



## Bogardus Engineering LLC

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# Statement of Qualification

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## Introduction

It is a pleasure and an honor for Bogardus Engineering, LLC to submit this presentation of our Qualifications for Professional Services. We are a small firm by choice and as such, we maintain a uniform workload that is designed to benefit the client. Smaller workloads enable us to give each and every project the personal touch and attention that is required and expected, because you are our most important client. Our objective is to provide a quality product, delivered on time, with all of the information necessary for review and implementation. We offer a unique presentation style that is easy to follow, easy to review and easy to find the important facts quickly. Each report that is prepared for all of our clients will have and should expect the same electronic format.

Tracy A. Bogardus P.E. has worked with all of the public agencies within Southern Arizona and many public agencies throughout Arizona. Mr. Bogardus and has earned a reputation of excellence in character, workmanship and integrity.

Bogardus Engineering LLC was founded April 29, 2002. The owner has extensive experience with a variety of hydrologic and hydraulic projects. The list of projects includes but is not limited to The Master Drainage Report for Las Campanas and Canoa Ranch, in Green Valley, the master drainage plans for Havasu Foothills Estates in Mohave County, Canoa Ranch, Rancho Vistoso, and Stone Canyon Golf Courses. He has worked on commercial drainage plans for The University of Arizona Environmental and Engineering Building, the Unisource Building in downtown Tucson, large commercial developments and companies such as Wal-Mart, Bashas, Walgreen, Safeway, and many churches. Tracy has been involved with projects from the planning to the construction for over 1100 projects. Work outside of the traditional civil engineering design and build projects include working with mining companies to provide onsite drainage and erosion mitigation. He has worked with Magma Copper to revise railroad trestles with large diameter CMP pipes to convey runoff from a major watershed. He has designed erosion control for tailing piles and mitigation for the lateral migration of regional watercourses. He has designed the conveyance of stormwater runoff around sand and gravel mines adjacent to the Santa Cruz River and the mitigation or setback requirements for lateral migration. He has worked on projects as the lead drainage engineer for many County, Federal and State projects.

## Background of the Firm

### Bogardus Engineering, LLC

Bogardus Engineering, LLC was founded by Tracy A. Bogardus P.E., April 29, 2002 and is a small firm with the owner as the only engineer. The company operates out of a small office that has been set up to handle the day-to-day operations efficiently. The legal address and location of the office is as follows:

Bogardus Engineering, LLC

16618 N. Avenida de la Reata

Tucson, Arizona 85739

### Range of Services

Bogardus Engineering, LLC can offer a full range of Hydrologic/Hydraulic engineering services. We have prepared hydrologic analysis by using HEC-1, rational method, the SCS method and local models such as the Pima County method to determine runoff. We are proficient in the preparation of Conditional Letter of Map Revisions (CLOMR), Letter of Map Letter of Map Revisions (LOMR), Letter of Map Amendments (LOMA) and FEMA elevation certifications. We have experience working with representatives from many governmental agencies, such as EPA, US Army Corps of Engineers, FEMA, US Fish and Wildlife, Bureau of Reclamation, Arizona Department of Transportation, and many city and county managers. We offer culvert design, scour and erosion analysis, erosion mitigation, erosion mitigation, sediment analysis, channel design, flood control projects, geomorphic analysis, floodplain delineation, drainage and floodplain planning, bank protection design, channel stabilization, storm drain design, street and parking lot drainage design and analysis, detention routing (above and below ground), US Army Corp of Engineer 404 wash delineation and most analysis that pertains to hydrology or hydraulic design.

Our office includes three computers, each equipped with all of the hydrologic tools and computer programs that are necessary to provide the detailed analysis mentioned above. The computers are managed professionally and backup information stored daily both onsite and offsite.

## Qualifications and Experience

### Project Management

The principle of the firm has over 22 year experience, including 2 years working as an undergraduate research assistant at the University of Arizona. He has worked within a multi-disciplined civil engineering firm that worked with municipal agencies, private development, and institutional organizations. The firm offered disciplines of landscape architecture, the planning and design of all elements of civil engineering, hydrology/hydraulics, and surveying. Tracy was the Department Manager for the hydrology/hydraulic group for almost 7.5 year and was required to interface with all other areas of design thus requiring him to be involved with every project in the office. A typical week would consist of 15 to 30 different projects at various stages of design or construction, of which, he would assess what was required to be done and prioritize the work according to the client demand, time, resources, and staff availability.

Bogardus Engineering, LLC was established to specialize in surface hydrology and hydraulics, preparing FEMA submittals, as well as sediment transport analysis and erosion control analysis. This specialization will allow the firm to manage the accounts personally, with the objective of correct, on time reporting. The specialization will further allow the firm to focus on the projects. The primary objective when the firm started was to ensure a uniform workload that allow for the undivided attention during the project. Those who are the most experienced should be the ones that are the most involved with the design. Quality of product and design were of paramount importance. We strive to be on the cutting edge of technology.

