REQUEST FOR QUALIFICATIONS/PROPOSALS

For

CONSTRUCTION MANAGER / GENERAL CONTRACTOR SERVICES

Addendum No. 1

Idaho Meat Science & Innovation Center
Vandal Brand Meats

University of Idaho
Moscow, Idaho

October 24, 2022
UI PN CP200032

For additional information contact:

Daryle Faircloth, Project Manager -or- Raymond Pankopf, Director

Architectural & Engineering Services, Budget and Planning, University of Idaho

(208) 885 6246 (208) 885 9333 (fax)
REQUEST FOR QUALIFICATIONS
for
Construction Manager/General Contractor (CM/GC) Services

Addendum No. 1
Idaho Meat Science & Innovation Center
Vandal Brand Meats

University of Idaho
Moscow, Idaho

To: Architects and Engineers
From: Kim Salisbury, Assistant Vice President, Budget & Planning Facilities, University of Idaho

Subject: Addendum No. 1: Attached is additional supplemental information in relation to the Request for Qualifications for the proposed Construction Manager / General Contractor (CM/GC) Services in support of the Idaho Meat Science & Innovation Center – Vandal Brand Meats to be located on the Main Campus of the University of Idaho, Moscow, Idaho. UI CP200032.

Item 1: RFP/Q Clarifications:
1. Page 3 of 19: Delete e-mail address dfaircloth@uidaho.edu and replace with darylef@uidaho.edu
2. Page 19 of 19: Delete e-mail address dfaircloth@uidaho.edu and replace with darylef@uidaho.edu

Item 2: Pre-Proposal Meeting:
1. Exhibit ‘A’ – Pre-Proposal Meeting Minutes, dated Oct 18, 2022
2. Exhibit ‘B’ – Pre-Proposal Meeting Sign-in Sheet, dated Oct 18, 2022
3. Exhibit ‘C’ – CKA presentation

Date of Issue: Tuesday, October 25, 2022

Any questions, which arise from this addendum, shall be addressed to:
Daryle Faircloth, Architectural Project Manager
Architectural & Engineering Services
University of Idaho
875 Perimeter Drive MS 2281
Moscow, Idaho 83844-2281
(208) 885-6246
darylef@uidaho.edu

Proposals shall be clearly labeled, reference the RFQ dated October 28, 2022, and be submitted no later than: 5:00 p.m., Friday, October 28, 2022.

End RFQ Addendum No. 1 Document
REQUEST FOR QUALIFICATIONS/PROPOSALS
For
CONSTRUCTION MANAGER / GENERAL CONTRACTOR SERVICES

Pre-Proposal Meeting Minutes
Idaho Meat Science & Innovation Center
Vandal Brand Meats

University of Idaho
Moscow, Idaho

October 18, 2022
UI PN CP200032

For additional information contact:
Daryle Faircloth, Project Manager -or- Raymond Pankopf, Director
Architectural & Engineering Services, Budget and Planning, University of Idaho

(208) 885 6246
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REQUEST FOR QUALIFICATIONS
   for
Construction Manager/General Contractor (CM/GC) Services

Pre-Proposal Meeting Minutes
Idaho Meat Science & Innovation Center
Vandal Brand Meats

University of Idaho
Moscow, Idaho

To: Prospective Construction Manager/General Contractor Consultant Firms

Subject: Pre-Construction Phase Construction Manager/General Contractor (CM/GC) services by a qualified CM/GC Consulting firm to participate in a collaborative process to assist in the design, value-engineer, influence the methods and sequencing of the construction phase, and participate in the delivery and construction of the Idaho Meat Science & Innovation Center (MSIC), to be located on the campus of the University of Idaho, Moscow, Idaho.

UI CP200032

Date of Issue: Wednesday, October 19, 2022

Executive Summary:

The University of Idaho is seeking qualifications from interested Construction Manager/General Contractor (CM/GC) firms to assist the university in the design and construction of the Idaho Meat Science & Innovation Center (MSIC). The MSIC is to be located adjacent to the new Seed Potato Germplasm Laboratory completed in 2021 on the main campus of the University of Idaho, Moscow, Idaho.

It is the intent of the university to deliver the Idaho Meat Science & Innovation Center via a Construction Manager/General Contractor (CM/GC) methodology and process. A separate Request for Qualifications (RFQ) for firms interested in providing Architectural and Engineering Services (A/E) for the MSIC effort was issued June 22, 2020. Castellaw Kom Architects (CKA) of Lewiston, Idaho, teamed with Anderson Mason Dale Architects (AMD) of Denver, Colorado was selected and has initiated the design process. Design is currently approximately 35% complete with the completion of the Schematic Design (SD) phase of the design process.

The initial authorization by the Board of Regents of the University of Idaho for the Idaho Meat Science & Innovation Center is limited to the programming, planning, and design phases of the overall design and construction process. Therefore, the initial scope of services sought at this time are limited to Preconstruction Phase services. However, upon successful completion of the programming, planning, and design phases, it is the intent of the University of Idaho to seek authorization to proceed with the
construction phase. Additional services covering the bid, award and construction administration phases of the project may then be sought from the successful respondent to this Request for Qualifications.

Firms responding to this Request for Qualifications/Proposals for CM/GC Consulting Services are required to participate in today’s Mandatory Pre-Submittal Review Meeting be held 1:30 p.m., Tuesday, October 18, 2022, at the Facilities Services Building, 875 Perimeter Drive, on the main campus of the University of Idaho, Moscow Idaho. Required participation is met through either in person or zoom attendance.

Responses to this Request for Qualifications/Proposals for CM/GC Consulting Services with regard to the proposed new the Idaho Meat Science & Innovation Center will be received at the office of Architectural and Engineering Services, Budget and Planning, University of Idaho, 875 Perimeter Drive, Moscow, Idaho, 83844-2281 until close of business (COB) at 5:00 p.m., Friday, October 28, 2022.

Any questions which arise from this request shall be addressed to:

Raymond Pankopf, Director
University of Idaho, Architectural & Engineering Services
875 Perimeter Drive MS 2281
Moscow, Idaho 83844-2281

(208) 885-6246
rayp@uidaho.edu

or

Daryle Faircloth, Project Architect
University of Idaho, Architectural & Engineering Services
875 Perimeter Drive MS 2281
Moscow, Idaho 83844-2281

(208) 885-6246
darylef@uidaho.edu

Program clarification and additional data may be requested by appointment with either of the above listed individuals. The university respectfully requests that interested proposers limit their contacts to these individuals and contact only these individuals in the interest of maintaining a consistency of response and fairness to all proposers. Please make no contact with other members of the design team, including consultants, except regarding certain items as specifically directed in the RFQ, if any.

The initial contract is envisioned to be for the planning, programming and design phase services. Additional bidding, award and construction phase services may be required at the university’s discretion. As noted, such additional services are contingent upon additional authorization by the University of Idaho Board of Regents.
Mandatory Review:

A Mandatory Pre-Submittal Review Meeting of the project is held today, 1:30 p.m., Tuesday, **October 18, 2022**, at the Facilities Services Building, **875 Perimeter Drive**, on the main campus of the University of Idaho, Moscow Idaho. The review will be followed by a tour of the selected site for the proposed new Idaho Meat Science & Innovation Center for those attending in person.

*Failure to attend this review by at least one member of the proposing firm’s team will result in disqualification of the firm in question. Please sign the sign in sheet; zoom attendees will be added to the sign in sheet.*

An addendum will be issued at end of business, **Wednesday, October 20, 2022**, and posted to the UI website and e-mailed to participants of the pre-proposal meeting.

Project Funding:

The design and construction of the proposed new Idaho Meat Science & Innovation Center is to be funded by fiscal instruments developed by the University. Although the university is currently requesting funding for the Idaho Meat Science & Innovation Center via the FY2024 Permanent Building Fund process, there are currently no State of Idaho Permanent Building Funds involved in the proposed new Idaho Meat Science & Innovation Center project. Therefore, the current project administration plan is that the University of Idaho will administer all related contracts according to the terms and conditions of the award and applicable laws and guidelines. The CM/GC consultant will receive general instructions through the university. A Project Architect from Architectural and Engineering Services will be assigned to serve as the project manager and liaison between the university and the CM/GC consultant during all phases of the work.

Should the university receive funding for this project via the FY2024 Permanent Building Fund process, the administration plan for the project may be subject to change. This is to be determined and dependent upon whether or not State funding is infused into the project.

The university envisions the process for the development of the design and the delivery of the proposed new Idaho Meat Science & Innovation Center project to be a collaborative process in which the CM/GC will participate as a partner with the university and the other members of the design and delivery team.

Description of the Project:

General:
The university seeks to design and construct a new USDA-certified animal processing facility to facilitate the teaching, research, outreach and service conducted through the U of I meat science program. This new facility will replace the existing meat science laboratory that was built over 60 years ago and will be known as the Idaho Meat Science & Innovation Center, to be located adjacent to the new Seed Potato Germplasm Laboratory on the Moscow, Idaho campus. The facility will also serve as the home facility for Vandal Brand Meats, the retail component of the program that employs student workers from various degrees across the university.
Based on the Schematic Design efforts completed to date, the proposed site consists of an area approximately 46,500 square foot and building of approximately 12,700 gross square foot.

The project is currently authorized for the design phase at $7,650,000. It is assumed that, given the recent escalation construction costs industry wide, that the authorization level will need to be adjusted when the university seeks construction authorization at the conclusion of the design phase. The CM/GC consultant is expected to play a critical role in determining the appropriate budget and authorization level.

**Planning Background:**
This project has been a priority for the university since 2018 and launched a planning process for the funding pipeline that would enable this project to move forward. In August 2020, the University of Idaho (U of I) hired Castellaw Kom Architects and Anderson Mason Dale Architects to design a new Meat Science Innovation Center on the U of I Main Campus in Moscow, Idaho. The first phase of the Programming effort was program confirmation of the new facility using the Vandal Meat Lab Feasibility Study (Coengineers PLLC, 2017) as a starting point. The Programming phase took place during the months of September and October 2020, and the Schematic Design phase followed in May of 2021.

**Goals:**
The new Meat Science Innovation Center is an extremely important project for the U of I Moscow Campus and surrounding community. In addition to the expanded program offerings the new facility will provide for the campus, the Meat Science Innovation Center provides a unique opportunity to bring the community to campus to engage in a dialogue around meat production and connect people to where their food comes from.

The guiding principles for the project were developed during a series of workshops held in September and October 2020. The workshops engaged a variety of campus stakeholders including the Project Committee, which had valuable input throughout the process. The expressed goals for the project have been consistent, and some of the driving goals of the project are the following:

- **Educational Space**
- **Resource for Industry Partners**
- **Processing Bandwidth**
- **Public Engagement and Outreach**
- **Campus Presence**
- **Proposed Project Description:**
  - The university seeks to design and construct a new USDA-certified animal processing facility to facilitate the teaching, research, outreach and service conducted through the U of I meat science program. This new facility will replace the existing meat science laboratory that was built over 60 years ago and will be known as the Idaho Meat Science & Innovation Center. The facility will also serve as the home facility for Vandal Brand Meats, the retail component of the program that employs student workers from various degrees across the university.
  - This new facility will replace outdated existing facilities located nearby. The proposed site for the new Meat Science and Innovation Center facility is located within the historic West Farm neighborhood at the main campus in Moscow, Idaho. The site features frontage on Perimeter Drive, an arterial used both by university and general Moscow traffic which provides an opportunity to support the retail component of the MSIC program and operations. The new MSIC
The project is consistent with the strategic goals and objectives of UI and is fully consistent with UI’s strategic plan.

**Scope/Intent of the RFQ/P:**

It is the intent of this Request for Qualifications/Proposal to identify a CM/GC Consultant best qualified to assist the university with the planning, programming, design and construction of the Idaho Meat Science & Innovation Center as described in this RFQ/P.

The university is seeking a design and construction team comfortable and experienced in working within a CM/GC delivery environment and process.

The Idaho Meat Science and Innovation Center is currently under design by the CKA/AMD team. The team completed the Schematic Design (SD) phase in summer of 2021 and was then asked to put the design process on temporary hold while the university engaged in additional fundraising activities for the facility. Recently, the university sought to reinvigorate the design process and that process is underway with an effort to validate the SD results before proceeding with Design Development (DD).

The university actively seeks now a CM/GC consultant to partner with the current design team and to participate in the DD and CD development of the project. The intent is to have a mature process and completed CDs by the start of the summer 2023 construction season.

Upon review and acceptance of the final design solution by the Executives of the University of Idaho, the CM/GC Consultant may be asked to proceed with additional phase services as necessary to bid, award and construct the desired Idaho Meat Science & Innovation Center at the University of Idaho. Additional services beyond the Pre-Construction phase are contingent upon authorization to proceed with bidding, award and construction of the Idaho Meat Science & Innovation Center by the University of Idaho Board of Regents.

