

## Effective Partnering to Increase Access to Water on the Navajo Nation

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### **Engineers with the U.S. Public Health Service carried out a series of missions in the Navajo Nation during the coronavirus pandemic to increase water access and public health through the construction of centralized watering points.**

On March 11, 2020, the Navajo Nation declared a public health emergency after identification of SARS-CoV-2 in surrounding areas. Like other acute respiratory infections, transmission of COVID-19 is disrupted by a convenient and plentiful water supply for handwashing and cleaning surfaces. However, American Indian and Alaska Native populations have the highest percentage of homes without indoor plumbing of any U.S. racial or ethnic group—and the Navajo have the highest number of homes without indoor plumbing of any U.S. Tribe. About 30 percent of Navajo homes lack piped water. Residents without piped water rely on centralized distribution water points.

In order to increase access to water and aid in the prevention of COVID-19, the Navajo Nation invited the Centers for Disease Control & Prevention (CDC) to provide technical assistance. This work is an example of the effective partnering between engineers, environmental health officers, and epidemiological and surveillance personnel from CDC, the Indian Health Service (IHS), and the Navajo Nation that has been carried out during the pandemic.

### **Prioritizing Needs**

In April 2020, a team composed of four members of CDC's Division of Environmental Health Science & Practice and one member of the IHS Division of Sanitation Facilities Construction (DSFC) deployed to the Navajo Nation. Their focus was on identifying communities without access to piped water; recommending interventions to address lack of water access; advising on the implementation of recommendations to improve water access; and working with the Navajo Nation contributions to develop informative messaging for safe water collection.

The team partnered with DSFC and IHS Navajo Area staff to develop and deploy a survey to collect water access information. Surveyors visited all 100 Chapters of the Navajo Nation to identify chapter-owned water points and determine their operational status. The survey findings informed actions to increase water access. Some recommendations at each site were modified over time as more information was gathered.

By August 2021, many of the critical needs identified by the survey have been addressed. The *Coronavirus Aid, Relief, and Economic Security Act* appropriated funding to IHS to install 59 transitional water points, the provision of 37,000 water storage containers, and 3.5 million doses of disinfection tablets, and along with outreach to increase public knowledge about the new water services available. These efforts were guided by a ranking system developed by the team that prioritized water access interventions in chapters with the highest rates of COVID-19 and lowest level of household water service at the time of the assessment.

### **Strategic Coordination**

After sites were prioritized by the first response team, a second phase of the work began. Several four- to five-person field teams of engineers from the U.S. Public Health Service were deployed in 30-day rotations from May

2020 to February 2021. These engineers performed services at each chapter location in need of a transitional water point.

Engineering field teams began with site visits to each location to meet with chapter officials, educate them on the mission goals, and perform a topographic survey of the site. The chapters are located throughout the Navajo Nation's vast 27,000-mi<sup>2</sup> footprint (roughly the size of West Virginia). Teams needed to strategically coordinate and plan with chapter officials to ensure the effective use of time.

While field work was taking place, efforts also were underway at the deployment field office to develop specifications, scope of work, cost estimates, construction details, and user agreements. The engineering field team lead was directed from IHS Headquarters by a teleconferencing app.

After field reconnaissance was complete, field engineers used data to design site plans for each water point. Maps of the existing water distribution system were made available by coordinating with local IHS staff and incorporated into the site design background imagery within the construction plans.

Soon after site designs and related project documents were complete, procurement of the materials began. Public Health Service engineers inspected products to ensure conformance with the project specifications. Construction by the Navajo Engineering Construction Authority began immediately after costs and agreements were finalized.

Engineers then inspected construction and project management from start-to-finish. Construction included connecting to the existing water line and installing a watering point that would be easily accessible to chapter members.

## Education and Training

After construction was completed, Navajo chapter officials were trained on how to use the new watering points. Ultimately, the chapter is responsible to operate the new facility, ensure accessibility, and maximize use by the Navajo people.

Public Health Service environmental health officers, along with engineer officers, were deployed in the later stages of the mission. These teams, which included environmental health specialists, industrial hygienists, and occupational safety and health specialists, informed chapter staff about the program, how to safely operate facilities, and how to report usage and operational issues. Several field teams also set up a support network to respond to reports of operational issues and continued to advise participating chapters about the benefits of the program.

### *Engagement and Outreach*

Public Health Service officers were engaged with 106 Chapters of the Navajo Nation and provided training on the operation of water points and safe collection and hauling procedures, including disinfection of hauled water. Engineers provided direct, onsite response to 27 water point facilities that reported operational issues while other supporting efforts helped establish a network of trained local Navajo personnel.

