas, due the fact that there is no effective regulatory instrument or means for enforcement to ensure that on plot sanitation does not result in contamination of the aquifer.

5.6.1 Reducing the cost of sewerage

There are a number of intermediate sanitation technologies between on-plot disposal and conventional waterborne sewerage that may be considered for urban communities. One technical solution that has been developed in Brazil is the concept of condominial sewerage, which is specifically for residential housing estates similar in to the *novostroykas* in Bishkek.

The following adaptations of conventional sewerage can be introduced to reduce the capital and operating costs of the systems:

- i) In order to reduce construction costs, the typical technical specifications that are used for conventional sewerage design can be relaxed. This includes the use of smaller diameter pipes, flatter sewer gradients and replacing manholes with simple access points.
- ii) Block sewers are located within the residents' plots or under sidewalks, in order to reduce the length of piping, which connect to the secondary sewerage system.
- iii) Thirdly, responsibility for maintenance of the block sewers may be delegated to the residents, thereby reducing the operating costs incurred by the service provider.

It is particularly appropriate for upgrading of informal peri-urban settlements and for areas with intermediate levels of water consumption (30 to 50 l cap⁻¹ day⁻¹), but has also been applied in greenfield developments with higher levels of water supply.

As the engineering design specifications are not likely to satisfy the accepted government design standards, it will be important to discuss the design and construction details with the relevant planning authorities (BAA), as well as OGUKS and the Vodokanal. As well as introducing new technical standards, the implementation process is based upon the participation of local communities and therefore, successful implementation of sewerage requires extensive community mobilization and support (as described in Section 6).

5.7 Groundwater protection

Depths to ground water are highly variable across Bishkek. In the South, the groundwater is relatively deep²⁴, whereas in the north, adjacent to the Chuy canal lies a shallow artesian aquifer. Where the source of drinking water is an aquifer with a high groundwater table, the risk of contamination from pit latrines needs to be considered. Although, the groundwater is shallow in the northern areas of Bishkek it is not used as a source of drinking water (except in a few cases where household still have handpumps).

In the South, the groundwater is deep and is more likely to be prone to nitrate pollution. As the existing water treatment system in Bishkek does not remove nitrates, protection of the aquifer is considered to be important, albeit on a different nature and time scale to health risks associated with poor sanitation.

BSG and the Kyrgyz Scientific and Research Institute for Irrigation produced a groundwater vulnerability assessment which was used to help local stakeholders develop an Action Plan for groundwater protection (Morris *et al* 2005). According to this study, an uninformed opinion would suggest a need for greater protection

²⁴ The static water table is about 40 m but the pumping from 120m below ground level causes a significant drawdown

measure in north, but the assessment undertaken by BGS showed that the aquifer system to the north of the city center (roughly north of the line of the Chuy Canal) is much less vulnerable to pollution than the area south of the city. This is due to the presence of low permeability silty clays, which protect the aquifer to the north, and there is little groundwater abstracted for potable supply north of the canal.

As a result of this study, the following areas were identified to be sensitive to groundwater pollution and therefore need to be protected:

- (i) The catchment area to the Orto Alysh wellfield, which stretches back into the National Park
- (ii) The piedmont²⁵ area south of the city, where the water table is deep but the aquifer very permeable with rapid recharge
- (iii) The river and canal systems, which are major sources of recharge to the underlying aquifer via bed leakage.

The BGS study also concluded that there is a need to focus future developments towards the east, west and north of the current urbanized area, with the aim of preserving the important groundwater aquifer in the south.

5.8 Drainage of groundwater and surface water

An important benefit of improved land drainage relates to the reduced damage caused by high groundwater on the structural foundations of buildings in the area. This is particularly important, as *novostroyka* residents are understandably more concerned about the condition of their housing than about poorly operating pit latrines.

A land drainage system consists of a network of buried perforated concrete pipes surrounded by a granular bedding material, which promotes the exfiltration of the water from the soil into the pipe. The pipe then acts as a conduit for the water, which then flows to a disposal point at the lowest point of the system (manhole or outfall) or, in the case of dispersal drains, to a dispersal area or leach field.