The final, exact scope of work is yet to be determined and will depend in part upon the input of the CM/GC Consultant to be identified through the RFQ/P process. It is the intent of the university that the selected CM/GC Consultant participates fully in a robust and collaborative design effort that defines and solidifies the final scope of work.

**Safety, Collaboration, and Coordination:**

The intent of the university is that an important and vital component of the scope of work for this effort is that the selected CM/GC Consultant participates as a partner with the university to integrate the physical work and construction of this effort into the daily flow and life of the campus and campus community.
Work Schedules shall be planned and coordinated to the greatest extent feasible and possible to accommodate the needs of the university, the academic calendar, the athletics calendar, special events, etc. with a specific emphasis on the safety of construction and project personnel, students, faculty staff, and the greater campus community.

The selected CM/GC Consultant shall recognize that this project intends to create and operate a fully functioning construction site within the core of a robust university, and that the site is bounded by major pedestrian and vehicular corridors. The construction period for this new Idaho Meat Science & Innovation Center will naturally coincide and overlap with varsity sports seasons and games which occur in the west campus neighborhood at the ASUI Kibbie Activity Center (Kibbie Dome) and the new ICCU Idaho Arena. Thus, the site will be periodically impacted by game day activities.

Successful integration of the construction operations into this environment in such a manner that facilitates both construction and operations and the university’s core mission to the greatest extent feasible, and the safety of all parties involved is of extreme importance to the university.

It is vital and necessary that the selected CM/GC Consultant for the Idaho Meat Science & Innovation Center project be able to coordinate materials deliveries, equipment, access, and operations with the university in a manner that minimizes impacts to the schedules and cost of both parties to the greatest degree possible. This includes other possible construction efforts on campus that may be underway whether those efforts are administered by the University of Idaho or the State of Idaho Division of Public Works. **Affirmation of the ability to work well and coordinate with the university in such close proximity to the betterment of the university’s intent to deliver both its on-going role and mission and a successful construction project on-time is a key factor in the selection of a CM/GC Consultant for this proposed new Idaho Meat Science & Innovation Center project.**

Schedule:

The current project schedule generally calls for a design process that will run through the spring of 2023, with an anticipation of construction activities beginning in summer of 2023. Substantial Completion and Certificate of Occupancy is anticipated at the in early fall academic semester of 2024.

The exact details of the proposed construction schedule are yet to be determined and the intent of the university is that the selected CM/GC Consultant for the Idaho Meat Science & Innovation Center project participates fully in that determination.

Design Team:

As noted earlier in this document, the selection process for the design team for the Idaho Meat Science & Innovation Center is complete. The selected design team members and/or firms have been identified at the time of the issuance of this RFQ/RFP are Castellaw Kom Architects (CKA) of Lewiston, Idaho, teamed with Anderson Mason Dale Architects (AMD) of Denver, Colorado.

Form of Agreement:

It is the intention of the University to initially enter into a contract with the selected CM/GC Consultant for Preconstruction activities only. These activities will include participation in design, value engineering, estimating, constructability review and possibly subcontract bidding. Upon completion of
Preconstruction activities, the CM/GC will submit a Guaranteed Maximum Price (GMP) and a critical path Method (CPM) schedule for the university’s review and approval as outlined in the RFQ.

**Required Services, Pre-Construction Services:**

It is the intent of the University that the specific scope of Preconstruction services will be negotiated prior to signing the Preconstruction Services Agreement, based on the Proposer’s input as well as the university’s requirements. In general, services are anticipated to include:

1. Consult with, advise, assist, and provide recommendations to the university and design team on all aspects of the planning and design of the work.

2. Provide information, estimates, schemes, and participate in decisions regarding construction materials, methods, systems, phasing, and costs to assist in determinations which are aimed at providing the highest quality building within the budget and schedule.

3. Review in-progress design documents and provide input and advice on construction feasibility, alternative materials, and availability of materials and equipment. Review completed design documents and suggest modifications to improve completeness and clarity.

4. Work with the university, the design team and with partners to best determine construction products and techniques may be best incorporated into the design and construction of the Idaho Meat Science & Innovation Center.

5. Provide input to the university and the design team regarding the current construction market bidding climate, status of key subcontract markets, etc. Recommend division of work to facilitate bidding and award of trade contracts, considering such factors as bidding climate, improving or accelerating construction completion, minimizing trade jurisdictional disputes, and related issues.

6. Develop and continuously monitor the project critical path method schedule and recommend adjustments in the design documents of construction bid packaging to ensure completion of the project in the most expeditious manner possible, while addressing and meeting the University’s critical schedule requirements.

7. Prepare construction cost estimates for the project at appropriate times throughout the design phases of the work. Notify the university and design team immediately if their construction cost estimates appear to be exceeding the construction budget or the GMP.

8. Work with the university and design team to determine impacts to the design and the construction delivery process brought about by the facility’s location and site constraints. Consider items such as haul routes, sequencing, lay down space, the academic calendar, class schedules, occupied buildings, university events, etc. Develop alternatives and options for ameliorating the impacts of such conditions and constraints.

9. Work with the university and design team to maximize energy efficiency in the project. Provide estimating and value engineering support to the University’s analysis and application for energy related incentive programs offered by local utilities. Participate with the University and design
team to analyze utility options for the service of the building.

10. Furnish a Guaranteed Maximum Price (GMP) in accordance with the contract for the university’s review and approval. It is anticipated that the GMP will be called for generally at the midpoint of the Construction Document phase. The exact timing of the GMP delivery will be determined with the input of the selected CM/GC Consultant.

In the event that the CM/GC is unable to furnish a GMP within the university’s budget, the university retains the sole option to cancel the solicitation and start a new process for the construction of the project, or cancel the Preconstruction contract and award a contract for Preconstruction activities to another proposer.

Required Services, Construction Phase Services:

Construction period services will be provided under terms of a standard form AIA contract with supplemental conditions.

The selected CM/GC will work with, and coordinate with the design team throughout the design and construction process. The selected CM/GC shall provide necessary information, effort and deliverables, as outlined in the RFQ.

It is anticipated that the CM/GC may desire to engage sub-contractors with whom a favorable partnership has existed in the past due to the value engineering and GMP delivery expectations placed on the CM/GC.

However, the CM/GC shall recognize that the university has a responsibility to the sub-contractors within the local service area. For the university, this “local service area” consists of two layers. The first, immediate layer consists of northern Idaho, plus the communities of Clarkston, Pullman, and Spokane, Washington. The second layer is the State of Idaho. The CM/GC is highly encouraged to develop a qualifications-based selection process, or, to accept bids from a prequalified grouping of firms mutually agreeable to all parties which will allow the greatest number of qualified, local subcontractors an opportunity to compete for substantive portions of the work. The university will monitor the process of selection of portions of the work for sub-contractor execution as well as the process of sub-contractor selection.

Future Services:

Future services may be required. If required, these will be administered by the University of Idaho, and may include future design phase services and construction phase services, as well as post-construction phase services. The university reserves the right to award follow-on contracts for these services to the successful CM/GC Consultant as the needs of the University require upon the conclusion of the contract resulting from this solicitation.

Informational Documents:

The UI Strategic Plan and Long Range Campus Development Plan and other pertinent documents are available on the UI web pages as noted in the RFQ with links provided.
Items of specific interest include:

- University home page:  [http://www.uidaho.edu](http://www.uidaho.edu)
- University Long Range Campus Development Plan (LRCDP): [http://www.uidaho.edu/facilities/ae/longrangecampusdevelopmentplan/illustrativeplan](http://www.uidaho.edu/facilities/ae/longrangecampusdevelopmentplan/illustrativeplan)
- Facilities Services home page: [http://www.uidaho.edu/infrastructure/facilities](http://www.uidaho.edu/infrastructure/facilities)
- University of Idaho Meat Science Innovation Center – Vandal Brand Meats Development page: [www.uidaho.edu/cals/vandal-brand-meats](www.uidaho.edu/cals/vandal-brand-meats)
- Meat Science Innovation Center Schematic Design Report: [https://www.uidaho.edu/infrastructure/facilities/bids](https://www.uidaho.edu/infrastructure/facilities/bids)

**Proposal Content and Instructions to Proposers:**

The proposal submitted in response to this RFQ/RFP shall be in the format outlined below and shall be wet-signed by an officer of the CM/GC firm with proper authority to commit the firm as outlined in the RFQ.

**Format:**

To assist in the evaluation, it is desirable that the proposal be formatted in a similar fashion to the headings listed below. Proposals should be clear and concise. Emphasis should be placed on the specific qualifications of the people who will actually perform the work of this contract and the specific approach to the execution of said work. Performance on past projects with the University of Idaho, other agencies of the state of Idaho, and other higher education clients is an important factor. Submit 10 copies of the proposal, one electronic copy and one copy of additional data as described within the RFQ.

1. Basic Qualifications:
2. CM/GC Role
3. Key Personnel
4. Project Management
5. Change Orders and Claims
6. Proposed Work Plan
7. Value Engineering
8. Preconstruction Services Fee
9. CM (Construction Phase) Fee
10. Sub-Contractor Work and Selection
11. Special Qualifications
12. Past Performance
13. Additional Information

**Evaluation, Selection Procedure and Interview Information:**

Under this RFQ/RFP, the selection procedure is intended to evaluate the capabilities of interested CM/GC firms to provide services to the university for this project.

An evaluation committee consisting of persons from the university planning, design, facilities management, members of the design team, and client communities will rank order the proposals based upon the response to the criteria listed within this request.
At least two, but in no case more than five, firms may be selected for a personal interview. The interview process is intended to evaluate the capabilities of interested firms to provide services to the university for this project within the context and confines of this RFQ/RFP. After completion of the interviews, the evaluation committee will adjust the ranking based upon interview performance.

Interviews are planned to be held **Tuesday, Nov. 29, Wednesday, Nov. 30, and /or Thursday, Dec. 1, 2022**, at the University of Idaho. All finalists will be notified of the exact times and places of their interviews.

Each interview will be a maximum of 90 minutes in duration. The format of the interview will be left up to the proposing firm; however, at least 30 minutes should be reserved for questions by the Selection Committee. Members of the CM/GC firm’s proposed on-site project management team must be present at the interview. The proposing firms must notify the University of Idaho Department of Architectural and Engineering Services no less than three days prior to their interview of any audio/visual or presentation support materials they may require.

**Interview Evaluation:**

The selection committee will evaluate the interview sessions and in a manner similar to the RFQ/P review process. Topics covered in the interview session shall include the topics listed hereinbefore under the “Proposal Content” section plus any additional, relevant topics which may arise during both the formal presentation and the question and answer portions of the interview.

**Award:**

Based upon the results of the selection committee, the University of Idaho will recommend a course of action to the University of Idaho Executive Leadership.

**Proposed Dates:**

<table>
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<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Issue RFQ/RFP</td>
<td>Monday, Oct 10, 2022</td>
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<tr>
<td><strong>MANDATORY</strong> Review</td>
<td>Tuesday, October 18, 2022 (1:30 p.m. UI Facilities Services)</td>
</tr>
<tr>
<td>Deadline, Solicitation Protests</td>
<td>Thursday, October 20, 2022</td>
</tr>
<tr>
<td>Proposals Due</td>
<td>Friday, October 28, 2022 (COB – 5:00 p.m.)</td>
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<tr>
<td>Announce Interview Candidates</td>
<td>Tuesday, Nov 8, 2022</td>
</tr>
<tr>
<td>Oral Interviews</td>
<td>T, W, Th, November 29 / 30 &amp; Dec 1, 2022</td>
</tr>
<tr>
<td>Announce Selected Firm</td>
<td>Friday, December 9, 2022</td>
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</tbody>
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**Anticipated Performance Period:**

The university anticipates the performance period for the completion of the Preconstruction phase services to be on, or about, **July 1, 2023**. University of Idaho planning assumptions are based on a construction period of **July 2023, through July 2024**. Punchlist, commissioning and miscellaneous activities may continue to June of 2025 as needed and required.
Additional Information:

The University of Idaho will attempt to select a firm not later than Friday, December 2, 2022. Upon selection of a CM/GC Consultant, the University will issue a letter of intent to negotiate. However, final award shall be contingent upon the successful negotiation and approval of a contract. The contents of a submitted proposal may be incorporated in a legal contract or agreement. Proposers should be aware that methods and procedures proposed could be folded into contractual obligations.

The University of Idaho reserves the right to reject any and/or all proposals received as a result of this request.

The University of Idaho may also negotiate separately with any source in any manner necessary to serve its best interests. Awards will be made on the basis of proposals resulting from this request and subsequent interviews.

Protests:

Solicitation Protests:

If any Proposer contemplating submitting a Proposal for the contract is in doubt as to the true meaning of any part of the RFQ/RFP, or detects discrepancies or omissions, such Proposer may submit to the university a written request for an interpretation thereof as outlined in the RFQ.

