



Offer and Acceptance

**State of Arizona
State Procurement Office**

100 N. 15th Ave. Suite 201
Phoenix, AZ 85007

SOLICITATION NO.: ADSP016-00005912 Request
for Qualifications: 2016 Annual Professional
Services List

PAGE
1

Offeror: Shannon & Wilson, Inc.

OF
1

OFFER

TO THE STATE OF ARIZONA:

The Undersigned hereby offers and agrees to furnish the material, service or construction in compliance with all terms, conditions, specifications and amendments in the Solicitation and any written exceptions in the offer. Signature also certifies Small Business status.

Shannon & Wilson, Inc.

Company Name

1321 Bannock Street, Suite 200

Address

Denver

City

CO

State

80204

Zip

grf@shanwil.com

Contact Email Address

Signature of Person Authorized to Sign Offer

Gregory R. Fischer, PhD, PE

Printed Name

Senior Vice President and Denver Office Manager

Title

Phone: 303-825-3800

Fax: 303-825-3801

By signature in the Offer section above, the Offeror certifies:

1. The submission of the Offer did not involve collusion or other anticompetitive practices.
2. The Offeror shall not discriminate against any employee or applicant for employment in violation of Federal Executive Order 11246, State Executive Order 2009-9 or A.R.S. §§ 41-1461 through 1465.
3. The Offeror has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted offer. Failure to provide a valid signature affirming the stipulations required by this clause shall result in rejection of the offer. Signing the offer with a false statement shall void the offer, any resulting contract and may be subject to legal remedies provided by law.
4. The Offeror certifies that the above referenced organization IS/ IS NOT a small business with less than 100 employees or has gross revenues of \$4 million or less.

ACCEPTANCE OF OFFER

The Offer is hereby accepted.

The Contractor is now bound to sell the materials or services listed by the attached contract and based upon the solicitation, including all terms, conditions, specifications, amendments, etc., and the Contractor's Offer as accepted by the State.

This Contract shall henceforth be referred to as Contract No. ADSP016-00005912

The effective date of the Contract is March 1, 2016

The Contractor is cautioned not to commence any billable work or to provide any material or service under this contract until Contractor receives purchase order, contract release document or written notice to proceed.

State of Arizona
Awarded this 29 day of February 2016

Procurement Officer



ATTACHMENT I – General Qualifications

ANNUAL REQUEST FOR QUALIFICATIONS AND EXPERIENCE NO:
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DEFINITIONS

Architect Services, Engineer Services, Land Surveying Services, Assayer Services, Geologist Services and Landscape Architect Services: Those professional services within the scope of the practice of those services as provided in ARS § 32-101.

Branch Office: A geographically distinct place of business or subsidiary office of a firm that has a key role on the team.

Discipline: Primary technical capabilities of key personnel, as evidenced by academic degree, professional registration, certification, and/or extensive experience.

Firm: Defined in ARS § 32-101(B.19.).

Key Personnel: Individuals who will have major contract responsibilities and/or provide unusual or unique expertise.

SPECIFIC INSTRUCTIONS:

1. Complete this form for each branch office seeking work under this RFQ.

a. – e. **Firm (or Branch Office) Name and Address.** Self-explanatory.

f. **Year Established.** Enter the year the firm (or branch office, if appropriate) was established under the current name.

g. **Ownership.**

(g1). *Type.* Enter the type of ownership or legal structure of the firm (sole proprietor, partnership, corporation, joint venture, etc.).

(g2). *Small Business Status.* A firm is a small business if the firm has less than 100 employees **or** has gross revenues of \$4 million or less.

h.-j. **Point of Contact.** Provide this information for a representative of the firm that the Customer can contact for additional information. The representative must be empowered to speak on contractual and policy matters.

k. **Name of Firm.** Enter the name of the firm.

2. **Employees by Discipline.**

a. Select disciplines from the List of Disciplines (Function Code) listed on Page 3 of 4 Instructions. For employees that do not qualify for any of the disciplines, select "Other". *Note: The intended searchable database indicated in the RFQ will be populated from the Qualifications Form I Excel attachment only.*

b. Each person can be counted only twice; once for his/her primary function and once for his/her secondary function. Primary and secondary functions should be indicated by including a "P" or an "S" in column b after the Description Title is given.

c-d. If the form is completed for a firm (including all branch offices), enter the number of employees by disciplines in column c. If the form is completed for a branch office, enter the number of employees by discipline in column d and for the firm in column c.

3. **Profile of Firm's Experience and Annual Average Revenue for Last Year.**

a. Enter the approximate number of projects the firm (or branch) has done attributable by Profile Code listed on Page 3 of 4 Instructions over the last year.



