RDG PLANNING ● DESIGN

project manual

Field of Dreams
Movie Site Professional Ballpark

28995 Lansing Road, Dyersville, IA 52040

This is Iowa Ballpark, Inc., City of Dyersville
340 1st Avenue East, Dyersville, IA 55040

Issuance:		Date:
BP01	BID PACKAGE 01 – EARLY SITE	September 27, 2023

RDG Project No.: 3005.252.04
Volume No.: 1 of 1

Creatively influencing life for the better through purpose driven design.

RDG Planning & Design
301 Grand Avenue
Des Moines, Iowa 50309 Tel 515.288.3141 www.rdgusa.com RDG IA Inc

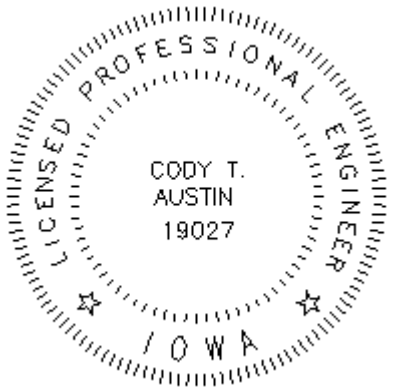
SECTION 00 01 01 – PROJECT TITLE PAGE

PROJECT:	**Field of Dreams** Movie Site Professional Ballpark 28995 Lansing Road, Dyersville, IA 52040 RDG No.: **3005.252.04**
OWNER:	**This is Iowa Ballpark, Inc., City of Dyersville** 340 1st Avenue East, Dyersville, IA 55040
DATE:	September 27, 2023
ARCHITECT:	**RDG Planning & Design** 301 Grand Avenue, Des Moines, Iowa 50309 Phone: 515.288.3141 Contact: Tom Ohle | tohle@rdgusa.com | 515.314.5912
LANDSCAPE ARCHITECT:	**RDG Planning & Design** 301 Grand Avenue, Des Moines, Iowa 50309 Phone: 515.288.3141 Contact: Ryan Peterson | rpeterson@rdgusa.com | 608.673.4970
CIVIL:	**Origin Design** I37 Main Street, Suite 100, Dubuque, Iowa 52001 Phone: 563.556.2464 Contact: Cody Austin | cody.austin@origindesign.com | 563.231.6195
STRUCTURAL:	**Walter P Moore and Assoc, Inc.** 201 East Kennedy Boulevard, Suite 700, Tampa, FL 33602 Phone: 813.221.2424 Contact: Dylan Richard | drichard@walterpmoore.com | 813.275.8129
MECHANICAL | PLUMBING FIRE PROTECTION:	**Henderson Engineers, Inc.** 8345 Lenexa Drive, Suite 300, Lenexa, KS 66214 Phone: 913.742.5000 Contact: Ryan Yotter | ryan.yotter@hendersonengineers.com | 816.663.8708
ELECTRICAL:	**Henderson Engineers, Inc.** 8345 Lenexa Drive, Suite 300, Lenexa, KS 66214 Phone: 913.742.5000 Contact: Jordan Bartholomew | jordan.bartholomew@hendersonengineers.com | 816.663.8709
AV | BROADCAST:	**Henderson Engineers, Inc.** 8345 Lenexa Drive, Suite 300, Lenexa, KS 66214 Phone: 913.742.5000 Contact: Jason Kartak | jason.kartak@hendersonengineers.com | 913.742.5323
LIGHTING:	**RDG Planning & Design** 301 Grand Avenue, Des Moines, Iowa 50309 Phone: 515.288.3141 Contact: David Raver | draver@rdgusa.com | 515.309.3216
ACOUSTICAL CONSULTANT:	**Henderson Engineers, Inc.** 8345 Lenexa Drive, Suite 300, Lenexa, KS 66214 Phone: 913.742.5000 Contact: Kevin Butler | kevin.butler@hendersonengineers.com | 913.742.5605

IRRIGATION:	**Hines Inc.** 323 W Drake Road, Suite 204, Ft. Collins, CO 80526 Phone: 970.282.1800 Contact: Justin Dannelly | justin@hinesinc.com | 970.233.7926
FOOD SERVICE:	**Rapids Foodservice** 6201 South Gateway Drive, Marion, IA 52302 Phone: 319.447.3515 Contact: Luke Green | Luke.green@rapidscontract.com | 319.373.7280
CONSTRUCTION MANAGER:	**Miron Construction Co., Inc.** 335 French Court SW, Cedar Rapids, IA 52404 Phone: 319.298.5200 Contact: Joel Stave | joel.stave@miron-construction.com | 920.886.7869

END OF DOCUMENT 00 01 01

SECTION 00 01 05 – CERTIFICATION PAGE



CIVIL

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed professional engineer under the laws of the State of Iowa.

CODY T. AUSTIN, P.E. IOWA LIC No. **19027**
Printed or typed name

09/27/2023
Signature Date
Expiration Date: DECEMBER 31, 2024

Pages or sheets covered by this seal: Date Issued:
Project Manual pages identified in Table of Contents. **27 SEP 2023**

ARCHITECTURAL

I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge. I am a duly licensed architect under the laws of the State of Iowa.

JACK D. PATTON, AIA IOWA LIC No. **03193**
Printed or typed name

09/27/2023
Signature Date
Expiration Date: JUNE 30, 2025

Pages or sheets covered by this seal: Date Issued:
Project Manual pages identified in Table of Contents. **27 SEP 2023**

END OF SECTION 00 01 05

SECTION 00 01 10 - TABLE OF CONTENTS

PROJECT: **Field of Dreams**
Movie Site Professional Ballpark
28995 Lansing Road, Dyersville, IA 52040
RDG No. **3005.252.04**

OWNER: **This is Iowa Ballpark, Inc., City of Dyersville**
340 1st Avenue East, Dyersville, IA 55040

Abbreviation	Company Name	Discipline:
CIVIL	Origin Design Co.	Civil Engineering Consultant
STRUC	Walter P. Moore and Associates, Inc.	Structural Consultant
LARCH	RDG Planning & Design	Landscape Architectural Consultant
ARCH	RDG Planning & Design	Architectural Consultant
LIGHT	RDG Planning & Design	Lighting Consultant
ACOUS	Henderson Engineering, Inc.	Acoustical Consultant
MECH	Henderson Engineering, Inc.	Mechanical Consultant
ELEC	Henderson Engineering, Inc.	Electrical Consultant
AV	Henderson Engineering, Inc.	AV | Broadcast Consultant
IRRIG	FRS Design Group	Irrigation Consultant
FOOD	Rapids Foodservice	Food Service Consultant
CM	Miron Construction Co., Inc.	Construction Manager
OWNER	This is Iowa Ballpark, Inc., City of Dyersville	Owner

END OF TABLE OF CONTENTS

SECTION 00 26 00 – PROCUREMENT SUBSTITUTION PROCEDURES

1.1 SUMMARY

A. Pre-Bid Substitutions.

1.2 BIDDER'S OPTIONS

A. For products specified by reference standard only, select product meeting that standard, by any manufacturer.

B. For products specified by naming one or several products or manufacturers, select one of the products and manufacturers named. Submit a Request for Substitution for a product or manufacturer which is not specifically named unless "No Substitutions" is indicated. Architect and/or Engineer will review and consider for approval.

C. For products specified by naming one or several products or manufacturers and stating "or equivalent", or "equal", or "Architect approved equivalent", or similar wording, submit a Request for Substitution for a product or manufacturer which is not specifically named. Architect and/or Engineer will review and consider for approval.

D. For products specified by naming only one or several products or manufacturers, and "No Substitutions" is indicated, there is no option and no substitution will be allowed.

1.3 SUBSTITUTIONS

A. Prepare Base Bid in accordance with requirements of the Bidding Documents.
   1. Substitutions for products may be made during the bidding period by submitting a completed Request for Substitution form and providing substantiating product information. The Architect/Engineer will consider substitution requests for approval provided they meet the submittal requirements and product information is complete and accurate.
   2. Submit the Request for Substitution form via e-mail directly to the contact person listed on the Project Title Page of the discipline responsible for preparation of the related specification Section.
   3. Request for Substitution must be received by the Architect/Engineer a minimum of ten (10) calendar days prior to the Bid Date.
   4. Do not submit duplicate requests by multiple transmission methods such as mail delivery, hand delivery, fax, etc. Requests requiring physical samples may be delivered.
   5. Architect will notify Bidders of approved product substitutions in an addendum.

B. Submit a separate request for each item. Provide the following with each request:
   1. Complete data substantiating compliance of proposed substitution with requirements stated in Bidding Documents:
      a. Product identification, including manufacturer's name and address.
      b. Manufacturer's literature, identifying:
         1) Product description and model number.
         2) Reference standards.
         3) Performance and test data.
      c. Samples, as applicable.
      d. Name and address of projects on which product has been used and date of each installation.
   2. Itemized comparison of the proposed substitution with product specified, listing significant variations.
   3. Advise of any change in construction schedule resulting from use of proposed substitution.
   4. All effects of substitution on separate contracts.
   5. List of changes required in other work or products.

6. Designation of responsibility for cost of required license fees or royalties.
7. Description of availability of maintenance services and sources of replacement materials and parts.

C. Substitutions will not be considered for acceptance when:
1. Acceptance will require substantial revision of Contract Documents.
2. In the judgement of the Architect/Engineer, the submittal does not include adequate information for a comprehensive evaluation.

1.4 BIDDER'S REPRESENTATION

A. In making formal request for substitution the bidder represents that:
1. The bidder has investigated proposed product and has determined that it is equivalent to or superior in all respects to that specified.
2. The bidder will provide the same warranties or bonds for substitution as for the product specified.
3. The bidder will coordinate installation of the accepted substitution into the Work, and will make such changes as may be required for the Work to be completed in all respects.
4. The bidder waives claims for additional costs caused by substitution that may subsequently become apparent.

1.5 ARCHITECT'S ACTION

A. Review requests for substitution. Substitution requests that are either approved or not approved will not be returned to person submitting request.

B. Issue an addendum to identify accepted substitutions.

C. Only those substitutions noted as approved in an addendum may be included in the Bid.

1.6 SUBSTITUTION REQUEST FORM

A. A Request for Substitution form is included at the end of this Section.

B. Substitutions will be considered only when the Request for Substitution form is completed and submitted with product information requested.

C. If no samples are included with request, the preferred method of receipt is by email. Do not send duplicate request forms by mail.

D. If samples are included with request, include Request for Substitution form with delivery of samples. Do not mail or email duplicate request forms.

REQUEST FOR SUBSTITUTION **DATE RECEIVED: _____**

E-MAIL TO: Joel Stave | joel.stave@miron-construction.com
Tom Ohle | tohle@rdgusa.com

PROJECT: **Field of Dreams**
Movie Site Professional Ballpark

PROJECT NO.: 3005.252.04

We submit the following product/system/material information for your consideration and approval:

SPECIFICATION SECTION NUMBER AND NAME: _____

SPECIFIED ITEM: _____

PROPOSED SUBSTITUTION: _____

Attach complete information on changes to Drawings and/or Specifications, which proposed substitution would require for its proper installation.

Submit with request necessary samples and substantiating data to show equivalency (quality and performance) to that specified. Clearly mark manufacturer's literature to identify proposed item and to identify criteria confirming product is equivalent to the specification.

Submit the Request for Substitution form via e-mail directly to the contact person listed on the Project Title Page of the discipline responsible for preparation of the related specification Section.

Do not submit duplicate requests by multiple transmission methods such as mail delivery, hand delivery, fax, etc. Requests requiring physical samples may be delivered.

The undersigned certifies that the function, appearance, quality, performance and compatibility with adjacent materials are equivalent to the specified item.

Submitted by:

(Signature) (Phone)

(Firm) (Fax)

(Address) (Email)

ARCHITECT ACTION:
□ RECOMMENDED □ NOT RECOMMENDED □ RECOMMENDED AS NOTED
□ RECEIVED LATE □ INSUFFICIENT DATA RECEIVED

By: Date:

ENGINEER OR CONSULTANT ACTION:
□ RECOMMENDED □ NOT RECOMMENDED □ RECOMMENDED AS NOTED
□ RECEIVED LATE □ INSUFFICIENT DATA RECEIVED

By: Date:

OWNER ACTION:
□ RECOMMENDED □ NOT RECOMMENDED □ RECOMMENDED AS NOTED
□ RECEIVED LATE □ INSUFFICIENT DATA RECEIVED

By: Date:

FILL IN ALL BLANKS BELOW:

A. Does the substitution affect dimensions indicated on the Drawings?

☐ Yes ☐ No If yes, describe the changes: _____

_____

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?

☐ Yes ☐ No If no, fully explain: _____

_____

C. What effect does substitution have on other Contracts or other trades?

_____

D. What effect does substitution have on construction schedule?

_____

E. Manufacturer's warranties of the proposed and specified items are:

☐ Same ☐ Different If different, fully explain: _____

_____

F. Reason for Request for Substitution:

_____

G. Comparison of specified item with the proposed substitution; list significant variations:

_____

H. What maintenance services are provided and who will provide:

_____

I. Estimated cost savings or additional cost to make substitution:

_____

(Attach additional sheets as required)

END OF SECTION 00 26 00

SECTION 00 30 00 – INFORMATION AVAILABLE TO BIDDERS

1.1 SUBSURFACE INVESTIGATION REPORT

A. A copy of a geotechnical report with respect to the building site titled as follows:

Geotechnical Engineering Report
Field of Dreams Movie Site Professional Ballpark
28995 Lansing Road, Dyersville, IA
Terracon PN: 07225161R

Dated September 15, 2023, and prepared by Terracon Consulting Engineers, Bettendorf, IA.

B. A copy of the geotechnical report noted above is included bound at the back of the Project Manual.

C. This report identifies properties of below grade conditions and offers recommendations for the design of foundations prepared primarily for the use of the Architect/Engineer.

D. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.

E. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Sum accruing to the Owner.

1.2 SITE SURVEY

A. A copy of the topographic survey with respect to the project site is included in the Construction Documents set titled as follows:

C01.01 - Existing Conditions prepared by Origin Design Co.

B. This survey identifies grade elevations prepared primarily for the use of the Architect/Engineer in establishing new grades and identifying natural water shed.

END OF SECTION 00 30 00

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project information.
   2. Work covered by Contract Documents.
   3. Work performed by Owner.
   4. Owner-furnished/Contractor-installed (OFCI) products.
   5. Contractor's use of site and premises.
   6. Coordination with occupants.
   7. Work restrictions.
   8. Specification and Drawing conventions.

B. Related Requirements:
   1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Field of Dreams Movie Site Professional Ballpark.
   1. Project Location: 28995 Lansing Road, Dyersville, IA 52040.

B. Owner: This is Iowa Ballpark, Inc., City of Dyersville, 340 1st Avenue East, Dyersville, IA 55040.

C. Architect: RDG Planning & Design, 301 Grand Avenue, Des Moines, Iowa 50309.

D. Construction Manager: Miron Construction Co., Cedar Rapids, IA.
   1. Construction Manager for this Project is Project's constructor. The terms "Construction Manager" and "Contractor" are synonymous.

E. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
   1. See Section 01 31 00 "Project Management and Coordination." for requirements for using web-based Project software.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
   1. Construction MLB style ballpark of approximately 3,000 seats with location for 5,000 future temporary seats, and spaces for spectator amenities, media/broadcast, and baseball operations, including related mechanical, electrical and site construction.

B. Type of Contract:
   1. Project will be constructed under a single prime contract.

1.4 WORK PERFORMED BY OWNER

A. Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.5 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:
   1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
   2. Provide for delivery of Owner-furnished products to Project site.
   3. Upon delivery, inspect, with Contractor present, delivered items.
      a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
   4. Obtain manufacturer's inspections, service, and warranties.
   5. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:
   1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
   2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
   3. Receive, unload, handle, store, protect, and install Owner-furnished products.
   4. Make building services connections for Owner-furnished products.
   5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
   6. Repair or replace Owner-furnished products damaged following receipt.

C. Owner-Furnished/Contractor-Installed (OFCI) Products:
   1. As indicated on Drawings.

1.6 CONTRACTOR'S USE OF SITE AND PREMISES

A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.7 COORDINATION WITH OCCUPANTS

A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
   1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
   2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
   3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
   4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.8 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: No limitations; comply with City noise ordinances.

C. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages and other controlled substances on Owner's property is not permitted.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 22 00 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:
   1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
   2. Section 01 40 00 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1:
   1. Description: Onsite borrow material utilized for embankment construction. Utilization of stockpiled material for additional embankment construction along the third base line above and beyond grading shown on plans in accordance with Section 312000 “Earth Moving” .
   2. Unit of Measurement: cubic yard of soil excavated from stockpile.

   ADD: _____Dollars $_____per CY

B. Unit Price No. 2:
   1. Description: Base Stone Material furnished, placed, and compacted as shown on the typical sections.
   2. Unit of Measurement: Tons of material placed as measured by weight tickets.

   ADD: _____Dollars $_____per Ton

C. Unit Price No. 3:
   1. Description: Sub-Base Stone (Modified Macadam) Material furnished, placed, and compacted as shown on the typical sections.
   2. Unit of Measurement: Tons of material placed as measured by weight tickets.

   ADD: _____Dollars $_____per Ton

END OF SECTION 01 22 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
   2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate 1: ADD – Storm sewer within site.

END OF SECTION 01 23 00

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:
   1. Section 00 26 00 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
   2. Section 01 21 00 "Allowances" for products selected under an allowance.
   3. Section 01 23 00 "Alternates" for products selected under an alternate.
   4. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Substitution Request Form: Use facsimile of form provided in Project Manual.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
      b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.
      f. Certificates and qualification data, where applicable or requested.
      g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
      h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
      i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
      j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall

Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Substitution request is fully documented and properly submitted.

c. Requested substitution will not adversely affect Contractor's construction schedule.

d. Requested substitution has received necessary approvals of authorities having jurisdiction.

e. Requested substitution is compatible with other portions of the Work.

f. Requested substitution has been coordinated with other portions of the Work.

g. Requested substitution provides specified warranty.

h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:
   1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.2 SUBMITTAL PROCEDURES

A. Prepare proposal requests as PDF electronic files and upload to web-based Project software website specifically established for project. Enter required data in web-based software site to fully identify submittal.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
   1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
      e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
   1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.
8. Submit or post proposal requests using Portable Data File (PDF) format.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:
   1. Section 01 21 00 "Allowances" for procedural requirements governing the handling and processing of allowances.
   2. Section 01 22 00 "Unit Prices" for administrative requirements governing the use of unit prices.
   3. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   4. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.2 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SUBMITTAL PROCEDURES

A. Prepare schedule of values and Applications for Payment as PDF electronic files and upload to web-based Project software website specifically established for project. Enter required data in web-based software site to fully identify submittal.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
   1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
   2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
   3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the schedule of values:
      a. Project name and location.
      b. Owner's name.
      c. Name of Architect.
      d. Architect's Project number.
      e. Contractor's name and address.
      f. Date of submittal.
   2. Arrange schedule of values consistent with format of AIA Document G703.
   3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
   4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    a. Differentiate between items stored on-site and items stored off-site.
6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
    1. Other Application for Payment forms proposed by the Contractor shall be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
    1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
    2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
    3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
    4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
    1. Provide name and location of storage facility, detailed list of stored materials, certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
    2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
    3. Provide summary documentation for stored materials indicating the following:
        a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
        b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
        c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit PDF electronic file of signed and notarized original copy of each Application for Payment to Architect via electronic transmission procedure established for Project. Include waivers of lien and similar attachments if required.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   1. List of subcontractors.
   2. Schedule of values.
   3. Contractor's construction schedule (preliminary if not final).
   4. Products list (preliminary if not final).
   5. Schedule of unit prices.
   6. Submittal schedule (preliminary if not final).
   7. List of Contractor's staff assignments.
   8. List of Contractor's principal consultants.
   9. Copies of building permits.
   10. Initial progress report.
   11. Report of preconstruction conference.
   12. Certificates of insurance and insurance policies (submit with executed Agreement).
   13. Performance and payment bonds (submit with executed Agreement).