Prospective Proposers may submit a request for change of particular solicitation provisions and specifications and conditions to Daryle Faircloth no later than 5:00 p.m. Thursday, October 20, 2022. Such requests for change shall include the reasons for the request and any proposed changes to the solicitation provisions and specifications and conditions.

Submittal of Proposals:

A firm that submits a proposal represents and warrants the following:

A. that it is financially solvent, able to pay its debts as they mature, and possessed of sufficient working capital to perform the services and work described herein;

B. that it is capable of performing and completing the services and work described herein and has sufficient experience and competence to do so; and

C. that it is authorized to do business in Idaho, properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and the services and work described herein, and has or will obtain all licenses and permits required by law.
To confirm your interest in participating in the request process please contact, either by phone or e-mail:

Daryle Faircloth  
Project Architect & Manager  
Architectural & Engineering Services  
University of Idaho  
Moscow, Idaho 83844-2281

Raymond Pankopf  
Construction Contract Supervisor  
Architectural & Engineering Services  
University of Idaho  
Moscow, Idaho 83844-2281

(208) 885-6246  
(208) 885-9333 fax  
darylef@uidaho.edu

(208) 885-6246  
(208) 885-9333 fax  
rayp@uidaho.edu

darylef@uidaho.edu

As stated in the RFQ/P, **submit 10 hardcopies and one electronic copy via flash-drive of the proposal** responding to the requirements detailed in this RFQ/RFP plus one copy of any additional data. All submittals shall be made to:

Daryle Faircloth, Project Architect  
University of Idaho  
Architectural & Engineering Services  
875 Perimeter Drive MS 2281  
Moscow, Idaho 83844-2281

Proposals shall be clearly labeled, reference this RFQ/RFP, and be submitted no later than:  
**5:00 p.m., Friday, October 28, 2022.**

*Castellaw Kom Architects provided power point presentation including schematic design plans and exterior images.*

*Meeting adjourned for site visit / walk.*

*Questions from Site Walk:*

1. **What is the extent of site utilities:**  
   a. Services / utilities at adjacent SEED Potato Building site were designed / size to also serve the MSIC-VBM building. 8” domestic water and 8” storm sewer located in the asphalt parking lot at the SEED Potato Building. Water stub-out for MSIC-VBM is in place.

2. **Has there been a geotechnical evaluation performed at the site:**  
   a. Yes. Geo-Tek, Inc.. The report was completed in conjunction the SEED Potato Building and included samples for the MSIC-VBM sites. Report date is December 18, 2020.

*End of CM/GC Pre-Proposal Meeting Minutes*
Meat Science Innovation Center - Vandal Brand Meats - Pre-Proposal Meeting for CMGC Pre-Construction Phase Services
Tuesday, October 18, 2022

<table>
<thead>
<tr>
<th>NAME</th>
<th>COMPANY</th>
<th>TELEPHONE NUMBER</th>
<th>E-MAIL ADDRESS</th>
</tr>
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<tbody>
<tr>
<td>Daryle Faircloth</td>
<td>University of Idaho AES</td>
<td>208-885-7346</td>
<td><a href="mailto:daryleff@uidaho.edu">daryleff@uidaho.edu</a></td>
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<tr>
<td>Matt Proctor</td>
<td>University of Idaho AES</td>
<td>208-885-6246</td>
<td><a href="mailto:mrproctor@uidaho.edu">mrproctor@uidaho.edu</a></td>
</tr>
<tr>
<td>Mike Soul</td>
<td>G&amp;N Construction Co.</td>
<td>208-619-3744</td>
<td><a href="mailto:gnelson@ginnoconstruction.com">gnelson@ginnoconstruction.com</a></td>
</tr>
<tr>
<td>Rich Wells</td>
<td>G&amp;N Construction Co.</td>
<td>208-667-5560</td>
<td><a href="mailto:rich@ginnoconstruction.com">rich@ginnoconstruction.com</a></td>
</tr>
<tr>
<td>Mason Hewett</td>
<td>KLK - Kenaston Leone &amp; Keeble</td>
<td>208-791-9754</td>
<td><a href="mailto:rhewett@kenaston.com">rhewett@kenaston.com</a></td>
</tr>
<tr>
<td>Justine Livingston</td>
<td>Kirby Nagelhaft Construction Co.</td>
<td>341-969-7934</td>
<td><a href="mailto:justine1@kirbynagelhaft.com">justine1@kirbynagelhaft.com</a></td>
</tr>
<tr>
<td>Carie Frenchi</td>
<td><a href="mailto:CAPRE@QUALITY-CONTRACTORS.COM">CAPRE@QUALITY-CONTRACTORS.COM</a></td>
<td>208-669-9669</td>
<td><a href="mailto:capre@quality-contractors.com">capre@quality-contractors.com</a></td>
</tr>
<tr>
<td>CVS van Ganssen</td>
<td>QUALITY CONTRACTORS</td>
<td>208-669-9698</td>
<td></td>
</tr>
<tr>
<td>Greg Castellaw</td>
<td>CASTELLAW KOM BRE</td>
<td>208-746-0183</td>
<td><a href="mailto:gc@castellaw.com">gc@castellaw.com</a></td>
</tr>
<tr>
<td>Robert Collier</td>
<td>University of Idaho CALS</td>
<td>208-885-9489</td>
<td><a href="mailto:rcollier@uidaho.edu">rcollier@uidaho.edu</a></td>
</tr>
<tr>
<td>James Nasados</td>
<td>University of Idaho CALS</td>
<td>208-885-6727</td>
<td><a href="mailto:jnasados@uidaho.edu">jnasados@uidaho.edu</a></td>
</tr>
<tr>
<td>Eric Billings</td>
<td>University of Idaho CALS</td>
<td>208-885-5369</td>
<td><a href="mailto:ebillings@uidaho.edu">ebillings@uidaho.edu</a></td>
</tr>
<tr>
<td>Jen Root</td>
<td>University of Idaho CALS</td>
<td>208-885-4087</td>
<td><a href="mailto:jroot@uidaho.edu">jroot@uidaho.edu</a></td>
</tr>
<tr>
<td>Matt Doumit</td>
<td>University of Idaho CALS</td>
<td>208-885-7984</td>
<td><a href="mailto:mdoumit@uidaho.edu">mdoumit@uidaho.edu</a></td>
</tr>
<tr>
<td>Kim Salisbury</td>
<td>University of Idaho Budget &amp; Planning</td>
<td>208-885-5055</td>
<td><a href="mailto:kims@uidaho.edu">kims@uidaho.edu</a></td>
</tr>
<tr>
<td>Mike Sauer</td>
<td>KLK - Kenaston Leone &amp; Keeble</td>
<td>509-327-4451</td>
<td></td>
</tr>
<tr>
<td>Marshall Turner</td>
<td>Hoffman Construction Company</td>
<td>503-221-8811</td>
<td></td>
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</tbody>
</table>
University of Idaho
Idaho Meat Science & Innovation Center - Vandal Brand Meats
Pre-Submittal Review Meeting

To sign-in remotely, e-mail contact info to:
darylef@uidaho.edu
<table>
<thead>
<tr>
<th>Event</th>
<th>Date/Time</th>
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</thead>
<tbody>
<tr>
<td>Issue RFQ/RFP</td>
<td>Monday, Oct 10, 2022</td>
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<tr>
<td>MANDATORY Review</td>
<td>Tuesday, October 18, 2022 (1:30 p.m. UI Facilities Services)</td>
</tr>
<tr>
<td>Deadline, Solicitation Protests</td>
<td>Thursday, October 20, 2022</td>
</tr>
<tr>
<td>Proposals Due</td>
<td>Friday, October 28, 2022 (COB – 5:00 p.m.)</td>
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<tr>
<td>Announce Interview Candidates</td>
<td>Tuesday, Nov 8, 2022</td>
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<tr>
<td>Oral Interviews</td>
<td>T, W, Th, November 29 / 30 &amp; Dec 1, 2022</td>
</tr>
<tr>
<td>Announce Selected Firm</td>
<td>Friday, December 9, 2022</td>
</tr>
<tr>
<td>Anticipated Construction</td>
<td>July 2023 – July 2024</td>
</tr>
</tbody>
</table>
University of Idaho
Idaho Meat Science & Innovation Center - Vandal Brand Meats
Pre-Submittal Review Meeting

To sign-in remotely, e-mail contact info to: darylef@uidaho.edu

QUESTIONS?

CASTELLAW + KOM ARCHITECTS + AndersonMasonDale Architects
GEOTECHNICAL EVALUATION FOR THE “MEAT SCIENCE INNOVATION CENTER (MSIC) – UI CP200032” – A 1+ ACRE SITE – LOCATED AT THE NWC OF IDAHO AVENUE AND PERIMETER DRIVE, MOSCOW, IDAHO

December 18, 2020

GTI-Project No. 2187-ID

Prepared For:

UNIVERSITY OF IDAHO
Facility Services – Architectural and Engineering Services
875 Perimeter Drive MS2281
Moscow, Idaho 83844-2281

GeoTek, Inc.
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In accordance with your request, GeoTek, Inc. (GTI) has completed a geotechnical evaluation of the subject property for the construction of an educational facility (Meat Science Innovation Center (MSIC) consisting of a single-story building with an approximate 17,000 square foot footprint, parking lot, and associated improvements. The purpose of our study was to evaluate the soils underlying the site and to provide recommendations for project design and construction based on our findings. This report outlines the geologic and geotechnical conditions of the site based on current data and provides earthwork and construction recommendations with respect to those conditions.

SCOPE OF SERVICES

The scope of our services has included the following:

1. Review of soils and geologic reports and maps for the site (Appendix A).
2. Site reconnaissance.
3. Review of aerial photographs.
4. Excavating and logging of six (6) exploratory test pits (Appendix B).
5. Obtaining samples of representative soils, as the exploratory test pits were advanced.
6. Performing laboratory testing on representative soil samples (Appendix D).
7. Assessment of potential geologic constraints.
8. Engineering analysis regarding foundation design/construction, foundation settlement, and site preparation.

9. Preparation of this report.

SITE DESCRIPTION

The project site consists of an irregularly shaped parcel totaling approximately 1± acre that is generally bound by the Seed Potato Germplasm Facility (currently in construction) to the north, Perimeter Drive to the east, Idaho Avenue extension and the University of Idaho Facilities Services Building to the south, and an existing modular Public Safety and Security Office to the west (Figures 1 and 2). Currently, the property consists of an existing asphaltic concrete paved parking lot and grass landscaping. From topographic maps, the site's elevation is approximately 2,595 to 2,600 feet above mean sea level. Historically, topography generally directs surface water to the northwest.

PROPOSED DEVELOPMENT

It is our understanding that site development would consist of performing typical cut and fill earthwork to attain the desired graded configuration(s) for the construction of a single-story building with an approximate 17,000 square foot footprint, parking lot, and associated improvements. It is further assumed that final site grade will be within 5 feet of existing site grade with no basements, below grade walls, or retaining walls. The building type will likely be a combination of traditional steel and wood framing construction supported on conventional shallow foundations and concrete slab-on-grade floors. Utilities will be extended from Perimeter Drive or Idaho Avenue extension to service the new building. Stormwater runoff is anticipated to be directed to the existing City of Moscow stormwater system along Perimeter Drive.

FIELD STUDIES

Subsurface conditions at the site were explored by using an excavator. Six (6) test pits were advanced onsite. Test pits were excavated to a depth between 14.5 feet and 16.5 feet. A log of each exploration is included with this report in Appendix B. The approximate locations of the explorations are indicated on the enclosed Site Exploration Plan (Figure 2). Locations of the test pits were selected based on coordination with UI, CKA, and Parametrix. Two (2) percolation tests were performed on the subject site. Two (2) piezometers were installed onsite and initial ground water measurements were obtained (Appendix C). Field studies were completed during November of 2020 by our field personnel who conducted field excavation location mapping, logged the excavations, and obtained samples of representative soils for laboratory testing. The Unified Soil Classification System (USCS) Classification was used to visually classify the subgrade soils during the field evaluation.
REGIONAL GEOLOGY

The subject site is situated within the Palouse Region of Latah County. The Palouse lies on the eastern edge of the Columbia Plateau which boasts the characteristic feature of the Palouse, its rolling hills. The Palouse encompasses approximately 19,000 square miles across southeastern Washington, western Idaho, and northeastern Oregon. The Palouse hills are comprised of silt, or Loess, transported to the region creating the wind-blown shapes that exist today. Though the source of this loess has been debated, it is generally considered to be blown from the fine-grained Ringold Formation on the eastern margins of the Cascades and perhaps from the Touchet Beds in the Pasco Basin. Beneath these dunelike hills and between the deep “basement” rock lie a great layer of basalt. Some of the fractured and broken basalt flows are water bearing as are the sedimentary interests of the Palouse (Breckenridge, 1984).