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- b. Enter the appropriate Profile Codes from Instructions Pages 3 of 4 that represent the type of work the firm (or branch) has done over the last year.
 - c. Using the Revenue Index Number on Page 3 of 6 Form, indicate the approximate revenue the firm has earned over the last year per Profile Code entered into the table.
4. **Resumes of Key Personnel Proposed for This Contract.** Complete this section for each key person who will participate in this contract.
- a. Self-explanatory.
 - b. Self-explanatory
 - c. Total years of relevant experience (block c1), and years of relevant experience with current firm, but not necessarily the same branch/office (block c2).
 - d. Name, City and State of the firm where the person currently works, which must correspond with one of the firms (or branch office or a firm, if appropriate) listed in Section 1.
 - e. Provide information on the highest relevant academic degree(s) received. Indicate the area(s) of specialization for each degree.
 - f. Provide information on current relevant professional registration(s) and in which State(s) they are current.
 - g. Provide information on any other professional qualifications relating to this contract, such as education, professional registration, publications, organizational memberships, certifications, training, awards, and foreign language capabilities.
 - h. Provide information on no more than five (5) projects in the last year which the person had a significant role that demonstrates the person's capability relevant to her/his proposed role in this contract. These projects do not necessarily have to be any of the projects presented in Section 5 for the project team if the person was not involved in any of those those projects or the person worked on other projects that were more relevant than the team projects in Section 5. Use the check box provided to indicate if the project was performed with any office of the current firm. If any of the professional services or construction projects are not complete, leave Year Completed blank and indicate the status in Brief Description and Specific Role.
5. **Example Projects Which Best Illustrate Firms Qualification for this contract.** Select project where multiple team members worked together, if possible, that demonstrate the team's capability to perform work similar to that required for this contract. Complete one Section 5 for each project. List no more than five (5) projects.
- a. Title and Locations of project or contract. For an indefinite delivery contract, the location is the geographic scope of the contract.
 - b. Enter the year completed of the professional services (such as planning, engineering study, or design), and/or the year completed if construction. If any of the professional services or the construction projects are not complete, leave Year Completed blank and indicate the status in Brief Description of Project and Relevance to This Contract (block f).
 - c. Project Owner or user, such as a government agency or installation, an institution, a corporation or private individual.
 - d. Provide the original budget or not to exceed dollar amount for the project.
 - e. Provide the Total Cost of the Project. If any of the professional services or construction projects is not complete, indicate the percentage complete and whether this project will be on budget, over or under budget.
 - f. Brief Description: Indicate scope, size, and length of project, principle elements and special features of the project. Discuss the relevance of the example project to this contract.
6. **Additional Information.** Use this section to provide additional information you feel may be necessary to describe your firm's qualifications for this contract.
7. **Annual Average Professional Services Revenues of Firm for Last 3 Years.** Complete this block for the firm or branch office for which this form is completed. In column a, enter an approximate percentage of total work attributable to State, Federal or Municipal Work. In column b, enter an approximate percentage of total work attributable to Non-Government work. Percentages should take into consideration work completed over the last 3 years.



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8. **Authorized Representative.** An authorized representative of the firm or branch office must sign and date the completed form. Signing attests that the information provided is current and factual. Provide the name and title of the authorized representative who signed the form.

List of Disciplines (Function Codes) for Question 2

- | | | |
|---------------------------|--|--------------------------|
| Aeronautical Engineer | Environmental Engineer | Mining Engineer |
| Agricultural Engineer | Environmental Scientist | Nuclear Engineer |
| Archeologist | Fire Protection Engineer | Petroleum Engineer |
| Architect | Geodetic Surveyor | Photogrammetrist |
| Architectural Engineering | Geographic Information System Specialist | Project Manager |
| Biologist | Geological Engineer | Sanitary Engineer |
| CADD Technician | Geologist | Soils Engineer |
| Chemical Engineer | Hydrographic Surveyor | Structural Engineer |
| Civil Engineer | Hydraulic Engineer | Technician/Analyst |
| Construction Manager | Hydrologist | Transportation Engineer |
| Construction Inspector | Industrial Engineer | Water Resources Engineer |
| Control Systems Engineer | Landscape Architect | |
| Cost Engineer/Estimator | Mechanical Engineer | |
| Ecologist | Metallurgical Engineer | |
| Electrical Engineer | | |

List of Experience Categories (Profile Codes for Question 3)

- | | |
|---|--|
| Acoustics, Noise Abatement | Dams (<i>Concrete; Arch</i>) |
| Aerial Photography; Airborne Data and Imagery Collection and Analysis | Dams (<i>Earth; Rock</i>); Dikes; Levees |
| Activity Centers | Desalinization (<i>Process and Facilities</i>) |
| Air Pollution Control | Design-Build - Preparation of Requests for Proposals |
| Airports; Navajds; Airport Lighting; Aircraft Fueling | Digital Elevation and Terrain Model Development |
| Airports; Terminals and Hangars; Freight Handling | Digital Orthophotography |
| Agricultural Development; Grain Storage; Farm Mechanization | Dining Halls; Clubs; Restaurants |
| Animal Facilities | Dredging Studies and Design |
| Anti-Terrorism/Force Protection | Design & Planning Structured Parking Facilities |
| Area Master Planning | Detention Security Systems |
| Auditoriums and Theaters | Disability / Special Needs |
| Automation; Controls; Instrumentation | Ecological and Archeological Investigations |
| Barracks; Dormitories | Educational Facilities; Classrooms |
| Bridge Design: Bridges | Electrical Studies and Design |
| Cartography | Electronics |
| Cemeteries (<i>Planning and Relocation</i>) | Elevators; Escalators; People-Movers |
| Chemical Processing and Storage | Energy / Water Auditing Savings |
| Child Care/Development Facilities | Energy Conservation; New Energy Sources |
| Codes; Standards; Ordinances | Environmental Impact Studies, Assessments or Statements |
| Cold Storage; Refrigeration and Fast Freeze | Fallout Shelters; Blast-Resistant Design |
| Commercial Building (<i>Low Rise</i>); Shopping Centers | Fire Protection |
| Community Facilities | Fisheries; Fish Ladders |
| Communications Systems; TV; Microwave | Forensic Engineering |
| Computer Facilities | Garages; Vehicles Maintenance Facilities; Parking |
| Conservation and Resource Management | Gas Systems (<i>Propane; Natural, Etc.</i>) |
| Construction Management | Geodetic Surveying: Ground and Airborne |
| Construction Surveying | Heating; Ventilating; Air Conditioning |
| Corrosion Control; Cathodic Protection Electrolysis | Highways; Streets; Airfield Paving; Parking Lots |
| Cost Estimating; Cost Engineering and Analysis; Parametric Costing; Forecasting | Historical Preservation |
| Cryogenic Facilities | Hospital and Medical Facilities |
| Construction Materials Testing | Hotels; Motels |
| | <i>Housing (Residential, Multi-Family; Apartments; Condominiums)</i> |



