Interview With

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Q. How does it feel to be nominated for the Bentley's 2021 Year in Infrastructure and Going Digital Awards?

A. There is nothing better when the hardwork and efforts are being recognized and appreciated. It heightens the motivation in the workplace and increases the morale of the members of the organization. Bentley has always been a trusted organization in providing software solutions around the world. Even before the digitalization boom, Bentley Software solutions were a known organization in the industry. Its accomplishments are nothing less than a benchmark for the new and developing software firms. The professionalism and client satisfaction achieved by Bentley systems is remarkable which is also sustainable and economic in nature. Hence, it is an honor and achievement to be nominated by Bentley for the 2021 Year in Infrastructure and Going Digital Awards. As an organization, we are thrilled to know that our work is appreciated by one of the best firms in the world.

Q. Please elaborate on the project in your own words.

A. Project overview and challenge description:

Mirzapur is one of the southern districts of Uttar Pradesh. This district is known for the Vindhyavasini Temple in Vindhyachal. Vindhyachal Dham is one of the holiest places in India. It is right in the middle of the two pious cities of Prayag and Kashi. Mirzapur extends over 4525 km² and lies between the latitudes 23.52 and 25.32 North latitude and 82.7 and 83.33 East longitude. It forms part of the Varanasi district to the North and Northeast. Bounded in the south by the Sonabhadra district and in the Southwest by the Allahabad district. In the northeast, where the Ganga separates the Tehsil of Chunar from the Varanasi district, it has an average height of 80 meters (265 feet). The district of Mirzapur lies between the latitude 23.52 East longitude.

The Chhanvar fields are considered to be one of the district's elongated floodplains. The proposed Leduki GOV multi-village water supply scheme for 128 villages of the Marihan block from the Mirzapur district of the Bundelkhand region in Uttar Pradesh was designed with the optimization of infrastructure, operation, and maintenance in mind in order to achieve the level of service under the ambitious program of the state Government. Design parameters of theState Water and Sanitation Mission(SWSM), Lucknow (Uttar Pradesh, India), and theCentral Public Health and Environmental Engineering Organization(CPHEEO) manual are followed in order to provide the technically and financially viable project for sustainable drinking water. The population of the immediate, intermediate, and final stages has beenforecasted taking into account the population over the past five decades.

The population in 1971, 1981, 1991, 2001, and 2011 was considered for forecasting the future trends of the population.The scheme has been designed considering 2023 as itsbase year, 2038 as the intermediate year, and 2053 as itsultimate stage. Ultimate stagesoul population of Nos. 290528. Currently, the water consumption is done by individual and public hand pumps. The scheme provides for a proposed piped water supply system. This ensures and restricts an even distribution of the treated water to all 128 villages.

Scheme having following components:

1. 9.0 m diameter intake well cum Approach Bridge at surface source dam.
2. Augmentation of Conventional WTP of 29MLD capacity.
3. Clear Water pumping station at WTP.
4. Intermediate clear water pumping stations (4 Nos.)
5. 12 Service reservoirs of different capacities.
6. Raw Water and Clear Water Transmission mains & distribution mains.
7. House connections with water meters.

Ganga separates the Tehsil of Chunar from the Varanasi district, it has an average height of 80 meters (265 feet). The district of Mirzapur lies between the latitude 23.52 East longitude.

Scope of Work:

1. Conducted topographical survey & necessary field investigation
2. Detailed hydraulic and structural design of Intake well, WTP, OHT, and All civil structures.
3. Raw water and Clearwater rising main hydraulic design along with surge calculation.
4. Preparation of general arrangement drawings, detailed engineering drawings including structural Drawings.

Challenges are:

1) 128 Villages spreading over 4525Sqm having Elevation deference of 141m. Soil condition is mainly hard strata which creates huge excavation cost.
2) Need to accommodate the additional pipe length of more than 50Km within sectioned cost.
3) Need to complete engineering within 3months

Q. Please share the challenges that you faced in your project?

A. In tools like EPANET we were not able to co-relate and view the topographic of the village and alternate route alignment toplan a better distribution network and transmission line. We were using different tools for making accurate decisions. Safetydevised and their end effects were not analyzed with other tools.WaterGEMS gives multiple modules in one platform, apart from the hydraulic analysis we took decisions on the alignment ofthe network, planning of DMA, safety equipment effects (like PRV, FCV, etc.), and last but important representation of Projects toclients.

We have done the following Field activities to complete the project:

1. Topological survey with DGPS, Total Station & GPS instrument.
2. Study of proposed sites for Intake, WTP, and OHTs.
3. Site data collection includesthe present population, the household's no., and the existing water supply scheme.
4. Source sustainability study to confirm the availability of required water for projected population and demand
5. Water sample testing.

Q. How did you overcome the challenges?

A. The designed scheme was optimized as some of the main pumping networks were converted to a gravity network, which helped to save pumping machine costs, electricity costs, and operating and maintenance costs of the pumping machines. With OpenFlowsand WaterGEMS, modeling the network became an easy and accurate task. With the extended function of the Bing map integration, we were able to visualize the project location. Design completed within the time frame. Scenarios and alternatives helped to analyze 125 km of pump pipelines and to provide the client with a technically economical and safe water pipeline network. The Bentley STAAD software helped with the structural design of the elevated tanks, water treatment plant (WTP), and intake shaft. With WaterGEMS and STAAD, we were able to deliver the project 30 days before the scheduled date and reach our project milestone, which in itself is a great achievement.

Q. How did Bentley Systems help you in overcoming the challenges?

A. Using WaterGEMS and STAAD we were able to deliver the project 25 days prior to the schedule and achieve our project milestone which itself is a great feat. The timely and successful delivery of the project is a great achievement that was possible only because of Bentley products.

Some of the Tools used of Bentley Software for

- ❖ DMA Formation for flow monitoring and better O &M
- ❖ Pressure Zone Analysis for Equitable Distribution
- ❖ Rerouting of Network on checking availability of route over the background Bing map.
- ❖ Appropriate OHT location in order to optimize Pipe Diameter.
- ❖ Converting the Rising main Network into Gravity network.
- ❖ Reducing Pumping head by changing the Pumping station location.

Q. What are your thoughts for the water industry in year 2022 in line with the Covid times?

A. The Covid 19 virus has greatly affected the industries and diverted the financial growth. Like any industry, the Water Industry also suffered a huge blow in terms of production, supply, and economy. Many businesses reduced their commercial activities or temporarily closed to combat the Covid-19. However, with time the civilization is learning to adapt to the new environmental conditions. Therefore, it is safe to predict that the market conditions shall improve from the last two years.

The constructional practices, which were put on hold due to the extremity of the conditions shall resume in turn increasing the demand for products. This will also provide employment to the native people near the production plants and will help in balancing the economy of the nation. There will be some restrictions in accordance with the covid 19 precautionary measures and a big portion of the budget will be dedicated to the safety and sanitization equipment.