The composition of the Palouse loess is comprised of a variety of minerals. Similar to loess throughout the world, the Palouse contains quartz and feldspar minerals. Unique to the loess in this region, mica as well as small amounts of volcanic glass and dark minerals can be found. Studies have shown that a complex series of layers have formed on the Palouse rather than a homogenous deposit of silt. A constant state of fluctuation in the formation of the loess deposits characterize the regions history. Used primarily as farmland, the Palouse region has seen drastic shifts in its topography due to the susceptible ability to erosion of the loess deposits (Breckenridge 1984).

During the Holocene, the modern characteristics of the Palouse soil was developed in its loess. The Cascade volcanoes have repeatedly covered the Palouse with an abundance of volcanic ash, distributed in layers, and creating the moisture retaining capabilities of the soil allowing successful dryland farming in the region. At its thickest the Palouse loess is up to 246ft. thick. (Busacca, 1989)

SUBSURFACE CONDITIONS

Uncontrolled Fill

The majority of the site has been developed and used as a parking lot. From our observations and review of historical site photography, grading has previously been performed and fill has been placed at the site as part of this and nearby development. Generally, this fill was observed across the entire site extending 11 to 15 feet with deeper fills along the eastern portion of the site. Deeper fills may be encountered onsite than identified in our onsite exploration.

This uncontrolled fill is considered undocumented and is defined as materials that were originally placed without documentation as to material type and placement location and without compaction test reports. The uncontrolled fill encountered was loose/firm in consistency and contained organics/roots that are not considered suitable for support of foundations, concrete flat work or pavement in their current condition.

The uncontrolled fill consists of existing aggregate base in parking areas underlain by a mixture of red brown to dark brown with gray mottling, silt and clay with varying amounts of sand gravel and debris. The moisture content of the uncontrolled fill was generally moist. Debris observed in our
test pits, throughout the uncontrolled fill, consisted of various construction materials: wood, metal, plastic, bricks, and organics.

**Native Loess Soils**
Native loess soils encountered generally consisted of dark brown silt and reddish-brown lean clay. The moisture content within the materials was generally moist to saturated. The consistency of these soils was firm. We anticipate that the onsite soils can be excavated with conventional earthwork equipment equivalent to CAT D9R dozers and CAT 235 excavators.

**Basalt Bedrock**
Basalt bedrock was not encountered in our field exploration. From a review of previous exploration boring logs from nearby sites, including the UI ICCU Arena (GTI project numbers 1695-ID and 1906-ID) currently under construction directly north of the UI Kibbie Dome, we anticipate basalt bedrock to be located approximately 50 feet below the existing ground surface, or more.

**SURFACE & GROUND WATER**
Ground water was not encountered in any of the excavations (to a maximum depth of 16.5’). We anticipate ground water levels to be more than 20 feet below the existing site surface. Ground water levels will fluctuate throughout the seasons and year-to-year due to changes in precipitation, nearby landscape irrigation, infiltration, and site development. Generally, irrigation ditches and canals will locally influence ground water during the irrigation season (i.e., May through October).

If deep excavations (near the expected ground water level) onsite are anticipated, it should be expected that special excavation and fill placement measures may be necessary. Wet materials should be spread out and air-dried or mixed with drier soils to reduce their moisture content as appropriate for fill placement. Initial ground water monitoring and percolation testing field results can be found in Appendix C.

**TECTONIC FAULTING AND REGIONAL SEISMICITY**
The site is situated in an area of active as well as potentially active tectonic faults, however no faults were observed during our field evaluation. There are a number of faults in the regional area, which are considered active and would have an affect on the site in the form of ground shaking, should they be the source of an earthquake. The nearest mapped fault is depicted to be approximately 5 ½ miles to the southeast of the site at its closest point. It is reasonable to assume that structures built in this area will be subject to at least one seismic event during their life, therefore, it is recommended that all structures be designed and constructed in accordance with the International Building Code (IBC).

The site is located at approximately 46.7281° N Latitude and 117.0237° W Longitude. Based on our experience in the general vicinity, references in our library, field evaluation of the site, a Site Class Designation of ‘D’ may be used for seismic design. The spectral acceleration (SA) for 0.2 second and 1.0 second periods for Site Class Designation of ‘D’ was determined from the USGS Website,
Earthquake Hazards Program, Interpolated Probabilistic Ground Motion for the Contiguous 48 States by Latitude/Longitude, 2015 International Building Code Data Edition. The results for Site Class ‘D’ are presented in the following Table:

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<th>Mapped Spectral Response Acceleration Site Class D (percent of g)</th>
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<td>0.2 sec period Mapped Spectral Acceleration ($S_0$)</td>
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<tr>
<td>1.0 sec period Mapped Spectral Acceleration ($S_1$)</td>
<td>10.4</td>
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<tr>
<td>0.2 second period Design Spectral Response Acceleration ($SD_0$)</td>
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<td>1.0 second period Design Spectral Response Acceleration ($SD_1$)</td>
<td>16.5</td>
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</table>

It is important to keep in perspective that if a seismic event were to occur on any major fault, intense ground shaking could be induced to this general area. Potential damage to any settlement sensitive structures would likely be greatest from the vibrations and impelling force caused by the inertia of the structures mass than that created from secondary seismic constraints. Considering the subsurface soil conditions and local seismicity, it is estimated that the site has a very low risk associated with the potential for these phenomena to occur; and adversely affect surface improvements. These potential risks are no greater at this site than they are for other structures and improvements developed on the alluvial materials in this vicinity.

**Secondary Seismic Constraints**

The following list includes other potential seismic related hazards that have been evaluated with respect to the site, but in our opinion, the potential for these seismically related constraints to affect the site is considered negligible.

* Liquefaction
* Dynamic Settlements
* Surface Fault Rupture
* Ground Lurching or Shallow Ground Rupture

**Summary:**

It is important to keep in perspective that if a seismic event were to occur on any major fault, intense ground shaking could be induced to this general area. Potential damage to any settlement sensitive structures would likely be greatest from the vibrations and impelling force caused by the inertia of the structures mass than that created from secondary seismic constraints. Considering the subsurface soil conditions and local seismicity, it is estimated that the site has a low risk associated with the potential for these phenomena to occur and adversely affect surface improvements. These potential risks are no greater at this site than they are for other structures and improvements developed on the alluvial materials in this vicinity.

**RESULTS OF LABORATORY TESTING**

Laboratory tests were performed on representative samples of the onsite earth materials in order to evaluate their physical and chemical characteristics. The tests performed and the results obtained
CONCLUSIONS

Based on our field exploration, laboratory testing and engineering analyses, it is our opinion that the subject site is suited for development from a geotechnical engineering viewpoint. The recommendations presented herein should be incorporated into the final design, grading, and construction phases of development. The engineering analyses performed concerning site preparation and the recommendations presented below, have been completed using the information provided to us regarding site development. In the event that the information concerning proposed development is not correct, the conclusion and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and conclusions of this report are modified or approved in writing by this office.

RECOMMENDATIONS - EARTHWORK CONSTRUCTION

General
All grading should conform to the International Building Code (IBC) and the requirements of the City of Moscow and Latah County, except where specifically superseded in the text of this report. During earthwork construction, all removals, drain systems, slopes, and the general grading procedures of the contractor should be observed and the fill selectively tested.

If unusual or unexpected conditions are exposed in the field, they should be reviewed by this office and, if warranted, modified and/or additional recommendations will be offered. It is recommended that the earthwork contractor(s) perform their own independent reconnaissance of the site to observe field conditions firsthand. If the contractor(s) should have any questions regarding site conditions, site preparation, or the remedial recommendations provided, they should contact an engineer at GeoTek for any necessary clarifications prior to submitting earthwork bids. All applicable requirements of local and national construction and general industry safety orders, the Occupational Safety and Health Act, and the Construction Safety Act should be met.

Demolition
The following recommendations are provided as guidelines in the event a structure is encountered that are not intended to remain.

1. All existing surface or subsurface structures (not intended to remain), within the area to be developed, should be razed and moved off site.

2. If a septic tank (to be abandoned or below a proposed improvement) is located within the project site, it is recommended that it be pumped out and with few exceptions likely removed. Any leach lines, seepage pits, or other pipes associated with this structure should also be removed or properly abandoned.

3. If any wells are encountered, an attempt should be made to identify the owner and purpose
of the well. Well abandonment should adhere to the recommendations provided by the Idaho Department of Water Resources, the Public Health Department, or any other government agencies. If the well is located in the area of a proposed structure, these recommendations should be reviewed by GTI and if warranted, additional geotechnical recommendations will be offered.

**Removals/Processing - General**

All debris, vegetation, and other deleterious material should be stripped/removed from areas proposed for structural fill placement and improvements and disposed of offsite. If existing improvements or property line restrictions limit removals, condition specific recommendations can be provided.

Some of the on-site soils contain high moisture contents and low dry densities. Once the overburden soils are excavated and removed, these soils will pump and become unstable with repeated loading from construction and compaction equipment. These soils will need to be stabilized before placing fill material. Several stabilization techniques could be used including: allowing the exposed soils to dry to lower moisture contents; placing and rolling in to the unstable subgrade 3 to 8 inch diameter clean rock until a stable subgrade is achieved; or using a geogrid and aggregate base material to create a stabilizing layer. If conditions during construction reveal that stabilization may be required, GeoTek should be contacted to provide appropriate recommendations.

**Transitional Pads**

Transitional pads are defined in this report as pads which are partially cut and partially fill. To mitigate some of the differential settlement which will occur on transitional pads, the cut side should be over-excavated/processed to a minimum depth equal to 2 feet below the bottom of the footings or to the depth of the fill, whichever is less. On transitional pads with more than 7.5 feet of fill, plans need to be reviewed by GTI and site-specific recommendations will be provided.

**Excavation Difficulty**

We anticipate that the onsite soils can be excavated with conventional earthwork. Seasonal conditions could cause wet soil conditions to occur onsite. Depending on the depth of cuts, it should be expected that special excavation and fill placement measures may be necessary. Wet materials should be spread out and air-dried or mixed with drier soils to reduce their moisture content to the appropriate level for fill placement. Frozen soils, if encountered, should be removed and allowed to thaw prior to any fill placement or construction. Removal bottoms should be checked by a representative of GTI to see if deeper removals are necessary.

**Fill Placement**

Subsequent to completing removals/processing and ground preparation, the excavated onsite and/or imported soils may be placed in relatively thin lifts (less than 8 inches thick), cleaned of vegetation and debris, brought to at least optimum moisture content, and compacted to a minimum relative compaction of 90 percent of the laboratory standard (ASTM D 1557).

**Fill Material**

Soils will be imported to the site for earthwork construction purposes. A sample of any intended import material should first be submitted to GTI so that, if necessary, additional laboratory or
chemical testing can be performed to verify that the intended import material is compatible with onsite soils. In general, structural fill material should be within the following minimum guidelines:

**Non-Structural Fill On-site Soils**
On-site soils may be selectively used as non-structural fill if they meet the fill requirements presented below. Based on our exploration, most of the soils would not be suitable for reuse as structural fill. The existing site soil is expected to be over-optimum moisture content after excavation. Contractors must understand the time and effort required to process fill, remove debris, and moisture condition it (i.e. dry it) to facilitate its reuse as fill. Material should be within the following minimum recommendations:

* Maintain less than 0.1 percent sulfate content.
* Maintain less than 1.0 percent soluble material.
* Maintain a plasticity index of less than 12.0 percent (i.e., low expansive).
* Maintain 100 percent passing the 6-inch screen.

**Structural Fill Import Material**
Soils will be imported to the site for earthwork construction purposes. In general, structural fill import material should be within the following minimum guidelines:

* Free of organic matter and debris.
* Maintain less than 0.2 percent sulfate content.
* Maintain less than 3.0 percent soluble material.
* Maintain less than 0.02 percent soluble chlorides.
* Maintain less than 0.2 percent sodium sulfate content.
* Maintain a Plasticity Index less than 12 (i.e., low expansive).
* One hundred percent passing the six-inch screen.
* At least seventy-five percent passing a three-inch screen.
* Maintain at least 20 percent retained on No. 4 screen.
* Maintain between 5 and 20 percent passing the #200 screen.

**Coarse Structural Fill Material**
Coarse granular fill with greater than 30 percent retained above the ¾-inch sieve is too coarse for proctor compaction testing control; therefore, a “method specification” developed during construction is necessary. This material is suitable for use as Structural Fill provided the requirements of ISPWC Section 202-3 are followed. At a minimum, GTI recommends that a maximum lift thickness of 18-inches uniformly distributed and compacted with a at least 3 passes of a vibratory roller with minimum 30,000 pounds per impact and at least 1,000 vibrations per minute per each 6-inch lift (i.e. for an 18-inch lift a minimum of 9 passes). Rolling requirements may be decreased as the vibratory/grid roller size is increased per the referenced ISPWC section.