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Hotels; Motels
Hydraulics and Pneumatics
Hydrographic Surveying
Industrial Buildings; Manufacturing Plants
Industrial Processes; Quality Control
Industrial Waste Treatment
Intelligent Transportation Systems
Infrastructure
Irrigation; Drainage
Judicial and Courtroom Facilities
Laboratories; Medical Research Facilities
Land Surveying
Landscape Architecture
Libraries; Museums; Galleries
Lighting (*Interior; Display; Theater, Etc.*)
Lighting (*Exteriors; Streets; Memorials; Athletic Fields, Etc.*)
Labs - General
Labs – Research – Dry
Labs – Research – Wet
LEED Accredited A/E
LEED Independent 3rd Party Building Commissioning
Mapping Location/Addressing Systems
Materials Handling Systems; Conveyors; Sorters
Metallurgy
Materials Testing
Measurement / Verification / Conservation Water Consumption Savings
Mining and Mineralogy
Medical Related
Modular Systems Design; Fabricated Structures or Components
Mold Investigation
Museums
Nuclear Facilities; Nuclear Shielding
Office Buildings; Industrial Parks
Outdoor Recreation
Petroleum and Fuel (*Storage and Distribution*)
Photogrammetry
Pipelines (*Cross-Country - Liquid and Gas*)
Phase I Environmental
Prisons & Correctional Facilities
Plumbing and Piping Design
Prisons and Correctional Facilities
Product, Machine Equipment Design Pneumatic Structures, Air-Support Buildings Power Generation, Transmission, Distribution Public Safety Facilities
Radar; Sonar; Radio and Radar Telescopes
Radio Frequency Systems and Shielding's
Railroad; Rapid Transit
Recreation Facilities (*Parks, Marinas, Etc.*)
Refrigeration Plants/Systems
Rehabilitation (*Buildings; Structures; Facilities*)
Research Facilities
Resources Recovery; Recycling
Roof Infrared Imaging to Identify Water Leaks

Roofing
Safety Engineering; Accident Studies; OSHA Studies
Security Systems; Intruder and Smoke Detection
Seismic Designs and Studies
Sewage Collection, Treatment and Disposal
Soils and Geologic Studies; Foundations
Solar Energy Utilization
Solid Wastes; Incineration; Landfill
Special Environments; Clean Rooms, Etc.
Structural Design; Special Structures
Surveying; Platting; Mapping; Flood Plain Studies
Sustainable Design
Swimming Pools
Storm Water Handling and Facilities
Specifications Writing
Toxicology
Testing and Inspection Services
Traffic and Transportation Engineering
Topographic Surveying and Mapping
Towers (*Self-Supporting and Guyed Systems*)
Tunnels and Subways
Traffic Studies
Transportation
Urban renewals; Community Development
Utilities (*Gas and Steam*)
Value Analysis; Life-Cycle Costing
Warehouse and Depots
Water Resources; Hydrology; Ground Water
Water Supply; Treatment and Distribution
Wind Tunnels; Research/Testing Facilities Design
Waste Water Treatment Facility
Water Well Rehabilitation; Water Well Work
Zoning; Land Use Studies



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(If a firm has branch offices, complete for each specific branch office seeking work.)

1. Annual Request for Qualifications

a. FIRM (OR BRANCH OFFICE) NAME:	Shannon & Wilson, Inc. – Denver, CO
b. FIRM (OR BRANCH OFFICE) STREET:	1321 Bannock Street, Suite 200
c. FIRM (OR BRANCH OFFICE) CITY:	Denver
d. FIRM (OR BRANCH OFFICE) STATE:	Colorado
e. FIRM (OR BRANCH OFFICE) ZIP CODE:	80204

f. YEAR ESTABLISHED:	1954
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(g1). OWNERSHIP - TYPE:	Corporation, Employee Owned
(g2) OWNERSHIP - SMALL BUSINESS STATUS:	No

h. POINT OF CONTACT NAME AND TITLE:	Greg Fischer, Senior Vice President, and Denver Office Manager
i. POINT OF CONTACT TELEPHONE NUMBER:	303-825-3800
j. POINT OF CONTACT E-MAIL ADDRESS:	grf@shanwil.com

k. NAME OF FIRM <i>(If block 1a is a branch office):</i>	Shannon & Wilson, Inc. – Headquarters Seattle, WA
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2. EMPLOYEES BY DISCIPLINE

a. Discipline Title	b. Function: Primary (P) or Secondary (S)	c. No. of Employees - Firm	d. No. of Employees - Branch
Biologist	P	5	0
CADD Technician	P	5	1
Civil Engineer	P	1	0
Construction Inspector	P	4	0
Environmental Engineer	P	14	0
Environmental Scientist	P	18	0
Geographic Information System Specialist	P	3	1
Geological Engineer	P	50	8
Geologist	P	40	2
Hydraulic Engineer	P	3	0
Mining Engineer	P	1	0
Soils Engineer	P	56	8
Technician/Analyst	P	25	6
Other - Administrative	P	43	3
Other - Chemist	P	4	0
Other - Seismic Engineer	P	6	0
Other - Hydrogeologist	P	10	0
Other – Computer Programmer	P	7	0
Other – Underground Engineer	P	6	1
Total		301	30