As discussed in Section 4, problems related to shallow groundwater are widespread and this has implications both on the operation of the pit latrines and structural damage to foundations of housing and other buildings. The areas that have been identified to suffer most from these problems due to shallow groundwater are in Group B and Group C, which already has provision of land drainage, but requires substantial renovation and partial reconstruction.

²⁵ Piedmont meaning “lying or formed at the base of mountains”

5.9 Solid waste management

Combinat Blagoustroistva, the municipal solid waste management service provider, lacks the capacity and resources to extend services to the *novostroykas* into their operations. As the *novostroykas* are already served by private sector service providers, the consultants recommend that strengthening the existing system is more appropriate than attempting to transfer responsibility for solid waste management to the municipal utility.

The *Novostroyka* Development Committees, led by the local TAC can work together toward the improvement of solid waste collection systems through the raising of the tariff collection ratio, awareness campaigns and provisions of improved interim transfer stations at the *novostroyka* level for waste storage prior to bulk collection by the trucks.

Novostroykas should be encouraged to improve existing management schemes through the support to the TACs. The *novostroyka* could introduce its own door-to-door collection service for which households would pay for the refuse to be collected and taken to the transfer station from where the municipality or private operator would collect the waste. The door-to-door service could subsidize the cost of transporting the waste for the neighborhood collection, which could be provided as a free service for those who cannot (or refuse to) pay and therefore give the non-payers no justification for continuing to burn or bury their refuse.

An improved collection system whereby the *novostroyka* is provided with neighborhood collection containers should be introduced to improve the service. In addition, the community managed solid waste collection system could promote recycling of glass, plastics and metal and composting of organic wastes to reduce the amount of refuse to be collected for transportation to the city-dumping site.

5.10 Other environmental health interventions

The following interventions are to be considered to be additional and complimentary components to the project for the reasons that the health implications are potentially more serious than those related to sanitation and/or local residents prioritize these and are therefore unlikely to respond to social marketing of hygiene or sanitation before these environment health risks are mitigated.

Therefore, any future project should take into serious consideration these issues and include components to initiate remedial action against these problems, prior to attempts to introduce other forms of intervention. These are considered to be particularly important as local self-government bodies do not attach importance to these problems and there are few NGOs promoting environmental interests working within the *novostroykas*.

Ash disposal site in Bakai Ata

In relation to the ash disposal site, in 1996 the central government issued a decree to relocate the site to a new location (2 km away from the current position) at a lower altitude. The new site has been allocated, but due to lack of funds, Bishkek power plant was not able to extend the pipeline, which conveys the PFA from the

plant to the dumping site. Funds to extend the pipeline are therefore essential for improvement of environment health conditions in Bakai Ata.

Anthrax burial site – Ala Too

The anthrax burial site requires serious investigations to define the required parameters to ensure that the potential health risks are mitigated. This will require structural improvements to improve safety, reinforced fencing around the site and relocation and resettlement of *novostroyka* residents who are believed to be living illegally on the protection area. In addition is the need for community awareness and education so that residents are aware of the risks of violating the protection area.

Asphalt manufacture – Kelechek novostroyka

For the asphalt manufacture, the most appropriate intervention is to introduce new technologies to upgrade factory to reduce emissions.

6.0 Proposed implementation strategies

This section focuses on the activities required for effective implementation of the proposed interventions described in Section 5. These focus on the institutional framework for service delivery and the necessary steps to improve the planning approaches adopted by the government agencies involved in infrastructure in the *novostroykas*. In addition, this section focuses on the necessary activities required to strengthen the enabling environment to enhance sustainability of service delivery.

6.1 Institutional framework for project management and implementation

Targeted proposed interventions of the project cannot be successfully implemented without a substantial strengthening of the capacity of involved State planning and implementation agencies and service providers. Capacity building component of the proposed project will be aimed at further performance improvement of these agencies, resulting in overall developed service provision and delivery.