**Observation and Testing**
During earthwork construction, all removal/processing and the general grading procedures should be observed and the fill selectively tested by a representative(s) of GTI. If unusual or unexpected conditions are exposed in the field, they should be reviewed by GTI and if warranted, modified and/or additional recommendations will be offered.
Ground Water
Ground water was not encountered during our field exploration (to a maximum depth of 16.5'). We anticipate a perched ground water condition will be encountered during the wetter months near the boundary between the uncontrolled fill and underlying native loess soils. In addition, a perched condition may occur between the existing parking lot aggregate base and uncontrolled fill. Based on site conditions in the future, a transient high ground water condition could develop over a clay or less permeable layer and this condition could generate down gradient seepage. The possible effect these layers could have on this and adjacent sites should be considered and can best be evaluated in the field during grading. If warranted by exposed field conditions, it may be recommended that a drainage system be established to collect and convey any subsurface water to an appropriate location for drainage. Typically, potential areas of seepage are difficult to identify prior to their occurrence; therefore, it is often best to adopt a "wait and see" approach to determine if any seepage conditions do develop, at which time specific recommendation to mitigate an identified condition can be provided.

Earthwork Settlements
Ground settlement should be anticipated due to primary consolidation and secondary compression. The total amount of settlement and time over which it occurs is dependent upon various factors, including material type, depth of fill, depth of removals, initial and final moisture content, and in-place density of subsurface materials. Compacted fills, to the heights anticipated, are not generally prone to excessive settlement. However, some settlement of the left in-place existing fill and alluvium is expected, and the majority of this settlement is anticipated to occur during grading.

RECOMMENDATIONS – FOUNDATIONS

Based on the relatively deep uncontrolled fill zone encountered, GTI has provided several foundation options. The following options have been provided to mitigate the amount of potential settlement and have been listed in an order of increasing risk for settlement.

The standard of practice in Geotechnical Engineering regarding uncontrolled fill, typically is to fully remove the material beneath structures and other site improvements to reduce the risk of differential settlement impacts. Other alternatives include deep foundations or intermediate foundation systems – rammed aggregate piers to bypass uncontrolled fill to support foundation loads in dense native soil or bedrock at depth. Another alternative would be to use a Raft or Mat slab to reduce soil contact pressure, settlement, bridging the weak soils from mat rigidity. Finally, a partial removal of uncontrolled fill under footing bottoms, geotextile separation fabric installation, and structural fill backfill option could be implemented, provided the owner accepts the risks of differential performance by leaving fill below the structure. An evaluation of the foundation support options is necessary from a design and economic standpoint. The risks associated with leaving the uncontrolled fill in place under a lightly loaded building is not considered to be a matter of life safety; recognizing the potential for maintenance or premature replacement.

General
Foundation design and construction recommendations are based on preliminary laboratory testing and engineering analysis performed on near surface soils. The proposed foundation systems should
be designed and constructed in accordance with the guidelines contained herein and in the International Building Code.

Based on our experience in the area, the soils on site should have a negligible corrosive potential to concrete and metal. Materials selected for construction purposes should be resistant to corrosion. Where permitted by building code, PVC pipe should be utilized. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the Portland Cement Association (PCA) and the American Concrete Institute (ACI).

Based on our grading recommendations, the soils beneath the foundations are anticipated to have low expansion potential. Therefore, foundation recommendations for low expansive soil conditions are provided below. If more expansive soils are encountered, the pad(s) will either need to be regraded and the more expansive soils removed by the contractor or increased foundation recommendations will need to be provided.

Column loads are anticipated to be 75 kips or less while wall loads are expected to be 5 kips per lineal foot or less. The conventional recommendations provided are from a geotechnical engineering perspective (i.e., for expansive conditions) and are not meant to supersede the design by the project’s structural engineer.

**Option 1: Complete Removal of Uncontrolled Fill and Conventional Foundation Recommendations**

Control of surface water infiltration and ground infiltration from other water sources, such as utilities and landscape irrigation, is critical to reduce the potential for adverse settlement of the undocumented fills underlying the site. An increase in water content of the undocumented fills could result in unanticipated ground settlements that may manifest at the ground surface. Ground settlements, due to changes in water content, may be develop gradually or suddenly. Methods to reduce the risk of adverse settlement include stiffening of the ground surface with a heavy compactor and overexcavation under shallow foundations. To fully and completely alleviate all settlement risks associated with the undocumented fill, all of the undocumented fill should be removed and replaced with properly compacted satisfactory materials.

The bearing values indicated are for the total dead plus frequently applied live loads and may be increased by one third for short duration loading which includes the effects of wind or seismic forces. When combining passive pressure and friction for lateral resistance, the passive component should be reduced by one third. A grade beam, reinforced as below and at least 12 inches wide, should be utilized across all large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjacent footings. Footings should be founded at a minimum depth of 30 inches below lowest adjacent ground surface as required by local codes to extend below the frost line. Footings must bear on a minimum of at least 12-inches of structural fill. Reinforcement for spread footings should be designed by the project’s structural engineer.
### Footing Type

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<thead>
<tr>
<th>Minimum Structural Fill Depth Below Footing Bottom (inches)</th>
<th>Minimum Footing Depth (inches)</th>
<th>Allowable Bearing Pressure (psf)</th>
<th>Coefficient of Friction</th>
<th>Passive Earth Pressure (psf/ft)</th>
<th>Maximum Earth Pressure (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip or Spread on Completely Removed Uncontrolled Fill</td>
<td>12</td>
<td>30</td>
<td>3,000</td>
<td>0.35</td>
<td>250</td>
</tr>
</tbody>
</table>

The coefficient of friction and passive earth pressure values recommended are working values. Strip footings should have a minimum width of one foot and spread footings should have a minimum soil to concrete area of four-square feet. Increases are allowed for the bearing capacity of the footings at a rate of 250 pounds per square foot for each additional foot of width and 250 pounds per square foot for each additional foot of depth into the recommended bearing material, up to a maximum outlined. If the bearing value exceeds 3,500 psf, an additional review by GTI is recommended.

**Option 2: Various Deep Foundation Systems**

As an alternate, GTI recommends that the structure be founded upon grade beams to structurally transfer building loads to the deep foundation system. The deep foundation system could consist of drilled piers, H-piles, helical piles, or micropiles. GTI is available for further design and development if this option is selected. GTI should review the contractor’s selection, design, installation plan, and equipment prior to initiating construction.

If selected, we recommend the deep foundation system be included in the project as a bidder-designed project component, including a test pier installation to confirm anticipated installation depths and conditions. Installation depths for the deep foundation system would be required to penetrate all uncontrolled fill and provide ultimate/allowable design compressive loads to support the anticipated column and wall loads.

**Option 3: Intermediate Foundation System – Rammed Aggregate Piers**

As an alternative, GTI recommends that the structure be founded on rammed aggregate piers for soil improvement at the subject site. The rammed aggregate pier elements are constructed using processes proprietary to Geopier Foundation Company, Inc. It is our understanding that the structure will have column loads of up to 75 kips and wall loads of 5 kips per linear foot. GeoTek has determined that this is an acceptable method of construction on the condition that the contractor is able to adhere to the recommendations in this geotechnical report. The proposed columns and walls may be supported on rammed aggregate piers.

It is imperative to reiterate that if the building is supported on rammed aggregate piers, and the possible surrounding lightly loaded structural elements are supported on spread foundations, we recommend that there is a separation between the two elements so that movement can occur without distressing the structure due to differential settlement.

The foundation support elements are constructed by drilling a hole to create a replacement cavity, removing a segment of compressible subsoil, then building a bottom bulb by placing graded stone
aggregate into the bottom of the hole and ramming the aggregate using equipment with a specially
designed rammer head having a 45-degree angled sides. The beveled tamper head assists in transferring
force laterally during impact densification, resulting in pushing the aggregate against the confined walls
of the excavation. The rammed aggregate piers shaft is built on top of the bottom bulb, successive lifts
of graded stone aggregate are placed in the hole and rammed. In addition to increasing shear resistance
via skin friction along the shaft circumference, the increased horizontal stress in the soil makes it stiffer.

At sites with shallow groundwater and potentially caving soil, an alternate installation method is
employed. In these circumstances, a one-piece hollow mandrel is driven into the soil to the design
penetration depth, displacing the native soil. The mandrel is then filled with aggregate and the
column of compacted stone is constructed in the same thin lifts by alternately raising and lowering
the mandrel while using a vertical ramming hammer to compact the aggregate and further displace
the native soil. No drill spoils are generated during installation of rammed aggregate pier
displacement pier reinforcement.

A proprietary designer/installer (i.e. Geopier) should be contacted to confirm our design
recommendations are incorporated into the foundation system with respect to the proposed
foundation loading conditions and tolerable settlement criteria. In addition, the foundation system
should be designed and constructed in accordance with the guidelines contained herein and in the

The proprietary designer/installer could be contacted to provide preliminary recommendations for
the design of the foundations at this site. Their preliminary recommendations would include a
maximum allowable bearing pressure for spread footings bearing on a rammed aggregate pier
improved subgrade of closely spaced pier groups (typically a minimum 30% rammed aggregate piers
element area to footing area footprint coverage). This pressure is a composite pressure, applicable
across the entire area of the footing. Typically, the allowable pressure may be increased by 1/3 for
consideration of short-term seismic loading.

In addition, the preliminary recommendations would provide a typical diameter, spacing, depth, and
provide an allowable capacity per pier. In general, a minimum factor of safety of 3.0 against ultimate
bearing capacity failure is recommended for footings supported on rammed aggregate piers

Rammed aggregate piers can be constructed below the ground water table; however, dewatering
will be required, and clean aggregate must be used. Foundations should be free of loose material
and debris once rammed aggregate piers are constructed. It is not anticipated that rammed aggregate
piers (or deep foundations if that option is selected) would be needed under the slab-on-grade unless
significant slab pressures (greater than 500 pounds per square foot) are anticipated.

The proprietary designer/installer’s experience should be utilized to confirm settlement tolerances
will be achieved. At least one full-scale modulus load test should be performed to confirm the design
allowable bearing and anticipated settlement to be confirmed by rammed aggregate piers. The
contractor is also responsible for any necessary changes to their design and construction
methodology to achieve these required capacities.
The licensed rammed aggregate pier foundation installer would design and install rammed aggregate piers foundations for this project. The installer will provide an internal peer review and approval of design. In addition, GeoTek should be provided all design criteria and plans for review and comment. Responsibility for settlement performance is accepted by the rammed aggregate piers design-build team.

We recommend that you contact a rammed aggregate pier installer to further review and analyze the subsurface data contained in this report, using available structural load and design information. After designing the foundation support system, they will provide a cost and time estimate. The estimate should include the cost to provide full-scale rammed aggregate pier Modulus Load Test on site to verify design assumptions. The test provides a conservative measure of the stiffness of the rammed aggregate piers element and will help establish installation procedures for this project. We can coordinate with the rammed aggregate piers installer to locate the Modulus Load Test in the weakest site area and to provide full-time Quality Assurance monitoring services during Modulus Load Test operations.

We recommend that the rammed aggregate piers installer’s operations be monitored by GeoTek full-time as a Quality Assurance service. Our service will supplement the installer’s internal QC program. Together the QA/QC program will monitor initial load testing, drill depths, rammed aggregate piers element lengths, average lift thicknesses, installation procedures, aggregate quality, and densification of lifts. These items will be documented for each rammed aggregate pier element installed to provide a complete installation report.

**Option 4: Raft or Mat Slab**

Another option, GTI recommends that a raft or mat foundation be constructed for support of the structure. This type of foundation system will provide for reduced soil contact pressures, bridging of weak soils from mat rigidity, and an increase in tolerable amounts of settlement. This option will require the following:

1. A net allowable bearing pressure of 2,000 pounds per square foot shall be used for the design of the mat foundation system. A 1/3 increase is allowable for short-term loading, which is defined by seismic events or designed wind speeds.

2. The existing uncontrolled fill material shall be excavated to expose competent, native soils or to a minimum depth of 5-feet below bottom of slab elevation. The removal and compaction of structural fill materials should extend at least 5-feet from all outside edges of the slab.

3. After excavation and prior to reinstallation of excavated materials, the exposed subgrade shall be compacted to at least 90% of the maximum dry density, as determined by ASTM D1557.

4. A separation geofabric (Contech C-300, Tencate Mirafi 600x, or equivalent) must be installed over the exposed, compacted subgrade prior to placement of controlled fill.

5. Structural Fill or Coarse Structural Fill Material may be placed following. Each lift must
be compacted to at least 95% of the maximum dry density, as determined by ASTM D1557. The mat foundation shall be directly supported on at least 6-inches of aggregate base, as defined in the Concrete Slab-on-Grade Floors Section of this report.

6. Utility connections shall be flexible to allow for movement of the slab.

Based on typical R-value test results and the interrelationships published by the Portland Cement Association for "R"-Value (resistance value) vs Modulus of Subgrade Reaction, an approximate k-value (modulus of subgrade reaction) of 100 pounds per square inch per inch may be utilized for mat foundation design if founded on the recommended structural fill section.