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3. PROFILE OF FIRM'S EXPERIENCE AND ANNUAL AVERAGE REVENUE FOR LAST YEAR

a. Approximate No. of Projects	b. Experience	c. Revenue Index Number (see below)
Numerous	Soils and Geologic Studies; Foundations	8
Numerous	Bridge Design: Bridges	7
Numerous	Environmental Impact Studies, Assessments or Statement	7
Numerous	Railroad; Rapid Transit	7
Numerous	Highways; Streets; Airfield Paving; Parking Lots	6
Numerous	Dams (Earth; Rock); Dikes; Levees	5
Numerous	Water Resources; Hydrology; Ground Water	5
Numerous	Tunnels and Subways	5
Numerous	Testing and Inspection Services	5
Numerous	Sewage Collection, Treatment and Disposal	5
Numerous	Commercial Building (Low Rise); Shopping Centers	5
Numerous	Mining and Mineralogy	4
Numerous	Pipelines (Cross-Country - Liquid and Gas)	4
Numerous	Solid Wastes; Incineration; Landfill	4
Numerous	Petroleum and Fuel (Storage and Distribution)	3
Numerous	Educational Facilities; Classrooms	3
Numerous	Industrial Buildings; Manufacturing Plants	3
Numerous	Water Supply; Treatment and Distribution	2
Numerous	Airports; Terminals and Hangars; Freight Handling	2

PROFESSIONAL SERVICES REVENUE INDEX NUMBER

- | | |
|---|---|
| 1. Less than \$100,000 | 6. \$2 million to less than \$5 million |
| 2. \$100,000 to less than \$250,000 | 7. \$5 million to less than \$10 million |
| 3. \$250,000 to less than \$500,000 | 8. \$10 million to less than \$25 million |
| 4. \$500,000 to less than \$1 million | 9. \$25 million to less than \$50 million |
| 5. \$1 million to less than \$2 million | 10. \$50 million or greater |



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4. Resumes of Key Personnel Proposed for this Contract *(Complete one Section #4 for each key person.)*

a. NAME: Greg R. Fischer, PhD, PE	b. ROLE IN THIS CONTRACT Geotechnical Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 29	2. WITH CURRENT FIRM 26
d. LOCATION (City and State) Denver, Colorado			
e. EDUCATION (DEGREE AND SPECIALIZATION) PhD - Civil Engineering		f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Engineer in AZ and 24 other States	
g. OTHER PROFESSIONAL QUALIFICATIONS (Organizations, Awards, etc.) American Council of Engineering Companies American Society of Civil Engineers American Public Work Association Structural Engineers Association of Colorado International Geotextile Society North American Geosynthetic Society Society of American Military Engineers American Society of Foundation Engineers Association of State Dam Safety Officials			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION (City and State) South Mountain Freeway Design/Build Pursuit (Phoenix, AZ)	(2) YEAR COMPLETED Professional Services ongoing
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE <i>Greg is overseeing the Shannon & Wilson team providing geotechnical engineering services for the pursuit phase of the South Mountain Freeway design-build project. The project consists of constructing more than 20 miles of new freeway, including more than 60 new bridges and associated retaining walls.</i>	<input checked="" type="checkbox"/> Check if project performed with current firm
2.	(1) TITLE AND LOCATION (City and State) I-94 Painted Canyon Landslide (Billings County, ND)	(2) YEAR COMPLETED- Professional Services 2014-2015
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE <i>Greg was the Principal-in-Charge for evaluation of a large landslide on I-94 in Theodore Roosevelt National Park. The project included evaluating various stabilization alternatives to mitigate this landslide, including an anchored drilled shaft wall, slope re-grading, drainage improvements, and a ground anchor and block system.</i>	<input checked="" type="checkbox"/> Check if project performed with current firm
3.	(1) TITLE AND LOCATION (City and State) RTD I-225 Light Rail (Aurora, CO)	(2) YEAR COMPLETED- Professional Services ongoing
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE <i>Greg is currently serving as the project manager for geotechnical services for approximately 10 miles of new light rail line, including 8 bridges, numerous retaining walls, and paving of adjacent roadways. The field exploration program for the project consists of more than 4,000 feet of drilling in urban areas. Greg is overseeing recommendations for drilled shaft and driven pile foundations for bridges; cast-in-place concrete retaining walls; MSE retaining walls; cantilevered and anchored drilled shaft walls; soil nail walls; track section and subgrade; and pavement design.</i>	<input checked="" type="checkbox"/> Check if project performed with current firm
4.	(1) TITLE AND LOCATION (City and State) I-94 East of Glendive Geotechnical Investigation (Dawson County, ND)	(2) YEAR COMPLETED Professional Services 2015
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE <i>Greg was the Principal-in-Charge overseeing geotechnical investigations to identify potential causes for roadway settlement, subsurface voids, piping and severe erosion, and damaged drainage culverts along a 6-mile stretch of highway. Work involved subsurface explorations and geophysical investigations to characterize site conditions, which consisted of weak soils and highly-erosive, dispersive clay. Several rehabilitation options were developed and analyzed to assist the Montana Department of Transportation in evaluating various options for roadway rehabilitation.</i>	<input checked="" type="checkbox"/> Check if project performed with current firm
5.	(1) TITLE AND LOCATION (City and State) Colorado Springs Utilities, Stanley Canyon Tunnel Inspection (Monument, CO)	(2) YEAR COMPLETED Professional Services 2015
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE <i>Greg was the Project Manager for geotechnical inspection of the Stanley Canyon Tunnel, a 3-mile-long, 9-foot-diameter hydroelectric tunnel alternately lined with concrete and steel. The goal of the project was to (1) establish a baseline of existing tunnel conditions for future reference, and (2) identify severely deteriorated areas and repair these areas during a limited window of opportunity coincident with a scheduled drawdown.</i>	<input checked="" type="checkbox"/> Check if project performed with current firm