6.1.1 Definition of institutional roles and responsibilities

In order to overcome the overlap of responsibilities between the two municipal agencies, UKS and OGUKS (see Section 3.2), a process of institutional reform and restructuring is recommended to ensure that one institution maintains responsibility for the overall planning and allocation of resources for infrastructure in the city as a whole. This is also particularly important if the formal integration of the *novostroykas* as part of the city is to be achieved. In addition, it is more efficient in terms of resources and enables greater transparency and accountability.

There remains an important role for OGUKS in order to have an institution working specifically for the interests of the *novostroyka* communities and to lobby for allocation of investments in these areas. OGUKS will continue with responsibilities for the implementation of social and community infrastructure works in the *novostroykas* including the management of the construction and the contraction of

construction companies, but with increased focus on working towards a more systematic demand responsive approach and development of financing instruments and mechanisms for cost recovery.

As UKS already has the mandate for the overall city infrastructure planning and investment, the *novostroyka* areas should fall under its area of jurisdiction. Thus, in the *novostroykas*,

- i) UKS will continue having the responsibility of planning and financing of larger, primary infrastructure, including those that serve the *novostroyka* areas
- ii) OGUKS will be responsible for the secondary infrastructure in the *novostroyka* areas.
- iii) Community (tertiary level) infrastructure will be the responsibility of the TACs in collaboration with OGUKS and Novostroyka Development Committees (see Section 6.5).

For this to be effective there will be a need to develop a methodology for defining the division between tertiary and secondary system lies to ensure that the responsibility for different components of the centralized system can be allocated.

The proposed project will therefore require some changes in the institutional framework for implementation and the different roles and responsibilities of the various government agencies are summarized in Table 6.1 and described below in more detail.

6.1.2 Project management

Overall management responsibility should be in a Project Implementation Unit (PIU) set under the Mayor's office of Municipality of Bishkek. The PIU will be best placed to interact with the relevant city administration departments, service providers, local government and the Mayor's office itself.

The main roles of the PIU should be:

- i) Prioritization of the projects for different *novostroykas*;
- ii) Management of the design works undertaken by eligible local engineering companies, and regulation of their work according to State design standards;
- iii) Assessment of operation and maintenance cost and envisaged tariffs and average fees; Agreement with community on these expected fees
- iv) Agreement with community on the level of community contributions
- v) Coordination of the design inputs with operators of relevant services: BVK, electricity distribution services, land drainage etc);
- vi) Leading of development of cooperative relations between service providers and consumers (community based consumer groups) with the aim to prevent future illegal use or non payment conflicts;
- vii) Procurement of civil works, supply and installation contractors;

- viii) Coordination of construction supervision services;
- ix) Handover of the completed infrastructure assets to companies responsible for operation

Table 6.1 Summary of main governmental agencies and proposed roles in project implementation

Institution	Roles and responsibilities
BAA (SCAC)	Urban planning activities and coordination of spatial information related to physical infrastructure and land use; thus enabling the other agencies and utilities to perform their duties more effectively.
UKS	Overall responsibility for investment planning and implementation of primary infrastructure serving the whole city (including <i>novostroyka</i> areas).
OGUKS	A dedicated multi-disciplinary development team, focusing on meeting the needs of the <i>novostroyka</i> communities. In addition to the contracting and regulation of the private contractors involved in construction of infrastructure works, OGUKS will provide technical assistance to TACs and specialist skills related to community liaison and mobilization for the implementation of community based infrastructure projects.
Sanitary and Epidemiological Services (SES)	SES will continue to undertake water quality surveillance, collection of statistical data about infectious diseases, and development and implementation of systems for monitoring and enforcement of regulations for household sanitation and other interventions from a health perspective. Legalization of private bathhouses and their monitoring with the aim of prevention of infectious diseases.
Republican Centre for Health Promotion - Ministry of Health	RCHP will provide hygiene promotion activities and will be responsible for preparation, development and implementation of the project's social marketing strategy for demand generation for sanitation during and after the project.