Resistance to lateral foundation displacement for trench beams or shear keys beneath the mat foundation may be computed using an allowable friction factor of 0.35, which may be multiplied by the effective vertical load on each foundation. Additional lateral resistance may be computed using an allowable passive earth pressure equivalent to a fluid pressure of 350 psf per foot of depth, acting against vertical projections of the foundations. These two modes of resistance should not be added unless when combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third. It should be noted that these values are ultimate and a factor of safety of at least 1.5 should be included when calculating for sliding and overturning resistance.

**Option 5: Partial Removal of Uncontrolled Fill and Conventional Foundation Recommendations**

If this option is selected, it is understood that the owner is willing to invest in partial rehabilitation of the site to reduce settlement risks. Settlement risks at this site can be substantially reduced, so long as all of the recommendations of this report are incorporated as an integrated whole. The owner’s decision to perform partial remediation is a decision to accept some risk of ground settlement.

The existing subgrade below all foundation elements shall be excavated to expose competent, native soils, or to a minimum depth of at least 5-feet below footing elevation into the uncontrolled fill. After excavation and prior to reinstallation of excavated materials, the existing fill material footing subgrade shall be compacted to at least 90% of the maximum dry density, as determined by ASTM D1557. A separation geofabric (Contech C-300, Tencate Mirafi 600x, or equivalent) must be installed over the exposed, compacted subgrade prior to placement of controlled fill. Structural Fill or Coarse Structural Fill Material may be placed following. Each lift must be compacted to at least 95% of the maximum dry density, as determined by ASTM D1557.

Column loads are anticipated to be 75 kips or less while wall loads are expected to be 5 kips per lineal foot or less. The conventional recommendations provided are from a geotechnical engineering perspective (i.e., for expansive conditions) and are not meant to supersede the design by the project’s structural engineer.

A net allowable bearing pressure of 2,000 pounds per square foot shall be used for the design of the partial removal of uncontrolled fill and conventional foundation recommendations. A 1/3 increase is allowable for short-term loading, which is defined by seismic events or designed wind speeds.
The bearing values indicated are for the total dead plus frequently applied live loads and may be increased by one third for short duration loading which includes the effects of wind or seismic forces. When combining passive pressure and friction for lateral resistance, the passive component should be reduced by one third. A grade beam, reinforced as below and at least 12 inches wide, should be utilized across all large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjacent footings. Footings should be founded at a minimum depth of 30 inches below lowest adjacent ground surface as required by local codes to extend below the frost line. Reinforcement for spread footings should be designed by the project’s structural engineer.

<table>
<thead>
<tr>
<th>Footing Type</th>
<th>Minimum Structural Fill Depth Below Footing Bottom (inches)</th>
<th>Minimum Footing Depth (inches)</th>
<th>Allowable Bearing Pressure (psf)</th>
<th>Coefficient of Friction</th>
<th>Passive Earth Pressure (psf/ft)</th>
<th>Maximum Earth Pressure (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip or Spread on Partially Removed Uncontrolled Fill</td>
<td>12</td>
<td>30</td>
<td>2,000</td>
<td>0.35</td>
<td>250</td>
<td>2,500</td>
</tr>
</tbody>
</table>

The coefficient of friction and passive earth pressure values recommended are working values. Strip footings should have a minimum width of one foot and spread footings should have a minimum soil to concrete area of four-square feet. Increases are allowed for the bearing capacity of the footings at a rate of 250 pounds per square foot for each additional foot of width and 250 pounds per square foot for each additional foot of depth into the recommended bearing material, up to a maximum outlined. If the bearing value exceeds 2,500 psf, an additional review by GTI is recommended.

**Concrete Slab-on-Grade Floors**

Uncontrolled fill was encountered across the site. GTI recommends that these fill materials be excavated to a sufficient depth to expose competent, native soils or to a minimum depth of 3 feet minimum below finished subgrade. If fill materials remain after over-excavation, the exposed subgrade must be compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557.

A non-woven geotextile fabric (Contech C-300, Tencate Mirafi 600x, or equivalent) followed by a biaxial geogrid reinforcement (Tensar BX1200 or equivalent) should be utilized meeting the requirements of the ISPWC - (if any foundation option is selected besides the complete uncontrolled fill removal), placed on the over-excavated slab subgrade. It is important that the geogrid be placed as flat against the prepared geofabric/subgrade as possible. Roll ends and roll edges should be overlapped at least 3 feet. Once the grid is in-place, approved structural fill should be spread across the grid.

The approved fill should be placed by pushing it out over the grid, working from one end to the other. No construction traffic should be allowed on the geogrid. Working from one end and pushing the approved fill across the prepared area tensions the grid and increases its performance. The approved fill should be placed and compacted to 95% of the laboratory maximum (ASTM D1557). This will help reduce, but not eliminate, differential fill performance risks to the planned floors. GTI personnel must be present during construction.
If the grading recommendations presented in this report are complied with, proposed concrete floor slabs may be supported on a 6-inch layer of compacted ¾-inch aggregate base material. A structural engineer should evaluate the proposed loading and determine the slab thickness, concrete strength, and the locations and size of the reinforcing steel.

Modulus of subgrade reaction (k) may be used in the design of the floor slab supporting heavy truck traffic, forklifts, machine foundations, and heavy storage areas. Based on typical R-value test results and the interrelationships published by the Portland Cement Association for "R"-Value (resistance value) vs Modulus of Subgrade Reaction, an approximate k-value (modulus of subgrade reaction) of 100 pounds per square inch per inch may be utilized for slab design.

It is recommended that a plastic water vapor retarder be utilized below the slab. The vapor retarder should conform to the specifications presented in ASTM E1745-17 and should be placed as described in ASTM E1643-18A and the Guide for Concrete Floor and Slab Construction, published by the American Concrete Institute (ACI 302.1R-15).

A minimum ten-mil thick vapor retarder should be placed on a minimum 6-inch-thick layer of aggregate base material and a 2-inch layer of select sand should be placed over the vapor retarder. The vapor retarder should be lapped adequately to provide a continuous protection under the entire slab. Prior to the placement of concrete, moisture should be added to the subgrade soils to minimize water loss of the concrete during placement and curing.

**Foundation Drain System**
All perimeter foundations or grade beams must be constructed with a drainage system, regardless of the foundation design option selected, to prevent water ponding below the building. Provide a minimum 4-inch diameter perforated drainpipe surrounded by gravel at the bottom of the foundation. Gravel used in the drainage systems should be a minimum of 6 inches of 3/4 to 1-1/2-inch clean crushed rock wrapped in filter fabric. Positive slope to daylight in an approved location should be provided. The surface of the backfill should be sealed by pavement or the top 18 inches compacted with native low permeability soil. Proper surface drainage should also be provided.

**PAVEMENT SECTIONS**
On-site pavements at the project will consist of on-site parking and drive areas for automobiles and light trucks. The subgrade conditions, assumed traffic volume, and pavement material properties were evaluated to develop the on-site pavement sections recommended below.

The traffic volume, loading conditions, vehicle type, and traffic patterns were not provided to us at the time of this report. Therefore, we have made some assumptions on the anticipated traffic loading for the proposed pavements at the site.

**Pavement Construction and Maintenance**
All section changes should be properly transitioned. If adverse conditions are encountered during the preparation of subgrade materials, special construction methods may need to be employed. All subgrade materials should be processed to a minimum depth of 12 inches and compacted to a
minimum relative compaction of 90 percent near optimum moisture content. All aggregate base should be compacted to a minimum relative compaction of 95 percent at optimum moisture content. The recommended pavement sections provided are meant as minimums. If thinner or highly variable pavement sections are constructed, increased maintenance and repair should be expected. If the ADT (average daily traffic) or ADTT (average daily truck traffic) increases beyond that intended, as reflected by the traffic index(s) used for design, increased maintenance and repair could be required for the pavement section.

**Pavement Subgrade**
Uncontrolled fill was encountered in portions of the site. GTI recommends that these fill materials be excavated to a sufficient depth to expose competent, native soils or to a minimum depth of 3 feet below finished subgrade. Based on the type of soil on-site, it is anticipated that the upper soils would have an R-value of approximately 15. If fill materials remain after over-excavation, the exposed subgrade must be compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557. GTI personnel must be present during excavation to identify these materials.

It is recommended that the exposed subgrade be proof rolled prior to placing any base course material. Any soft, loose, or weak areas should be identified and stabilized by overexcavation and replacing the material with more suitable fill. In-place stabilization could also be used depending on the conditions encountered during proof rolling. A separation fabric (Contech C-300, Tencate Mirafi 600x, or equivalent) must be installed over the exposed, compacted subgrade prior to placement of controlled fill.

Positive site drainage should be maintained at all times. Water should not be allowed to pond or seep into the ground. If planters or landscaping are adjacent to paved areas, measures should be taken to minimize the potential for water to enter the pavement section.

**On-Site Traffic**
Traffic loading and patterns were not provided. The volume and axle loading for the anticipated vehicles was not available. Two types of pavement sections are provided in this report: Automobile Parking and Drive Lanes. The 18-kip equivalent single axle loads (ESALs) per day are presented in the following Table. The provided pavement sections are based on the above assumptions, if more accurate traffic information becomes available, our office should be contacted so that revisions to the pavement sections and be provided if necessary.

<table>
<thead>
<tr>
<th>Pavement Area</th>
<th>ESALs/Day</th>
<th>20 Year ESAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automobile Parking</td>
<td>1</td>
<td>7,300</td>
</tr>
<tr>
<td>Heavy Duty</td>
<td>3</td>
<td>21,900</td>
</tr>
</tbody>
</table>

**Design Recommendations**
The procedures outlined in the ASSHTO Guide for Design of Pavement Structures, 1993 were used to evaluate the ESALs and pavement section design for the project. Other design methods such as the Asphalt Institutes, Asphalt Pavements for Highways and Streets, Manual Series No. 1 (MS-1) and
the procedures outlined in the National Asphalt Pavement Association, Design of Hot Mix Asphalt Pavements, for Commercial, Industrial, and Residential Areas., Information Series 109 could be referred to for sections thickness design recommendations.

AASHTO design parameters used in determining the required structural capacity of the AC pavements included:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>85%</td>
</tr>
<tr>
<td>Initial Serviceability</td>
<td>4.5</td>
</tr>
<tr>
<td>Terminal Serviceability</td>
<td>2.0</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.45</td>
</tr>
<tr>
<td>Layer Coefficients</td>
<td></td>
</tr>
<tr>
<td>Asphalt Concrete</td>
<td>0.44</td>
</tr>
<tr>
<td>Aggregate Base</td>
<td>0.12</td>
</tr>
<tr>
<td>Drainage coefficients</td>
<td>1.0</td>
</tr>
</tbody>
</table>

A subgrade resilient modulus of 4,100 pounds per square inch was used, corresponding to the upper 12 inches of subgrade having an R-value of 15. The R-value-subgrade resilient modulus correlation used in design is derived from the following equation:

\[
MR = 145^*(10^((0.0147*R) + 1.23))
\]

**On-Site Asphalt Concrete Pavement Sections**

Based on the assumed traffic volumes and the information outlined above, the pavement sections presented in the following Table are recommend for on-site paved areas. If the traffic loading is higher than those assumed, additional thickness may be required to attain the same design life.

<table>
<thead>
<tr>
<th>Pavement Area</th>
<th>Required SN</th>
<th>Asphalt Concrete Thickness (inches)*</th>
<th>Aggregate Base Thickness (inches)*</th>
<th>Geotextile Separation Fabric*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automobile Parking</td>
<td>1.83</td>
<td>2½</td>
<td>10</td>
<td>Required</td>
</tr>
<tr>
<td>Heavy Duty</td>
<td>2.20</td>
<td>3½</td>
<td>10</td>
<td>Required</td>
</tr>
</tbody>
</table>


**On-Site Portland Cement Concrete Pavement Sections**

The Portland Cement Concrete (PCC) pavement sections presented below are based on an estimated R-value of 15, assumed traffic index(s), a load safety factor of 1.1, a modulus of rupture of 600 psi, and the guidelines presented in the latest revision to the Portland Cement Association, "Portland Cement Concrete Pavement Design for Light, Medium & Heavy Traffic (1991)".
The following criteria for the Portland Cement Concrete pavement section should also be incorporated into site design.

1. The concrete should have a minimum specified compressive strength ($f'$c) of 5,000 psi and a maximum water-cementitious materials ratio of 0.45. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the Portland Cement Association (PCA), the American Concrete Institute (ACI), and the International Building Code (IBC).

2. No traffic should be allowed upon the newly poured concrete slabs for a minimum of 7 days after placing. This time period is critical as it gives the concrete time to cure and gain strength.

3. Perimeter edges of the concrete should be thickened, as appropriate.

4. Longitudinal and transverse joints should be utilized to control cracking. Longitudinal and transverse control joints should be placed on approximately 11-to-15-foot centers. These control joints can be constructed by using expansion joint material and pouring each section separately or by saw cutting the slabs to a minimum depth of one-fourth the slab thickness. Other methods for appropriately providing control joints may also be utilized. All joints should be properly sealed.