H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
      a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 01 77 00 "Closeout Procedures."
   2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Evidence of completion of Project closeout requirements.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. AIA Document G706.
   5. AIA Document G706A.
   6. AIA Document G707.
   7. Evidence that claims have been settled.
   8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General coordination procedures.
   2. Coordination drawings.
   3. RFIs.
   4. Digital project management procedures.
   5. Project meetings.

B. Related Requirements:
   1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
   2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 SUBMITTAL PROCEDURES

A. Prepare submittals and other documents required by this Section as PDF electronic files and upload to web-based Project software website specifically established for project. Enter required data in web-based software site to fully identify submittal.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
   1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
   1. Post copies of list in project meeting room and temporary field office. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate

construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    b. Coordinate the addition of trade-specific information to coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    f. Indicate required installation sequences.
    g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to

accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.

3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
    d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
    a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."

1.7 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
    1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
    2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
    1. Project name.
    2. Owner name.
    3. Project number.
    4. Date.
    5. Name of Contractor.
    6. Name of Architect.
    7. RFI number, numbered sequentially.
    8. RFI subject.
    9. Specification Section number and title and related paragraphs, as appropriate.
    10. Drawing number and detail references, as appropriate.
    11. Field dimensions and conditions, as appropriate.
    12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.

13. Contractor's signature.
14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond.
1. The following Contractor-generated RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Contractor shall promptly respond. Architect’s response may be withheld until additional contractor information is provided.
3. Architect's action on RFIs does not authorize a change to the Contract Time or the Contract Sum.
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 7 days of receipt of the RFI response and submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    b. No change to the Contract Documents impacting cost or time shall proceed unless directed by a fully executed contract change document.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Contractor shall execute a data licensing agreement in the form of AIA Document C106-2013, Digital Data Licensing Agreement included in Project Manual following this Section.

4. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

B. Web-Based Project Software: Provide, administer, and use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.
   1. Web-based Project software site includes, at a minimum, the following features:
      a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
      b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
      c. Document workflow planning, allowing customization of workflow between project entities.
      d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
      e. Track status of each Project communication in real time, and log time and date when responses are provided.
      f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
      g. Processing and tracking of payment applications.
      h. Processing and tracking of contract modifications.
      i. Creating and distributing meeting minutes.
      j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
      k. Management of construction progress photographs.
      l. Mobile device compatibility, including smartphones and tablets.
   2. Provide unlimited number of web-based Project software user licenses for use of Owner, Owner's Commissioning Authority, Architect, and Architect's consultants. Provide software training for web-based Project software users.
   3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
   1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.
   3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
   1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Responsibilities and personnel assignments.
      b. Tentative construction schedule.
      c. Phasing.
      d. Critical work sequencing and long lead items.
      e. Designation of key personnel and their duties.
      f. Lines of communications.
      g. Use of web-based Project software.
      h. Procedures for processing field decisions and Change Orders.
      i. Procedures for RFIs.
      j. Procedures for testing and inspecting.
      k. Procedures for processing Applications for Payment.
      l. Distribution of executed Agreement, bonds and insurance certificates.
      m. Distribution of the Contract Documents.
      n. Submittal procedures.
      o. Preparation of Record Documents.
      p. Use of the premises.
      q. Work restrictions.
      r. Working hours.
      s. Owner's occupancy requirements.
      t. Responsibility for temporary facilities and controls.
      u. Procedures for moisture and mold control.
      v. Procedures for disruptions and shutdowns.
      w. Construction waste management and recycling.
      x. Parking availability.
      y. Office, work, and storage areas.
      z. Equipment deliveries and priorities.
      aa. First aid.
      bb. Security.
      cc. Progress cleaning.
   3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
   1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect , and Owner's Commissioning Authority of scheduled meeting dates.
   2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
      a. Contract Documents.
      b. Options.
      c. Related RFIs.
      d. Related Change Orders.
      e. Purchases.
      f. Deliveries.
      g. Submittals.
      h. Review of mockups.
      i. Possible conflicts.

j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
a. Preparation of Record Documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Procedures for completing and archiving web-based Project software site data files.
d. Submittal of written warranties.
e. Requirements for preparing operations and maintenance data.
f. Requirements for delivery of material samples, attic stock, and spare parts.
g. Requirements for demonstration and training.
h. Preparation of Contractor's punch list.
i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
j. Submittal procedures.
k. Coordination of separate contracts.
l. Owner's partial occupancy requirements.
m. Installation of Owner's furniture, fixtures, and equipment.
n. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at monthly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with

current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
        1) Review schedule for next period.
    b. Review present and future needs of each entity present, including the following:
        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site use.
        8) Temporary facilities and controls.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of correction of deficient items.
        12) Field observations.
        13) Status of RFIs.
        14) Status of Proposal Requests.
        15) Pending changes.
        16) Status of Change Orders.
        17) Pending claims and disputes.
        18) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    a. Construction Schedule: Review progress since the last coordination meeting. Determine whether the Work is on time, ahead of schedule, or behind schedule, in relation to construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

c. Review present and future needs of each contractor present, including the following:
    1) Interface requirements.
    2) Sequence of operations.
    3) Status of submittals.
    4) Deliveries.
    5) Off-site fabrication.
    6) Access.
    7) Site use.
    8) Temporary facilities and controls.
    9) Work hours.
    10) Hazards and risks.
    11) Progress cleaning.
    12) Quality and work standards.
    13) Status of RFIs.
    14) Proposal Requests.
    15) Change Orders.
    16) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

AIA Document C106™– 2013

Digital Data Licensing Agreement

AGREEMENT made as of the ??? day of ??? in the year ???
(In words, indicate day, month and year.)

BETWEEN the Party transmitting Digital Data ("Transmitting Party"):
(Name, address and contact information, including electronic addresses)

RDG Planning and Design
301 Grand Avenue
Des Moines, IA 50309
Phone Number: 515.288.3141
Electronic Address: desmoines@rdgusa.com

and the Party receiving the Digital Data ("Receiving Party"):
(Name, address and contact information, including electronic addresses)

Company
Address
City-State-Zip
Phone Number: ???
Electronic Address: ???

For the following Project:
(Name and location or address)

Project name
Location

The Transmitting Party and Receiving Party agree as follows.

TABLE OF ARTICLES

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 The purpose of this Agreement is to grant a license from the Transmitting Party to the Receiving Party for the Receiving Party's use of Digital Data on the Project, and to set forth the license terms.

§ 1.2 This Agreement is the entire and integrated agreement between the parties. Except as specifically set forth herein, this Agreement does not create any other contractual relationship between the parties.

§ 1.3 For purposes of this Agreement, the term Digital Data is defined to include only those items identified in Article 5 below.

§ 1.3.1 Confidential Digital Data is defined as Digital Data containing confidential or business proprietary information that the Transmitting Party designates and clearly marks as "confidential."

ARTICLE 2 TRANSMISSION OF DIGITAL DATA

§ 2.1 The Transmitting Party grants to the Receiving Party a nonexclusive limited license to use the Digital Data identified in Article 5 solely and exclusively to perform services for, or construction of, the Project in accordance with the terms and conditions set forth in this Agreement.

§ 2.2 The transmission of Digital Data constitutes a warranty by the Transmitting Party to the Receiving Party that the Transmitting Party is the copyright owner of the Digital Data, or otherwise has permission to transmit the Digital Data to the Receiving Party for its use on the Project in accordance with the terms and conditions of this Agreement.

§ 2.3 If the Transmitting Party transmits Confidential Digital Data, the transmission of such Confidential Digital Data constitutes a warranty to the Receiving Party that the Transmitting Party is authorized to transmit the Confidential Digital Data. If the Receiving Party receives Confidential Digital Data, the Receiving Party shall keep the Confidential Digital Data strictly confidential and shall not disclose it to any other person or entity except as set forth in Section 2.3.1.

§ 2.3.1 The Receiving Party may disclose the Confidential Digital Data as required by law or court order, including a subpoena or other form of compulsory legal process issued by a court or governmental entity. The Receiving Party may also disclose the Confidential Digital Data to its employees, consultants or contractors in order to perform services or work solely and exclusively for the Project, provided those employees, consultants and contractors are subject to the restrictions on the disclosure and use of Confidential Digital Data as set forth in this Agreement.

§ 2.4 The Transmitting Party retains its rights in the Digital Data. By transmitting the Digital Data, the Transmitting Party does not grant to the Receiving Party an assignment of those rights; nor does the Transmitting Party convey to the Receiving Party any right in the software used to generate the Digital Data.

§ 2.5 To the fullest extent permitted by law, the Receiving Party shall indemnify and defend the Transmitting Party from and against all claims arising from or related to the Receiving Party's modification to, or unlicensed use of, the Digital Data.

ARTICLE 3 LICENSE CONDITIONS

The parties agree to the following conditions on the limited license granted in Section 2.1:
(State below rights or restrictions applicable to the Receiving Party's use of the Digital Data, requirements for data format, transmission method or other conditions on data to be transmitted.)

§ 3.1 Digital Data contained in these electronic files at the time of transfer, are part of RDG's Instruments of Service, and RDG shall be deemed the author and owner of its Instruments of Service and shall retain all common law, statutory and other reserved rights, including copyrights.

§ 3.2 These electronic files are being provided to Receiving Party for informational purposes only and shall be used by Receiving Party, and anyone receiving them through Receiving Party, solely as a convenience in performing Work for this project. Any other use or reuse by Receiving Party or others is strictly prohibited except for the following:

§ 3.2.1 The Landscape Architectural Digital Data file, when transmitted, may be used for horizontal layout purposes and earthwork quantity take-off. Architectural and Engineering Digital Data files may not be used for this purpose.

§ 3.3 This Digital Data is not Contract Documents and therefore may not represent revisions made by addenda, construction phase changes, or subsequent changes after transmission. This data does not assure as-constructed conditions.

If differences or conflicts exist between digital data and hard-copy project or Contract Documents, the hard-copy project or Contract Documents and subsequent Contract Document changes shall govern.

§ 3.4 Use of this Digital Data does not relieve Receiving Party of its duty to fully comply with the Contract Documents.

§ 3.5 Digital Data may be shared by Receiving Party with other third parties for use on this project only under the same licenses conditions. Receiving Party may only share with full notice of these license conditions and separate third party license agreements.

§ 3.6 Use of this Digital Data is at the sole risk of the using Party and is without liability, risk or legal exposure to RDG.

§ 3.7 RDG makes no representation or warranty, either expressed or implied as to the Digital Data's accuracy or suitability for any specific purpose. Use of this Digital Data is at the sole risk of the using Party and is without liability, risk or legal exposure to RDG.

§ 3.8 Under no circumstances shall delivery of this Digital Data for use by Receiving Party be deemed a sale by Transmitting Party and Transmitting Party makes no warranties, either express or implied, of merchantability and fitness for any purpose.

ARTICLE 4 LICENSING FEE OR OTHER COMPENSATION

~~The Receiving Party agrees to pay the Transmitting Party the following fee or other compensation for the Receiving Party's use of the Digital Data:~~
~~*(State the fee, in dollars, or other method by which the Receiving Party will compensate the Transmitting Party for the Receiving Party's use of the Digital Data.)*~~

ARTICLE 5 DIGITAL DATA

The Parties agree that the following items constitute the Digital Data subject to the license granted in Section 2.1:
(Identify below, in detail, the information created or stored in digital form the parties intend to be subject to this Agreement.)

Digital Data Name	File Date	File Size	Software Version
File Name	???	??? KB	Autodesk Revit 2022

This Agreement is entered into as of the day and year first written above and will terminate upon Substantial Completion of the Project, as that term is defined in AIA Document A201™–2007, General Conditions of the Contract for Construction, unless otherwise agreed by the parties and set forth below.
(Indicate when this Agreement will terminate, if other than the date of Substantial Completion.)

NA

TRANSMITTING PARTY	RECEIVING PARTY
(Signature) ??? ??? *(Printed name and title)*	*(Signature)* ??? ??? *(Printed name and title)*

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's Construction Schedule.
   2. Site condition reports.
   3. Unusual event reports.

1.2 SUBMITTAL PROCEDURES

A. Prepare construction schedules, site condition reports, and special reports as PDF electronic files and upload to web-based Project software website specifically established for project. Enter required data in web-based software site to fully identify submittal.

1.3 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
   2. Indicate start and completion dates for the following as applicable:
      a. Securing of approvals and permits required for performance of the Work.
      b. Temporary facilities.
      c. Construction of mock-ups, prototypes and samples.
      d. Owner interfaces and furnishing of items.
      e. Interfaces with Separate Contracts.
      f. Regulatory agency approvals.
      g. Contractor’s punch list.
      h. Owner’s/Architect’s punch list.
   3. Long Lead-Time Procurement Activities: Include procurement process activities for major items requiring a cycle of more than 60 days as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   4. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
   5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
   6. Commissioning Time: Include no fewer than 15 days for commissioning.

7. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Mock-ups: Indicate dates for completion of all mock-ups and the review time to obtain approval. Do not begin work represented by the mock-up until the mock-up is approved. List as part of the critical path for the work.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
1. Structural completion.
2. Temporary enclosure and space conditioning.
3. Commissioning of major MEP systems.

E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.5 GANTT-CHART SCHEDULE REQUIREMENTS

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule.

C. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1.6 REPORTS

A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

B. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
   1. Submit unusual event reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittal schedule requirements.
   2. Administrative and procedural requirements for submittals.

B. Related Requirements:
   1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
   2. Section 01 31 00 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
   3. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
   4. Section 01 40 00 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
   5. Section 01 77 00 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
   6. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
   7. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
   8. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
   1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
   2. Initial Submittal: Submit concurrently with construction schedule. Include submittals required during the first 30 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
   3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
      a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
   4. Format: Arrange the following information in a tabular format:
      a. Scheduled date for first submittal.

b. Specification Section number and title.
c. Submittal Category: Action; informational.
d. Name of subcontractor.
e. Description of the Work covered.
f. Scheduled date for Architect's final release or approval.
g. Scheduled dates for purchasing.
h. Scheduled date of fabrication.
i. Scheduled dates for installation.
j. Activity or event number.

1.4 SUBMITTAL FORMAT

A. Submittal Information: Include the following information in each submittal:
1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals: Prepare submittals as PDF document, incorporating complete information into each PDF file. Name PDF file with submittal number.
1. PDF Documentation Format: Unrestricted, searchable, read-only, Portable Document Format (PDF) that allows printing, copying or extracting content, and the addition of markups using Adobe Acrobat, Bluebeam Revu, or similar PDF reading and editing software.
2. Electronically convert paper documents using Optical Character Recognition (OCR) software if needed to comply with specified documentation format properties.
3. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
4. Name file with submittal number or other unique identifier, including revision identifier.
a. File name shall use Specification Section number followed by a dash and then a sequential number (e.g., 061000-01).
b. Resubmittals shall include an alphabetic suffix (e.g., 061000-01a).

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website specifically established for project. Enter required data in web-based software site to fully identify submittal.
    a. No fee or special software other than internet access is required for access to or use of web-based software website.
    b. Specific access instructions will be provided following Award of Contract.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.

f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams that show factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Do not submit Safety Data Sheets (SDS) with submittal. Safety Data Sheets included with submittal documents will not be reviewed by Architect.
6. Submit Product Data before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Identification of products.
      b. Schedules.
      c. Compliance with specified standards.
      d. Notation of coordination requirements.
      e. Notation of dimensions established by field measurement.
      f. Relationship and attachment to adjoining construction clearly indicated.
      g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
   1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
   2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
      a. Project name and submittal number.
      b. Product name and name of manufacturer.
      c. Sample source.
      d. Drawing designation or Specification paragraph number and generic name of each item.
   3. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
      a. Submit separate paper copy of transmittal and physical Samples to Architect.
   4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
      b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
   5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
      a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
   6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or

containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned. Retain one returned Sample set as a project record Sample.
    1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
    1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
    2. Manufacturer and product name, and model number if applicable.
    3. Number and name of room or space.
    4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:
    1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
    2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
    3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
    4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
    5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
    6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:
    1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
    2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

B. Informational Submittals: Architect's responsive action is not required; noncompliant submittals will be returned.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents or received from sources other than Contractor may be returned without review or discarded at Architect's discretion.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 33 00

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
   4. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Mockups: Full-size physical assemblies that are constructed either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
   1. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as part of permanent construction, consisting of multiple products, assemblies, and subassemblies, with cutaways enabling inspection of concealed portions of the Work.
      a. Include each system, assembly, component, and part of the exterior wall to be constructed for the Project. Colors of components shall be those selected by the Architect for use in the Project.
   2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
   3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 SUBMITTAL PROCEDURES

A. Prepare submittals and reports as PDF electronic files and upload to web-based Project software website specifically established for project. Enter required data in web-based software site to fully identify submittal.

1.6 ACTION SUBMITTALS

A. Shop Drawings: For mockups.
   1. Include plans, sections, and elevations, indicating materials and size of mockup construction.

2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports and documents as specified.

D. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.

2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation

of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:
   1. Provide test specimens representative of proposed products and construction.
   2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   4. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   5. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   6. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
   7. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
   1. Build mockups of size indicated.
   2. Build mockups in location indicated or, if not indicated, as directed by Architect.
   3. Notify Architect 14 days in advance of dates and times when mockups will be constructed. Coordinate date and time of mockup reviews to coincide with Project progress meetings.
   4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
   5. Demonstrate the proposed range of aesthetic effects and workmanship.
   6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
      a. Allow seven days for initial review and each re-review of each mockup.
   7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
   8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   10. Demolish and remove mockups when directed unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Field quality-control testing and field special inspection services specified are the Owner's responsibility. Owner will engage a qualified testing agency to perform these services.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
   2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
   1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
   2. Engage a qualified testing agency to perform quality-control services.
      a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
   3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
   4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Architect, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
   4. Facilities for storage and field curing of test samples.
   5. Delivery of samples to testing agencies.
   6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
   1. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
   1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
   2. Notifying Architect, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
   3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority with copy to Contractor and to authorities having jurisdiction.
   4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
   5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
   6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms, including "requested," "authorized," "selected," "required," and "permitted," have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms, including "shown," "noted," "scheduled," and "specified," have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
   1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations, List: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following

list. Abbreviations and acronyms not included in this list are to mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; (see FGIA).
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; www.concrete.org.
9. ACP - American Clean Power; (Formerly: American Wind Energy Association); www.cleanpower.org.
10. ACPA - American Concrete Pipe Association; www.concretepipe.org.
11. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
12. AF&PA - American Forest & Paper Association; www.afandpa.org.
13. AGA - American Gas Association; www.aga.org.
14. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
15. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
16. AI - Asphalt Institute; www.asphaltinstitute.org.
17. AIA - American Institute of Architects (The); www.aia.org.
18. AISC - American Institute of Steel Construction; www.aisc.org.
19. AISI - American Iron and Steel Institute; www.steel.org.
20. AITC - American Institute of Timber Construction; (see PLIB).
21. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
22. AMPP - Association for Materials Protection and Performance; www.ampp.org.
23. ANSI - American National Standards Institute; www.ansi.org.
24. AOSA/SCST - Association of Official Seed Analysts (The)/Society of Commercial Seed Technologists (The); www.analyzeseeds.com.
25. APA - APA - The Engineered Wood Association; www.apawood.org.
26. APA - Architectural Precast Association; www.archprecast.org.
27. API - American Petroleum Institute; www.api.org.
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASA - Acoustical Society of America; www.acousticalsociety.org.
30. ASCE - American Society of Civil Engineers; www.asce.org.
31. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (see ASCE).
32. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
33. ASME - ASME International; American Society of Mechanical Engineers (The); www.asme.org.
34. ASSE - ASSE International; (American Society of Sanitary Engineering); www.asse-plumbing.org.
35. ASSP - American Society of Safety Professionals; www.assp.org.
36. ASTM - ASTM International; www.astm.org.
37. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
38. AVIXA - Audiovisual and Integrated Experience Association; www.avixa.org.
39. AWI - Architectural Woodwork Institute; www.awinet.org.
40. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
41. AWPA - American Wood Protection Association; www.awpa.com.
42. AWS - American Welding Society; www.aws.org.
43. AWWA - American Water Works Association; www.awwa.org.
44. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
45. BIA - Brick Industry Association (The); www.gobrick.com.
46. BICSI - BICSI, Inc.; www.bicsi.org.