Additionally, the Public Health Service supported four training sessions with 29 Navajo Nation and Navajo Area IHS staff members to establish a network of local personnel who could provide long-term response to operational and maintenance issues. Participants consisted of DSFC staff in the four districts spanning Navajo Nation. Another training session included staff from Navajo Engineering Construction Authority, which was a major partner in the construction portion of the mission. Officers conducted three more training presentations

to strengthen local environmental health officer capacity and provide consultation and technical support to chapters about Navajo Safe Water Access Programs.

The participation of environmental health officers demonstrated the capacity of the Public Health Service to deploy a wide range of health professionals who respond swiftly and effectively to public health emergencies and emergent concerns.

## Surveying Home Sites

The success of the Water Access Mission led the Navajo Nation to request an additional Public Health Service response in September 2020. In the Cistern and On-Site Wastewater Mission, engineers and environmental health officers collected field data and designed site plans for individual onsite water and wastewater systems at Navajo homes lacking these facilities.

A total of three teams assessed over 600 Navajo homes from September 2020 to December 2020 and completed construction bid packages for 78 sites that will be ready for construction once funding resources are fully available. Team members collected homeowner information; developed GPS surveys of each home site using ArcGIS; and conducted a household assessment of plumbing that included enumerations of household residents, bedrooms, bathrooms, and status of electrical power. They also conducted a soil analysis for septic system design and designed water cistern and onsite septic systems. Information and photos were entered into the Survey123 Program for engineering reports.

### *Tiered Grading System*

Home sites were categorized by a three-tier system. Tier 1 (30 percent) had indoor plumbing and were ready for construction of individual water and wastewater facilities. Tier 2 (45 percent) did not have indoor plumbing ready and/or home site lease was not filed. Tier 3 (25 percent) were homes that were ineligible because they were already served with water and wastewater facilities, were abandoned, or were no longer located on the site.

Engineer officers provided the Navajo Nation with a full design package for the 78 completed Tier 1 home sites. The remaining 370 Tier 1 and Tier 2 sites have the necessary information to develop future design packages for construction once the original 78 Tier 1 homesites have onsite water and wastewater facilities installed. It is important to note that not all home sites were ready for exterior water and wastewater facilities because their indoor plumbing was not ready for connection outside the home.

## Advancing Water Access

Hauling water for drinking and sanitation adds another layer of complexity to life in the Navajo Nation. Time spent to drive to water points, fill up containers, and return home prevents families from engaging in other important activities. Facilities offering water hauling must assure that services are operational and dependable when customers arrive; otherwise, they will gain a reputation for being unreliable and residents may not use them.

The work completed resulted in a significant reduction of travel time to and from watering points for households without piped water. Prior to the Safe Water Access Mission, an average household round trip to a watering point was 52-mi. This was reduced to 17-mi. The Public Health Service officers demonstrated how a practical, hands-on engineering and public health focused response can improve critical sanitation deficiencies during an infectious disease event.

These deployments showcase the roles and impact of Public Health Service engineers working closely with tribal leaders, and their dedication in advancing water access and public health in the Navajo Nation.

## Increasing Water Access

<b>Survey findings</b>	<b>Number</b>	<b>Team recommendation to increase water access</b>
Water points open and in good condition	54	Notify residents of days and times of operation
Chapters without a water point, but with most homes having piped water	13	No action needed; most homes have piped water
Water points closed due only to COVID-19 concerns	4	Contact chapter and determine how to address concerns
Water points not operational (minor repairs needed)	13	Quickly repair water point or install transitional water point
Water points not operational (major repairs or new water point needed)	35	Install transitional water point

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



The Navajo Safe Water Access Mission surveyed, constructed, and educated personnel on proper operation of distribution water points to increase the availability of clean water and support public health throughout the Navajo Nation. Photo by Capt. Kris Neset, USPHS



The Safe Water Access Mission reduced the average round trip to a transitional water point in the Navajo Nation from 52-mi to 17-mi. Photo by Lt. Mike Buck Elk



As a follow on to the Safe Water Access Mission, Public Health Service engineers assessed over 600 Navajo homes, categorized their onsite water and wastewater systems, and completed construction bid packages for priority sites. Photo by Capt. Steven Bosiljevac, USPHS



Public Health Service officers deployed to the Navajo Nation to provide technical assistance, survey and design water point sites, and then train local chapter officials on operating water points. Photo by local Gallup, N.M. resident