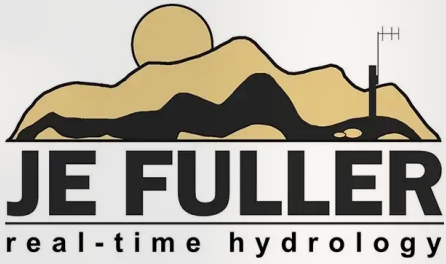


Customer Success Story



Cost Effective
Floodplain Analysis for
a Home on the Range”.

JE FULLER

JE Fuller is a multi-disciplinary engineering firm with several offices in Arizona and New Mexico and experience with a broad range of engineering projects around the world. From hydrology and hydraulic analyses to dam safety and watershed planning, the firm provides comprehensive environmental services for projects of all scale and scope. For a company that tries to help a variety of clients, the ability to deliver cost-effective solutions for customers with smaller budgets is also important. This factor recently came into play with a project involving a single-family homeowner (SFHO) proposing to make improvements in a regulated floodplain.



Unique Flood Hazards in Arizona

Very real flood hazards exist in parts of Arizona. As the Pima County Regional Flood Control District website points out, a 2017 study showed that over the last 20 years, Pima County comes in eighth in the U.S in terms of number of flood related deaths. Rain events can quickly become hazardous and flash floods are common throughout the year. Special Flood Hazard Areas (SFHA) known as “sheet flow floodplains” present particular risks to people and property. These are areas characterized by minimally defined channels, known as “washes”, that are not large enough to carry and contain base flow. Sheet flow areas allow flood water to spread out in broad sheets over large surface areas where it can flow in unpredictable directions, sometimes to depths of six inches or more. These flood hazards present real danger to human life and to property as well. Moving floodwaters can undercut building foundations and cause other serious structural damage.

The Pima County Floodplain and Erosion Hazard Management Ordinance regulates areas with sheet flooding and requires property owners to obtain floodplain use permits (FPUP) when planning projects that may divert water and/or cause detrimental surface flow patterns.



About JE Fuller

JE Fuller was founded in 1995 by Jon Fuller, an accomplished engineer and geomorphologist. Jon developed an approach to work life that matched his views on how people should be treated. Over the years, he found people of like mind and intent to work with him.

In 2013, Jon sold the company to his employees to create what is now an employee owned, client-driven company that offers a wide-range of hydrologic and geomorphic professional services in a personal manner.

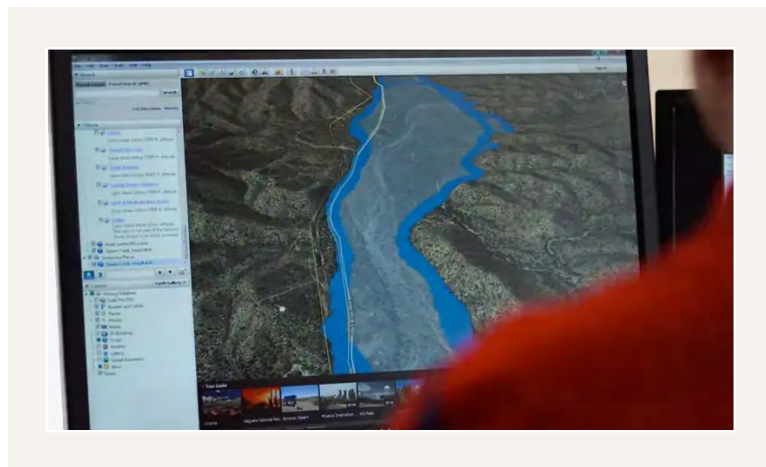
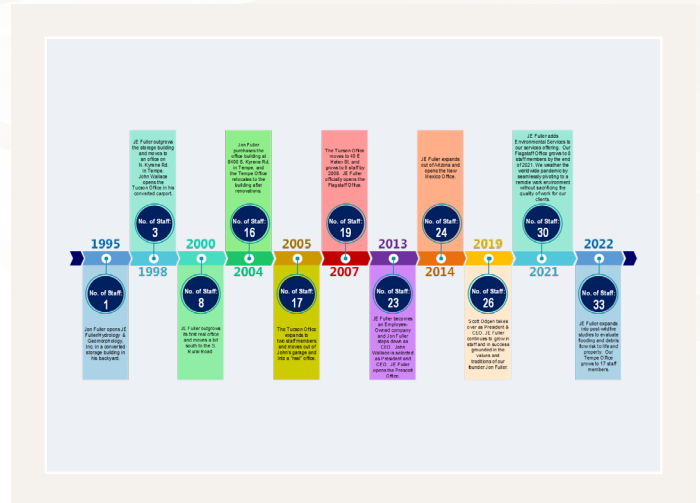


A Single-Family Homeowner, a Pool, and Sheet Flow in Pima County

With a residence in a regulated floodplain and plans to install a swimming pool, the Pima County Regional Flood Control District (PCRFC) warned the property owner that several existing walls installed by the previous owner could adversely affect flood flows. JE Fuller was hired to perform the required hydrologic analysis to show that neither the existing structures nor the proposed swimming pool would create damaging flow dynamics or adversely affect adjoining properties.