47. BIFMA - Business and Institutional Furniture Manufacturer's Association; www.bifma.org.
48. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
49. BWF - Badminton World Federation; www.bwfbadminton.com.
50. CARB - California Air Resources Board; www.arb.ca.gov.
51. CDA - Copper Development Association Inc.; www.copper.org.
52. CE - Conformite Europeenne (European Commission); www.ec.europa.eu/growth/single-market/ce-marking.
53. CEA - Canadian Electricity Association; www.electricity.ca.
54. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
55. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
56. CGA - Compressed Gas Association; www.cganet.com.
57. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
58. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
59. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
60. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
61. CPA - Composite Panel Association; www.compositepanel.org.
62. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
63. CRRC - Cool Roof Rating Council; www.coolroofs.org.
64. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
65. CSA - CSA Group; www.csagroup.org.
66. CSI - Cast Stone Institute; www.caststone.org.
67. CSI - Construction Specifications Institute (The); www.csiresources.org.
68. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
69. CTA - Consumer Technology Association; www.cta.tech.
70. CTI - Cooling Technology Institute; www.coolingtechnology.org.
71. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
72. DHA - Decorative Hardwoods Association; www.decorativehardwoods.org.
73. DHI - Door and Hardware Institute; www.dhi.org.
74. ECIA - Electronic Components Industry Association; www.ecianow.org.
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. EOS/ESD - EOS/ESD Association, Inc.; Electrostatic Discharge Association; www.esda.org.
78. ESTA - Entertainment Services and Technology Association; www.esta.org.
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
81. FGIA - Fenestration and Glazing Industry Alliance; https://fgiaonline.org.
82. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
83. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
84. FM Approvals - FM Approvals LLC; www.fmapprovals.com.
85. FM Global - FM Global; www.fmglobal.com.
86. FRSA - Florida Roofing and Sheet Metal Contractors Association, Inc.; www.floridaroof.com.
87. FSA - Fluid Sealing Association; www.fluidsealing.com.
88. FSC - Forest Stewardship Council U.S.; www.fscus.org.
89. GA - Gypsum Association; www.gypsum.org.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HMMA - Hollow Metal Manufacturers Association; (see NAAMM).
93. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
94. IAS - International Accreditation Service; www.iasonline.org.
95. ICC - International Code Council; www.iccsafe.org.
96. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
97. ICPA - International Cast Polymer Association (The); www.theicpa.com.
98. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
99. IEC - International Electrotechnical Commission; www.iec.ch.
100. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.

101. IES - Illuminating Engineering Society; www.ies.org.
102. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
103. IGMA - Insulating Glass Manufacturers Alliance; (see FGIA).
104. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.org.
105. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
106. Intertek - Intertek Group; www.intertek.com.
107. ISA - International Society of Automation (The); www.isa.org.
108. ISFA - International Surface Fabricators Association; www.isfanow.org.
109. ISO - International Organization for Standardization; www.iso.org.
110. ITU - International Telecommunication Union; www.itu.int.
111. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
112. LPI - Lightning Protection Institute; www.lightning.org.
113. MBMA - Metal Building Manufacturers Association; www.mbma.com.
114. MCA - Metal Construction Association; www.metalconstruction.org.
115. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
116. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
117. MHI - Material Handling Industry; www.mhi.org.
118. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
119. MPI - Master Painters Institute; www.paintinfo.com.
120. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry, Inc.; www.msshq.org.
121. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
122. NACE - NACE International; (National Association of Corrosion Engineers International); (see AMPP).
123. NADCA - National Air Duct Cleaners Association; www.nadca.com.
124. NAIMA - North American Insulation Manufacturers Association; www.insulationinstitute.org.
125. NALP - National Association of Landscape Professionals; www.landscapeprofessionals.org.
126. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
127. NBI - New Buildings Institute; www.newbuildings.org.
128. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
129. NCMA - National Concrete Masonry Association; www.ncma.org.
130. NEBB - National Environmental Balancing Bureau; www.nebb.org.
131. NECA - National Electrical Contractors Association; www.necanet.org.
132. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
133. NEMA - National Electrical Manufacturers Association; www.nema.org.
134. NETA - InterNational Electrical Testing Association; www.netaworld.org.
135. NFHS - National Federation of State High School Associations; www.nfhs.org.
136. NFPA - National Fire Protection Association; www.nfpa.org.
137. NFPA - NFPA International; (see NFPA).
138. NFRC - National Fenestration Rating Council; www.nfrc.org.
139. NGA - National Glass Association; www.glass.org.
140. NHLA - National Hardwood Lumber Association; www.nhla.com.
141. NLGA - National Lumber Grades Authority; www.nlga.org.
142. NOFMA - National Oak Flooring Manufacturers Association; (see NWFA).
143. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
144. NRCA - National Roofing Contractors Association; www.nrca.net.
145. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
146. NSF - NSF International; www.nsf.org.
147. NSI - Natural Stone Institute; www.naturalstoneinstitute.org.
148. NSPE - National Society of Professional Engineers; www.nspe.org.
149. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
150. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
151. NWFA - National Wood Flooring Association; www.nwfa.org.
152. NWRA - National Waste & Recycling Association; www.wasterecycling.org.
153. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
154. PDI - Plumbing & Drainage Institute; www.pdionline.org.
155. PLASA - PLASA; www.plasa.org.

156. PLIB - Pacific Lumber Inspection Bureau; www.plib.org.
157. PVCPA - Uni-Bell PVC Pipe Association; www.uni-bell.org.
158. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
159. RFCI - Resilient Floor Covering Institute; www.rfci.com.
160. RIS - Redwood Inspection Service; (see WWPA).
161. SAE - SAE International; www.sae.org.
162. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
163. SDI - Steel Deck Institute; www.sdi.org.
164. SDI - Steel Door Institute; www.steeldoor.org.
165. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
166. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (see ASCE).
167. SIA - Security Industry Association; www.securityindustry.org.
168. SJI - Steel Joist Institute; www.steeljoist.org.
169. SMA - Screen Manufacturers Association; www.smainfo.org.
170. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
171. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
172. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
173. SPIB - Southern Pine Inspection Bureau; www.spib.org.
174. SPRI - Single Ply Roofing Industry; www.spri.org.
175. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
176. SSINA - Specialty Steel Industry of North America; www.ssina.com.
177. SSPC - SSPC: The Society for Protective Coatings; (see AMPP).
178. STI/SPFA - Steel Tank Institute/Steel Plate Fabricators Association; www.steeltank.com.
179. SWI - Steel Window Institute; www.steelwindows.com.
180. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
181. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
182. TCNA - Tile Council of North America, Inc.; www.tcnatile.com.
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.kbcdco.tema.org.
184. TIA - Telecommunications Industry Association (The); www.tiaonline.org.
185. TMS - The Masonry Society; www.masonrysociety.org.
186. TPI - Truss Plate Institute; www.tpinst.org.
187. TPI - Turfgrass Producers International; www.turfgrasssod.org.
188. TRI - Tile Roofing Industry Alliance; www.tileroofing.org.
189. UL - Underwriters Laboratories Inc.; www.ul.org.
190. UL LLC - UL LLC; www.ul.com.
191. USAV - USA Volleyball; www.usavolleyball.org.
192. USGBC - U.S. Green Building Council; www.usgbc.org.
193. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
194. WA - Wallcoverings Association; www.wallcoverings.org.
195. WCLIB - West Coast Lumber Inspection Bureau; (see PLIB).
196. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
197. WDMA - Window & Door Manufacturers Association; www.wdma.com.
198. WI - Woodwork Institute; www.woodworkinstitute.com.
199. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
200. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
   1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
   2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
   3. ICC - International Code Council; www.iccsafe.org.
   4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the

following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. CPSC - U.S. Consumer Product Safety Commission; www.cpsc.gov.
2. DOC - U.S. Department of Commerce; www.commerce.gov.
3. DOD - U.S. Department of Defense; www.defense.gov.
4. DOE - U.S. Department of Energy; www.energy.gov.
5. DOJ - U.S. Department of Justice; www.ojp.usdoj.gov
6. DOS - U.S. Department of State; www.state.gov.
7. EPA - United States Environmental Protection Agency; www.epa.gov.
8. FAA - Federal Aviation Administration; www.faa.gov.
9. GPO - U.S. Government Publishing Office; www.gpo.gov.
10. GSA - U.S. General Services Administration; www.gsa.gov.
11. HUD - U.S. Department of Housing and Urban Development; www.hud.gov.
12. LBNL - Lawrence Berkeley National Laboratory; Energy Technologies Area; www.lbl.gov/.
13. NIST - National Institute of Standards and Technology; www.nist.gov.
14. OSHA - Occupational Safety & Health Administration; www.osha.gov.
15. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
16. USACE - U.S. Army Corps of Engineers; www.usace.army.mil.
17. USDA - U.S. Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
18. USDA - U.S. Department of Agriculture; Rural Utilities Service; www.usda.gov.
19. USP - U.S. Pharmacopeial Convention; www.usp.org.
20. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from U.S. Government Publishing Office; www.govinfo.gov.
2. DOD - U.S. Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.dsp.dla.mil/Specs-Standards/.
3. DSCC - Defense Supply Center Columbus; (see FS).
4. FED-STD - Federal Standard; (see FS).
5. FS - Federal Specification; Available from DLA Document Services; www.dsp.dla.mil/Specs-Standards/.
    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from U.S. General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
6. MILSPEC - Military Specification and Standards; (see DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (see USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they are to mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. BEARHFTI; California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; (see BHGS).
2. BHGS; State of California Bureau of Household Goods and Services; (Formerly: California Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation); www.bhgs.dca.ca.gov.
3. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.oal.ca.gov/publications/ccr/.
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx.

5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; https://tfsweb.tamu.edu/.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.

B. Fencing Windscreen Privacy Screen: Polyester fabric scrim with grommets for attachment to chain link fence, sized to height of fence, in color selected by Architect from manufacturer's standard colors.

C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E 84 and passing NFPA 701 Test Method 2.

D. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
   1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
   2. Conference room of sufficient size to accommodate project meetings. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle at 6’-0” o.c. maximum spacing, on each wall. Furnish room with conference table, chairs, and tack and marker boards.
   3. Drinking water and private toilet.
   4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
   5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
   1. Use of electrical-resistance heaters, gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction and marked for intended location and application.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille

in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures."

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
   1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
   1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

G. Telephone Service: Not required; provide superintendent with cellular telephone.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
   2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
   1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
   2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 20 00 "Earth Moving."
   3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
   4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 10 00 "Paving."

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Project site for parking areas for construction personnel.

E. Storage and Staging: Use designated areas of Project site for storage and staging needs.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
   1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
   2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
   1. Identification Signs: Provide Project identification signs as indicated on Drawings.
   2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
      a. Provide temporary, directional signs for construction personnel and visitors.
   3. Maintain and touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 73 00 "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
   1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

J. Temporary Elevator Use: Use of elevators is not permitted..

K. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 01 10 00 "Summary."

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.6 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
   1. Protect porous materials from water damage.
   2. Protect stored and installed material from flowing or standing water.
   3. Keep porous and organic materials from coming into prolonged contact with concrete.
   4. Remove standing water from decks.
   5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
   1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
   2. Keep interior spaces reasonably clean and protected from water damage.
   3. Periodically collect and remove waste containing cellulose or other organic matter.
   4. Discard or replace water-damaged material.
   5. Do not install material that is wet.
   6. Discard and replace stored or installed material that begins to grow mold.
   7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
   1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
   2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
   3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
      a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
      b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
      c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:
   1. Section 01 21 00 "Allowances" for products selected under an allowance.
   2. Section 01 23 00 "Alternates" for products selected under an alternate.
   3. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
   4. Section 01 42 00 "References" for applicable industry standards for products specified.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
   1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
2. Data indicating compliance with the requirements specified in "Comparable Products" Article.

E. Basis-of-Design Product Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures" that demonstrates compliance with requirements.

F. Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
1. Resolution of Compatibility Disputes between Multiple Contractors:
    a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.
    b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.
3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.4 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:
1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from the wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
    a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Evaluation of "or equal" product status is by the Architect; whose determination is final.

B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements.
    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"
2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"
4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
    a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
    a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-

service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation. Architect will notify Contractor of approval or rejection of proposed comparable product within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
1. Submittal Procedures: Comply with Section 01 33 00 "Submittal Procedures."
2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements:
1. Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements in individual Specification Sections.
2. When approved in advance by Architect, other submittal requirements specified in individual Specification Sections may be combined with comparable product submittal. Approval by the Architect of comparable product submittal and of other submittal requirements will satisfy product’s submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. Installation of the Work.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Repair of the Work.
   7. Protection of installed construction.

B. Related Requirements:
   1. Section 01 10 00 "Summary" for limits on use of Project site.

1.2 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
   1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   1. Description of the Work.
   2. List of detrimental conditions, including substrates.
   3. List of unacceptable installation tolerances.
   4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
   1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
   2. Establish limits on use of Project site.
   3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
   4. Inform installers of lines and levels to which they must comply.
   5. Check the location, level and plumb, of every major element as the Work progresses.

6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Use containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.8 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
   1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
   2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
      a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
   3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
   4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.

1.2 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.3 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
   3. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.
   4. Submit testing, adjusting, and balancing records.
   5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Advise Owner of pending insurance changeover requirements.
   2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
   3. Complete startup and testing of systems and equipment.
   4. Complete repair and restoration operations required by Section 01 73 00 "Execution".
   5. Perform preventive maintenance on equipment used prior to Substantial Completion.
   6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
   7. Advise Owner of changeover in utility services.
   8. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
   9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
   10. Complete final cleaning requirements.
   11. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
   1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
   1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
   2. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
   3. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
   4. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine final completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
   1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.
4. Submit list of incomplete items in the following format:
    a. PDF Electronic File: Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties prior to requesting final inspection.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
    1. Submit on digital media acceptable to Owner.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
    1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
        a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
        b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
        c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
i. Vacuum and mop concrete.
j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
l. Remove labels that are not permanent.
m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
r. Clean strainers.
s. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Systems and equipment operation manuals.
   2. Systems and equipment maintenance manuals.
   3. Product maintenance manuals.

B. Related Requirements:
   1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
   2. Section 01 91 13 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.2 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
   1. Architect and Commissioning Authority will comment on whether content of operation and maintenance submittals is acceptable.
   2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:
   1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

C. Initial Manual Submittal: Submit draft copy of each manual at least 45 days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
   1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments.

D. Final Manual Submittal: Submit each manual in final form to Owner at least 15 days before commencing demonstration and training.

E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
    a. Documentation Format: Unrestricted, searchable, read-only, Portable Document Format (PDF) that allows printing, copying or extracting content, and the addition of markups using Adobe Acrobat, Bluebeam Revu, or similar PDF reading and editing software.
    b. Electronically convert paper documents using Optical Character Recognition (OCR) software if needed to comply with specified documentation format properties.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.5 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:
1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Name and contact information for Commissioning Authority.
8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
9. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
   1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
   2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
   1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
   2. Performance and design criteria if Contractor has delegated design responsibility.
   3. Operating standards.
   4. Operating procedures.
   5. Operating logs.
   6. Wiring diagrams.
   7. Control diagrams.
   8. Piped system diagrams.
   9. Precautions against improper use.
   10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:
   1. Product name and model number. Use designations for products indicated on Contract Documents.
   2. Manufacturer's name.
   3. Equipment identification with serial number of each component.
   4. Equipment function.
   5. Operating characteristics.
   6. Limiting conditions.
   7. Performance curves.
   8. Engineering data and tests.
   9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:
   1. Startup procedures.
   2. Equipment or system break-in procedures.
   3. Routine and normal operating instructions.
   4. Regulation and control procedures.
   5. Instructions on stopping.
   6. Normal shutdown instructions.
   7. Seasonal and weekend operating instructions.
   8. Required sequences for electric or electronic systems.
   9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and

frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
   1. Do not use original project record documents as part of maintenance manuals.

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:
   1. Product name and model number.
   2. Manufacturer's name.
   3. Color, pattern, and texture.
   4. Material and chemical composition.
   5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures.
   2. Types of cleaning agents to be used and methods of cleaning.
   3. List of cleaning agents and methods of cleaning detrimental to product.
   4. Schedule for routine cleaning and maintenance.
   5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:
   1. Record Drawings.
   2. Record Specifications.
   3. Record Product Data.
   4. Miscellaneous record submittals.

B. Related Requirements:
   1. Section 01 73 00 "Execution" for final property survey.
   2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
   3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Number of Copies: Submit one full-size set of marked-up record prints.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b. Accurately record information in an acceptable drawing technique.
      c. Record data as soon as possible after obtaining it.
      d. Record and check the markup before enclosing concealed installations.
      e. Cross-reference record prints to corresponding photographic documentation.
   2. Content: Types of items requiring marking include, but are not limited to, the following:
      a. Dimensional changes to Drawings.
      b. Revisions to details shown on Drawings.
      c. Depths of foundations.
      d. Locations and depths of underground utilities.
      e. Revisions to routing of piping and conduits.
      f. Revisions to electrical circuitry.
      g. Actual equipment locations.
      h. Duct size and routing.
      i. Locations of concealed internal utilities.
      j. Changes made by Change Order or Construction Change Directive.

k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders and record Drawings where applicable.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Instruction in operation and maintenance of systems, subsystems, and equipment.
   2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
   1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For instructor.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
   1. Identification: On each copy, provide an applied label with the following information:
      a. Name of Project.
      b. Name and address of videographer.
      c. Name of Architect.
      d. Name of Contractor.
      e. Date of video recording.
   2. At completion of training, submit complete training manual(s) for Owner's use prepared in same format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.
2. Documentation: Review the following items in detail:
    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.
5. Adjustments: Include the following:
    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
    a. Diagnostic instructions.
    b. Test and inspection procedures.
7. Maintenance: Include the following:
    a. Inspection procedures.

b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:
a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Owner will furnish an instructor to describe Owner's operational philosophy.
2. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
1. Schedule training with Owner with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

D. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.9 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.
1. Submit video recordings on CD-ROM or thumb drive.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the

following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
1. Film training session(s) in segments not to exceed 15 minutes.
a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by either audio narration by microphone while video recording is recorded or dubbing audio narration off-site afterwards. Include description of items being viewed.

F. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 79 00

SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. REFERENCED SPECIFICATION: The work identified in the summary shall be constructed in accordance with the 2023 Edition of the Iowa Statewide Urban Standard Specifications (SUDAS). The relevant Divisions and Specifications of the SUDAS Manual covering the work are listed below in the table of contents. The entire SUDAS Manual may be viewed, downloaded, or purchased at http://www.iowasudas.org.