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4. Resumes of Key Personnel Proposed for this Contract *(Complete one Section 4 for each key person.)*

a. NAME: Mark J. Vessely, PE	b. ROLE IN THIS CONTRACT Geotechnical Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 20	2. WITH CURRENT FIRM 5
d. LOCATION <i>(City and State)</i> - Denver, CO			
e. EDUCATION <i>(DEGREE AND SPECIALIZATION)</i> BS - Geotechnical Engineering MS - Civil Engineering		f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Engineer- Colorado Professional Geologist- Colorado	
g. OTHER PROFESSIONAL QUALIFICATIONS <i>(Organizations, Awards, etc.)</i> Transportation Research Board- Member of Geotechnical Asset Management Subcommittee; American Society of Civil Engineers- Steering Committee Member for 2006, 2008, 2010, 2012 Geotechnical Seminars; Colorado Association of Geotechnical Engineers- President (2011), Vice President (2010), Secretary (2009), Board Member at Large (2007-2008); FHWA Northwest Geotechnical Workshop and Highway Geology Symposium- State DOT Workshop Coordinator for 2006 Joint Conference in Breckenridge, Colorado			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION <i>(City and State)</i> Central Federal Lands Highway Division and Bureau of Land Management, Red Rock Scenic Loop Drive, (West of Las Vegas, NV)	(2) YEAR COMPLETED-	
		Professional Services 2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE <i>Mark was the Project Manager for geotechnical design of roadway improvements, including roadway widening, new alignment alternatives, bridge structures, and pavement rehabilitation for over thirteen miles of existing roadway and trail access parking lots within the Red Rock Canyon National Conservation area. Shannon & Wilson provided geotechnical engineering analysis to develop recommendations for new and rehabilitation pavement designs, bridge structure foundations, and excavation into caliche soil deposits.</i>	<input checked="" type="checkbox"/>	Check if project performed with current firm
2.	(1) TITLE AND LOCATION <i>(City and State)</i> Central Federal Lands Highway Division, SR28 (1) Lake Tahoe SR 28 Phase 1 and 2, (South of Incline Village, NV)	(2) YEAR COMPLETED	
		Professional Services 2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE <i>Mark is the project manager for geotechnical services associated with design and construction of a new \$30M shared use recreation path from Incline Village to Sand Harbor within the U.S. Forest Service Lake Tahoe Basin. Phase 1 and 2 includes three miles of new path that is separated from the SR 28 alignment. Mile 1 is located above the highway on steep slopes until crossing SR 28 with a tunnel below the road way. The remaining two miles are located on steep slopes below the highway and above the protected shoreline of Lake Tahoe. Shannon & Wilson performed project scoping in 2013, which included preliminary alignment feasibility evaluations. Currently, we have completed subsurface investigations for approximately 80 percent of the alignment and are working on geotechnical design for several retaining walls, rock cut slopes, bridge structures, and the tunnel below SR 28.</i>	<input checked="" type="checkbox"/>	Check if project performed with current firm
3.	(1) TITLE AND LOCATION <i>(City and State)</i> Colorado Department of Transportation, Geologic Hazards and Geologic Investigations On Call Contract, (Statewide, CO)	(2) YEAR COMPLETE	
		Professional Services ongoing	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE <i>Mark is the project manager for a multi-year on call project to provide CDOT geotechnical services for multiple tasks ranging from emergency response requests for landslides and rockfall, drilling investigations, laboratory services, and design for geotechnical projects including rockfall and slope stabilization. Additionally, we have provided draft documents to CDOT in support of asset management plans and the first CDOT geotechnical design manual. Other representative tasks under this contract have included evaluating the feasibility of using radar systems as stand-alone devices or in combination with other instrumentation to provide a full-time monitoring system that for rockfall and rockslides in Glenwood Canyon; performing a Quality Control and Quality Assurance (QA/QC) assessment of the Colorado Rockfall Hazard Rating System; design and construction services for a sinkhole that formed above an abandoned railroad tunnel at Tennessee Pass on U.S. Highway 24; development of mobile data collection applications to support staff activities in the field; and implementation of a real time automatic data acquisition system to allow CDOT staff to view multiple geotechnical monitoring locations around the state via an web based system. .</i>	<input checked="" type="checkbox"/>	Check if project performed with current firm
4.	(1) TITLE AND LOCATION <i>(City and State)</i> Montana Department of Transportation, District 1 Slopes Design Build, (Northwest MT)	(2) YEAR COMPLETED	
		Professional Services 2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE <i>Mark was the project manager for this Design-Build project that involved repair of 11 landslide sites throughout northwest Montana. The slides consisted of embankment and cut slope failures within the right-of-way with widths of up to 500 feet. As required by MDT, the project was completed within one construction season with design work beginning in July and construction complete in mid-October. The slide repairs consisted of soil nail walls and slopes with both shotcrete and flexible facing, buttresses, and groundwater drains.</i>	<input checked="" type="checkbox"/>	Check if project performed with current firm



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4. Resumes of Key Personnel Proposed for this Contract (Complete one Section 4 for each key person.)

