

# STATE OF MONTANA

## JOB DESCRIPTION

*Montana state government is an equal opportunity employer. The State shall, upon request, provide reasonable accommodations to otherwise qualified individuals with disabilities.*

**Job Title:** Geotechnical Specialist **Position Number:** 40025, 40002

**Location:** Helena **Department:** Transportation

**Division and Bureau:** Engineering/Geotechnical and Pavement Bureau

**Section and Unit:** Geotechnical Section

**Job Overview:** This position serves as an entry to mid-level geotechnical specialist and conducts basic to intermediate geotechnical engineering analysis and design and performs field investigations. The position is assigned progressively challenging responsibilities to reach mid-level status. The position with assistance and guidance (dependent upon experience) from a Geotechnical District Manager or other senior geotechnical section staff evaluates project plans; establishes guidelines, procedures, and parameters for various projects and activities; plans and oversees a variety of investigation, sampling, and engineering projects; provides technical assistance to a variety of individuals and agencies involved with ongoing road construction projects; and performs a variety of other duties in support of the Department goals and Division objectives. The duties are performed in both the office and field. The incumbent reports directly to the Geotechnical Operations Manager and indirectly to the Geotechnical Engineer.

### **Essential Functions (Major Duties or Responsibilities):**

#### **Level 1**

#### **Geotechnical Engineering Analysis and Design -- 90%**

This position provides basic engineering analysis and design service for geotechnical aspects of Department Road and bridge construction projects. The geotechnical specialist with varying amounts of oversight and guidance dependent upon the specific task; evaluates overall project purpose and requirements to determine geotechnical issues and impacts; performs analytical procedures and conducts engineering analyses; organizes and writes preliminary reports to present findings and recommendations; designs field exploration plans and directs subsurface investigations; and attends meetings and reviews to discuss, coordinate, and develop solutions to geotechnical problems.

- Reviews project purpose and requirements to determine potential geotechnical issues requiring analysis; identifies actual and/or potential engineering conflicts, errors or deficiencies; and anticipates problems associated with individual projects and specific geotechnical considerations (e.g., bearing pressures, slope stability, groundwater flow, etc.).

- Performs analytical procedures and conducts basic engineering of geotechnical components of specific projects, including bearing pressures, short and long-term settlement magnitudes, cut and fill slope stability, foundation supports and pile foundations, groundwater and seepage flow, dynamic and seismic loading conditions, and other analytical procedures.
- Organizes and writes preliminary geotechnical reports to present results of field and laboratory studies, analytical procedures, and recommendations for geotechnical design parameters.
- Designs field exploration plans to determine engineering factors related to topography, buried and overhead utilities, anticipated geological and subsurface conditions, available and appropriate exploration equipment, and specific project requirements. Assists with the installation and monitoring of instrumentation used in exploration borings and construction
- Performs engineering subsurface investigations to collect and analyze the various soils and rock samples according to project specifications.

#### **Other Duties as Assigned --10%**

- Performs a variety of other engineering activities assigned by the Geotechnical Engineer or Direct Supervisors in support of the Department mission and Division objectives. This includes exchanging information with agency staff; assisting Geotechnical District Managers with their duties; directing special projects, participating in state, interstate, and federal research programs; and attending ongoing education and training as needed.

#### **Level 2**

#### **Geotechnical Engineering Analysis and Design -- 80%**

This position provides mid-level engineering analysis and design service for geotechnical aspects of Department Road and bridge construction projects. The geotechnical engineering specialist evaluates overall project purpose and requirements to determine geotechnical issues and impacts; establishes analytical procedures and conducts engineering analyses; designs alternatives and approaches to complex geotechnical problems; organizes and writes reports to present findings and recommendations; designs field exploration plans and directs subsurface investigations; and attends and conducts reviews and conferences to discuss, coordinate, and develop solutions to geotechnical problems. This includes:

- Reviews project purpose and requirements to determine potential geotechnical issues requiring analysis; identifies actual and/or potential engineering conflicts, errors or deficiencies; and anticipates problems associated with individual projects and specific geotechnical considerations (e.g., bearing pressures, slope stability, groundwater flow, etc.).
- Performs analytical procedures and conducts intermediate engineering of geotechnical components of specific projects, including bearing pressures, short and long-term settlement magnitudes, cut and fill slope stability, foundation supports and

pile foundations, groundwater and seepage flow, dynamic and seismic loading conditions, and other analytical procedures.