5. Trash Enclosures should be provided with a reinforced PCC section that is a minimum 8.0 inches thick.

**OTHER RECOMMENDATIONS**

**Site Improvements**
As is commonly known, expansive soils are problematic with respect to the design, construction and long-term performance of concrete flatwork. Due to the nature of concrete flatwork, it is essentially impossible to totally mitigate the effects of soil expansion. Typical measures to control soil expansion for structures include; low expansive soil caps, deepened foundation system, increased structural design, and soil presaturation. As they are generally not cost effective, these measures are very seldom utilized for flatwork because it’s less costly to simply replace any damaged
or distressed sections than to "structurally" design them. Even if "structural" design parameters are applied to flatwork construction, there would still be relative movements between adjoining types of structures and other improvements (e.g., curb and sidewalk). This is particularly true as the level of care during construction of flatwork is often not as meticulous as that for structures. Unfortunately, it is fairly common practice for flatwork to be poured on subgrade soils, which have been allowed to dry out since site grading. Generally, after flatwork construction is completed, landscape irrigation begins, utility lines are pressurized, and drainage systems are utilized; presenting the potential for water to enter the dry subgrade soils, causing the soil to expand.

Recommendations for exterior concrete flatwork design and construction can be provided upon request. If, in the future, any additional improvements are planned for the site, recommendations concerning the geological or geotechnical aspects of design and construction of said improvements could be provided upon request. This office should be notified in advance of any fill placement, grading, or trench backfilling after rough grading has been completed. This includes any grading, utility trench and retaining wall backfills.

Landscape Maintenance and Planting
Water has been shown to weaken the inherent strength of all earth materials. Slope stability is significantly reduced by overly wet conditions. Graded slopes constructed within and utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable vegetation cover as soon as possible after construction. Compaction to the face of fill slopes would tend to minimize short-term erosion until vegetation is established. Plants selected for landscaping should be lightweight, deep-rooted types, which require little water and are capable of surviving the prevailing climate. From a geotechnical standpoint, leaching is not recommended for establishing landscaping. If the surface soils are processed for the purpose of adding amendments, they should be recompacted to 90 percent compaction. Only the amount of irrigation necessary to sustain plant life should be provided. Over watering the landscape areas could adversely affect proposed site improvements. We recommend that any proposed open bottom planter areas adjacent to proposed structures, be eliminated for a minimum distance of 5 feet and desert landscape using xeriscape technology be used outside of this buffer zone. As an alternative, closed bottom type planters could be utilized. An outlet, placed in the bottom of the planter, could be installed to direct drainage away from structures or any exterior concrete flatwork. Irrigation timers should be adjusted on a monthly basis.

Soil Corrosion
Based on our experience in the area, the soils onsite should have a negligible corrosive potential to concrete and metal, materials selected for construction purposes should be resistant to corrosion. Where permitted by building code PVC pipe should be utilized. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the Portland Cement Association (PCA) and the American Concrete Institute (ACI).

Trench Excavation
All footing trench excavations should be observed by a representative of this office prior to placing reinforcement. Footing trench spoil and any excess soils generated from utility trench excavations should be compacted to a minimum relative compaction of 90 percent if not removed from the site. Considering the nature of the onsite soils, it should be anticipated that caving or sloughing could be
a factor in excavations. Shoring or excavating the trench walls and slopes to the angle of repose (typically 25 to 45 degrees) may be necessary and should be anticipated in non-cemented soils. All excavations should be observed by one of our representatives and conform to national and local safety codes.

**Onsite Utility Trench Backfill**
Considering the overall nature of the soil encountered onsite, it should be anticipated that materials will need to be imported to the site for use as pipe bedding and pipe zone material. All utility trench backfill should be brought to near optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard. Compaction testing and observation, along with probing, should be performed to verify the desired results. Sand backfill, unless excavated from the trench, should not be used adjacent to perimeter footings or in trenches on slopes. Compaction testing and observation, along with probing, should be performed to verify the desired results. Offsite utility trenches should be compacted to a minimum of 90 relative compaction. Compaction testing and observation, along with probing, should be performed to verify the desired results.

**Drainage**
Positive site drainage should be maintained at all times in accordance with the IBC. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond and/or seep into the ground. Pad drainage should be directed toward the street or other approved area. The ground immediately adjacent to the foundation shall be sloped away from the building at a minimum of 5-percent for a minimum distance of 10 feet measured perpendicularly to the face of the wall. If physical obstructions prohibit 10 feet of horizontal distance, a 5-percent slope shall be provided to an approved alternate method of diverting water away from the foundation. Swales used for this purpose shall be sloped a minimum of 2-percent where located within 10 feet of the building foundation. Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2-percent away from the building. Roof gutters and down spouts should be utilized to control roof drainage. Down spouts should outlet onto paved areas or a minimum of five feet from proposed structures or into a subsurface drainage system. Areas of seepage may develop due to irrigation or heavy rainfall. Minimizing irrigation will lessen this potential. If areas of seepage develop, recommendations for minimizing this effect could be provided upon request.

**PLAN REVIEW**
Final grading, foundation, and improvement plans should be submitted to this office for review and comment as they become available, to minimize any misunderstandings between the plans and recommendations presented herein. In addition, foundation excavations and earthwork construction performed on the site should be observed and tested by this office. If conditions are found to differ substantially from those stated, appropriate recommendations would be offered at that time.
LIMITATIONS

The materials encountered on the project site and utilized in our laboratory study are believed representative of the area; however, soil materials vary in character between excavations and conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors. GeoTek, Inc. assumes no responsibility or liability for work, testing, or recommendations performed or provided by others. Since our study is based upon the site materials observed, selective laboratory testing and engineering analysis, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. Standards of practice are subject to change with time.

The opportunity to be of service is greatly appreciated. If you have any questions concerning this report or if we may be of further assistance, please do not hesitate to contact the undersigned.

Respectfully submitted,
GeoTek, Inc.

Josh Krause, EI
Staff Professional

Luke J. Landriani, PE
Senior Engineer

GeoTek, Inc.
APPROXIMATE SITE LOCATION

Not to Scale
FIGURE 2
SITE EXPLORATION PLAN
Meat Science Innovation Center
NW Corner of Idaho Ave. and Perimeter Dr.
Moscow, Idaho 83843
Prepared for: University of Idaho

Not to Scale

Approximate Test Pit Location
REFERENCES


Brecknridge, R.M., 1984, Geology of the Palouse, Idaho Geological Survey, University of Idaho

Busacca, Alan J., 1989, Long Quaternary Record in Eastern Washington, U.S.A., Interpreted from Multiple Buried Paleosols in Loess, Department of Agronomy and Soils, and Department of Geology


GeoTek, Inc., In-house proprietary information.

Idaho Department of Water Resources, Well Information, Well Driller Reports, 2015

Idaho Transportation Department CD-ROM Publications


USGS, 2003, Seismic Hazard Map of Idaho, Peak Acceleration (%g) with 2% Probability of Exceedance in 50 years.
### LOG GENERAL NOTES

#### CONSISTENCY OF FINE-GRAINED SOILS

<table>
<thead>
<tr>
<th>Unconfined Compressive Strength, Qu, psf</th>
<th>Standard Penetration or N-Value (SS) Blows/Ft</th>
<th>Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 500</td>
<td>&lt;2</td>
<td>Very Soft</td>
</tr>
<tr>
<td>500 - 1,000</td>
<td>2 - 3</td>
<td>Soft</td>
</tr>
<tr>
<td>1,001 - 2,000</td>
<td>4 - 7</td>
<td>Firm</td>
</tr>
<tr>
<td>2,001 - 4,000</td>
<td>8 - 16</td>
<td>Stiff</td>
</tr>
<tr>
<td>4,001 - 8,000</td>
<td>17 - 32</td>
<td>Very Stiff</td>
</tr>
<tr>
<td>&gt; 8,001</td>
<td>32+</td>
<td>Hard</td>
</tr>
</tbody>
</table>

SPT penetration test using 140 pound hammer, with 30 inch free fall on 2 inch outside diameter (1-3/8 ID) sampler.

For ring sampler using 140 lb hammer, with a 30 inch free fall on 3 inch outside diameter (2-1/2 ID) sample, use N-value x 0.7 to get Standard N-value.

For fine grained soil consistency, thumb penetration used per ASTM D-2488.

#### RELATIVE DENSITY OF COARSE-GRAINED SOILS

<table>
<thead>
<tr>
<th>Standard Penetration (SPT) or N-Value (SS) Blows/Ft</th>
<th>Relative Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>Very Loose</td>
</tr>
<tr>
<td>4 - 9</td>
<td>Loose</td>
</tr>
<tr>
<td>10 - 29</td>
<td>Medium Dense</td>
</tr>
<tr>
<td>30 - 49</td>
<td>Dense</td>
</tr>
<tr>
<td>50+</td>
<td>Very Dense</td>
</tr>
</tbody>
</table>

#### RELATIVE PROPORTIONS OF SAND & GRAVEL

<table>
<thead>
<tr>
<th>Descriptive Term of other constituents</th>
<th>Percent of Dry Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>&lt; 15</td>
</tr>
<tr>
<td>With</td>
<td>15 - 29</td>
</tr>
<tr>
<td>Modifier</td>
<td>&gt; 30</td>
</tr>
</tbody>
</table>

#### GRAIN SIZE TERMINOLOGY

<table>
<thead>
<tr>
<th>Major Component of Sample</th>
<th>Particle Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulders</td>
<td>Over 12 inches</td>
</tr>
<tr>
<td>Cobbles</td>
<td>3 inches to 12 inches</td>
</tr>
<tr>
<td>Gravel</td>
<td>#4 Sieve to 3 inches</td>
</tr>
<tr>
<td>Sand</td>
<td>#200 Sieve to #4 Sieve</td>
</tr>
<tr>
<td>Silt or Clay</td>
<td>Passing #200 Sieve</td>
</tr>
</tbody>
</table>

#### RELATIVE HARDNESS OF CEMENTED SOILS (CALICHE)

<table>
<thead>
<tr>
<th>Description</th>
<th>General Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Dense to Moderately Hard</td>
<td>Partially Cemented Granular Soil - Can be carved with a knife and broken with force by hand.</td>
</tr>
<tr>
<td>Very Stiff to Moderately Hard</td>
<td>Partially Cemented Fine-Grained Soil - Can be carved with a knife and broken with force by hand.</td>
</tr>
<tr>
<td>Moderately Hard</td>
<td>Moderate hammer blow required to break a sample</td>
</tr>
<tr>
<td>Hard</td>
<td>Heavy hammer blow required to break a sample</td>
</tr>
<tr>
<td>Very Hard</td>
<td>Repeated heavy hammer blow required to break a sample</td>
</tr>
</tbody>
</table>
### LOG LEGEND

#### MATERIAL DESCRIPTION

<table>
<thead>
<tr>
<th>Soil Pattern</th>
<th>USCS Symbol</th>
<th>USCS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILL</td>
<td></td>
<td>Artificial Fill</td>
</tr>
<tr>
<td>GP or GW</td>
<td></td>
<td>Poorly/Well graded GRAVEL</td>
</tr>
<tr>
<td>GM</td>
<td></td>
<td>Silty GRAVEL</td>
</tr>
<tr>
<td>GC</td>
<td></td>
<td>Clayey GRAVEL</td>
</tr>
<tr>
<td>GP-GM or GW-GM</td>
<td></td>
<td>Poorly/Well graded GRAVEL with Silt</td>
</tr>
<tr>
<td>GP-GC or GW-GC</td>
<td></td>
<td>Poorly/Well graded GRAVEL with Clay</td>
</tr>
<tr>
<td>SP or SW</td>
<td></td>
<td>Poorly/Well graded SAND</td>
</tr>
<tr>
<td>SM</td>
<td></td>
<td>Silty SAND</td>
</tr>
<tr>
<td>SC</td>
<td></td>
<td>Clayey SAND</td>
</tr>
<tr>
<td>SP-SM or SW-SM</td>
<td></td>
<td>Poorly/Well graded SAND with Silt</td>
</tr>
<tr>
<td>SP-SC or SW-SC</td>
<td></td>
<td>Poorly/Well graded SAND with Clay</td>
</tr>
<tr>
<td>SC-SM</td>
<td></td>
<td>Silty Clayey SAND</td>
</tr>
<tr>
<td>ML</td>
<td></td>
<td>SILT</td>
</tr>
<tr>
<td>MH</td>
<td></td>
<td>Elastic SILT</td>
</tr>
<tr>
<td>CL-ML</td>
<td></td>
<td>Silty CLAY</td>
</tr>
<tr>
<td>CL</td>
<td></td>
<td>Lean CLAY</td>
</tr>
<tr>
<td>CH</td>
<td></td>
<td>Fat CLAY</td>
</tr>
<tr>
<td>PCEM</td>
<td></td>
<td>PARTIALLY CEMENTED</td>
</tr>
<tr>
<td>CEM</td>
<td></td>
<td>CEMENTED</td>
</tr>
<tr>
<td>BDR</td>
<td></td>
<td>BEDROCK</td>
</tr>
</tbody>
</table>