a. NAME: Beth Widmann	b. ROLE IN THIS CONTRACT Professional Geologist	c. YEARS EXPERIENCE	
		1. TOTAL 21	2. WITH CURRENT FIRM 8
d. LOCATION (City and State) Denver, Colorado			
e. EDUCATION (DEGREE AND SPECIALIZATION) BS - Structural Geology MS - Structural Geology		f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Geologist- Colorado Registered Geologist- Arizona	
g. OTHER PROFESSIONAL QUALIFICATIONS (Organizations, Awards, etc.) American Public Works Association (APWA)			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION (City and State) CDOT Geohazard Mitigation Feasibility Studies, (Multiple Locations, CO)	(2) YEAR COMPLETED	
		Professional Services 2014-2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Beth has been providing geological engineering and GIS support for feasibility studies that focus on mitigating rockfall and other geologic hazards along major transportation corridors. Specifically, she has been involved with the I-70 DeBeque Canyon and US-24 Manitou Springs corridor studies. Her work has involved compiling spatial data and completing spatial analysis of various data sets to assist in the identification of mitigation segments defined by geologic ground conditions, geologic hazards, potential, historic rockfall and hazard event data, accident data, and traffic counts. Data was used to calculate a level of risk letter grade for each segment. Various mitigation alternatives were then theoretically applied to each segment as part of a risk reduction and cost benefit analysis for each segment within the corridor.	<input checked="" type="checkbox"/>	Check if project performed with current firm
2.	(1) TITLE AND LOCATION (City and State) CDOT Geotechnical Asset Management Program, (Multiple Locations, CO)	(2) YEAR COMPLETED	
		Professional Services 2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Beth is currently involved in the compilation and analysis of data from multiple sources to develop a comprehensive database of geologic hazards affecting CDOT roadways and assets. The data is being used to assess risk, prioritize sites for mitigation, and assist with decisions regarding program funding. Beth's responsibilities include researching and compiling relevant data, assigning scoring criteria to individual sites, analyzing data using ArcGIS, and preparing figures for CDOT presentations and meetings with management and transportation commission staff.	<input checked="" type="checkbox"/>	Check if project performed with current firm
3.	(1) TITLE AND LOCATION (City and State) CDOT Wall Inventory and Risk Assessment, (Multiple Locations, CO)	(2) YEAR COMPLETED	
		Professional Services 2014-2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Beth is currently involved in the development of a comprehensive retaining wall asset inventory and condition assessment of all wall features on CDOT maintained roadways. Beth's work involves quality checking wall location information and providing spatial analysis of wall inventory data using ArcGIS. Beth is also assisting with defining risk assessment parameters and calculations and with developing a risk-based management plan that will prioritize repair needs and help guide future funding decisions.	<input checked="" type="checkbox"/>	Check if project performed with current firm
4.	(1) TITLE AND LOCATION (City and State) CDOT Flood Recovery Office, (Greeley, CO)	(2) YEAR COMPLETED	
		Professional Services 2014-2015	Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Since February 2014, Beth has been assisting with the flood recovery effort by providing part time project management and GIS support at the Flood Recovery Office in Greeley. Beth has been involved with developing new geo-spatial data as well as working with numerous agencies to gather existing data. The GIS data was used to create maps for field use and official damage reports; to develop and populate a website for internal use by CDOT staff and their project partners as well as a public facing website; and to help manage and quality check project data. Beth also participated in the preparation of a lessons-learned document for management of future disaster events.	<input checked="" type="checkbox"/>	Check if project performed with current firm
5.	(1) TITLE AND LOCATION (City and State) US-24 Tennessee Pass TDR Instrumentation, (Lake and Eagle Counties, CO)	(2) YEAR COMPLETED	
		Professional Services 2013-2014 (ongoing monitoring)	Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE US-24 overlies an abandoned railroad tunnel at Tennessee Pass. The tunnel has previously experienced collapse resulting in the development of a sinkhole beneath roadway and closure of the highway for emergency repairs. Beth was responsible for overseeing the completion of several borings to depths of up to 175 feet and installation of TDR cable to monitor ground movement beneath the roadway. The cables were then linked to an automated data acquisition system (ADAS) to provide a real-time, early warning system in the event of future collapse/sinkhole events.	<input checked="" type="checkbox"/>	Check if project performed with current firm



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5. EXAMPLE PROJECTS WHICH BEST ILLUSTRATE PROPOSED TEAM'S QUALIFICATIONS FOR THIS CONTRACT

(Present no more than five (5) projects. Complete one Section 5 for each project.)

a. TITLE AND LOCATION <i>(City and State)</i> South Mountain Freeway Design/Build Pursuit (Phoenix, AZ)		b. YEAR COMPLETED	
		PROFESSIONAL SERVICES ongoing	CONSTRUCTION <i>(If applicable)</i>
23. PROJECT OWNER'S INFORMATION			
c. PROJECT OWNER AECOM/Arizona State Department of Transportation	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$1,800,000,000 (est.)	e. TOTAL COST OF PROJECT To be determined	

f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)
 Shannon & Wilson is providing geotechnical engineering services for the pursuit phase of the South Mountain Freeway design-build project. The project consists of constructing more than 20 miles of new freeway, including more than 60 new bridges and associated retaining walls.

a. TITLE AND LOCATION <i>(City and State)</i> BNSF Rockfall Mitigation Seligman Subdivision, (Williams, AZ)		b. YEAR COMPLETED	
		PROFESSIONAL SERVICES 2014	CONSTRUCTION <i>(If applicable)</i>
23. PROJECT OWNER'S INFORMATION			
c. PROJECT OWNER Burlington Northern Santa Fe (BNSF) Railway Co.	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT	e. TOTAL COST OF PROJECT \$9,000	

f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)
 This contract began with the review of Shannon & Wilson's on previous report completed in 2011 about potential rockfall hazards at the Seligman Subdivision. Shannon & Wilson's scope of work for this contract included a site visit to view a potentially unstable boulder above the tracks, and to provide a geotechnical recommendations to reduce the hazard to railroad operations.

a. TITLE AND LOCATION <i>(City and State)</i> Yuma Seismic Strengthening Evaluation (Yuma, AZ)		b. YEAR COMPLETED	
		PROFESSIONAL SERVICES 2009	CONSTRUCTION <i>(If applicable)</i>
23. PROJECT OWNER'S INFORMATION			
c. PROJECT OWNER U.S. Bureau of Reclamation	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$33,000	e. TOTAL COST OF PROJECT \$33,448	

f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)
 Shannon & Wilson is currently completing a geotechnical liquefaction hazard assessment for the U.S. Bureau of Reclamation's Yuma Project Office Headquarters, located at the Yuma Desalting Plant. Our work is being completed in support of a seismic retrofit of the building. As part of our evaluation we reviewed several previous studies at the site. Using the Standard Penetration Test results, boring logs, and laboratory data provided to us by the Bureau of Reclamation, we performed simplified empirical analyses using three of the most widely used and accepted methods to evaluate liquefaction potential beneath the site. We also used empirical methods to assess the magnitude of earthquake-induced settlement. Additionally, we used an empirical method to assess the potential for earthquake-induced lateral spreading at the site.