6.1.3 Institutional responsibility for hygiene and sanitation promotion

The Republican Centre for Health Promotion (RCHP), which is part of the Ministry of Health, is charged with the responsibility to promote hygiene awareness and good health practices throughout the whole of the Kyrgyzstan. In Bishkek, RCHP operates at the level of City Branch of the Center for Health Promotion with the mandate to promote health and healthy lifestyles.

A sanitation marketing approach is to be recommended, which involves the development and implementation of more targeted communications strategy to promote improved hygiene behavior amongst different target groups. Therefore, although RCHP is in the best position to take the lead on the project's hygiene promotion component, there will be a need for some external support and technical

support to assist the agency in the design, development and implementation of a social marketing for hygiene promotion in Bishkek and Osh.

A successful social marketing campaign is dependent upon the collection and analysis of data about the target groups (consumers) to develop an in-depth picture of consumer motivations and appropriate channels of communication. However, the demands for extensive research to design the campaign cannot necessarily be provided without sufficient time and resources, which are often not feasible due to project constraints. Therefore, a rapid research approach presented by Biran *et al* (2005) is recommended, as it is better suited for a smaller-scale intervention such as the *novostroyka* urban upgrading project.

Stimulating demand for sanitation infrastructure and behavioral change can take a long time and require more concerted efforts and associated resources to achieve real sustainable results than water supply. An essential part of social marketing is the need for a period of data gathering within the target community (3 months is generally required), which provides a sound base for program planning. After this a short period discussing the collated results with the community will allow the formulation of a promotion program founded on what consumers know, do, and want. As a result, messages, communication channels, target audiences, and target practices should be accurately defined to achieve optimum results (DFID 1999)

Although closely related to hygiene, sanitation promotion is more focused on encouraging householders to invest in improved sanitation and in the provision of an enabling environment that facilitates the transfer of technical knowledge and skills and the stimulation of the supply chain to provide component and construction materials for latrines. OGUKS is the recommended institution to take on institutional responsibility in these areas, but this will require capacity support and staff development to be able to provide a broad range of services in the area of sanitation promotion envisaged by the project.

Regulation and management of household sanitation

In combination with the need for hygiene promotion, there is a need for development of a legal and regulatory framework for household sanitation as well as a quantitative system for monitoring and evaluating health improvements. The State Sanitary Epidemiological Department is best placed to do this and the project will work towards strengthening the role of the State role through SES in better control of household sanitation and related services.

Key actors in the promotion of hygiene and sanitation

It is proposed that project will pilot health and hygiene promotion schemes. These pilot schemes can be the basis for future operations of the Republican Centre for Health Promotion in Bishkek. For the strategy to be effectively implemented and in order for health messages to be effectively conveyed, the project will need to engage with a range of local stakeholders including :

- i) Representatives from community-based groups and non-governmental organizations for hygiene and sanitation promotion activities

- ii) Medical staff from the *novostroyka* health posts and teachers and others working on community education, to focus specifically on hygiene promotion
- iii) Small-scale entrepreneurs working in the construction industry and provision of building materials for sanitation 'hardware' promotion

6.2 Planning and budgeting

Due to the inherent weaknesses in the current capital investment planning and monitoring, it is recommended that project will work with UKS and OGUKS to improve current planning and monitoring practices and the development of demand driven approaches, reflecting the participation of beneficiary communities. There is a need for a of comprehensive information management system to assist in decision-making, physical planning and design of infrastructure.

Although the project aims to support scaling up of best practice, the project in Bishkek is likely to initially focus on a limited number of *novostroykas* which will then subsequently lead to replication in other *novostroykas*. The initial intervention might focus on 1 older, more established *novostroyka* and another, which is newly established and is therefore less well served and social structures are less well developed.

The project is not designed specifically to focus on the poorest of the poor. Undoubtedly, it should ensure that the poor are not excluded from the benefits of the project, but this does not mean that the richer households are not to benefit – especially as these households are better positioned to contribute – both in terms of capital and ongoing operational costs.

