GEOTECHNICAL INSTRUMENTATION ENGINEERING CONSULTATION AGREEMENT

Pursuant to this Geotechnical Instrumentation Engineering Consultation Agreement ("Agreement"), Rahul Vaishnav ("Consultant") has agreed to provide Geotechnical Instrumentation Engineering Services to Hirani Engineering & Land Surveying, D.P.C. ("Client") for their instrumentation monitoring projects.

This Agreement establishes the scope of services, responsibilities, and terms under which the Consultant will provide expert instrumentation data analysis, site investigations, monitoring solutions, software development, and related engineering consultation services.

A. Scope of Services

The Consultant acknowledges that geotechnical instrumentation projects require specialized expertise to ensure structural safety, foundation stability, environmental compliance, and adherence to engineering standards.

The purpose of this Agreement is to provide the Client with direct access to expert services, including:

- Subsurface investigation and soil analysis
- Development of construction work plans and procedures
- Geotechnical instrumentation design, installation, and monitoring
- Slope stability analysis and earthwork evaluation
- Vibration monitoring and analysis
- Construction noise analysis and acoustic modelling

- Noise propagation modelling and impact assessment
- Total station installation and surveying integration
- Construction monitoring and quality assurance
- Software development for construction data management and analysis
- AI training and implementation for construction applications

In exchange for the agreed-upon Service Fee, the Consultant will provide Comprehensive Geotechnical Instrumentation Engineering Services as defined in Section B of this Agreement. All services will be provided in accordance with industry standards, applicable building codes, and engineering ethics. Payment terms and service deliverables are outlined in subsequent sections of this Agreement.

B. Definitions and Service Categories

- Service Fee: refers to the fees for geotechnical instrumentation engineering services provided during the agreed-upon project duration or service period. The Client must pay, and the Consultant must receive, the agreed-upon fees prior to commencement of services or according to the payment schedule established in the project proposal. The amount of Service Fees depends on the scope of work, site complexity, and service categories as defined herein.
- Site Investigation Services: include subsurface exploration through soil borings and test pits, standard penetration testing (SPT), cone penetration testing (CPT), soil sampling and laboratory testing, groundwater level monitoring, geophysical surveys, and preparation of detailed subsurface investigation reports with soil profiles and stratigraphic logs.
- Geotechnical Instrumentation Services: include design and specification of instrumentation systems, installation supervision of inclinometers, piezometers, settlement monitoring points, strain gauges, tiltmeters, and load cells. Services also include data acquisition system setup, real-time monitoring dashboards, automated alert systems, data validation and analysis, trend identification, and preparation of instrumentation monitoring reports with graphical presentations of instrument readings over time.
- Vibration Monitoring and Analysis Services: include installation and operation of seismographs and vibration monitoring equipment, measurement of peak particle velocity (PPV) and frequency content, assessment of vibration impacts on nearby

structures, comparison with regulatory standards and damage criteria, development of vibration mitigation strategies, and preparation of vibration monitoring reports with compliance documentation.

- Noise Monitoring and Acoustic Analysis Services: include ambient noise level measurements, construction noise monitoring at property boundaries, noise propagation modelling using specialized software, assessment of noise impacts on sensitive receptors, comparison with local noise ordinances and regulations, development of noise control and mitigation measures, preparation of noise impact assessment reports, and ongoing compliance monitoring throughout construction phases.
- Total Station and Surveying Services: include total station installation and calibration, integration of surveying data with geotechnical monitoring systems, precise measurement of structural movements and settlements, establishment of monitoring benchmarks and reference points, coordination with land surveying activities, and preparation of surveying reports with displacement vectors and movement analysis.
- Construction Work Plans and Procedures: include development of site-specific construction methodology, preparation of excavation support and dewatering plans, sequencing of construction activities to minimize risks, development of health and safety procedures, preparation of quality control and quality assurance plans, coordination with construction schedules, and documentation of construction best practices.
- Software Development Services: include custom software development for construction data management, development of automated data analysis tools and dashboards, integration of multiple data sources (instrumentation, surveying, testing), creation of web-based monitoring portals for stakeholders, development of mobile applications for field data collection, database design and management for construction projects, and API development for system integration.
- AI Training and Implementation Services: include training construction teams on artificial intelligence applications, implementation of machine learning models for predictive maintenance, development of AI-powered anomaly detection systems for monitoring data, natural language processing for construction document analysis, computer vision applications for quality control and progress tracking, training on AI tools for construction planning and optimization, and ongoing support for AI system deployment.

- Slope Stability and Earthwork Services: include slope stability analysis using limit equilibrium and finite element methods, earth pressure calculations for retaining structures, cut and fill volume calculations, compaction specifications and testing, erosion control recommendations, and preparation of earthwork design reports.
- Excluded Services: The Consultant will not perform structural design of buildings, architectural design services, environmental contamination assessment, or overall construction management services. Any services beyond the defined geotechnical and instrumentation scope will require a supplementary agreement.
- Report Deliverables: The Consultant will provide comprehensive written reports including executive summaries, detailed field observations and measurements, laboratory and field test results, engineering analyses and calculations, design recommendations and specifications, construction procedures and best practices,. All reports will be delivered in both digital (PDF) and hard copy formats unless otherwise specified. Digital dashboards and real-time monitoring portals will be provided for ongoing instrumentation projects.
- Response Time and Communication: The Consultant will respond to the Client's technical inquiries and requests for clarification within 24 business hours. For urgent site conditions, instrumentation alerts, or construction issues requiring immediate attention, the Consultant will provide emergency response within 24 hours. Regular project status updates will be provided at agreed-upon intervals, and real-time monitoring data will be accessible through web-based dashboards when applicable.

