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## **CONSTRUCTION OF ENGINEERING COMMUNICATION NETWORKS OF WATER SUPPLY ON THE TERRITORY OF 56,2 HECTARES ALONG ZHANAKURYLYS STREET IN THE KARASUVILLAGE**

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**Abstract:** Over the past 20 years, 48,2 thousand km of engineering networks have been built within the framework of the programs "Drinking Water," "Akbulak," "Regional Development," "Nurly Zhol." As a result, the level of water supply reached 92,6%. This article will present a project for the engineering and communication water supply networks construction on an area of 56,2 hectares along Zhanakurylys street of the Sayram district. Geomorphologically, the site is located within the first floodplain terrace of the Arys river. Groundwater based on archival materials lies at a depth of more than 23,0 m from the ground surface and does not participate in the process of forming the physical and mechanical properties of soils. Therefore, hydrogeological conditions of the work area are not given. Purpose: The intra-block road will be designed in its structure for the operation of various services of the administrative apparatus for rural localities and comprehensive maintenance of them.

**Keywords:** water supply, construction of engineering communication networks, groundwater, hydrogeological conditions, water metering units, design water flow rate

**Introduction** Conditional elevations of the projected territory of engineering and communication networks range from 623.32-668.47, with a slope from the southeast to the northwest. At the site of the designed engineering and communication networks of the earth's surface, a soil-plant layer is spread, 0,1 m thick, below, to a studied depth of 3,0 and more meters, there is loam of light brown, solid consistency.

According to the nomenclature and physical and mechanical properties of soils up to a depth of 3,0 m, one engineering and geological element (EGE) was identified:

- EGE - loam light brown, hard, collapsible, penetrated with thickness of 3,0 and more meters

During the survey period (December 2018), groundwater was not penetrated by exploration wells of 3,0 meters or more.

**Theoretical analysis.** According to the nomenclature physical and mechanical properties of soils up to a depth of 3,0 m, one engineering and geological element (EGE) was identified:

- EGE - loam light brown, hard, collapsible, penetrated with a thickness of 3,0 and more meters.

The type of soil conditions by subsidence is the first.

- Standard freezing depth, m: for loam – 0,67.

- Depth of penetration of ° C into soil, m: for loam – 0,77.

During the survey period (December 2018), groundwater was not penetrated by exploration wells of 3,0 meters or more. Physical and mechanical properties of soils. The seismicity of the site is eight points.

**Practical part.** According to the design assignments, a new construction of water supply networks of the site for individual construction of 56,2 hectares is envisaged.

The number of plots is 568, the population is 2760 people.

Combined water supply system (domestic and drinking, fire fighting and process). The water supply of the microdistrict is provided, according to Technical Condition №58 dated

02.09.2019, issued by the Sayram Tazalyk Housing and Communal Service from the existing ring network Ø180 two tie-ins into the existing well. Water metering units are provided at the tie-in. The pressure at the connection point is 0,2 MPa.

From the point of tie-in by a water conduit to two lines, water is supplied to the ring networks of the section. The design flow rate is 120 l/day per person. The water flow rate for external fire extinguishing is accepted - 10 l/s, according to the technical regulations "General fire safety requirements."

The main, annular water supply network is designed for the passage of fire and domestic drinking consumption. The route runs along the streets taking into account the minimum distances to the foundations of structures and underground utilities, according to SN KE 3.01-01-2011.

On the main ring network there are wells with fire hydrants and wells for connecting houses at the rate of 2-6 consumers per well. For each consumer, a water metering unit is provided in the well. Networks of access to houses are provided with dead ends on both sides of the streets to the border of residential areas.

Networks are accepted from PE100 SDR17 polyethylene pipes of "drinking" type, with maximum operating pressure of 6 atm as per SSN18599-2001, ST RK ISO 4427-1-2014

Water supply to the boundaries of residential areas is provided from PP-R polypropylene pipes, SDR11, PN10, not reinforced according to SSN KR 52134-2010 - Ø20x1,9mm. The base for pipelines is designed from leveled local soil with compaction by 0,3 m to a dry soil density of 1.65 ts/m<sup>3</sup> at the boundary of the compacted layer.

In the locations of underground fire hydrants, fire indicators with fluorescent or reflective coating are installed in accordance with ST RK SSN R12.4.026-2002 with SG application and distance in meters from the indicator to SG. Concrete columns in manholes are provided for fire hydrants.

Utility crossings over existing motor roads are provided by trench method. Since the development site is a new construction, roads will be provided after the installation of utilities. The opening and restoration of the road surface is provided only in the section of the water conduit. Connection of plastic pipes with gate valves and shaped parts is performed by means of mounting inserts. As a sealing material in flange joints, soft elastic rubber with a thickness of 5 mm is used. Plastic piping intersects the walls of the wells using plastic sleeves. Seal the gap between the sleeve and the pipeline with a waterproof elastic material. Plastic pipes shall be connected on LPE bushings.

In the lower sections of the network there are outlets towards wet wells with the installation of a gate valve, in the higher points there are vanes.