- Organizes and writes reports to present results of field and laboratory studies, analytical procedures, and recommendations for geotechnical design parameters.
- Designs field exploration plans to determine engineering factors related to topography, buried and overhead utilities, anticipated geological and subsurface conditions, available and appropriate exploration equipment, and specific project requirements. Assists with the installation and monitoring of instrumentation used in exploration borings and construction.
- Performs engineering subsurface investigations to collect and analyze the various soils and rock samples according to project specifications.
- locations, and establishing other parameters (e.g., time frames, equipment, etc.) as necessary to ensure accurate results and safety of personnel performing the investigations.
- Attends and conducts reviews and project milestone meetings for specific project elements and special design considerations by contractors, departmental personnel, and other state and local agency personnel as necessary.

#### **Project Planning and Oversight -- 10%**

This position provides planning assistance for District projects to ensure the most efficient, cost-effective, and otherwise appropriate use of human and material resources. This includes establishing guidelines and parameters for site-specific geotechnical studies; conducting technical reviews of construction plans to verify appropriate incorporation of geotechnical considerations and recommendations; developing solutions to a broad range of engineering deficiencies and problems; designing and administering a Laboratory Testing Program; and providing on-site and remote geotechnical engineering advice and technical assistance to a variety of parties.

- Conducts technical review of Construction plans to verify appropriate interpretation of geotechnical recommendations and requirements through both office and field reviews.
- Designs and administers a Laboratory testing Program based on field investigations, analytical results, and scientific observations to manage and monitor testing assignments for soil and rock samples recovered from field investigations.

#### **Other Duties as Assigned -- 10%**

Performs a variety of other engineering activities assigned by the Geotechnical Engineer or Direct Supervisors in support of the Department mission and Division objectives.

#### **Supervision**

The number of employees supervised is: 0

The position number for each supervised employee is: N/A

**Physical and Environmental Demands:**

- Lifting heavy objects (Soil/rock samples, analytical equipment, etc.) up to 50 lbs.
- Ability to walk over uneven terrain or in water
- Remaining seated for extended periods of time, with occasional walking; standing; bending
- Operating a personal computer
- Communicate in writing, in person, and over the phone
- Computing arithmetic operations
- Decision making that affects public health and safety
- Ability to meet inflexible deadlines
- Ability to be accurate with all aspects of work
- Ability to multi-task

Predominant work is performed in normal office environment. Field work involves:

- Exposure to extreme weather conditions
- Exposure to loud noises
- Exposure to high-speed traffic

**Knowledge, Skills and Abilities (Behaviors):****KNOWLEDGE:**

**Level 1:** Basic knowledge of geotechnical engineering and geology and construction methods, processes and procedures, computer-assisted design software, and engineering techniques are required for design projects of limited geotechnical complexity. An introductory knowledge of generally accepted geotechnical guidelines and procedures regarding road design and construction is also required.

**Level 2:** Requires intermediate knowledge of the concepts and theories of geotechnical engineering, geology, mathematics, the physical sciences, and highway and bridge design; methods and practices of highway construction and construction engineering; engineering policy; materials properties, specifications, and test methods; and construction safety practices. The position also requires basic knowledge of traffic engineering; highway economic, safety, and efficiency issues; Engineering Division objectives and Material Bureau goals; project planning; research methods and techniques; highway construction methods and techniques; transportation planning, design, and highway construction processes; field applications of highway engineering and construction; environmental rules and regulations; and construction methods and practices.

**SKILLS:**

**Level 1:** Must have the ability to interpret site-specific data from various sources and effectively communicate with Geotechnical Section management to finalize geotechnical designs. This position requires skill in reading and interpreting complex plans, specifications, and contract documents; drawing conclusions and making



**Human Resources Review**

**Job Code Title: Engineering Analyst**

**Job Code Number: D25011**

My signature below indicates that Human Resources has reviewed this job description for completeness and has made the following determinations:

- |   |   |
|---|---|
| <input type="checkbox"/> FLSA Exempt                        | <input checked="" type="checkbox"/> FLSA Non-Exempt               |
| <input checked="" type="checkbox"/> Telework Available      | <input type="checkbox"/> Telework Not Available                   |
| <input checked="" type="checkbox"/> Classification Complete | <input checked="" type="checkbox"/> Organizational Chart attached |

**Human Resources:**

---

**Signature**

**Title**

**Date**