1. Table of Contents SUDAS Standard Specifications, 2023 Edition
   a. Division 2 Earthwork
      1) Section 2010 – Earthwork, Subgrade, and Subbase

1.2 SUMMARY

A. Section Includes
1. Clearing and Grubbing
2. Earthwork, Excavation, and Embankment Construction
3. Subgrade Preparation
4. Subbase Construction

1.3 SUPPLEMENTAL SPECIFICATIONS TO THE SUDAS STANDARD SPECIFICATIONS.

A. Division 1 – General Provisions and Covenants
1. Division 1 is omitted from the Specifications for this work. All references made to Division 1 – General Provisions and Covenants shall be omitted from the Specifications.

B. Division 2 Earthwork
1. Section 2010 – Earthwork, Subgrade, and Subbase
   a. 1.08 – Measurement and Payment: Delete
   b. 2.01 Topsoil
      1) **A. On-Site topsoil:** On-site topsoil material is material excavated from the top 8 inches of the site. Use of on-site topsoil material is subject to the Engineer's approval.
   c. *Add new section as follows:*

Section 2010, 2.02 EXCAVATION MATERIALS

B. Class 12 Excavation, item 1. Change to the following:

1. Material deposits so firmly cemented together that they cannot be removed without continuous use of pneumatic tools, blasting, or rock sawing.

E. Borrow, Change to the following:

E. Borrow: Unless otherwise provided in the contract documents, when the quantity of fill material required is not available within the limits of the project cross –sections or specific borrow areas as indicated, the Contractor shall make up the deficiency from borrow areas provided by the Contractor.

Section 2010, 2.04 FOUNDATION MATERIALS

B. Granular Stabilization Materials, change item 1. to the following:

1. Clean, crushed stone or crushed concrete, with the following gradation:

Sieve	Percent Passing
3”	90-100
2”	80-100
1 ½”	0-70
1”	0-50
½”	0-25

OR – Iowa DOT Gradation Number 32 (4134 – Granular Backfill) OR Iowa DOT Gradation Number 13 (4122.02 – Macadam Stone Base).

C. Subgrade Treatment

Item 6. change to the following:

6. Geotextiles: Use fabric complying with Iowa DOT Article 4196.01-6.

Add item 7 as follows:

7. Bentonite: Provide powdered or granular bentonite as determined necessary to achieve a bentonite soil mixture with a maximum permeability of $1x10^{-7}$ cm/s. Two grams of the base bentonite when in a powder form shall possess the ability to swell to a volume of 16 cubic centimeters, or more, when added 0.25 grams at a time to 100 cubic centimeters of distilled water. The colloid content of the base bentonite shall exceed 855 when measured by evaporating the suspended portion of a 2% suspension after the suspension has been allowed to settle for 24 hours.

Section 2010, 2.05 STRUCTURAL BACKFILL MATERIAL

Add new section as follows:

2.05 STRUCTURAL BACKFILL MATERIAL

A. Porous Backfill:

1. Comply with Iowa DOT Specifications Section 4131.
2. The Engineer may authorize a change in gradation subject to material available locally at time of construction.

B. Structural Backfill:

1. Comply with Iowa DOT Specifications Section 4132.02 or 4132.03.
2. The Engineer may authorize a change in gradation subject to material available locally at time of construction.

Section 2010, 2.06 SOIL FOR BENTONITE AMENDEMENT

Add new section as follows:

2.06 SOIL FOR BENTONITE AMENDEMENT

Meet the following requirements for all soils to be amended with Bentonite to form a Bentonite amended soil liner:

- **A. Fines**: The soil to be amended should contain a minimum of 20 percent fines defined as the percentage, on a dry weight basis, of material passing the No. 200 Sieve.
- **B. Plasticity Index**: The soil shall have a minimum plasticity index of 10 and a maximum plasticity index of 30.
- **C. Particle Size**: 100 percent of the material shall pass the 2 inch sieve. No more than 10 percent shall be retained on the No. 4 sieve.

Section 2010, 3.01 CLEARING AND GRUBBING

C. Removal

Item 1. change to the following:

1. Trees and stumps, including roots, to a depth of at least 12 inches. Place topsoil to fill the resulting hole, incidental to clearing and grubbing.

Section 2010, 3.02 TOPSOIL

A. On-Site Topsoil

Item 1.b. change to the following:

b. Remove the upper 8 inches of existing on-site topsoil to allow finish grading with a finished grade of 4 inches of salvaged, imported or amended topsoil. The topsoil may be moved directly to an area where it is to be used, or may be stockpiled for future use.

Item 2.a. change to the following:

a. Place topsoil at least 4 inches deep; smooth and finish grade according to the contract documents. If topsoil is being amended with compost, thoroughly blend compost with on-site topsoil at the rate specified in Section 2010, 2.01.

Section 2010, 3.03 EXCAVATION

E. Drainage*:*

Add item 4 as follows:

4. When specified or indicated on the contract drawing, Contractor shall provide a detailed Dewatering Plan for excavations, including the following:
    a. Design and provide a dewatering system using accepted and professional methods of design and engineering consistent with the best current practice to eliminate water entering the excavation under hydrostatic head from bottom and/r sides.
        1) Design system to prevent differential hydrostatic head because of rising water levels from adjoining or nearby bodies of water, proximity of excavation to phreatic groundwater level, or surface runoff, resulting in a “quick” condition, and continue to worsen the excavation’s stability.
        2) System shall not be dependent solely upon sumps and/or pumping water from within excavation where differential head would result in a “quick” condition and continue to worsen the excavation’s stability.
    b. Maintain water levels below the bottom of planned excavation.

c. Perform the dewatering operation according to the dewatering plan approved by the Engineer. The dewatering plan may be modified to meet actual field conditions, with approval of the Engineer.
d. Ensure operation of the dewatering system does not damage adjoining structures and facilities. Cease dewatering operations and notify the Engineer if damage is observed.
e. Discharged Water: 1. Do not discharge water into sanitary sewers. 2. Discharging water into storm sewers requires Engineer's approval.

Section 2010, 3.07 SUBGRADE TREATMENT

Add item C. and D. as follows:

C. Bentonite:

1. Submit samples of each soil to be amended, and the bentonite to be incorporated, to the Engineer for permeability and suitability testing.
2. Incorporate the bentonite material uniformly during subgrade treatment preparation to the depth of 12 inches, or as otherwise specified in the contract documents, and at the rate specified in the contract documents.
3. Amended soil liner shall include the bottom and wetted sides of the lagoon dikes.
4. Amended soil liner shall be compacted with Moisture and Density Control (2010 3.04 D.).
5. The lagoon shall be filled with water from the municipal wastewater collection system for permeability testing.
6. Permeability testing, as required, will be determined by the Engineer. The pond(s) shall be tested in accordance with 18C.7,3,2 of the Iowa Wastewater Facilities Design Standards with a percolation rate not to exceed 1/16th of an inch per day at a water depth of 6 feet. If it is specified in the contract documents that the Contractor will conduct compaction testing, use the services of an independent testing laboratory approved by the Engineer.

D. Low Strength Subgrade Soils

1. Contractor shall follow the recommendations of the Geotechnical Report for the satisfactory improvement of low strength subgrade soils.

Section 2010, 3.08 SUBBASE

Item B. change to the following:

B. Construction: Construct the specified type of subbase to the specified depth, plus 2 feet outside of the pavement area, or 1 foot outside of the structural foundation area.

Section 2010, 3.09 FIELD QUALITY CONTROL

Item A. change to the following:

A. Compaction Testing: Contractor shall perform compaction testing as determined to be necessary by the Contractor for quality control. Engineer shall perform compaction testing as determined to be necessary by the Engineer at no cost to the Contractor, unless otherwise noted in the contract documents. However, Contractor shall make reasonable accommodations to allow the Engineer to perform any desired compaction testing. If deficiencies are found by the Engineer, the Contractor shall make all necessary corrections (rework and compact again) at no additional cost to the Owner.

Item B. change to the following:

B. Moisture Content and Density: The following requirements shall apply unless otherwise approved by the Engineer:

1. Ensure that the moisture content is within 1% to plus 3% of optimum.

2. Disturbed and/or places material under, or within 5 feet of, buildings, structures, and pavement/sidewalk shall be compacted to at least 95% of maximum standard Proctor density.
3. Disturbed and/or places material in all other areas shall be compacted to at least 90% maximum standard Proctor density with an allowance for necessary surface scarification to promote root growth in grassed areas.

Section 2010, 3.10 STRUCTURAL BACKFILL

Add new section 3.10 as follows:

3.10 STRUCTURAL BACKFILL

A. Do all backfilling necessary to fill all excavations resulting from the work of this section, carrying such fill to the required new subgrade.

B. Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris, insulation installed if required, and structures waterproofed and damp proofed as required. Do not deposit fill until the subgrade has been checked an approved by the Engineer. In no case shall fill be places on a subgrade that is muddy, frozen or contains frost.

C. Place and compact backfill to minimize settlement and avoid damage to walls, waterproofing, utility lines and other work in place.

D. The Contractor shall provide the necessary compaction of rolling equipment, or both, in order to obtain the specified compaction. Compaction by travel of grading equipment will not be considered adequate for uniform compaction.

E. Small vibratory or hand tamping compactors will be required wherever fill may be placed adjacent to walls or around footings and columns.

F. Any trenches dug in the compacted fill shall be backfilled firmly around the pipes in uniform layers not exceeding six inches (6”) in depth, with each layer being compacted with a small vibratory or hand tamping compactor to the same density as specified herein. It shall be the responsibility of the Contractor digging the trenches to backfill said trenches in accordance with the requirements of these specifications.

G. Place backfill simultaneously on both sides of free-standing structures. Take proper provisions to prevent wedging action against the structure.

H. Place backfill against foundation walls enclosing interior spaces, only after sufficient construction is in place to brace the top of the wall.

END OF SPECIAL PROVISIONS - DIVISION 2

END OF SECTION 31 20 00

SECTION 31 23 16.13 – TRENCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

A. REFERENCED SPECIFICATION: The work identified in the summary shall be constructed in accordance with the 2023 Edition of the Iowa Statewide Urban Standard Specifications (SUDAS). The relevant Divisions and Specifications of the SUDAS Manual covering the work are listed below in the table of contents. The entire SUDAS Manual may be viewed, downloaded, or purchased at http://www.iowasudas.org.

1. Table of Contents SUDAS Standard Specifications, 2023 Edition
   a. Division 3 Trench Excavation and Backfill
      1) Section 3010 – Trench Excavation and Backfill

1.2 SUMMARY

A. Section Includes
1. Excavating trenches for utilities from 5 feet outside building to utility service.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

1.3 SUPPLEMENTAL SPECIFICATIONS TO THE SUDAS STANDARD SPECIFICATIONS.

A. Division 1 – General Provisions and Covenants
1. Division 1 is omitted from the Specifications for this work. All references made to Division 1 – General Provisions and Covenants shall be omitted from the Specifications.

B. Division 3 Trench Excavation and Backfill
1. Section 3010 – Trench Excavation and Backfill
   a. Part 1.08 – Measurement and Payment: Delete

Section 3010, 2.01 MATERIALS EXCAVATED FROM A TRENCH

Replace Article 2.01 A.3 with the following:

3. Topsoil: Class V material. Comply with Section 3010, 2.04.

Section 3010, 2.03 BACKFILL MATERIAL

Add the following to end of Article 2.03 A:

4. Sand and Manufactured sand may only be used if approved by the Engineer.

Section 3010, 2.05 STABILIZATION (FOUNDATION) MATERIALS

Replace Article 2.05 A with the following:

A. Mechanically crushed quarried stone not screened or processed after primary crushing.
B. Nominally 2 to 5 inch average diameter.
C. Maximum 12% passing the number 200 screen.

Section 3010, 2.07 RIGID INSULATION BOARD

Add the new Article 2.07

A. 2" extruded polystyrene with minimum R value of 4.5 per inch of thickness.
B. Extruded polystyrene foam shall meet ASTM 578, Type VI, 40 psi compressing strength (ASTMD1621), 0.1% Max water absorption (ASTM C272).

Section 3010, 2.08 ENGINEERING FABRIC

Add new Article 2.08:

A. **Engineering Fabric:** Comply with the Iowa DOT Article 4196.01.

Section 3010, 3.03 TRENCH PROTECTION

Add the following to end of Article 3.03:

C. Shall be placed in accordance with OSHA 29 CRF 1926.

Section 3010, 3.04 DEWATERING

Add the following to the end of Article 3.08 D:

8. Discharged Water: If dewatering discharge is overwhelming an approved sewer, waterway or street or is causing damage in any way, the Engineer may stop the dewatering efforts or require the rate of discharge to be reduced at no additional cost to the Jurisdiction.

Section 3010, 3.05 PIPE BEDDING AND BACKFILL

Replace Article 3.05 A.2 with the following:

The trench shall not be backfilled until the pipe elevations, gradient, alignment, and joints have been checked, including any necessary testing. After pipe installation and required testing, place remaining bedding material and immediately place backfill in trench.

Add the following to the end of Article 3.05 A:

7. Engineering Fabric shall be placed at the interface between the clean bedding stone and backfill containing more than 10% material passing the number 200 screen.

Replace Article 3.05 E.3 with the following:

3. Class I and II Backfill Material:
    a. Compact to at least 95% standard proctor density within the right-of-way, under any paved surface or within two feet thereof, and within 5-ft of a building foundation. Moisture content -1% to +3% of optimum moisture content.
    b. Compact to at least 90% of standard proctor density outside of the right-of-way. Moisture content shall be within -1% to +3% of optimum.

Replace Article 3.05 E.4.c with the following:

c. Moisture content shall be within -1% to +3% of optimum.

Section 3010, Part 3 – EXECUTION

Add the following to the end of Part 3:

3.07 RIGID INSULATION BOARD

A. Insulate any water mains or water services that are less than 5'-6" below existing grade. Install the full width (4') of insulation board over the entire exposed water main or service.

B. Insulate between any water mains or water service and utility structures when pipes are less than 5'-6" from utility structure.

Section 3020, 1.03 SUBMITTALS

1.03 Submittals - Delete Reference to Division 1 and replace with the following:

All materials to be incorporated into the work must have certifications furnished which show that the materials comply with the Specifications prior to any construction

Section 3020, 2.01 CARRIER PIPE

Add the following to the end of Article 2.01 A:

6. Electrical Conduit: Comply with section 8010-2.01-B.
7. Fiber Optic Conduit: Comply with section 8010-2.01-B.

Add the following to the end of Article 2.01 B:

5. Electrical Conduit: Comply with section 8010-2.01-B.
6. Fiber Optic Conduit: Comply with section 8010-2.01-B.

Section 3020, 2.03 CASING SPACERS

Replace Article 2.03 B with the following:

B. Meet the following material requirements:

1. Stainless Steel Band/Panel and Riser: Type 304 stainless steel according to ASTM A 240.
2. Liner: Elastomeric PVC per ASTM D 149.
3. Spacer Skid/Runner: Abrasion resistant polymer with a low coefficient of friction.
4. Fasteners: Type 304 (18-8) stainless steel per ASTM A 193.

Add the following to the end of Article 2.03:

C. Shall be North American Made

D. Cascade Waterworks Mfg., or approved equivalent.

Section 3020, 3.01 EXCAVATION

Add the following to the end of Article 3.01 C:

4. Perform work within limits indicated on Contract Drawings. Contractor shall be responsible for obtaining additional construction easements or other authorizations necessary if working outside of limits.

Replace Article 3.04 C.7 with the following:

7. Close the end of the casing pipe around the carrier pipe with a casing end seal. The uncased side of the end seal shall be pushed toward the cased side of the end seal before fastening to reduce the likelihood of damage during backfill.

END OF SPECIAL PROVISIONS – DIVISION 3

END OF SECTION 31 20 00

SECTION 31 11 23 – AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

A. REFERENCED SPECIFICATION: The work identified in the summary shall be constructed in accordance with the 2023 Edition of the Iowa Statewide Urban Standard Specifications (SUDAS). The relevant Divisions and Specifications of the SUDAS Manual covering the work are listed below in the table of contents. The entire SUDAS Manual may be viewed, downloaded, or purchased at http://www.iowasudas.org.
   1. Table of Contents SUDAS Standard Specifications, 2023 Edition
      a. Division 2 Earthwork
         1) Section 2010 – Earthwork, Subgrade, and Subbase

1.2 SUMMARY

A. Section Includes
   1. Aggregate subbase.
   2. Aggregate base course.

1.3 SUPPLEMENTAL SPECIFICATIONS TO THE SUDAS STANDARD SPECIFICATIONS.

A. Division 1 – General Provisions and Covenants
   1. Division 1 is omitted from the Specifications for this work. All references made to Division 1 – General Provisions and Covenants shall be omitted from the Specifications.

B. Division 2 Earthwork
   1. Section 2010 – Earthwork, Subgrade, and Subbase
      a. Part 1.08 – Measurement and Payment: Delete

Section 2010, 3.08 SUBBASE

Item B. change to the following:

B. Construction: Construct the specified type of subbase to the specified depth, plus 2 feet outside of the pavement area, or 1 foot outside of the structural foundation area.

Section 2010, 3.09 FIELD QUALITY CONTROL

Item A. change to the following:

A. Compaction Testing: Contractor shall perform compaction testing as determined to be necessary by the Contractor for quality control. Engineer shall perform compaction testing as determined to be necessary by the Engineer at no cost to the Contractor, unless otherwise noted in the contract documents. However, Contractor shall make reasonable accommodations to allow the Engineer to perform any desired compaction testing. If deficiencies are found by the Engineer, the Contractor shall make all necessary corrections (rework and compact again) at no additional cost to the Owner.

Item B. change to the following:

B. Moisture Content and Density: The following requirements shall apply unless otherwise approved by the Engineer:

Moisture Content and Density: The Contractor shall follow the recommendations of the Geotechnical report.

Section 2010, 3.10 STRUCTURAL BACKFILL

Add new section 3.10 as follows:

3.10 STRUCTURAL BACKFILL

A. Do all backfilling necessary to fill all excavations resulting from the work of this section, carrying such fill to the required new subgrade.

B. Backfilling shall not begin until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris, insulation installed if required, and structures waterproofed and damp proofed as required. Do not deposit fill until the subgrade has been checked an approved by the Engineer. In no case shall fill be places on a subgrade that is muddy, frozen or contains frost.

C. Place and compact backfill to minimize settlement and avoid damage to walls, waterproofing, utility lines and other work in place.

D. The Contractor shall provide the necessary compaction of rolling equipment, or both, in order to obtain the specified compaction. Compaction by travel of grading equipment will not be considered adequate for uniform compaction.

E. Small vibratory or hand tamping compactors will be required wherever fill may be placed adjacent to walls or around footings and columns.

F. Any trenches dug in the compacted fill shall be backfilled firmly around the pipes in uniform layers not exceeding six inches (6”) in depth, with each layer being compacted with a small vibratory or hand tamping compactor to the same density as specified herein. It shall be the responsibility of the Contractor digging the trenches to backfill said trenches in accordance with the requirements of these specifications.

G. Place backfill simultaneously on both sides of free-standing structures. Take proper provisions to prevent wedging action against the structure.

H. Place backfill against foundation walls enclosing interior spaces, only after sufficient construction is in place to brace the top of the wall.

I. Moisture Content and Density: The Contractor shall follow the recommendations of the Geotechnical report.

END OF SPECIAL PROVISIONS - DIVISION 2

END OF SECTION 31 11 23

SECTIONS 33 00 00 - UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

A. REFERENCED SPECIFICATION: The work identified in the summary shall be constructed in accordance with the 2023 Edition of the Iowa Statewide Urban Standard Specifications (SUDAS). The relevant Divisions and Specifications of the SUDAS Manual covering the work are listed below in the table of contents. The entire SUDAS Manual may be viewed, downloaded, or purchased at http://www.iowasudas.org.