Evidently there is a need to improve city-wide planning and this has implications on infrastructure and service delivery in *novostroykas*. The production of the revised Bishkek GenPlan will be an important planning and urban management tool for the municipality and various agencies involved in the delivery of different types of infrastructure and services throughout the city. However, it is not recommended that this should funded by a project which focuses on the *novostroyka* development

With the limited funding available from municipal and central budget every year, OGUKS and UKS need to have clear prioritization of capital investments in order to direct financial flows. The phasing of the investments can also be part of the new planning system involving greater responses to local demands.

One of the most common ways in which communities assess the effectiveness of local government is in its ability to provide public services. Willingness to pay studies may offer one way for local authorities to assess public perception of municipal service and opinions about future investment strategies.

An alternative approach, which is not based directly on trying to put a cost to a hypothetical market, is to assess service providers using an approach developed in India using report cards, which can have a strong influence on municipal budgetary systems and a way to enhance accountability. The majority of scorecards have focused on urban public services in order to demonstrate how the feedback from

civil society surveys can assist local governments improve the delivery of public services.

The governance scorecard attempts to assess the quality, efficiency, and adequacy of governance from the recipients' point of view and the main objectives are to:

- Obtain feedback from local residents about the quality and adequacy of public services.
- Identify what services people expect from the public sector and which from the private sector and how much they would be willing to pay for each type of service.
- Identify areas in which citizens experience problems in accessing the service and estimate the hidden costs incurred by the citizens.
- Evaluate the efficiency and effectiveness of service providers to respond to complaints.

One of the key advantages of the scorecard system is that it encourages citizens to adopt a pro-active stance by demanding accountability, accessibility and responsiveness from service providers. It may also promote the participation of low-income and marginalized sectors of society to play a role in decision-making process and increase public awareness and generate collective action and pressure from civil society against poor service delivery and political patronage.

Another approach involves participatory budgeting in order to promote increasing citizen participation in the allocation of city funds and therefore promote local government accountability. Citizen assemblies in each *novostroyka* city may help to determine priorities for the use of a part of the city's revenues. Participatory budgeting allows residents to decide on investment priorities in their communities and to review government responses. This involves a sequence of public hearings for each neighborhood and for the main city projects, which may subsequently influence the decision to invest in water supply and sanitation related infrastructure in relation to other perceived needs.

6.3 Capital financing

6.3.1 Financing of household sanitation

The sanitation strategy should avoid direct investment in household latrines as much as possible as this may suppress the willingness of households to utilize their own financial resources and lead to a culture of dependency in which residents expect external support to improve their own latrine. At the same time, subsidized latrines fail to install a sense of ownership, which undermines an interest and willingness to maintain the facilities.

All services should aim apply to *novostroykas* the same tariff policy as in the main city and subsidies should be discouraged. However, two forms of financial instrument may be considered to promote investment in household sanitation:

- i) Direct financial subsidy on selected latrine components – notably for sanplats and ventilation pipes for pit latrines.

- ii) A micro-financing scheme provides an opportunity to enable poor households to access funds to make housing improvements to household sanitation and drainage (including latrines and connections to water supply and sewerage). There are risks in the running of lending schemes for household sanitation related to potential misuse of the borrowed funds. However, these risks may be minimized by designing the scheme so that households can access financing for different investments without having to misuse the sanitation fund.

Responsibility for administration of both of these financial instruments for sanitation promotion should be the responsibility of OGUKS, working in collaboration with the TACs and Novostroyka development committees, and under close regulation of the PIU to ensure that the financial assistance is administered in a fair and accountable way.

6.3.2 Financing of water supply and sewerage

Sewerage in the *novostroykas* can be divided into primary, secondary and tertiary infrastructure and the financing mechanisms can vary accordingly. Projects for upgrading and construction of primary sewerage should be financed from the Municipal budget. Those projects should be included in the Master plan for sewerage and drainage for the city as a whole and fall under UKS responsibility for construction. Financing of secondary sewerage lines along main roads in the *novostroykas* should also be 100% funded from the city government budget. Requests for funding should come to UKS via OGUKS who will subsequently be responsible for implementation.