Water wells are made of prefabricated reinforced concrete elements as per T.P.3.900.1-14 1 with diameters of 1500 mm and 2000 mm. Around manholes arranged outside the roadway, a pavement with a width of 1 m with a slope from the manholes is provided. From the backfill side, paint waterproofing of concrete and reinforced concrete structures of wells with hot bitumen shall be performed in 2 times.

Manholes on water supply networks shall be installed on the local leveled base. Cast-iron gate valves with a rubberized wedge without a retractable flange spindle (tightness class A), fire hydrants as per SSN 8220-85 are installed in wells. Shaped parts - steel. To protect against corrosion, steel shaped parts in wells are coated with anti-corrosion insulation such as very reinforced bitumen-polymer. In order to ensure the safety of engineering networks, excavation work should be carried out as the existing utilities and structures are clarified in nature by opening them with wool in the presence of interested organizations. When backfilling pipelines above the top of the pipe, it is mandatory to arrange a protective layer of soft local soil with a thickness of at least 30 cm, which does not contain solid inclusions (crushed stone, stones, bricks, etc.). The pipeline shall be ground with manual non-mechanized tools.

The water required for the household and drinking purposes of the population of the new microdistrict meets the "Sanitary and epidemiological requirements for the water quality of

centralized drinking water supply systems." Order of the Minister of National Economy of the Republic of Kazakhstan dated March 16, 2015 №209 and ST RK 21322-2003 "Drinking Water".

**Conclusion.** The average daily water consumption is 397,44 m<sup>3</sup>/day.

Daily maximum flow rate – 476,928m<sup>3</sup>/day

Hourly maximum flow rate - 68, 128m<sup>3</sup>/h

Second maximum flow rate – 20,645l/s

The volume of annual water consumption is 145,066 thousand m<sup>3</sup>/year.

Water consumption standards are adopted in accordance with SNaR RK 4.01.02-2009 correspond to: rural settlements 120 l/day, for the needs of local industry and unaccounted expenses, 20% of the total consumption for household drinking needs was taken into account.

External fire fighting -10 l/s. Minimum free heads above the ground surface for a single-storey building - 10 m. Maximum heads in water supply networks shall not exceed -60 m. (SNaR RK 4.01.02-2009).

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**Түйін:** Соңғы 20 жыл ішінде «Ауыз су», «Ақбұлақ», «Өңірлерді дамыту», «Нұрлы жол» бағдарламалары аясында 48,2 мың шақырым инженерлік желі салынды. Нәтижесінде халықты сумен қамтамасыз ету деңгейі 92,6%-ға жетті. Бұл мақалада Қарасу ауылы Жаңақұрылыс көшесіндегі 56,2 га аумақта сумен жабдықтаудың инженерлік коммуникациялық желілерін салудың жобасы ұсынылады. Жобаланатын учаске Түркістан облысы Сайрам ауданының солтүстік-батыс бөлігіндегі Жаңақұрылыс көшесінің бойында орналасқан. Геоморфологиялық жағынан учаске Арыс өзенінің бірінші жайылмалы террасасы шегінде орналасқан. Алаңның топырақ беті салыстырмалы түрде жалпақ. Жер асты сулары мұрағаттық материалдар негізінде жер бетінен 23,0 м тереңдікте жатыр және топырақтың физикалық-механикалық қасиеттерін қалыптастыру процесіне қатыспайды. Сондықтан жұмыс учаскесінің гидрогеологиялық жағдайлары келтірілмейді. Объектінің мақсаты мен міндеті: кварталішілік желі салу өз құрылымы бойынша ауылдық елді-мекендерге және ауылдық округке кешенді қызмет көрсетуге арналған.

**Кілт сөздер:** сумен қамтамасыз ету, инженерлік желілер салу, топырақ сулары, гидрогеологиялық жағдайлар, су өлшеу қондырғылары, судың есептік шығыны

**Аннотация:** За последние 20 лет в рамках программ «Питьевая вода», «Ақбулақ», «Развитие регионов», «Нұрлы жол» построено 48,2 тыс км инженерных сетей. В результате уровень обеспеченности населения водой достиг 92,6%. В этой статье будет представлен проект строительства инженерно-коммуникационных сетей водоснабжения на площади 56,2 га по улице Жанақұрылыс в селе Карасу. Проектируемый участок расположен по улице Жанақұрылыс в северо-западной части Сайрамского района Туркестанской области. Геоморфологически участок расположен в пределах первой пойменной террасы реки Арысь. Грунтовая поверхность площадки относительно плоская. Грунтовые воды на основе архивных материалов залегают на глубине более 23,0 м от поверхности земли и не участвуют в процессе формирования физико-механических свойств грунтов. Поэтому гидрогеологические условия участка работ не приводятся. Цель и назначение объекта: строительство внутриквартальной дороги будет предназначено по своей

структуре для работы различных служб управленческого аппарата для сельской населенной местности и комплексного обслуживания сельского округа.

**Ключевые слова:** водоснабжение, строительство инженерных сетей, грунтовые воды, гидрогеологические условия, водомерные установки, расчетный расход воды