1. Table of Contents SUDAS Standard Specifications, 2023 Edition
    a. Division 3: Trench Excavation and Backfill
    b. Division 4: Sewers and Drains
    c. Division 6: Structures for Sanitary and Storm Sewers

1.2 SUMMARY

A. This Section includes storm sewers, piping, and related utility components as described on Project Drawings.

1.3 SUPPLEMENTAL SPECIFICATIONS TO THE SUDAS STANDARD SPECIFICATIONS

A. Divisions 3, 4, 5, and 6 of the IOWA STATEWIDE URBAN STANDARD SPECIFICATIONS for PUBLIC IMPROVEMENTS, 2023 EDITION and all subsequent revisions as amended below;

1. All Sections:
    a. Delete Part 1.08: MEASUREMENT AND PAYMENT.

Section 3010 - 1.03 SUBMITTALS

Add the following to the end of Article 1.03 A:

All certified granular materials, specified by gradation, must have a sieve analysis report submitted to the engineer during the submittal process. The report must be from the most recent crushing operation.

Section 3010 – 2.01 MATERIALS EXCAVATED FROM A TRENCH

Replace Article 2.01 A.3 with the following:

3.Topsoil: Class V material. Comply with Section 300, 2.04.

Section 3010, 2.03 BACKFILL MATERIAL

Add he following to the end of Article 2.03 A:

4. Sand and Manufactured sand may only be used if approved by the Engineer.

Section 3010, 2.05 STABILIZATION (FOUNDATION) MATERIALS

Replace Article 2.05 A with the following:

A. Mechanically crushed quarried stone not screened or processed after primary crushing.

B. Nominally 2 to 5 inch average diameter.

C. Maximum 12% passing the number 200 screen.

Section 3010, 2.07 RIGID INSULATION BOARD

Add new Article 2.07

A. 2” extruded polystyrene with minimum R value of 4.5 per inch of thickness.

B. Extruded polystyrene foam shall meet ASTM 578, Type VI, 40 psi compressing strength (ASTMD1621), 0.1% Max water absorption (ASTM C272).

Section 3010, 2.08 ENGINEERING FABRIC

Add new Article 2.08:

A. **Engineering Fabric**: Comply with the Iowa DOT Article 4196.01.

Section 3010, 3.03 TRENCH PROTECTION

Add the following to the end of Article 3.03:

C. Shall be placed in accordance with OSHA 29 CRF 1926.

Section 3010, 3.04 DEWATERING

Add the following to the end of Article 3.08 D:

8. Discharged Water: If dewatering discharge is overwhelming an approved sewer, waterway or street or is causing damage in any way, the Engineer may stop the dewatering efforts or require the rate of discharge to be reduced at no additional cost to the Jurisdiction.

Section 3010, 3.05 PIPE BEDDING AND BACKFILL

Replace Article 3.05 A.2 with the following:

The trench shall not be backfilled until the pipe elevations, gradient, alignment, and joints have been checked, including any necessary testing. After pipe installation and required testing, place remaining bedding material and immediately place backfill in trench.

Add the following to the end of Article 3.05 A:

7. Engineering Fabric shall be placed at the interface between the clean bedding stone and backfill containing more than 10% material passing the number 200 screen.

Replace Article 3.05 E.3 with the following:

3. Class I and II Backfill Material:

a. Compact to at least 95% standard proctor density within the right-of-way, under any paved surface or within two feet thereof, and within 5-ft of a building foundation. Moisture content -1% to +3% of optimum moisture content.

b. Compact to at least 90% of standard proctor density outside of the right-of-way. Moisture content shall be within -1% to +3% of optimum.

Replace Article 3.05 E.4.c with the following:

c. Moisture content shall be within -1% to +3% of optimum.

Section 3020, 3.01 EXCAVATION

Add the following to the end of Article 3.01 C:

4. Perform work within limits indicated on Contract Drawings. Contractor shall be responsible for obtaining additional construction easements or other authorizations necessary if working outside of limits.

Replace Article 3.04 C.7 with the following:

7. Close the end of the casing pipe around the carrier pipe with a casing end seal. The encased side of the end seal shall be pushed toward the cased side of the end seal before fastening to reduce the likelihood of damage during backfill.

SECTION 4020 – STORM SEWERS

Section 4020, 1.03 SUBMITTALS

Replace 1.03, with the following:

All materials to be incorporated into the work must have certifications furnished which show that the materials comply with the Specifications prior to any construction.

Section 4020, 2.01 STORM SEWERS

Replace 2.01, A., 3. with the following:

3. Use tongue and groove joints with rubber O-ring or profile gasket complying with ASTM C443 unless engineering fabric is specified.

Replace 2.01, B., 3. with the following:

3. Use tongue and groove joints wrapped with external joint seal, unless a rubber O-ring or profile gasket complying with ASTM C443 or engineering fabric is specified.

Replace 2.01, C., 3. with the following:

4. Use tongue and groove joints with rubber O-ring or profile gasket complying with ASTM C443 unless engineering fabric is specified.

Replace 2.01, M. with the following:

M. Bituminous Jointing Material: Use a cold-applied mastic sewer joint sealing compound recommended by the manufacturer for the intended use and approved by the Jurisdiction complying with AASHTO M198; must be used with external joint wrap.

Replace 2.01, N. with the following:

N. Engineering Fabric: Comply with Iowa DOT Materials I.M. 4196.01. Use of this material for wrapping pipe joints requires specific approval of the Engineer.

Add 2.01, P. as follows:

P. External Joint Wrap: Comply with ASTM C877.

Section 4020, 3.04 PIPE JOINTING

Replace 3.04, B., 1. with the following:

1. Comply with manufacturer's recommendations for installation of external joint wrap. Comply with Figure 4020.211 for joints wrapped with engineering fabric. Secure engineering fabric in place to prevent displacement while placing backfill material.

SECTION 4030 – PIPE CULVERTS

Section 4030, 1.03 SUBMITTALS

Replace 1.03, C. with the following:

All materials to be incorporated into the work must have certifications furnished which show that the materials comply with the Specifications prior to any construction.

SECTION 4040 – SUBDRAINGS AND FOOTING DRAIN COLLECTORS

Section 4040, 1.03 SUBMITTALS

Replace 1.03, C. with the following:

All materials to be incorporated into the work must have certifications furnished which show that the materials comply with the Specifications prior to any construction.

Section 6010, 2.01 MANHOLE AND INTAKE TYPES

Add 2.01, A as follows:

A. Allowable Manhole and Intake Types for Project:

1. Manholes and Intake Types for the Project shall be as indicated in the contract documents.
2. Refer to modified SUDAS Figures in Drawings for Project-specific modifications.

Section 6010, 2.05 PRECAST RISER JOINTS

2.05, B.2 Replace with the following:

2. **Storm Sewers:** All joint sealants used on sanitary sewers shall be used for storm sewers.

Section 6010, 2.07 BASE

2.07, A.1 Replace with the following:

1. **Circular Manhole:**
   a. Integral base and lower riser section according to ASTM C478.
   b. Minimum base thickness of 6 inches and reinforcing shall be developed into the sidewall reinforcing.
   c. If required by the contract documents, base shall extend past the exterior of the sidewall to dimension specified. Extended base and sidewall shall be poured monolithically.

Section 6010, 2.08 PIPE CONNECTIONS

2.08, A Replace with the following:

A. Flexible, Watertight Gasket: Comply with ASTM C923. Approved manufacturer A-Lok Industries and Press-Seal PSX Direct Drive Manhole connector or equal.

Section 6010, 2.10 CASTINGS (Ring, Cover, Grate, and Extensions)

2.10, C.1 Replace with the following:

1. **Manholes:** Unless otherwise noted in the contract documents, the following casting types shall be used on the Project:
   d. SW-601, A shall be used in paved areas. Casting shall be Neenah R-1642-A, or approved equivalent.
   e. SW-601, C shall be used in non-paved areas. Casting shall be Neenah R-1916-F, or approved equivalent.

Section 6010, 3.01 GENERAL REQUIREMENT FOR INTALLATION OF MANHOLES AND INTAKES

3.01, D Add the following:

3. **Storm Sewer Manhole and Intakes:** Final Rim Elevations of all catch basins, manholes, and intakes shall be verified with Engineer prior to construction.

3.01, F.2 Modify to the following:

2. **Storm Sewer Manhole and Intakes:** All joint sealants used on sanitary sewers shall be used for storm sewers.

Section 6010, 3.05 CONNECTION TO EXISTING MANHOLE OR INTAKE

Add 3.05, A.4 as follows:

4. All connections to sanitary sewer manholes shall be completed using a flexible connector. No concrete collars shall be used.

Remove 3.05, C.3 - Cut and Chipped Opening (Knock-out)

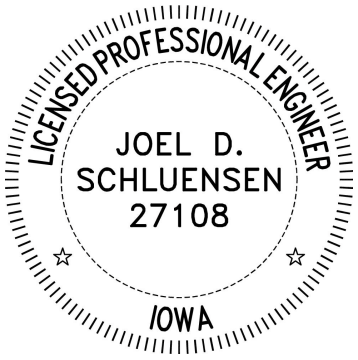
END OF SECTION 33 00 00

Field of Dreams Movie Site Professional Ballpark

Geotechnical Engineering Report

Prepared for:

RDG Planning & Design
PO BOX 259006
Madison, Wisconsin 53725



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

September 15, 2023

Joel D. Schluensen, P.E. Date

My license renewal date is December 31, 2024.

870 40th Avenue
Bettendorf, Iowa 52722
P (563) 355-0702
Terracon.com

September 15, 2023

City of Dyersville
340 1st Avenue E
Dyersville, Iowa 52040

Attn: Mr. Mick Michel, City Administrator
P: (563) 875-7724
E: mmichel@cityofdyersville.com

Re: Geotechnical Engineering Report
Field of Dreams Movie Site Professional Ballpark
28995 Lansing Road
Dyersville, Iowa
Terracon Project No. 07225161R

Dear Mr. Michel:

We have completed the scope of geotechnical engineering services for the above referenced project in general accordance with Terracon Proposal No. P07225161 dated December 9, 2022. Subsequent to issuing our previous Geotechnical Engineering Report dated March 1, 2023, RDG Planning & Design (RDG) requested information regarding support of the proposed building(s) on shallow foundations bearing on in-situ soils improved through ground improvements. This updated report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project. In addition, this report supersedes our previous report (Terracon Project No. 07225161, dated March 1, 2023) for this project.

We appreciate the opportunity to be of service to you on this project and look forward to providing the recommended testing and observation services during construction. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

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Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed improvements to the existing stadium within the Field of Dreams movie site located at 28995 Lansing Road in Dyersville, Iowa. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil and rock conditions
- Groundwater conditions
- Seismic site classification per IBC
- Site preparation and earthwork
- Foundation design and construction
- Floor slab design and construction
- Lateral earth pressures
- Pavement design and construction
- Estimated infiltration rate considerations
- Frost considerations

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Subsequent to issuing our Geotechnical Engineering Report dated March 1, 2023, RDG Planning & Design (RDG) requested information regarding support of the proposed building(s) on shallow foundations bearing on in-situ soils improved through ground improvements. This report provides recommendations regarding the support of the building with ground improvements as an alternative to deep foundations. In addition, this report supersedes our previous report (Terracon Project No. 07225161, dated March 1, 2023) for this project.

Drawings showing the site and boring locations are shown on the Site Location and Exploration Plan, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and/or as separate graphs in the Exploration Results section.

Project Description

Our understanding of the project conditions is as follows:

Item	Description
Information Provided	■ RDG provided Terracon a Request for Proposal (RFP), provided via email on November 14, 2022, for the Field of Dreams Movie Site Professional Ballpark. The RFP included information regarding the proposed structures and also a provided a site plan. ■ Conference call with RDG and Origin Design on February 16, 2023
Project Description	Improvements to the existing Field of Dreams major league baseball field will consist of increased seating capacity and more permanent structures and facilities. These improvements are further described in Proposed Structures. Improvements/reconstruction of portions of the existing natural turf field are not anticipated and were not considered in our analyses.
Proposed Structure	Structures associated with the project include: ■ Below-grade dugouts ■ Precast concrete bleacher seating ■ Team clubhouse ■ Upper concourse with concessions, restrooms, suite, and broadcast booths ■ Batter's eye, located beyond center field
Building Construction	The type of construction will be dependent on the proposed structure. This information was not provided at this time, but the type of construction is anticipated to be precast concrete, reinforced cast-in-place concrete, steel or wood framing.
Finished Floor Elevation	The following finished floor elevations were provided by RDG: ■ Level 1 (main ground level) = 997.50 feet ■ Receiving (ground level north) = 994.00 feet ■ Maintenance (ground level east) = 996.60 feet ■ Dugouts (1st base and 3rd base) = 994.17 feet ■ Batter's Eye (outfield) = 996.00 feet

Item	Description
Maximum Loads	The following anticipated structural loads were not provided. In the absence of information provided by the design team, we will use the following loads in estimating settlement based on our experience with similar projects. Precast bleacher seating: ■ Columns: 200 to 250 kips ■ Walls: 10 to 15 kips per linear foot (klf) The following anticipated structural loads were provided by RDG Team Clubhouse and Ancillary Facilities: ■ Columns: 750 kips ■ Walls: 10 kips per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf)
Maximum Loads (continued)	Scoreboard and batter's eye: ■ Axial: less than 20 kips ■ Shear: less than 10 kips ■ Moment: Less than 1,500 ft-kips
Grading	A grading plan was not provided at this time. We anticipate the majority of cuts and fills will be on the order of 5 feet or less to develop final grades.
Stormwater Detention	A stormwater detention pond will be constructed. The location and depth of this pond has not yet been determined but is anticipated to be in the vicinity of Boring 13 based on the preliminary site plan provided in the RFP.
Below-Grade Structures	Dugouts, anticipated to be approximately 2½ feet below adjacent grades. Elevator shafts will extend 4 to 5 feet below finished floor elevation for Level 1 in the Team Clubhouse Building.
Free-Standing Retaining Walls	None anticipated
Pavements	New parking lots and access roads are planned for the facility improvements. Decorative pavements/landscaping is also planned around the west and south sides of the stadium. Pavements are anticipated to be portland cement concrete. Specific information regarding the type and volume of traffic was not available at this time.

Item	Description
Pavements (continued)	The following anticipated ACI traffic categories and daily truck traffic were assumed to consist of: ■ Category A: Car parking areas and access lanes; 1 truck per day ■ Category B & C: Entrance, truck service lanes, and buses; 10 trucks per day ■ Category E: Garbage or fire truck lanes The pavement design period is 20 years.

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration.

Item	Description
Parcel Information	The project is planned within the existing Field of Dreams site, located at 28995 Lansing Road in Dyersville, Iowa. 42.4991°, -91.0589° (approximate, see Site Location)
Existing Improvements	The site currently consists of a major league baseball field Metal bleachers and other facilities installed for a previous MLB game have subsequently been removed from the site.
Current Ground Cover	Based on our field exploration, the site consists of gravel surfacing and grass in the areas of the proposed boring locations.
Existing Topography	The provided site plan indicates that elevations on the south, east, and west sides of the existing stadium are relatively level and range from elevations 993 to 996 feet. On the north side of the stadium, elevations increase from elevation 995 at the outfield wall to 1,008 feet northeast of the stadium lights. The ground surface elevation at the boring locations ranges from approximately 994 to 1007 feet.
Site History	Terracon prepared a geotechnical engineering report, Terracon Project No. 07195128, dated November 13, 2019, for the light pole foundations prior to the construction of the existing stadium.

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated on the individual logs. The individual logs can be found in the Exploration Results and the GeoModel can be found in the Figures attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	Surface	Topsoil Crushed Limestone
2	Existing Fill	Lean Clay with varying amounts of silt and sand; Poorly Graded Sand with varying amounts of clay and silt, Clayey Sand
3	Native Cohesive Soils	Lean Clay and Lean to Fat Clay with varying amounts of sand and silt
4	Native Granular Soils	Poorly Graded Sand with varying amounts of clay, silt, and gravel; Clayey Sand, Silty Sand, Silty Gravel
5	Bedrock	Limestone, moderately to highly weathered

The borings were advanced using a drilling technique that allow short term groundwater observations to be made while drilling. Groundwater seepage was encountered at depths ranging from about 5½ to 13 feet below existing grades at the time of our field exploration at some boring locations. Groundwater conditions may be different at the time of construction. Groundwater conditions may change because of seasonal variations in rainfall, runoff, and other conditions not apparent at the time of drilling. Long-term groundwater monitoring was outside the scope of services for this project. Please refer to Earthwork for recommendations addressing dewatering during construction

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard

penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil and bedrock properties observed at the site and as described on the exploration logs and results, our professional opinion is for that a Seismic Site Classification of D be considered for the project. Subsurface explorations at this site were extended to a maximum depth of 41½ feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

Geotechnical Overview

Based on the subsurface conditions encountered at the boring locations, it is our opinion that the lightly loaded proposed structures (e.g. ancillary buildings; maximum loads less than 100 kips as outlined in Project Description) can be supported using shallow foundations. At some shallow foundation locations, it should be anticipated that removal of unsuitable native soils from within the zone of influence beneath the foundation and replacement with structural fill will be required. More heavily loaded structures (e.g. precast stadium bleachers, team club house; maximum loads greater than 100 kips) should be supported on deep foundations. As an alternative to supporting these structures on deep foundations, we understand consideration may be given to supporting more heavily loaded structures on in-situ soils modified using a ground improvement system. Please refer to Shallow Foundations, Ground Improvements, and Deep Foundations for further information. We recommend that the following geotechnical considerations be addressed in the design and construction of the facility:

- Stripping Depths
- Foundation Support
- Existing Fill
- General

Stripping Depths

Topsoil was present at some of the boring locations (generally in unmodified areas) to depths of about 12 inches below current grades. Based on our experience with similar site conditions, a thicker B-horizon layer (similar in appearance to “topsoil”, but with a lower organic content) may be present within this zone at some locations across the site. In areas where grading has been previously completed, topsoil thicknesses generally ranged from 6 to 8 inches. For budgeting purposes, a stripping depth on the order of 6 inches could be used; however, greater removal depths could be required where soils containing high organic matter, such as previously unmodified (i.e. minimal to no previous grading) areas drainage swales, are present. Variations in the thickness

of topsoil/organic materials are expected across the site and could extend to greater depths in other areas of the site not explored; actual stripping depths are expected to vary across the site. Additional testing of the topsoil layer could be performed during construction to further define the organic portion of the uppermost strata. In general, soils with organic contents above 5% should be removed wherever encountered below areas to receive new fill, shallow footings, floor slabs, and pavements, particularly where they will be exposed to freezing temperatures and/or higher foundation/floor loads.

Existing Fill

Existing fill materials were encountered at most boring locations to depths of approximately 3½ to 5½ feet below existing grades. The existing fill could extend to greater depths in areas not explored. We understand that the majority of the existing fill was placed during the construction of the existing field, reportedly built to MLB standards. Based on our communication with RDG, we understand that distress has not been observed by others at the existing field to date. However, documentation regarding placement and compaction of the existing fill was not available for our review. Based on the result of our field exploration and our communication with RDG, it appears the existing fill encountered at the boring locations may have placed with some compactive effort; however, the fill varies in consistency, moisture content, and material type across the site. Structures and pavements supported over undocumented fills often do not perform predictably. Although portions of the fill have been in place for some time, without documentation of testing during placement, there is a risk of unpredictable performance and larger than normal settlements of foundations, floor slabs, and pavements supported over the undocumented fill. We recommend that documentation regarding placement and compaction of the existing fill be provided to the design team/owner to aid in the evaluation of the risk associated with undocumented existing fill.