In the comparison of costs between different technologies – particularly in relation to on-site sanitation and sewerage systems – it is necessary to consider the full costs of system construction and subsequent operational and maintenance costs.

Tertiary sewers and individual house connections will be **co-funded** by *novostroyka* communities, based on the demand priorities. The advantages of the co-financing include a reduced financial burden on the central authorities because if residents commit their own money it means that they have an incentive to ensure that funds are used effectively.

The target contribution financial for the tertiary infrastructure in the *novostroykas* will need to be discussed and agreed amongst the government agencies in consultation with the various non-governmental stakeholders and representatives from civil society. The experiences from the Asian Development Bank's Rural Water Supply Project demonstrates that community contributions of a total of 25% (5% upfront in cash, 15% in kind and 5% loan) have been difficult to achieve in practice.

These experiences suggest that community contributions may sound attractive to the funder, but are harder to achieve in reality. In addition the potential delays in project implementation may result in additional costs in other areas. Therefore, careful consideration needs to be made about the level of community contribution in terms of sewerage network, we only can expect community contribution in terms of trench digging and back filling.

The upfront cash collection can be difficult for two reasons: the poverty of the people and the reluctance of people to pay for services. A realistic level of contributions is therefore no more than 10%. It is envisaged that poorer households will not be able to

pay, but the local community is also expected to contribute in the form of labor to assist in construction and the poorer households can therefore offer contributions in kind. Therefore, it is recommended that the community contributions are targeted towards investments in communal facilities and connections rather than towards contributions towards household level infrastructure.

Financing of land drainage

Unlike sewerage, the land drainage infrastructure is not divided into primary, secondary and tertiary and does not have individual house connections. The capital costs for construction of land drainage infrastructure (open or underground) should therefore be covered by the State budget (through the budget of municipality of Bishkek).

Financing of bath-houses

There are various approaches towards financing and management of bath-houses, but given the legacy of the State run bathhouses and the current trend towards private sector ownership and management, it is most appropriate to leave this to the private sector. However, the project could assist with soft loans either to companies or to community-managed enterprises and benefit from the experience of UNDP-LIFE programme (see Annex 4).

6.4 Project implementation at the local level

6.4.1 Territorial Administrative Councils and *Novostroyka* Development Committees

The Territorial Administrative Council of the local self-government provides the link between *novostroyka* communities and OGUKS during construction of infrastructure, and with the PIU in aspects related to planning and project management. TACs will assist OGUKS in the preparation of detailed designs, prepared in close cooperation with BVK and Municipal Land Drainage Operator, and extent of resetting works in cases where sewerage or land drainage need to be laid close to private properties.

At present, the TAC head receives support from a small group of administration staff and heads of quarter committees. However, in the planning and implementation of the area improvement programs that are envisaged to be part of the project, a *Novostroyka development committee* (NDC) will be formed to facilitate the process.

The NDC will be nominated by the *novostroyka* residents to assist the TAC in a clear and transparent planning, implementation, and subsequently and maintenance of community infrastructure and services. It should be emphasized that this group is not a political unit and its roles and responsibilities are distinct from political and administration duties. The *Novostroyka Development Committees* are formed by open voting from each quarter and can include members from existing self-help groups, and local NGO and CBO sector.

Management of community financial contributions should be administrated by TAC and agreed with PIU. The TACs will work in close collaboration with the proposed *Novostroyka Development Committees*, who will be responsible for community

mobilization and collection of community contributions. The NDC and TAC will also lead the participation of the community in the planning and design process, undertaken by BAA and relevant engineering companies. Upon completion of the construction, the sewerage will be transferred to the balance of BVK, subject to agreement from local stakeholder, who will then take over responsibility for management.

6.4.2 Community participation and local resource mobilization

The project should capitalize upon local availability of resources – skills, labor, time as well as finance – and there is a need for increased focus on a more demand driven approach and community participation during the project cycle. The government agencies involved in project implementation will be particularly challenged by the components involving greater participation from *novostroyka* residents. Increased participation of different stakeholder groups will require improved systems for communication and coordination.