#### SAMPLING

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPT</td>
<td>Ring Sample</td>
</tr>
<tr>
<td>NR</td>
<td>No Recovery</td>
</tr>
<tr>
<td></td>
<td>Bulk Sample</td>
</tr>
<tr>
<td></td>
<td>Water Table</td>
</tr>
</tbody>
</table>

#### CONSISTENCY

<table>
<thead>
<tr>
<th>Cohesionless Soils</th>
<th>Cohesive Soils</th>
<th>Cementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>VL</td>
<td>So</td>
<td>MH</td>
</tr>
<tr>
<td>L</td>
<td>F</td>
<td>H</td>
</tr>
<tr>
<td>MD</td>
<td>S</td>
<td>VH</td>
</tr>
<tr>
<td>D</td>
<td>VS</td>
<td></td>
</tr>
<tr>
<td>VD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# TEST PIT LOG

**PROJECT #:** 2187-ID  
**PROJECT:** Meat Science Innovation Center  
**CLIENT:** University of Idaho  
**LOCATION:** NWC of Idaho Ave. and Perimeter Dr. Moscow, Idaho  
**ELEVATION:** ~2585

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Blows / 6 in.</th>
<th>Soil Pattern</th>
<th>USCS Symbol</th>
<th>Consistency</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ML</td>
<td></td>
<td>SILT with organics, Brown, Moist</td>
<td>So</td>
<td></td>
<td>Vegetation encountered</td>
</tr>
<tr>
<td>2</td>
<td>FILL</td>
<td></td>
<td>Uncontrolled Fill, Mixed Clay and SILT, Reddish Brown to Gray, Moist</td>
<td>F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TEST PIT NUMBER:** TP-1  
**CONSISTENCY:**  
**REMARKS:**  
**END OF TEST PIT @ 15.0’**  
**NO GROUNDWATER ENCOUNTERED**
# TEST PIT LOG

**TEST PIT NUMBER:** TP-2

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Blows / 6 in.</th>
<th>USCS Symbol</th>
<th>Soil Pattern</th>
<th>MATERIAL DESCRIPTION AND COMMENTS</th>
<th>Consistency</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>FILL</td>
<td>Uncontrolled Fill, Mixed Clay and SILT, Reddish Brown to Gray, Moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>ML</td>
<td>Loess-SILT, Dk. Brown to Black, Moist</td>
<td>F</td>
<td>Trace Vegetation encountered</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>END OF TEST PIT @ 15.0' NO GROUNDWATER ENCOUNTERED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**END OF TEST PIT @ 15.0' NO GROUNDWATER ENCOUNTERED**

**METHOD:** Excavator

**EXCAVATOR:** M.L. Albright and Sons

**DATE:** 11/12/20

**ELEVATION:** ~2585

---

320 E. Corporate Drive, Suite 300, Meridian, Idaho 83642 | Office: (208) 888-7010 | Fax: (208) 888-7924
### TEST PIT LOG

**PROJECT #:** 2187-ID  
**PROJECT:** Meat Science Innovation Center  
**CLIENT:** University of Idaho  
**LOCATION:** NWC of Idaho Ave. and Perimeter Dr. Moscow, Idaho  
**DATE:** 11/12/20  
**ELEVATION:** ~2585

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>Soil Pattern</th>
<th>USCS Symbol</th>
<th>MATERIAL DESCRIPTION AND COMMENTS</th>
<th>Consistency</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (ft)</td>
<td>Blows / 6 in.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>FILL Artificial Fill, Poorly Graded Gravel, Gray, Moist to Saturated</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>
| 2 | | | FILL Uncontrolled Fill, Mixed Clay and Silt, Reddish-Brown to Gray, Moist | F | Interbedded layers of reddish brown and gray silt from 1.5'-14' Wood Debris, Mulch, and Tarp @ 3.0'  
Gray Sand @ 6.0' |
| 15 | | ML | Loess- Silt, Dark Brown to Black, Moist | F | Trace Vegetation and Organics |
| 16 | | | END OF TEST PIT @ 15.5'  
NO GROUNDWATER ENCOUNTERED | | |

**LOGGED BY:** JJK  
**METHOD:** Excavator  
**EXCAVATOR:** M.L. Albright and Sons  
**REMARKS:**
### TEST PIT LOG

**PROJECT #:** 2187-ID  
**PROJECT:** Meat Science Innovation Center  
**CLIENT:** University of Idaho  
**LOCATION:** NW corner of Idaho Ave. and Perimeter Dr. Moscow, Idaho  
**ELEVATION:** ~2585

#### TEST PIT NUMBER: TP-4

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Blows / 6 in.</th>
<th>Soil Pattern</th>
<th>USCS Symbol</th>
<th>Consistency</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FILL</td>
<td></td>
<td>Artificial Fill, Poorly Graded Gravel, Gray, Moist to Saturated</td>
<td></td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>FILL</td>
<td></td>
<td>Uncontrolled Fill, Mixed Clay and SILT, Reddish Brown to Gray, Moist to Saturated</td>
<td></td>
<td>F</td>
<td>Perched Water, Percolation Pipe Installed at 8.0’</td>
</tr>
<tr>
<td>11</td>
<td>ML</td>
<td></td>
<td>Loess - SILT, Dk. Brown to Black, Moist</td>
<td></td>
<td>F</td>
<td>Trace Vegetation and Organics</td>
</tr>
<tr>
<td>16</td>
<td>CL</td>
<td></td>
<td>Lean CLAY, Reddish Brown, Moist</td>
<td></td>
<td>F</td>
<td></td>
</tr>
</tbody>
</table>

**END OF TEST PIT @ 16.5’**

**NO GROUNDWATER ENCOUNTERED**

**LOGGED BY:** JJK  
**METHOD:** Excavator  
**EXCAVATOR:** M.L. Albright and Sons  
**DATE:** 11/12/20
# Test Pit Log

**Test Pit Number:** TP-5

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Soil Pattern</th>
<th>USCS Symbol</th>
<th>Consistency</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FILL</td>
<td>Uncontrolled Fill, Poorly Graded Gravel, Gray, Moist to Saturated</td>
<td></td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FILL</td>
<td>Uncontrolled Fill, Mixed Clay and SILT, Reddish Brown to Gray, Moist to Saturated</td>
<td></td>
<td>F</td>
<td>Perched Water</td>
</tr>
<tr>
<td>15</td>
<td>CL</td>
<td>Lean CLAY, Dk. Brown to Black, Moist to Saturated</td>
<td></td>
<td>F</td>
<td>Trace Vegetation and Organics</td>
</tr>
</tbody>
</table>

**END OF TEST PIT @ 16.0’**

**NO GROUNDWATER ENCOUNTERED**
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Type</th>
<th>Soil Pattern</th>
<th>USCS Symbol</th>
<th>CONSISTENCY</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FILL</td>
<td>Artificial Fill, Poorly Graded Gravel, Gray, Saturated</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>FILL</td>
<td>Uncontrolled Fill, Mixed Clay and SILT, Reddish Brown to Gray, Saturated</td>
<td>So</td>
<td>Perched Water</td>
<td></td>
</tr>
</tbody>
</table>

**END OF TEST PIT @ 14.5’**

**NO GROUNDWATER ENCOUNTERED**
APPENDIX C
FIELD TESTS AND OBSERVATIONS (2187-ID)

PERCOLATION TESTS
The infiltration rate was determined by conducting percolation tests for onsite earth materials. The infiltration rate was determined in inches per hour. Infiltration rate results are presented below.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>INFILTRATION RATE (Inches/Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-2 @ 8.0'</td>
<td>1.5</td>
</tr>
<tr>
<td>TP-4 @ 8.0'</td>
<td>0.3</td>
</tr>
</tbody>
</table>

GROUND WATER MONITORING RESULTS
Ground water monitoring results are presented below. Ground water elevation results are recorded in feet below existing grade.

<table>
<thead>
<tr>
<th>STAND-PIPE PIEZOMETER #</th>
<th>TP-2</th>
<th>TP-4*</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/12/20</td>
<td>15.0’+</td>
<td>16.5’+</td>
</tr>
</tbody>
</table>

“+” Indicates a dry reading at the bottom of the piezometer
*Note: Minor perched water identified at a depth of 6.0’
LABORATORY TESTS RESULTS (2187-ID)

ATTERBERG LIMITS
Atterberg limits were performed on representative samples in general accordance with ASTM D 4318. The results are shown in the following plates.

PARTICLE SIZE ANALYSIS
Sieve analyses were performed in general accordance with ASTM test method C136 and ASTM C117. Test results are presented in the following plates.

RESISTANCE R-VALUE AND EXPANSION PRESSURE OF COMPACTED SOILS
Tests were conducted on representative soil samples, in general accordance with Idaho test method T-8 and AASHTO T-190, to determine the soil's performance when placed in the base, subbase, or subgrade of a road subjected to traffic.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>R-VALUE @ 200 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-4 @ 6.0'-7.0'</td>
<td>15</td>
</tr>
</tbody>
</table>
Material Test Report

Client: University of Idaho - Facilities
875 Perimeter Drive MS2281
Moscow ID 83844-2281

Project: 2187-ID
UI-Meat Science Innovation Center-(MSIC)-UI CP200032

Sample Details
Sample ID: 20-03128-S01
Date Sampled: 11/12/2020
Specification: General Sieve Set
Location: TP-4, 6.0'-7.0'

Sample Description:
ML, SILT

Atterberg Limit:
- Liquid Limit: 32
- Plastic Limit: 25
- Plasticity Index: 7

Grading: ASTM C 136, ASTM C 117

Date Tested: [Date]
Tested By: [Name]

Particle Size Distribution

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>% Passing</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 200</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>No. 160</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>No. 100</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>No. 80</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>No. 50</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>No. 40</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>No. 8</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>No. 4</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3/8in</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>1/2in</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COBBLES</th>
<th>GRAVEL</th>
<th>SAND</th>
<th>FINES (96.0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.0%)</td>
<td>(0.0%)</td>
<td>(0.0%)</td>
<td>(0.0%)</td>
</tr>
<tr>
<td>Coarse</td>
<td>Fine</td>
<td>Coarse</td>
<td>Medium</td>
</tr>
<tr>
<td>(0.0%)</td>
<td>(0.0%)</td>
<td>(1.3%)</td>
<td>(2.7%)</td>
</tr>
<tr>
<td>Silt</td>
<td>Clay</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D85: N/A
D60: N/A
D50: N/A
D30: N/A
D15: N/A
D10: N/A
Material Test Report

Client: University of Idaho-Facilities
875 Perimeter Drive MS2281
Moscow ID 83844-2281

Project: 2187-ID
UI-Meat Science Innovation Center-(MSIC)-UI CP200032

Sample Details
Sample ID 20-03128-S02
Date Sampled 11/12/2020
Specification General Sieve Set
Location TP-2, 8.0'-9.0'

Sample Description:
ML, SILT

Atterberg Limit:
- Liquid Limit: 40
- Plastic Limit: 31
- Plasticity Index: 9

Grading: ASTM C 136, ASTM C 117

Date Tested: 
Tested By: 

Particle Size Distribution

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>% Passing</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>½in</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3/8in</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>No.4</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>No.8</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>No.16</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>No.30</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>No.50</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>No.100</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>No.200</td>
<td>96</td>
<td></td>
</tr>
</tbody>
</table>

D85: N/A D60: N/A D50: N/A
D30: N/A D15: N/A D10: N/A

Form No: 18909, Report No: MAT:20-03128-S02 © 2000-2020 QESTLab by SpectraQEST.com
Material Test Report

Client: University of Idaho-Facilities
875 Perimeter Drive MS2281
Moscow ID 83844-2281

Project: 2187-ID
UI-Meat Science Innovation
Center-(MSIC)-UI CP200032

Sample Details
Sample ID: 20-03128-S03
Date Sampled: 11/12/2020
Specification: General Sieve Set
Location: TP-1, 12.0'-13.0'

Sample Description:
ML, SILT

Atterberg Limit:
Liquid Limit: 41
Plastic Limit: 30
Plasticity Index: 11

Grading: ASTM C 136, ASTM C 117

Date Tested:
Tested By:

Particle Size Distribution

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>% Passing</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>3/8in</td>
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<tr>
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<tr>
<td>No.200</td>
<td>96</td>
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</tr>
</tbody>
</table>

COBBLES | GRAVEL | SAND | FINES (95.9%) |
---------|--------|------|--------------|
| (0.0%)  | (0.0%) | (0.1%) | Coarse (0.4%) | Medium (1.3%) | Fine (2.3%) | Silt | Clay |
| D85: N/A | D60: N/A | D50: N/A | D30: N/A | D15: N/A | D10: N/A |