To remove the risk associated with undocumented fill, it is our opinion that the existing undocumented fill should be removed and replaced with structural fill placed and compacted as discussed in this report. Based on the depth of existing fill and proximity to the existing improvements, removal of undocumented existing fill may not be practical. If the owner accepts the possible risk of larger than normal settlements and associated damage to floor slabs, walls supported on floor slabs, etc. and pavements in exchange for reduced construction costs, the existing fill could be left in place below the floor slabs and pavement areas. The Geotechnical Engineer should be retained to observe and test the existing fill during floor slab subgrade preparation to help identify low-density fill zones. We recommend undocumented existing fill be removed below shallow foundations and backfilled as outlined in Shallow Foundations. The on-site soils and existing fill materials encountered in our borings generally appear suitable for placement as structural fill. Please refer to Earthwork for additional details.

If unsuitable fill or native soils are encountered during construction, they must be improved, or removed and replaced with structural fill. Removal and replacement of the existing fill to a depth of 12 inches below the floor slab/pavement subgrade elevation could also be considered to possibly increase the uniformity of support beneath the floor slabs/pavements. If the owner is not willing to accept the risks discussed, then the existing fill should be removed from below the building and/or pavement areas and replaced with structural fill placed and compacted as recommended in this report. In our opinion, the Geotechnical Engineer should further evaluate the existing fill soils once the surface materials have been removed. Based on our conversations with RDG, we understand the owner is willing to accept the risks associated with support of the floor slabs and pavements on/above existing fill.

Alternatively, the building loads can be supported on deep foundations or in-situ soils modified using a ground improvement system, as discussed below and in Ground Improvements and Deep Foundations. The floor slabs could then consist of a structural slab or also be supported or in-situ soils modified using a ground improvement system. Please refer to Floor Slabs and Ground Improvements for additional details.

Foundation Support

Based on the results of our exploration and analysis, the on-site soils present at the boring locations are generally suitable for conventional shallow foundations for lightly loaded column (100 kips or less) and wall loads (4 kips per lineal foot or less) using a relatively low bearing pressure. However, moderate (e.g., bleachers) to high structural loads (greater than 100 kips and 4 kips per foot for columns and walls, respectively), are expected to result in settlements greater than 1 inch. Heavy structural loads (e.g., Team Club House), i.e., those exceeding 250 kips and 6 kips per foot for columns and walls, respectively, are recommended to be supported on deep foundations, such as auger cast-on-place piles or straight-sided drilled shafts, extending to suitable native soils and/or bedrock. Please refer to Deep Foundations for additional details.

As an alternative to supporting the proposed structure(s) on deep foundations, consideration could be given to supporting the structure(s) on in-situ soils modified using a ground improvement system such as aggregate piers or stone columns that extend through the lower strength soils into suitable underlying native soils. Please refer to Ground Improvements for further information.

General

Prior to placing any new fill and subsequent to developing final subgrades in cut areas of the site, the exposed soils should be scarified to depths of at least 9 inches, adjusted to recommended moisture contents and compacted. The subgrades should also be proofrolled

with heavy construction equipment, and any weak or unstable soils removed and replaced with new structural fill.

Underground utilities/piping supported in/above existing undocumented fill may experience larger than normal and differential settlements, which could result in damage to the utilities. A greater potential for corrosion of metal structures buried in undocumented fill is also possible.

The on-site soils are easily disturbed by construction traffic. Light weight construction equipment should be used as much as practical. Care must be taken by the contractor to reduce disturbance of the subgrade soils; however, it will likely be necessary to improve the in-place subgrade soils in some areas of the site for support of construction equipment required to construct the building and to place and compact structural fill. Subgrade support can be improved as outlined in Earthwork.

The recommendations contained in this report are based upon the results of field and laboratory testing (presented in the Exploration Results), engineering analyses, and our current understanding of the proposed project. The General Comments section provides an understanding of the report limitations.

Earthwork

Earthwork is anticipated to include demolition, clearing and grubbing, excavations, and structural fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Demolition

The proposed structures will be constructed within the footprint of former bleacher structures. We recommend existing foundations, slabs, and utilities be removed from within the proposed structure footprint(s) and at least 5 feet beyond the outer edge of foundations/floor slabs.

For areas outside the proposed structure footprints and foundation bearing zones, existing foundations, floor slabs, and utilities should be removed where they conflict with proposed utilities and pavements. In such cases, existing foundations, floor slabs, and utilities should be removed to a depth of at least 2 feet below the affected utility or design pavement subgrade elevation.

Site Preparation

Prior to placing fill, existing vegetation, topsoil, and root mats should be removed. Stripping of the topsoil should be performed in the proposed building and parking/driveway areas as discussed in Geotechnical Overview.

Subgrade Preparation

Existing fill, and any loose, soft or otherwise unsuitable soils present within the proposed construction areas should be stripped as discussed in Geotechnical Overview.

After removing the unsuitable materials as discussed above and in Geotechnical Overview, but before placing structural fill, the exposed soils should be observed and tested by the Geotechnical Engineer. Depending upon the conditions encountered, it may be necessary scarify and compact the subgrade as recommended in this report. Scarification/compaction and/or densification of subgrade soils will help provide a firmer base for the compaction of new fill sections and help delineate soft or disturbed materials that may exist at shallow depths below grade.

Low strength subgrade soils, which cannot be satisfactorily compacted in place, could be encountered and will require improvement. Subgrade improvement methods will depend upon on factors including the time of year improvements are needed, the final use of the subgrade, soil type, subsurface water levels, weather conditions, the proposed grading plan, the construction schedule and methods of construction that will be used. Typical alternatives for improving subgrades include the following:

- Scarification and Compaction – Soils can be scarified, moisture condition (i.e., dried or wetted), and compacted. The success of this procedure depends primarily on favorable weather and sufficient time to manipulate the soils. Even with adequate time and favorable weather, stable subgrades may not be achieved if the thickness of the unstable material is greater than about 1 to 1½ feet.
- Undercut and Replacement with Crushed Stone/Aggregate – The use of crushed stone (similar to Iowa Department of Transportation (IaDOT) Modified Subbase Section 4123 Gradation 14), crushed concrete, and/or gravel could be given consideration for this project to improve subgrade stability. To limit depths of potential undercuts, the use of a geogrid could also be considered after underground work, such as utility construction, is completed. The specifications of the reinforcement product manufacturer should be verified prior to material purchase/delivery and placement at the site.
- Chemical Treatment – Unstable or high moisture content clay soils could be chemically treated with hydrated lime, fly ash or portland cement. Chemical treatment should be performed by a pre-qualified contractor having experience with successfully stabilizing subgrades on similar sized projects with similar soil

conditions. The use of chemical agents can impact the operation of adjacent facilities (e.g., wind-blown dust), and this should be considered by the designer and contractor. The Geotechnical Engineer should be notified prior to selection of a chemical stabilization agent to allow time for a review the material's source and chemical constituents data sheet. For estimating purposes, the incorporation rates for either hydrated lime or portland cement are typically 4 to 6 percent (on a dry soil unit rate basis), and about 14 to 16 percent for Class C fly ash. Additional testing could include, but not be limited to, determining the most suitable stabilizing agent, the optimum amounts required, the potential for sulfate induced heave, and freeze-thaw durability of the subgrade. We have observed problems on sites where dust from stabilization operations has migrated off-site and caused problems with building ventilation systems, paint on vehicles in parking lots, etc.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within 10 feet of structures, pavements or constructed slopes. General fill is material used to achieve grade outside of these areas.

Reuse of On-Site Soil: Excavated on-site soil, including the existing fill, may be selectively reused as fill for the project. Portions of the on-site soil will be sensitive to moisture conditions (particularly during seasonally wet periods) and may not be suitable for reuse when above optimum moisture content.

Material property requirements for on-site soil for use as general fill and structural fill are noted in the table below:

Property	Structural Fill	General Fill
Composition	Free of deleterious material	Free of deleterious material
Maximum particle size	3 inches	6 inches (or 2/3 of the lift thickness)
Plasticity	Maximum liquid limit of 45 Maximum plasticity index of 20	Not limited
GeoModel Layer Expected to be Suitable[1]	2, 3, 4	2, 3, 4

1. Based on subsurface exploration. Actual material suitability should be determined in the field at time of construction.

Imported Fill Materials: We understand consideration is being given to utilizing a nearby area for borrow material. Based on our experience at the Field of Dreams site

and in the vicinity of the project, suitable borrow material is anticipated at/near the site. Suitability and quantity of the in-situ materials should be evaluated by the Contractor and Civil Engineer prior to commencement of construction. Imported fill materials should meet the following material property requirements. Regardless of its source, compacted fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade.

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Low Plasticity Cohesive	CL, CL-ML ML, SM, SC	Maximum liquid limit of 45 Maximum plasticity index of 20
Granular	GW, GP, GM, GC, SW, SP, SM, SC	Maximum particle size of 3 inches

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site. Additional geotechnical consultation should be provided prior to use of uniformly graded gravel on the site.

Fill Placement and Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as structural fill
Minimum Compaction Requirements [1,2]	98% of max. below foundations and within 1 foot of finished pavement subgrade 95% of max. above foundations, below floor slabs, and more than 1 foot below finished pavement subgrade	92% of max.
Water Content Range [1]	Low plasticity cohesive: -2% to +3% of optimum Granular: -3% to +3% of optimum	As required to achieve min. compaction requirements

1. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).
2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D 4253 and D 4254). Materials not amenable to density testing should be placed and compacted to a stable condition observed by the Geotechnical Engineer or representative.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the building or connect to the stormwater system at the site.

Exposed ground should be sloped and maintained at a minimum 5% away from the building for at least 10 feet beyond the perimeter of the building. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of grade-supported improvements such as floor slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

During construction groundwater could be present in excavations. In our opinion groundwater should be kept at last 2 feet below the excavation bottom during

construction. Any water that collects in excavations should be removed prior to placement of foundation concrete or structural fill. Although the contractor is responsible for the means and methods to dewater excavations, in our opinion, water that accumulates in excavations extending into clay soils, that is due to direct precipitation and runoff, could possibly be removed using sump pits and pumps. A greater dewatering effort could be required for excavations extending below the water table.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/ precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, as well as proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 5,000 square feet of compacted fill in the building areas and 10,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 150 linear feet of compacted utility trench backfill and a minimum of one test performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

Based on the results of our exploration and analysis, the shallow soils present at the boring locations are generally suitable for supporting lightly loaded column (100 kips or less) or wall loads (4 kips per lineal foot or less) and using a relatively low bearing pressure using shallow footing foundations. To reduce post construction settlements in areas of high loads, the use of deep foundations should be considered for support of heavily loaded structures as discussed in Geotechnical Overview. However, structural load exceeding 100 kips and 4 kips per foot for column and wall loads, respectively, are generally expected to be supported on Deep Foundations.

As an alternative to the use of deep foundations, the structure could be supported on soils modified using ground improvement methods to improve the on-site soils and stabilize the subgrade soils. Design recommendations and construction considerations for shallow foundations supported on approved native soils or structural fill are presented in the following sections. Considerations for support of structures supported on soils modified through ground improvement are presented in the Ground Improvement section.

If the site has been prepared in accordance with the requirements noted in Earthwork, the following design parameters are applicable for shallow foundations.

Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure [1, 2]	1. 2,000 psf – Foundations supporting lightly loaded column or wall loads 2. 3,000 to 6,000 psf – Foundations supporting heavily loaded columns or walls bearing on soils modified using ground improvements; determined by designer[3]

Item	Description
Required Bearing Stratum [4]	1. GeoModel Layer 3 or structural fill extending to suitable native soils 2. Soil improvement system; determined by designer[3]
Minimum Foundation Dimensions	Per IBC 1809.7
Ultimate Passive Resistance [5] (equivalent fluid pressures)	See Lateral Earth Pressures
Sliding Resistance [6]	See Lateral Earth Pressures
Minimum Embedment below Finished Grade [7]	Exterior footings in unheated areas: 54 inches Exterior footings in heated areas: 42 inches Interior footings in heated areas: 36 inches
Estimated Total Settlement from Structural Loads [2]	■ Scoreboard and Batter's Eye: Less than about 1 inch [8] ■ Precast Bleacher Seating: On the order of 1½ to 2 inches [9]
Estimated Differential Settlement [2, 10]	About ¼ to ¾ of total settlement

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2. Values provided are for maximum loads noted in Project Description. Additional geotechnical consultation will be necessary if higher loads are anticipated.
3. The design bearing pressure and resulting load settlement relationship will be determined by the ground improvement designer/installer.
4. Unsuitable or soft soils should be overexcavated and replaced per the recommendations presented in Earthwork.
5. Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted structural fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
6. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance for granular materials is dependent on the bearing pressure which may vary due to load combinations. For fine-grained materials, lateral resistance using cohesion should not exceed ½ the dead load.
7. Embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure.
8. Based on a maximum isolated spread footing width of 5 feet.
9. Based on a maximum isolated spread footing width of 12 feet.
10. Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Design Parameters – Overturning and Uplift Loads

Shallow foundations subjected to overturning loads, such as for the proposed scoreboard, should be proportioned such that the resultant eccentricity is maintained in the center-third of the foundation (e.g., e < b/6, where b is the foundation width). This requirement is intended to keep the entire foundation area in compression during the extreme lateral/overturning load event. Foundation oversizing may be required to satisfy this condition.

Uplift resistance of spread footings can be developed from the effective weight of the footing and the overlying soils with consideration to the IBC basic load combinations.

Item	Description
Soil Moist Unit Weight	110 pcf
Soil Effective Unit Weight[1]	50 pcf
Soil weight included in uplift resistance	Soil included within the prism extending up from the top perimeter of the footing at an angle of 20 degrees from vertical to ground surface

1. Effective (or buoyant) unit weight should be used for soil above the foundation level and below a water level. The high groundwater level should be used in uplift design as applicable.

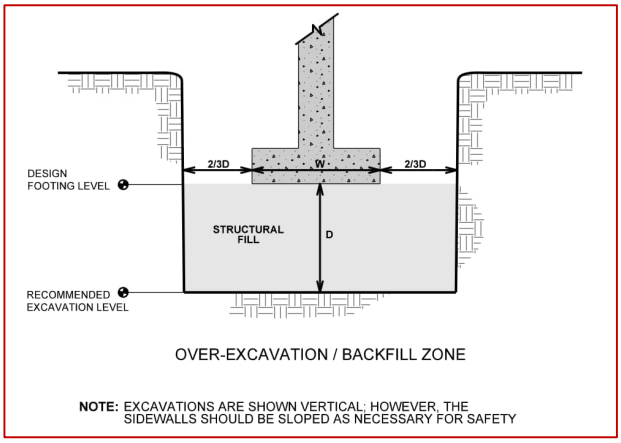
Foundation Construction Considerations

As noted in Earthwork, the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Sensitive soils exposed at the surface of footing excavations may require surficial compaction with hand-held dynamic compaction equipment prior to placing structural fill, steel, and/or concrete. Should surficial compaction not be adequate, construction of a working surface consisting of either crushed stone or a lean concrete mud mat may be required prior to the placement of reinforcing steel and construction of foundations.

If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on structural fill backfill placed in the excavations. Overexcavation for structural fill placement below footings should be

conducted as shown below. The overexcavation should be backfilled up to the footing base elevation, with crushed limestone placed, as recommended in the Earthwork section.



Ground Improvement

As an alternative to supporting a structure on deep foundations or removing and replacing undocumented fill as discussed in Geotechnical Overview, foundations and potentially floor slabs could be supported on lower strength/lower density native soils and/or undocumented fill if ground improvement methods are utilized. Ground improvement methods are proprietary systems designed by licensed contractors who could provide further information regarding support options.

A possible ground improvement alternative that may allow more efficient shallow foundation support (i.e. higher allowable bearing pressures and/or lower estimated settlement) includes the installation of aggregate piers. An aggregate pier consists of a stone-filled column constructed by excavating a cylindrical hole and backfilling it with crushed stone placed in lifts and applying a high degree of compactive effort resulting in stone-filled piers. The aggregate pier construction process not only results in a rigid stone-filled column that lends support to structures, it also helps to densify the soils surrounding the pier. Aggregate pier foundations are a proprietary product and, if considered, should be designed and installed by a specialty contractor. Therefore, we recommend that a performance specification be used for this system.

We understand if aggregate pier foundations are utilized, the aggregate pier design firm will be the Geotechnical Engineer of record for these foundations. As such, the design firm would provide the necessary design parameters for the planned foundation system including, but not limited to, allowable bearing capacity, settlement estimates and foundation-specific earthwork recommendations.

Deep Foundations

Based on the subsurface conditions encountered at the boring locations, it is our opinion that auger cast-in-place (ACIP) piles or straight-sided drilled shafts could be used for support of the proposed structures as an alternative to shallow foundations. Design information is provided in the following sections of this report. As an alternative to deep foundations, we understand consideration is being given to supporting the building with ground improvements as discussed in Geotechnical Overview.

Design Parameters

Soil design parameters are provided below in the Design Summary tables for the design of drilled shaft and/or (ACIP) foundations. The values presented for allowable side friction and end bearing include a factor of safety of 2 and 3, respectively. Bedrock was encountered within the planned boring depths at Borings 9, 10, 11, and 12. Bedrock was not encountered within the planned boring depths at the remaining locations.

Design Summary – No Bedrock[1, 2]

Depth (feet)	Stratigraphy [3]		Allowable Skin Friction (psf) [4, 5]	Allowable End Bearing Pressure (psf) [5, 6]
	GeoModel Layer No.	Material		
4½	2	Frost Zone	---	---
8	3	Lean Clay	400	---
12	3	Lean Clay	200	2,000
23	4	Poorly Graded Sand	500 to 650	2,000
33	4	Poorly Graded Sand	650 to 750	5,000
40	4	Poorly Graded Sand	750 to 800	5,000

1. Based on conditions encountered at Borings 1 to 8.
2. Design capacities are dependent upon the method of installation and quality control parameters. The values provided are estimates and should be verified when installation protocol have been finalized.
3. See subsurface profile in Geotechnical Characterization for more details on stratigraphy.
4. Applicable for compressive loading only. Reduce to 2/3 of values shown for uplift loading. The effective weight of the shaft can be added to uplift load resistance to the extent permitted by IBC.
5. Considers a water table 5 feet below existing grades or deeper.

6. Shafts/piles should extend at least one diameter into the bearing stratum for end bearing to be considered.

Design Summary – With Bedrock[1, 2]

Depth (feet)	Stratigraphy [3]		Allowable Skin Friction (psf) [4, 5]	Allowable End Bearing Pressure (psf) [5, 6]
	GeoModel Layer No.	Material		
4½	2	Frost Zone	---	---
6	3	Lean Clay	400	---
12½	4	Poorly Graded Sand	350 to 500	1,500
21½	4	Silty Gravel	500 to 600	2,000
41½	5	Limestone	600 to 1,000	30,000 [7]

1. Based on conditions encountered at Borings 9 to 12.
2. Design capacities are dependent upon the method of installation and quality control parameters. The values provided are estimates and should be verified when installation protocol have been finalized.
3. See subsurface profile in Geotechnical Characterization for more details on stratigraphy.
4. Applicable for compressive loading only. Reduce to 2/3 of values shown for uplift loading. The effective weight of the shaft/pile can be added to uplift load resistance to the extent permitted by IBC. Uplift resistance in un-reinforced portions of ACIP foundations should be ignored.
5. Shafts/piles should extend at least one diameter into the bearing stratum for end bearing to be considered.
6. Considers a water table 5 feet below existing grades or deeper.
7. Considers drilled shafts will extend into bedrock with at least a “fair” RQD rating; encountered at an approximate depth of 25 feet at Borings 10 and 12.