a. TITLE AND LOCATION <i>(City and State)</i>	b. YEAR COMPLETED
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2013 Emergency Flood Response (Boulder and Larimer Counties, CO)		PROFESSIONAL SERVICES 2014	CONSTRUCTION <i>(If applicable)</i>
23. PROJECT OWNER'S INFORMATION			
c. PROJECT OWNER Atkins/Kiewit/Colorado Department of Transportation	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT	e. TOTAL COST OF PROJECT \$268,000	

f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)
Shannon & Wilson's emergency geotechnical services to Kiewit as part of the US 34 reconstruction project between Loveland and Estes Park. The work consisted of assisting the Colorado Department of Transportation and Kiewit with reconstruction activities including rebuilding the roadway, which was severely damaged by the September 2013 rain event and subsequent flooding. Shannon & Wilson, Inc. provided recommendations for scour protection, embankment reconstruction, and to address landslides and rock falls. The team provided services for over 100 near-consecutive days.

a. TITLE AND LOCATION <i>(City and State)</i> Colorado Department of Transportation On-Call Contracts- Geotechnical and Rockfall	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES ongoing	CONSTRUCTION <i>(If applicable)</i>
23. PROJECT OWNER'S INFORMATION		
c. PROJECT OWNER Colorado Department of Transportation	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT	e. TOTAL COST OF PROJECT \$1,114,701

f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)
Shannon & Wilson has been supporting the Colorado Department of Transportation's Rockfall Group on an as-needed basis since 2011. Projects are issued on a task order basis, which to-date have included Geologic mapping along rockfall-prone sections of highways, developing rockfall mitigation measures, and evaluation and other geotechnical hazards, including post-fire induced debris flows. Shannon & Wilson has also provided Evaluation of the feasibility of using radar systems as stand-alone devices or in combination with other instrumentation to provide a full-time monitoring system that for rockfall and rockslides. Additionally we have been providing field personnel/engineers to observe and document various rockfall mitigation construction projects around the state, including installation/repair of slope mesh, scaling, blasting, and shotcrete repair of a barrier wall.



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6. ADDITIONAL INFORMATION

a. PROVIDE ANY ADDITIONAL INFORMATION YOU FEEL MAY BE NECESSARY TO DESCRIBE YOUR FIRMS QUALIFICATIONS. (ATTACH ADDITIONAL SHEETS AS NEEDED.)

FIRM OVERVIEW

Shannon & Wilson is an employee-owned, nationally recognized geotechnical and environmental engineering firm with 12 offices across the country. We are licensed and have worked throughout the U.S. and our staff is committed to travelling to project sites as needed. For any State of Arizona contract, work will be performed primarily by staff from our Denver, Colorado, office with support from our other offices across the country as required. As a firm, Shannon & Wilson has extensive experience with geotechnical engineering and geologic hazards mitigation for federal, state, and municipal transportation agencies, as well as freight railroads and utilities throughout North America. Our expertise is the result of more than 60 years of experience in the industry. We have a well-earned reputation for providing high-quality technical services. Our services include project development, field explorations, engineering analysis and design, geotechnical testing services, and pavement design.

GEOTECHNICAL ANALYSIS AND DESIGN

In most projects, data collected from our geologic/geotechnical studies and explorations is analyzed by our engineers to provide geotechnical parameters for design, recommendations for design, and/or actual design. The exception is when we produce data reports where the purpose is solely to transmit data without interpretation or recommendations.

Shannon & Wilson provides geotechnical studies and design recommendations for project elements relative to slope stability, earth retention, erosion control, and site drainage. Our design process considers ground conditions, embankment materials, groundwater and seepage, construction alternatives, loading conditions, and project constraints. We prepare recommendations for site preparation, grading, fill materials, fill placement and compaction, and excavation support and drainage based on the subsurface conditions encountered.



We have designed and overseen construction of stable slopes using zoned embankments, ground improvement, geosynthetics, and special fill placement and compaction techniques. We have developed cost-effective solutions for challenges posed by soft-soil conditions, including the use of ground improvement and light-weight fill such as foam cement and expanded polystyrene (EPS) geofoam. For areas with significant slope stability issues, our services include: field assessment of conditions, development of alternative designs, design of remedial measures, preparation of contract documents, and construction management and inspection. Using computer slope stability programs, we can model slope movements to predict behavior and design the most cost-effective stabilization measure(s).

Shannon & Wilson also has a history of providing rock slope design and rockfall mitigation services. We have geological, geotechnical, and mining engineering staff experienced in design of rock slopes, including: rock fall analysis and mitigation; scaling; blasting; and stabilization using rock bolts, anchors, mesh, and other means. Rock slopes are often located in rugged terrain, and our staff is experienced in collecting geologic data in such challenging conditions; many have formalized rope access training.



Regarding foundations, Shannon & Wilson has been designing foundations for structures for 60 years, including spread footings, driven piles, drilled shafts, and micropiles. Our Denver office has assisted in the design of numerous plants, pump and lift stations, and structures in varying subsurface conditions. We are innovative in finding cost-effective and technical solutions for any foundation design situation. Typical engineering considerations that we address in our reports include: evaluation of alternative foundation types, capacity or bearing pressure, settlement analysis and mitigation, dimensioning, seismic loading, lateral earth pressures, coefficients of subgrade reaction and sliding, drainage, foundation preparation and



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excavation, excavation stability, ground improvement for unstable soils, and backfilling

GEOLOGIC/GEOTECHNICAL STUDIES AND EXPLORATIONS

Geotechnical site characterization is at the heart of what we do every day. Our understanding of geologic conditions and the ability to relate these conditions to design is a key differentiator. Our geologists and engineers are well-versed in all aspects of geologic site investigation, including: compilation of existing geologic information; air photo analysis and interpretation; geologic and structural mapping; geotechnical drilling in soil; rock coring; excavation of test pits; geophysical studies; environmental drilling and sampling; installation of groundwater monitoring wells, piezometers, and in situ pressuremeter testing; and installation and monitoring of geotechnical instrumentation.