Project implementation will require an increased focus on participatory planning, working with community based organizations and mobilization of local resources (including monetary resources). These activities will require specialist skills and close co-operation with the Territorial Administrative Committees. OGUKS will therefore continue to play an important role in the *novostroyka* development but will require new skills in order to provide assistance to the TACs during the planning and implementation of the project.

Due to the nature of the land acquisition and the increasing acts of aggressive and disregard for government control by those in are involved in the recent land invasion, the project will have to focus on social mediation and improved communications and to overcome this type of resistance and to ensure that different stakeholders are willing to work in close cooperation

The level of interest in improved services expressed by residents of the *novostroyka* during the World Bank assessment as well as experiences from other projects indicates the potential for community participation and demand led services. Community participation and mobilization of local resources will be particularly important for the implementation and related construction activities for community infrastructure.

CBOs will play a key role in community mobilization, but some communities will lack the skills to participate as effective partners in planning, procurement procedures and construction expertise. Where such skill deficits exist, communities will need to obtain external support from OGUKS and NGOs. Particular support will be required in the area of management of community contributions. This will require the development of methodologies for tracking and accounting for community contributions, procedures for collection and banking of community contributions, as well as systems for ensuring that communities adhere to project management schedules for implementation of the project.

Stakeholder coordination and participation will therefore be particularly important during all stages of the project implementation – planning, construction, operation and maintenance. Customer consultation during planning and implementation process should be based on a survey of the physical, social and economic

settlement characteristics, in order to develop acceptable sanitation alternatives, system configurations, financing options and maintenance arrangements.

As described above, poor households may also offer payments in kind to assist with the construction of the community infrastructure. The project should build upon the social tradition of mutual assistance known as *ashar* and promote the formation of local community groups to play an active role in the project planning and implementation processes. However, due to the fact that social structures are weak in some *novostroykas*, there will be need to be considerable emphasis on strengthening the cohesiveness of committees prior to any more direct discussion about the details of physical of inventions this could take time.

The following lessons from the ARIS Village Investment Project in the mobilization of communities should be taken into consideration in the design and implementation of the *novostroyka* urban upgrading projects:

Many community activists will have little or not experienced in organizing communities in a larger project involving construction works. Therefore, ample time and training must be allowed in order to allow first-time voluntary mobilizers to prepare communities.

Capacities should be distributed throughout all tiers of community mechanisms: communities will often elect the most competent people first, leaving skills and competency gaps in those organizations that are formed later. A better balance of skills, expertise and experience is therefore needed throughout all community structures to enable them to participate in the process and elections of community leaders.

Some local governments staff may feel threatened by participatory planning process, which may impede project implementation. Therefore reassurances need to be made that such initiatives are not intended to replace government functions, but merely assist it in achieving its goals. Inclusion of existing Government personalities into the programming of project activities will ensure the threat of conflict is minimized.

6.4.3 Implementation of works – tendering and contracting procedures

Use of local contractors and community labor for tertiary household connections and selected secondary infrastructure can reduce costs involving outside contractors as well as promoting a sense of ownership to the community. Technical support and help with contracts will be required and OGUKS will need to provide appropriate training and close supervision of local contractors to ensure quality control of the system construction.

Local contractors will therefore be required to implement construction works and local community leaders will play a vital role in motivating public participation to assist in planning and monitoring construction. While there are many different models of community participation, they all share certain key characteristics and goals.

According to de Silva (2000), these are:

- Community members are involved in identifying needs and selecting a subproject.
- Community participation is encouraged throughout subproject identification, preparation, implementation, operations and maintenance, and is usually done through an elected community project management committee.
- Communities provide contributions in the form of labor, cash and/or materials.
- Their contributions promote community ownership and hopefully eventual subproject sustainability.

It is seen that other projects have successfully worked with communities to share the work and the finances required and local residents are well placed to be able to assess and prioritize their needs. They bring with them social networks that can help streamline the implementation of environmental health needs assessments and programming, resulting in interventions that are more cost effective and whose benefits are more equitably distributed.