Shafts/piles should be adequately reinforced as designed by the Structural Engineer for both tension and shear to sufficient depths. Buoyant unit weights of the soil and concrete should be used in the calculations below the highest anticipated groundwater elevation.

Foundations should have a minimum (center-to-center) spacing of three diameters. Closer spacing may require a reduction in axial load capacity. Axial capacity reduction can be determined by comparing the allowable axial capacity determined from the sum of individual piles in a group versus the capacity calculated using the perimeter and base of the pile group acting as a unit. The lesser of the two capacities should be used in design.

A minimum shaft diameter of 30 inches should be used. Drilled shafts should have a minimum length of 12 feet and should extend into the bearing strata at least one shaft/pile/bell diameter for the allowable end-bearing pressures listed in the above table. Additional embedment would be required where the bedrock is more highly weathered (e.g. at Boring 10).

Post-construction settlements of drilled shafts and/or ACIP designed and constructed as described in this report are estimated to range from about ½ to 1 inch. Differential settlement between individual shafts is expected to be ½ to ⅔ of the total settlement.

Lateral Loading

The following table lists input values for use in LPILE analyses. Modern versions of LPILE provide estimated default values of k_h and E_{50} based on strength and are recommended for the project. Since deflection or a service limit criterion will most likely control lateral capacity design, no safety/resistance factor is included with the parameters.

Design Summary – No Bedrock

Stratigraphy[1]		L-Pile Soil Model	S_u (psf)[2]	ϕ[2]	γ' (pcf)[2, 3]	ε_{50}	K (pci)	
Depth	GeoModel Layer No.						Static	Cyclic
4½	2	Stiff Clay w/o Free Water	50	---	120	Soil Parameters should be ignored due to the effects of frost		
8	3	Stiff Clay w/o Free Water	1,200	---	60	Use Default Value		
12	3	Stiff Clay w/o Free Water	600	---	55	Use Default Value		
23	3	Sand (Reese)	---	28	55	Use Default Value		
33	3	Sand (Reese)	---	30	55	Use Default Value		
40	3	Sand (Reese)	---	31	55	Use Default Value		

1. See Subsurface Profile in Geotechnical Characterization for more details on Stratigraphy.
2. Definition of Terms:
   S_u: Undrained shear strength
   ϕ: Internal friction angle
   γ': Effective unit weight
3. Considers a water table 5 feet below existing grades or deeper.

Design Summary – With Bedrock

Stratigraphy[1]		L-Pile Soil Model	S_u (psf)[2]	ϕ[2]	γ' (pcf)[2, 3]	ε_{50}	K (pci)	
Depth	GeoModel Layer						Static	Cyclic
4½	2	Stiff Clay w/o Free Water	50	---	120	Soil Parameters should be ignored due to the effects of frost		
6	3	Stiff Clay w/o Free Water	1,200	---	55	Use Default Value		
12½	3	Sand (Reese)	---	27	60	Use Default Value		
21½	3	Sand (Reese)	---	28	60	Use Default Value		
41½	5	Weak Rock (Reese)	---	---	90	Use Default Value		

1. See Subsurface Profile in Geotechnical Characterization for more details on Stratigraphy.
2. Definition of Terms:
   S_u: Undrained shear strength
   ϕ: Internal friction angle
   γ': Effective unit weight
3. Considers a water table 5 feet below existing grades or deeper.

Group action for lateral resistance of piles/shafts should be considered when spacing is less than six diameters (center to center). Group effects can be roughly estimated with the design parameters for allowable passive resistance in the direction of the load reduced in accordance with the table below; p-y multipliers can also be used in LPILE as a rough estimate for group load behavior. We can provide guidance for p-y multipliers if detailed analyses using LPILE are planned.

Pile/Shaft Spacing [1]	Reduction Factors
6D	1.0
4D	0.85
3D	0.65

1. Where D is the diameter of the shaft

The shafts/piles should be spaced at least three shaft diameters apart (center-to-center) if they will be used to resist lateral loads. Pile caps and/or grade beams could be subject to uplift loading due to frost action; thus, perimeter foundation elements beneath exterior and interior foundations for heated areas should extend at least 3½ and 3 feet, respectively below the lowest adjacent finished grade for frost protection.

The load capacities provided herein are based on the stresses induced in the supporting soil strata. The structural capacity of the shafts/piles should be checked to assure they can safely accommodate the combined stresses induced by axial and lateral forces. Lateral deflections of shafts/piles should be evaluated using an appropriate analysis method, and will depend upon the pile's diameter, length, configuration, stiffness and "fixed head" or "free head" condition. We can provide additional analyses and estimates of lateral deflections for specific loading conditions upon request. The load-carrying capacity of shafts/piles may be improved by increasing the diameter and possibly the length.

Drilled Shaft Construction Considerations

The drilling contractor should be experienced in the subsurface conditions observed at the site, and the excavations should be performed with equipment capable of providing a clean bearing surface. The drilled straight-shaft foundation system should be installed in general accordance with the procedures presented in "Standard Specification for the Construction of Drilled Piers", ACI Publication No. 336.1-01.

Shallow water and sand soils were encountered at the borings. Subsurface water levels are influenced by seasonal and climatic conditions, which result in fluctuations in subsurface water elevations. Additionally, it is common for water to be present after periods of significant rainfall. Casing or slurry drilling procedures should be anticipated to reduce the potential for excavation sidewall collapse.

The drilling contractor should remove all soft and disturbed soils from the base of the drilled pier prior to placing concrete. The drilled shaft installation process should be performed under the observation of the Geotechnical Engineer. The Geotechnical Engineer should document the shaft installation process including soil/rock and groundwater conditions observed, consistency with expected conditions, and details of the installed shaft.

A full-depth temporary steel casing should be anticipated to shore the sides of the shaft excavations in the overburden. Difficult drilling conditions should be expected within both the sand and gravel layers above the bedrock and in the weathered bedrock, and the potential for hard bedrock drilling conditions should also be anticipated. If casing is removed during concrete placement, care should be exercised to maintain concrete inside the casing at a sufficient level to resist earth and hydrostatic pressures present on a casing exterior. Water or loose soil should be removed from the bottom of the drilled shafts prior to placement of the concrete.

Use of a telescoping casing arrangement can be considered to avoid handling long casing lengths. The lower casing should be of sufficient length and stiffness and have an appropriate cutting edge to allow it to be firmly seated into the bedrock to seal out

groundwater. If possible, excess water should be evacuated from the casing to place concrete in the "dry."

Care should be taken to not disturb the sides and bottom of the excavation during construction. The bottom of the shaft excavation should be free of loose material before concrete placement. Concrete should be placed as soon as possible after the foundation excavation is completed, to reduce potential disturbance of the bearing surface.

While withdrawing casing, care should be exercised to maintain concrete inside the casing at a sufficient level to resist earth and hydrostatic pressures acting on the casing exterior. Arching of the concrete, loss of seal and other problems can occur during casing removal and result in contamination of the drilled shaft. These conditions should be considered during the design and construction phases. Placement of loose soil backfill should not be permitted around the casing prior to removal.

The drilled shaft installation process should be performed under the observation of the Geotechnical Engineer. The Geotechnical Engineer should document the shaft installation process including soil/rock and groundwater conditions observed, consistency with expected conditions, and details of the installed shaft.

ACIP Pile Construction Considerations

Installation of adjacent piles with a clear distance spacing of less than ten pile diameters should be delayed until grout in the initial pile has set to avoid possible grout intrusion between the piles which could jeopardize pile integrity.

Proper ACIP pile installation is highly operator-dependent and requires a greater than average dependence on quality workmanship and quality control monitoring. In addition, the successful ACIP pile completion largely depends on the equipment and installation procedures. The auger should be withdrawn in a controlled manner and a sufficient head of grout should always be maintained in the augers to prevent necking of fluid grout due to hydrostatic pressures.

If practical drilling refusal is experienced above the planned termination depth, then a boulder or other obstruction may be present, and a replacement pile should be installed. The situation should be evaluated by the Geotechnical Engineer and the Structural Engineer during the pile driving operations. Continued "hard" drilling to attempt to extend through an obstruction should not be performed due to the possibility of excessive soil removal.

The ACIP pile installation process should be performed under observation of the Geotechnical Engineer. The Geotechnical Engineer should document the pile installation process including soil/rock and groundwater conditions observed, consistency with expected conditions, and details of the installed pile.

Floor Slabs

Settlement of floor slabs supported on existing fill materials cannot be accurately predicted but could be larger than normal and result in some cracking. Any unsuitable subgrade materials observed during construction should be overexcavated and replaced with new structural fill. The recommendations provided in the following sections are based on supporting the floor slab over a portion of the existing fill, and the owner accepting the risk of larger than normal settlements and damage in exchange for reduced construction costs. Mitigation measures, as noted in Existing Fill within Earthwork, are critical to the performance of floor slabs. To help control cracking, frequent joints in the floor slab are recommended. For additional recommendations, refer to the ACI Design Manual. A higher than normal percentage of steel reinforcement should be considered in the floor slab to provide additional strength and help control crack displacement. A high modulus geogrid placed between the subgrade and base course could also be considered to improve the degree and uniformity of subgrade support, however, all below-grade construction should be completed before the geogrid is placed.

Design parameters for floor slabs assume the requirements for Earthwork have been followed. Specific attention should be given to positive drainage away from each structure and positive drainage of the aggregate base beneath the floor slab.

If a structural slab is planned for the Team Clubhouse structure, as discussed in Geotechnical Overview, the building slab will not rely on the subgrade for support. The recommendations provided in Earthwork should be followed to provide a working platform during construction. Placement of an approximately 6-inch-thick layer of base course material as outlined in the following table could be considered to provide a capillary break below the slab. As an alternative to removal and replacement of undocumented fill or use of a structural slab, consideration could be given to supporting the floor slab on in-situ soil modified using a ground improvement system such as aggregate piers or other specialty systems. Please refer to Ground Improvement for additional information.

Floor Slab Design Parameters

Item	Description
Floor Slab Support[1]	Use 6 inches base course meeting material specifications of ACI 302 Subgrade compacted to recommendations in Earthwork
Estimated Modulus of Subgrade Reaction [2]	100 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in Earthwork, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, when the project includes humidity-controlled areas, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut contraction joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations, refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

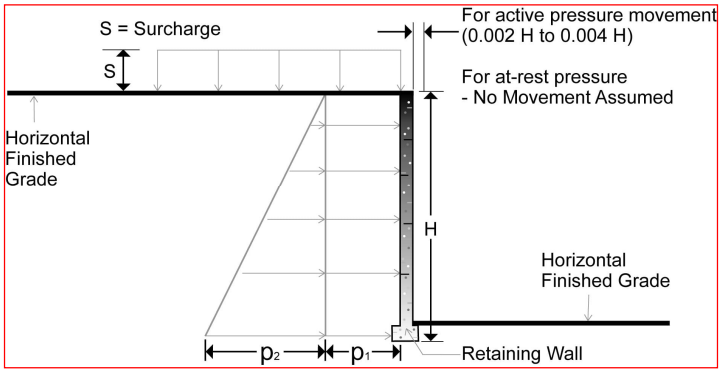
Finished subgrade, within and for at least 10 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should observe the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

Lateral Earth Pressures

Design Parameters

Structures with unbalanced backfill levels on opposite sides, such as the team dugouts, should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction, and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The “at-rest” condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Lateral Earth Pressure Design Parameters

Earth Pressure Condition [1]	Coefficient for Backfill Type [2]	Surcharge Pressure [3] p_1 (psf)	Equivalent Fluid Pressures (psf) [2,4]	
			Unsaturated [5]	Submerged [5]
Active (Ka)	Granular - 0.33 Fine Grained - 0.42	(0.33)S (0.42)S	(40)H (50)H	(80)H (85)H
At-Rest (Ko)	Granular - 0.50 Fine Grained - 0.59	(0.50)S (0.59)S	(60)H (70)H	(90)H (95)H
Passive (Kp)	Granular – 3.0 Fine Grained – 2.4	--- ---	(360)H (285)H	(240)H (200)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth

pressure, wall must move horizontally to mobilize resistance. Fat clay or other expansive soils should not be used as backfill behind the wall.

2. Uniform, horizontal backfill, with a maximum unit weight of 120 pcf and a friction angle of 24 and 30 degrees for fine grained and granular, respectively.
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included.
5. To achieve “Unsaturated” conditions, follow guidelines in Subsurface Drainage for Below-Grade Walls below. “Submerged” conditions are recommended when drainage behind walls is not incorporated into the design.

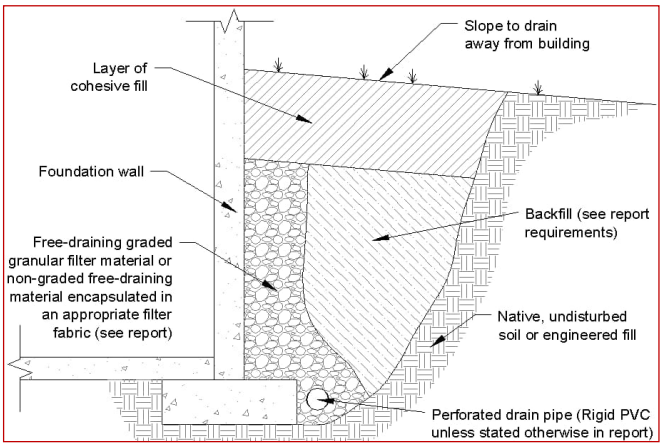
Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 30, 45, and 60 degrees from vertical for the at-rest, active, and passive cases, respectively. To calculate the resistance to sliding, a value of 0.3 should be used as the ultimate coefficient of friction between the footing and the underlying soil.

Footings, floor slabs or other loads bearing on backfill behind walls may have a significant influence on the lateral earth pressure. Placing footings within wall backfill and in the zone of active soil influence on the wall should be avoided unless structural analyses indicate the wall can safely withstand the increased pressure.

The lateral earth pressure recommendations given in this section are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever, or gravity type concrete walls. These recommendations are not applicable to the design of modular block - geogrid reinforced backfill walls (also termed MSE walls). Recommendations covering these types of wall systems are beyond the scope of services for this assignment. However, we would be pleased to develop a proposal for evaluation and design of such wall systems upon request.

Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls, below adjacent grade, is recommended to prevent hydrostatic loading on the walls, as indicated in the following figure. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 5% passing the No. 200 sieve, such as No. 57 aggregate. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 2 feet of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system.



As an alternative to free-draining granular fill, a prefabricated drainage structure may be used. A prefabricated drainage structure is a plastic drainage core or mesh which is covered with filter fabric to prevent soil intrusion and is fastened to the wall prior to placing backfill.

Pavements

Support of pavements on/above existing fill is discussed in this section. Even with the construction observation/testing recommended in this report, a risk remains for the owner that unsuitable materials within or buried by the fill will not be discovered. This may result in larger than normal settlement and damage to the overlying pavements, requiring additional maintenance. The recommendations presented in the following sections consider the owner is willing to accept the risks associated with supporting the pavements on/above existing fill in exchange for reduced construction costs. This risk can be reduced (but not eliminated) by thorough observation and testing as discussed herein. RDG should consider the following recommendations in the design and layout of pavements.

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in Project Description and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the Earthwork section.

Pavement Design Parameters

A modulus of subgrade reaction of 100 pci was used for the estimated portland cement concrete (PCC) pavement thicknesses. The value was empirically derived based upon our

experience with the sandy cohesive subgrade soils and our expectation of the quality of the subgrade as prescribed by the Site Preparation conditions as outlined in Earthwork.

Pavement Section Thicknesses

The following table provides our estimated minimum thickness of PCC pavements.

Portland Cement Concrete Design

Layer	Thickness (inches)		
	Traffic Category A [1]	Traffic Category B & C [1]	Traffic Category E [1]
PCC [2]	5	6	6½
Aggregate Base	4	4	4

1. See Project Description for more specifics regarding traffic classifications.
2. All materials should meet the current IaDOT requirements.

Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles.

Although not required for structural support, a minimum 4-inch thick base course layer is recommended to help reduce potential for slab curl, shrinkage cracking, and subgrade pumping through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer. PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with ACI 330 and ACI 325.

Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its “green” state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. Islands with raised concrete curbs, irrigated foliage, and low permeability near-surface

soils are particular areas of concern. The civil design for the pavements with these conditions should include features to restrict or collect and discharge excess water from the islands. Examples of features are edge drains connected to the stormwater collection system, longitudinal subdrains, or other suitable outlets and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Based on the possibility of shallow and/or perched groundwater, we recommend installing a pavement subdrain system to control groundwater, improve stability, and improve long-term pavement performance.

Due to frost-susceptible soils near the ground surface and the possibility of perched groundwater, consideration should be given to installing a pavement subdrain system to control subgrade moisture, improve stability, and improve long-term pavement performance.

We recommend at least 4 inches of free-draining granular material be placed beneath the pavements. The use of a free draining granular base will also reduce the potential for frost action. We recommend pavement subgrades be crowned at least 2% to promote the flow of water towards the subdrains, and to reduce the potential for ponding of water on the subgrade. The design recommendations for the subdrains are provided in the following table:

Subdrain Design Recommendations

Item	Value
Free Draining Granular Base Thickness below Pavement	A minimum of 4 inches of material meeting the specifications for IaDOT granular subbase (Section 4121), modified subbase (Section 4123), or special backfill (Section 4132).
Minimum Drainpipe Diameter	4 inches
Drain Trench Width	16 inches or greater to provide minimum 6-inch annulus of drainage aggregate around drainpipe.

Subdrain Design Recommendations

Item	Value
Invert Depth below Subgrade Elevation	3½ feet
Drainpipe Spacing	50 to 60 feet on-center
Subdrain Trench Backfill Material	■ IaDOT porous backfill (Section 4131), or ■ Free-draining coarse-grained material encapsulated with a non-woven geotextile filter fabric (Contech C60NW or equivalent)

The subdrains should be hydraulically connected to the free-draining granular base layer. Subdrains should be sloped to provide positive gravity drainage to reliable discharge points such as the stormwater detention basin. Periodic maintenance of subdrains is required for long-term proper performance.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic upkeep should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Pavement care consists of both localized (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Additional engineering consultation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.

- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

Estimated Infiltration Rates

Using the information obtained from the grain size analyses performed (see Exploration Results), the soil samples tested were classified in accordance with the USCS system and the USDA textural system. These classification systems differ slightly based on the particle size range for sand, silt and clay, and how the gravel size and other over-sized particles are incorporated in the sample. Based on the USDA textural classification, the approximate design infiltration rate was obtained from the Iowa Stormwater Management Manual (ISMM), Section 2E-7 Soils Testing Requirements for Infiltration Practices. The estimated design infiltration rates provided in the ISMM are as follows:

Soil Textural Classification	Design Infiltration Rate (inches/hour) [1]
Coarse sand or coarser	3.6
Loamy coarse sand	3.6
Sand	3.6
Loamy sand	1.6
Sandy loam	0.5
Loam	0.24
Silt loam	0.13
Sandy clay loam	0.11
Clay loam	0.09
Silty clay loam	0.06[2]
Sandy clay	0.05
Silty clay	0.04
Clay	0.02

1. Infiltration rates represent the lowest value for each textural class presented in Table 2 of Rawls [3], 1998
2. Infiltration rate is an average based on Rawls [4], 1982
3. Rawls, W.J., D. Gimenez, and R. Grossman. Use of Soil Texture, Bulk Density, and Slope of Water Retention Curve to Predict Saturated Hydraulic Conductivity. 1998. Transactions of the ASAE. Vol. 41(4):983-988
4. Rawls, W.J., D.L Brakensiek, and K.E. Saxton, K. E. Estimation of Water Properties.1982, Transactions of ASAE. Vol 25 (5):1316-1320 &1328

Frost Considerations

The soils on this site are frost susceptible, and small amounts of water can affect the performance of the slabs on-grade, sidewalks, and pavements. Exterior slabs should be anticipated to heave during winter months. If frost action needs to be eliminated in critical areas, we recommend the use of non-frost susceptible (NFS) fill or structural slabs (for instance, structural stoops in front of building doors). Placement of NFS material in large areas may not be feasible; however, the following recommendations are provided to help reduce potential frost heave:

- Provide surface drainage away from the building and slabs, and toward the site drainage system.
- Install drains around the perimeter of the building, stoops, below exterior slabs and pavements, and connect them to the site drainage system.
- Grade clayey subgrades so groundwater potentially perched in overlying fill or aggregate base, slope toward a site drainage system.
- Place NFS fill as backfill beneath slabs and pavements critical to the project.
- Place a 3 horizontal to 1 vertical (3H:1V) transition zone between NFS fill and other soils.
- Place NFS materials in critical sidewalk areas.