### Qualifications

**Education:** Bachelor of Science, Civil Engineering, December 1993, The University of Arizona, Tucson, Arizona

**Professional License:** State of Arizona Registered Professional Engineer with a proficiency in Civil Engineering

**Additional Courses:** Include HEC-1 Training, 1994; HEC-2 and HEC RAS Training, 1995; ASCE Bridge Scour and Erosion Mitigation, 1996; Storm Water Pollution Prevention Best Management Practices, 1997; HEC RAS Advanced Training, April 2002; WCIECA/CPESC Conference on Effective Storm Water Pollution Control at Construction Sites and EPA Phase 2 Changes, Nov 2001; FLO2D Two Dimensional Flood Routing Short Course, June 2006.

**Skills include but not limited to:** HEC-1, HEC-HMS, HEC-2, HEC-RAS, FLO2D Quattro Pro programming, Excel programming, Hy-8, Culvert Master, K-Y Pipes, AutoCAD, and various private hydrologic and hydraulic computer programs.

**Major Accomplishments:** Many years of design and planning of 4 master planned communities; processed many CLOMR's or LOMR's on major washes or rivers, a variety

of LOMA's or FEMA Elevation Certification for individual parcels and many developments within or partially within FEMA Special Flood Hazard Areas; several golf courses; major bank protection projects; the first high-rise building in downtown Tucson in decades; Floodplain Analysis for hundreds of watercourses ranging from 100 cfs to more than 80,000 cfs and the preparation or supervision of over 1100 drainage reports or studies.

## Experience

The owner's career requires the review of all technical writing released from his department and that he prepare complex technical reports. The owner has personally authored more than 800 drainage reports, studies or statements during his career. Under his direction, his prior staff has prepared, over 300 additional reports and statements, of which, all of the reports and statements he personally reviewed. Additional duties include the preparation of proposals for work ranging in size from small drainage statements to regional FEMA studies. He has been involved in contract preparation and administration, professional statements for legal defense, and the preparation of technical standards for many projects.

In the review process of many projects, Tracy has had the opportunity to teach the reviewer hydrologic or hydraulic principles that have helped them in their future review. He has taught people on his staff, complex design procedures, and methodologies. He has attended public Planning and Zoning meetings, or Mayor and Council meetings to address the projects he has worked on publicly. Tracy has met with representatives from many governmental agencies, such as EPA, US Army Corps of Engineers, FEMA, US Fish and Wildlife, Bureau of Reclamation, Arizona Department of Transportation, and many city and county managers.

Tracy's has been involved with fast paced, high volume, engineering firms. This has given Tracy a wide exposure of many project types, a wide variety of different problems to solve, and exposure to engineering tools to solve the problems. During the research of boundary conditions for the project, Tracy had an opportunity to evaluate other engineering solutions, thus enabling him to expand his experience.

Of the 1100+ projects, that he has been involved in, each has a drainage component. His solutions usually have an open channel solution, solved either by the use of the Manning's equation, or HEC-RAS. He has prepared Conditional Letter of Map Revisions and Letter of Map Revisions for submittal to FEMA, resulting in the eventual change in the maps. Each CLOMR or LOMR has had an element of sediment transport and scour mitigation required. Tracy has attended the ASCE Bridge Scour Analysis Course and use elements from the course in evaluating the potential scour at bridge abutments, piers, or bank protection and recommended revetment requirements. Many of the revetment requirements used hard armored channels such as rock riprap, gabions, shotcrete, concrete, or soil cement. Tracy is well versed in soft armor procedures as well; procedures that utilize erosion mats in combination with vegetation replanting. Some of the more unusual solutions encountered have involved driving rails and using railroad flatbed cars, Kilner jacks, jetties, and Tracy has been exposed to cargo net jetties to encourage the aggradation of sediment.

During his career Tracy has used HEC-1 and HEC-HMS, rational method, the SCS method, the Pima County method and various other methods to determine runoff. He has prepared regional studies for four master planned communities of greater than 640 acres. The findings have been than used as standards for the development of the community.

Regional basins have been used on many projects to attenuate the peak discharges due to undersized drainage structure conditions. One of the prominent structures he designed used side weirs on the channel to divide a portion of the peak flow for the 2, 10, and 100-year events into detention basins while allowing the conveyance of sediment downstream, which resulted in the minimization of the headcutting in the channel and prevent clear water scour.

The hydrologic / hydraulic engineering, under Tracy's management, has set standards for the development of floodplains in all projects requiring his involvement. Many of the regional studies he has worked on, have established floodways for both local government enforcement and to determine the limits of encroachment for development

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## Firm Organization

Tracy A. Bogardus P.E owns and operates Bogardus Engineering LLC and will be the only engineer/consultant working on the Hydrologic/Hydraulic analysis for any of the projects.

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## Affirmative Action

Statement

The eventual decision for selection of employees or sub-consultants is based on their technical ability, perceived integrity of the individual, and how that individual will work together as a team. We do not discriminate concerning race, color, religion, ancestry, sex, physical handicap, national origin, affectional preference, or marital status, not because we are restricted legally to do so, but that we are morally bound. This firm operates under a personal code of ethics to ensure the fair and equitable treatment of all persons with whom we do business.



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## References

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