Chris Rod, Project Engineer at JE Fuller and the project's main contact, discovered that GeoHECRAS gave him all the functionality and tools he needed to process all

phases of the client's permit application from pre-processing to post-processing through permit submittal. Rod started by pulling in GIS layers from the flood hazard maps on the Pima County website directly into GeoHECRAS to show relevant sheet flow zones. Shapefiles, topography and terrain digital elevation models (DEMs) were imported into GeoHECRAS to create grids and generate smooth contours. Break-lines were inserted to show changes in terrain. Due to the distributary nature of sheet flow, 2D unsteady flow modeling was used to map flood depths and flood velocities on the parcel and on neighboring properties.



Model Manipulation on the Fly

At other points in the model, Rod used 2D unsteady flow functionality to show flow movement around and inside property boundaries. Structures on the property like property walls, the residence and the proposed swimming pool were added to model structural impacts on surface flows. With GeoHECRAS's intuitive user-interface, Rod was able to easily manipulate different elements of the model to view different flow dynamics. The model was easily reconfigured, and different scenarios generated with minimal inputs. These adjustments could be made completely on the fly. The analysis was thorough enough that the

project was accepted by the PCRFC without modification of the site plan or alteration of existing walls and structures. GeoHECRAS's graphic visualizations were easily exported and incorporated into the submitted permit application. Needless to say, the homeowner was extremely satisfied with the cost-effective result.

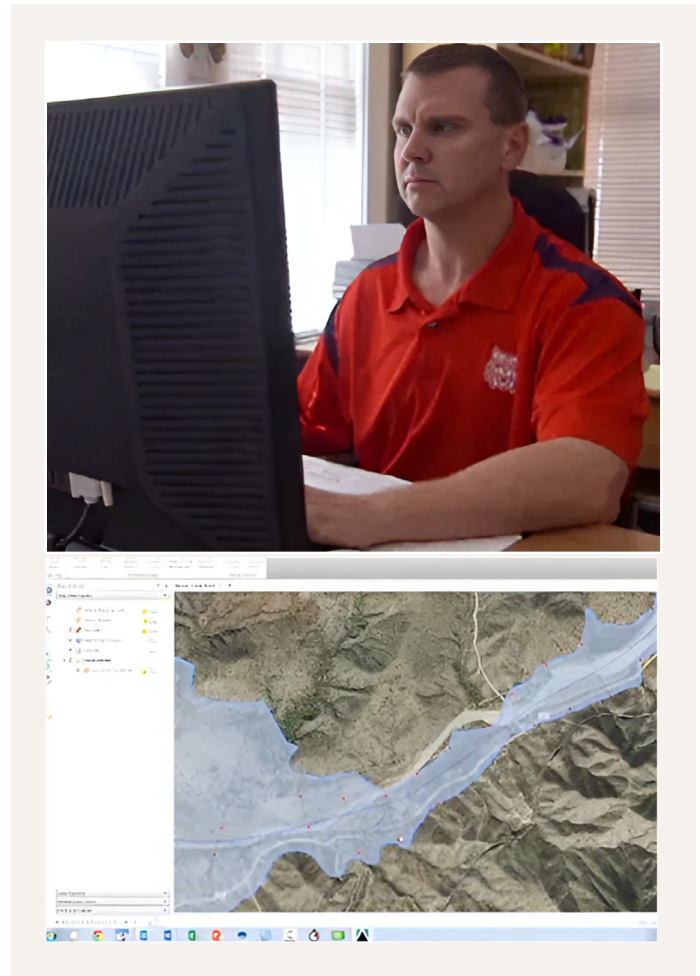


I do a lot of these kinds of projects. If I can do a floodplain analysis for a property owner in less than 3 or 4 hours to show that a future garage isn't going to be flooded, everyone wins. The speed and tools in GeoHECRAS give me the ability to do these things in an economically feasible way for the benefit of the small homeowner. These homeowners really need you to be fast and economically viable."

Chris Rod, P.E.
Project Manager/Project Engineer
JE Fuller

Maximizing the Efficiencies of GeoHECRAS with Small Scale Drainage Projects

GeoHECRAS creates cost and time efficiencies with large and small projects alike. Rod discovered that the use of GeoHECRAS for hydrologic analyses of smaller scale drainage and floodplain projects results in major cost savings for the customer. Without the right software, Rod emphasizes that these projects can easily rack up countless hours of labor, which translates to big bills for clients with smaller operating budgets, like residential property owners. In this example, the client did not have to elevate foundations, tear out walls or undertake costly flood mitigation measures at the proposed project site. With GeoHECRAS's tools, reports and hydrological site analysis were easily generated and presented a compelling case in favor of the proposed swimming pool. JE Fuller managed this drainage project with minimal work, minimal cost and in record time.



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