C. Standards and Compliance

All geotechnical instrumentation engineering services provided under this Agreement shall be performed in accordance with generally accepted engineering standards and practices.

The Consultant shall comply with all applicable local, state, and national building codes, regulations, and industry standards including but not limited to ASTM standards, ASCE guidelines, ISO standards for instrumentation, OSHA safety requirements, and relevant industry codes.

All noise and vibration assessments will comply with applicable EPA, FHWA, and local regulatory standards.

D. Liability and Responsibility

Recommendations provided are based on subsurface conditions encountered during investigation, instrumentation readings, and monitoring data collected during the project.

Recommendations may require revision if significantly different conditions are discovered during construction or if monitoring data indicates unexpected performance.

The Client acknowledges that subsurface conditions can vary between investigation points and unforeseen conditions may exist.

E. Term and Termination

This Agreement shall commence on the date of execution and continue until completion of the defined scope of services or until terminated by either party with 30 days written notice.

Upon termination, the Consultant shall be compensated for all services rendered up to the termination date, and the Client shall receive all completed work products, reports, data files, and access credentials to any monitoring systems or software developed under this Agreement.

F. Payment Terms for Specific Projects

Project: Floor Gymnasium Vibration Study - John Jay College

In exchange for a Project Service Fee of **$1,500.00 CAD** plus applicable HST during a seven days service period, the Consultant will provide Specialized Vibration Analysis Services for the Floor Gymnasium at John Jay College. All payments must be received prior to commencement of services.

1. Project Service Fee

Refers to the fees for vibration analysis services provided during a seven (7) day service period. The Client must pay, and the Consultant must receive, the full Project Service Fee of $1,500.00 CAD plus HST prior to the commencement of services. Payment confirms the Client's commitment to the project timeline and deliverables as outlined herein.

2. Scope of Vibration Analysis Services

The Consultant will provide the following specialized services for the Floor Gymnasium vibration study:

- Review and analysis of vibration monitoring data collected from floor sensors during volleyball games and other gymnasium activities
- Assessment of vibration impact on the structural integrity of the building and potential damage evaluation
- Theoretical calculations and modeling based on monitored vibration readings, structural characteristics, and occupancy loads
- Comprehensive review and application of AISC Design Guide 11 (Vibrations of Steel-Framed Structural Systems) to the specific case of the gymnasium floor system
- Development of a vibration assessment model incorporating actual field measurements and structural analysis
- Direct access consultation services via chat/messaging platforms for the duration of the seven (7) day service period
- Technical support and response to Client's questions and clarifications within 12 hours during the service period
- Preparation and delivery of a comprehensive final report including vibration data analysis, theoretical calculations, compliance assessment with AISC Design Guide

11, findings and conclusions, and recommendations for mitigation measures if required

3. Service Period and Timeline

The service period for this project is seven (7) calendar days from the date of payment receipt and project commencement. During this period, the Consultant will be available for direct consultation and will work diligently to complete the vibration analysis and deliver the final report. The timeline includes data review (Days 1-2), theoretical analysis and modeling (Days 3-5), report preparation (Days 6-7), and final deliverable submission by end of Day 7.

4. Direct Access Support

Enables the Client to communicate directly with the Consultant via chat, email, or messaging platforms throughout the seven (7) day service period. The Consultant will respond to technical inquiries, requests for clarification, and progress updates within 24 hours. This direct access ensures efficient communication and allows the Client to receive real-time updates on the analysis progress.

5. Deliverables

The Consultant will deliver a comprehensive final report by the end of the seven (7) day service period. The report will include:

- Executive summary of findings and recommendations
- Detailed analysis of vibration monitoring data with graphical representations
- Theoretical calculations and vibration assessment model (Excel format)
- Evaluation of structural impact and potential damage assessment
- Compliance review with AISC Design Guide 11 criteria
- Conclusions regarding floor vibration acceptability
- All supporting calculations, data analysis worksheets, and reference materials

All deliverables will be provided in digital format (PDF for reports, word, Excel for calculation models).

6. Required Information from Client

To commence services, the Client must provide the following information and materials:

- Complete vibration monitoring data from floor sensors in digital format
- Structural drawings and specifications of the gymnasium floor system

- Building structural information including floor type, span lengths, support conditions, and construction materials
- Details of typical occupancy loads and activities (volleyball games, basketball, etc.)
- Any previous structural assessments or reports related to the gymnasium floor
- AISC Design Guide 11 document (already provided by Client)
- Access to technical contacts for clarifications during the analysis period

7. Payment Schedule

- **Total Project Fee: $1,500.00 CAD**
- **HST (13%): $195.00 CAD**
- **Total Amount Due: $1,695.00 CAD**
- **Payment Due: Prior to commencement of services**
- **Payment Method: As agreed between Consultant and Client (wire transfer, check, or electronic payment)**

Services will commence within 12 hours of payment receipt confirmation.