We have performed subsurface investigations throughout a wide range of geographic settings, from remote mountain regions requiring specialty equipment to urbanized metropolitan areas with heavy traffic and dense utilities. Knowing that each site has unique geologic conditions that can impact projects in different ways, we design our field investigation programs with the specific needs of each project in mind, rather than employing a cookie-cutter approach where all sites are the same. Where possible, we utilize a phased approach to our investigation to allow for economical collection of soil, bedrock, and groundwater samples and other geologic data. Our exploration activities are staffed by an experienced geologist or engineer to provide quality control by observing the work, collecting representative soil/rock samples for laboratory testing, and preparing descriptive field logs.



Our staff is trained in environmental drilling and sampling. By assigning an experienced geologist or engineer during exploratory work, we can quickly react if unanticipated environmental concerns are identified during drilling. We are also capable of more routine soil and groundwater sampling for environmental purposes. As an example, for the past 18 months Shannon & Wilson has been providing environmental services to support construction dewatering operations at the Metro Wastewater Reclamation District Northern Treatment Plant. The dewatering discharge permit for the site (issued under the Colorado Discharge Permit System) requires periodic sampling of effluent discharge water on a weekly, monthly, and quarterly basis, and influent water sampling on a quarterly basis. Water samples are submitted to a laboratory for analytical testing to determine the concentrations of various constituents (e.g. total suspended solids, oil and grease, dissolved metals, volatile organic compounds, etc.), depending on the sampling event. Shannon & Wilson is responsible for conducting the sampling event, coordinating with the laboratory, and preparing a data report for each event. Periodic sampling and testing are also required in association with hydrostatic testing discharges; Shannon & Wilson performs the same scope of work for these sampling events.

TUNNELS

Shannon & Wilson has extensive experience with geotechnical design and construction considerations for tunneling. Our expertise encompasses all phases of the design/construction process, including: conceptual design and feasibility, ground characterization, geotechnical baseline reports, plans and specifications, construction monitoring and observation, claims resolution, and construction contract packaging and risk management.

We are experienced in local ground conditions and understand how to mitigate potential third party impacts due to ground settlement. In addition, we are familiar with permitting requirements and procedures associated with tunneling under highways and railroads, which helps keep project schedules on track. We are experienced in a wide range of tunnel excavation methods, including: open face and shield tunneling, auger boring, pipe ramming, microtunneling, earth and slurry pressure balance tunnel boring machines, and drill and blast. We have worked on tunnels ranging from 2 to 16 feet in diameter, to the world’s largest-diameter soft ground tunnel with an outside diameter of 85 feet.





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ROCK STABILIZATION/ROCK SCALING/ROCK BOLTING

Shannon & Wilson has a history of providing rock slope design and rockfall mitigation services to transportation agencies, utilities, and railway owners. We have geological, geotechnical, and mining engineering staff experienced in design of rock slopes, including: rock fall analysis and mitigation; scaling; blasting; and stabilization using rock bolts, anchors, mesh, and other means. Rock slopes are often located in rugged alpine terrain, and our staff is experienced in collecting geologic data in such challenging conditions; many have formalized rope access training.



Recent project experience includes work performed under an on-call rockfall services contract with the Colorado Department of Transportation (CDOT). Specific tasks included directing rock scaling in Clear Creek Canyon, slope radar monitoring in Glenwood Canyon, design of rock slope mitigation measures along SH-133 in Paonia, and conceptual slope designs for realignment of State Highway 119A in Boulder Canyon in support of the CDOT flood recovery projects. We are also part of the team recently providing Gross Dam Road Improvements project which involves several soil and rock cuts.

INSTRUMENTATION

Shannon & Wilson’s world-class reputation for state-of-the-practice instrumentation systems began more than 30 years ago with the in-house development of the Slope Indicator (the precursor to the modern-day inclinometer) by our co-founder, Stan Wilson. Today, we are specialists in the application of instrumentation for monitoring soil, rock, and structure behavior resulting from human-induced and natural phenomena. This includes the design, installation, and monitoring of instruments, as well as the reduction and interpretation of data for geotechnical and hydrogeologic applications. Many of our recent instrument systems have utilized automated data acquisition systems.



As examples, we have recently deployed instrumentation arrays at Denver International Airport to monitor the performance of 65-foot-high soil and rock cuts, and along Interstate 70 in Glenwood Canyon to monitor slopes for changes which may indicate increased rockfall risk.

GIS CAPABILITIES AND ASSET MANAGEMENT

Shannon & Wilson has full GIS capabilities and is currently providing extensive GIS services to CDOT. Our work for CDOT has involved developing a GIS-based data collection system using mobile phones or tablet systems to gather pertinent information on geologic hazards such as rockfall and landslide events, as well as to inventory key assets such as retaining walls. We are also using GIS to perform risk analysis for geological hazards impacting CDOT infrastructure as a means of prioritizing mitigation and allocating funding.

7. ANNUAL AVERAGE PROFESSIONAL SERVICES REVENUES OF FIRM FOR LAST 3 YEARS

a.	Percentage of Total Work Attributable to State, Federal and Municipal Government Work:	60%
b.	Percentage of Total Work Attributable to Non-Government Work:	40%

8. AUTHORIZED REPRESENTATIVE. The foregoing is a statement of facts.

Signature: Date: December 16, 2015

Name: Gregory R. Fischer, PhD, PE Title: Senior Vice President and Denver Office Manager