As an alternative to extending NFS fill to the full frost depth, consideration can be made to placing extruded polystyrene or cellular concrete under a buffer of at least 2 feet of NFS material.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. We recommended that Terracon be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Support of the floor slab and pavements above existing undocumented fill is discussed in this report. Even with the construction observation/testing recommended in this report, a risk remains for the owner and/or RDG that unsuitable materials within or buried by the fill will not be discovered. This may result in a larger than normal settlement of the

floor slab and pavements supported above existing fill. This risk cannot be eliminated without removing and replacing the existing fill with structural fill from below the addition's area. Terracon does not accept any risk if the owner and/or RDG chooses to support the slab over the existing fill.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly effect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

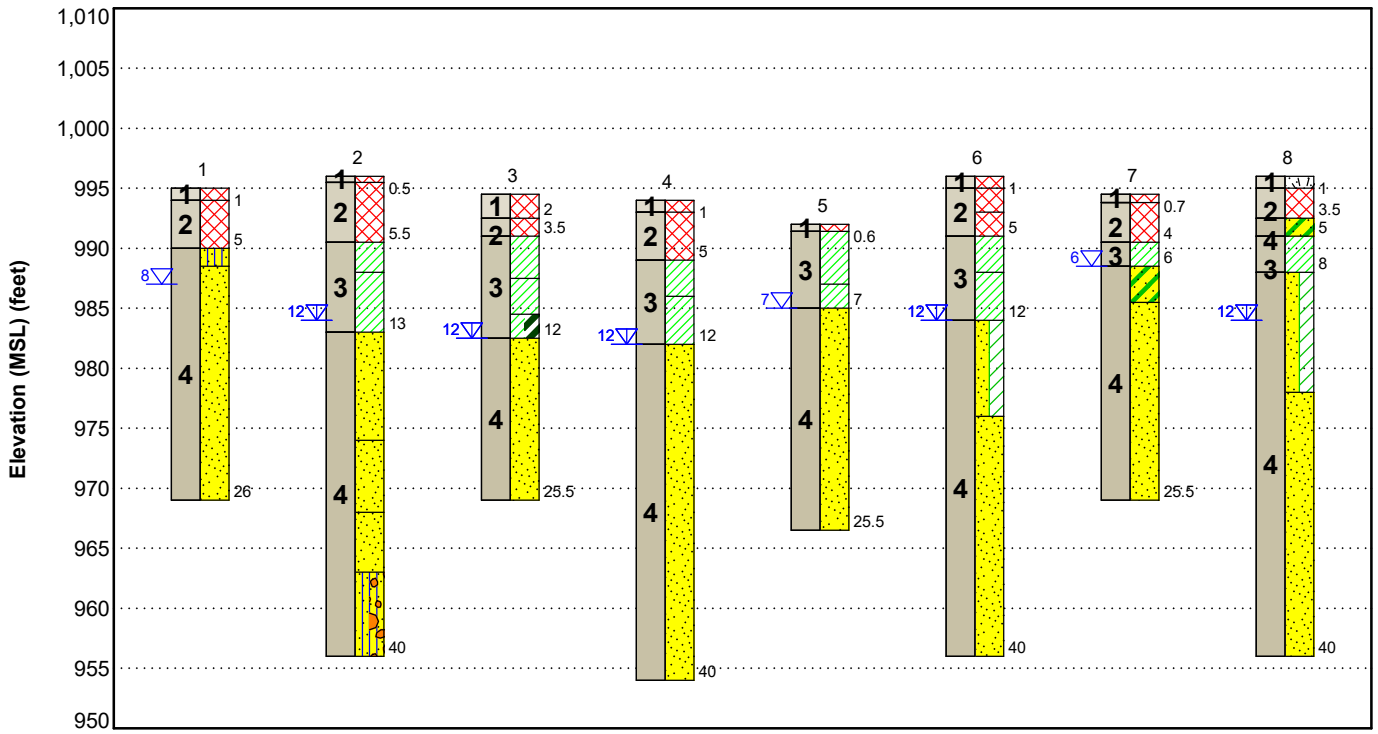
Figures

Contents:

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

GeoModel



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Surface	Topsoil Crushed Limestone
2	Existing Fill	Lean Clay with varying amounts of silt and sand; Poorly Graded Sand with varying amounts of clay and silt, Clayey Sand
3	Native Cohesive Soils	Lean Clay and Lean to Fat Clay with varying amounts of sand and silt
4	Native Granular Soils	Poorly Graded Sand with varying amounts of clay, silt, and gravel; Clayey Sand, Silty Sand, Silty Gravel
5	Bedrock	Limestone, moderately to highly weathered

LEGEND

- Fill
- Lean Clay
- Poorly-graded Sand with Clay
- Silty Sand
- Silty Sand with Gravel
- Clayey Sand
- Poorly-graded Sand
- Lean Clay/Fat Clay
- Topsoil

▽ First Water Observation
▽ Second Water Observation

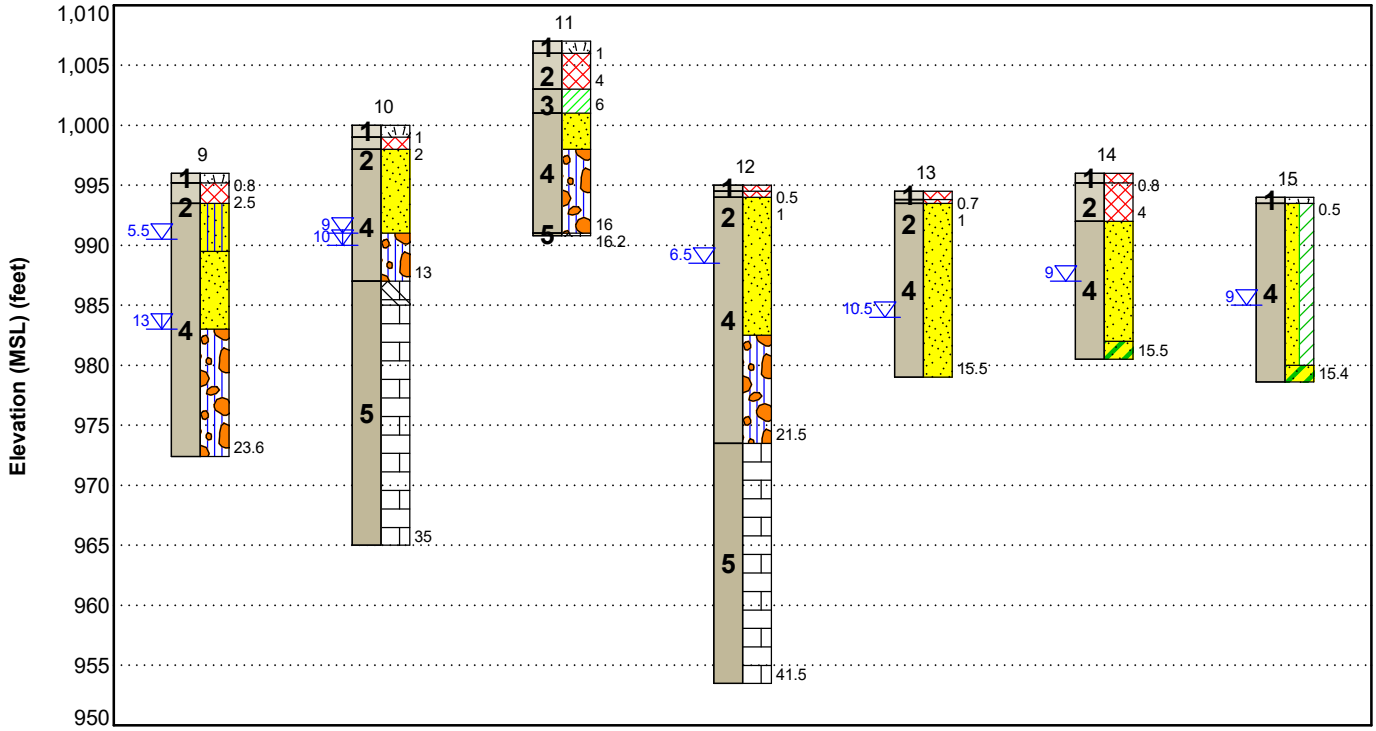
The groundwater levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

GeoModel



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Model Layer	Layer Name	General Description
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3	Native Cohesive Soils	Lean Clay and Lean to Fat Clay with varying amounts of sand and silt
4	Native Granular Soils	Poorly Graded Sand with varying amounts of clay, silt, and gravel; Clayey Sand, Silty Sand, Silty Gravel
5	Bedrock	Limestone, moderately to highly weathered

LEGEND

- Topsoil
- Fill
- Silty Sand
- Poorly-graded Sand
- Silty Gravel
- Weathered Limestone
- Limestone
- Lean Clay
- Clayey Sand
- Poorly-graded Sand with Clay

▽ First Water Observation
▽ Second Water Observation

The groundwater levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project. Numbers adjacent to soil column indicate depth below ground surface.

Attachments

Exploration and Testing Procedures

Field Exploration

Boring Number	Approximate Boring Depth (feet)	Location
1	26	Concession, restroom, and team clubhouse areas
3, 5, 7	25½	
2, 4, 6, 8	40	Stadium Seating
12	41½	
9	23½	Batter's eye, scoreboard, relocated lighting
10	35	
11	16½	
13, 14, 15	15½	Pavement / parking areas

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±10 feet) and referencing existing site features. Approximate ground surface elevations were obtained by interpolation from the topographic site plan provided in the RFP.

Subsurface Exploration Procedures: We advanced the borings with an ATV-mounted rotary drill rig using continuous flight augers (solid stem and/or hollow stem, as necessary, depending on soil conditions). Soil sampling was performed using thin-wall tube and/or split-barrel sampling procedures. Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. For safety purposes, all borings were backfilled with auger cuttings after their completion.

Upon encountering bedrock or refusal-to-drilling conditions, a minimum of 20 feet of rock coring using NQ2 rock core barrel was performed at select borings. Water was used as a drilling fluid for rock coring and the spent water will be discharged on site.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. The groundwater levels are shown on the attached boring logs.

The sampling depths, penetration distances, and other sampling information were recorded on the field logs. The samples were placed in appropriate containers and taken to our laboratory for testing and classification by a project engineer or geologist. Our exploration team prepared field logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Boring logs included in this report were prepared from the field logs, represent the project engineer's interpretation of the field logs, and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Water content
- Unit dry weight
- Unconfined compressive strength (soil)
- Atterberg limits
- Grain size analysis
- Moisture-density relationship
- California Bearing Ratio (CBR)
- Unconfined compressive strength (rock)

The laboratory testing program included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Boring log rock classification was determined using the Description of Rock Properties.

Site Location and Exploration Plan

Contents:

Site Location
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location

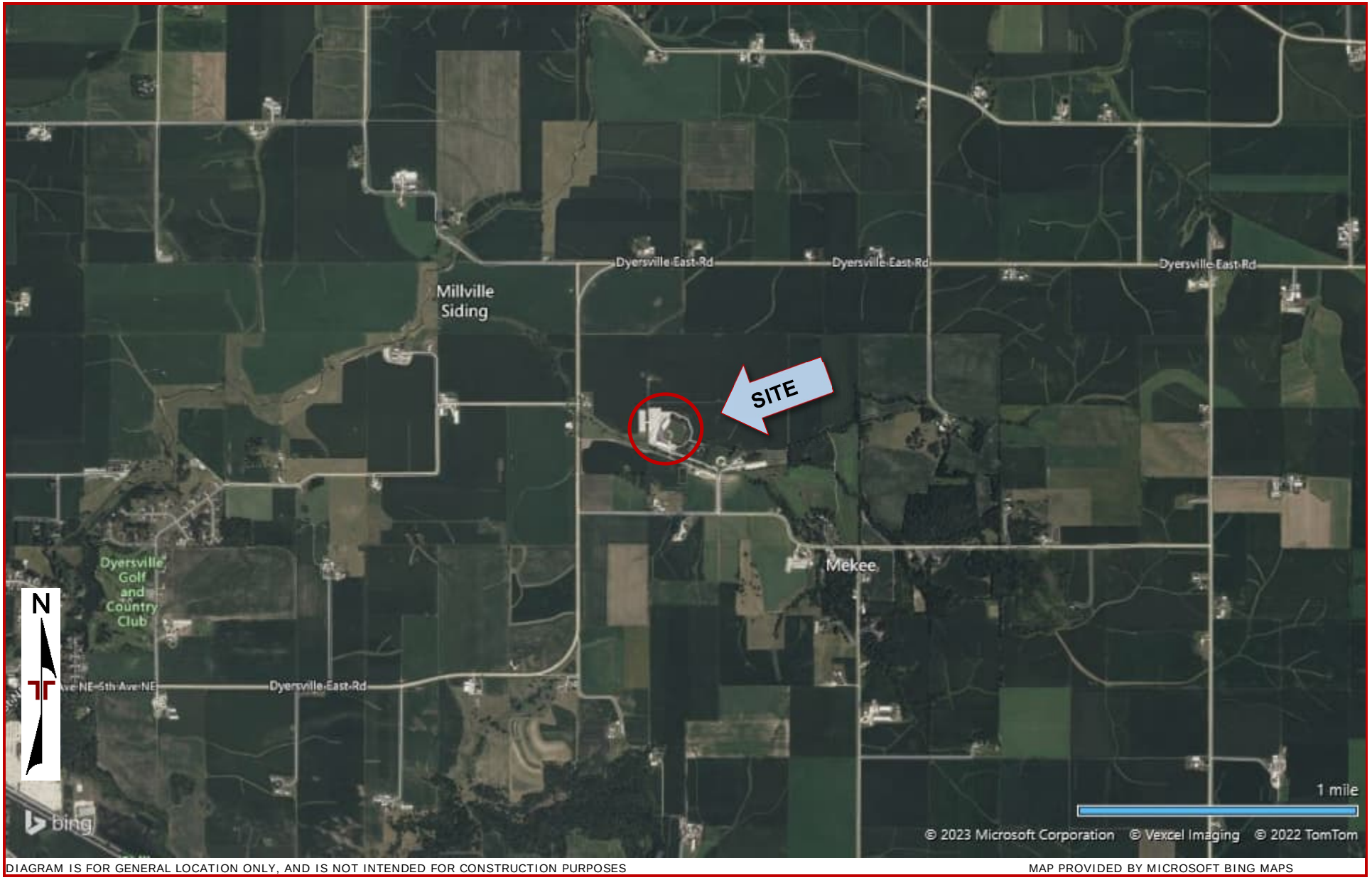

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

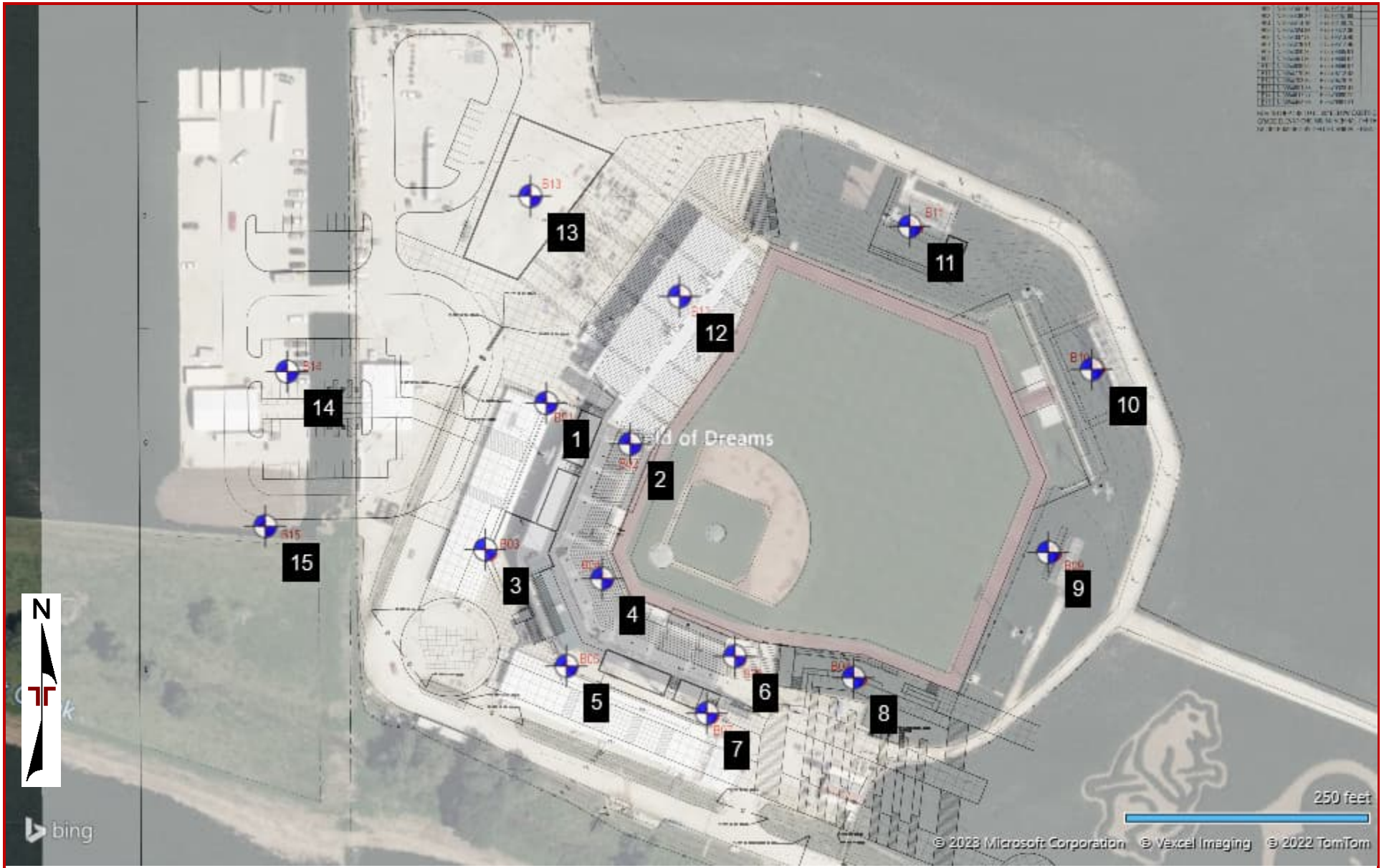

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless noted above.

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 1

Location: See Exploration Plan

Latitude: 42.4996° Longitude: -91.0593°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 995 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		1.0	**CRUSHED LIMESTONE**, approx. 12" 994												
2		5.0	**FILL - SANDY LEAN CLAY**, trace crushed limestone, brown and dark brown 990				12	5-6-4 N=10	1			11.2			
							17		2			11.5			32
4		6.5	**SILTY SAND (SM)**, fine grained, brown 988.5	5											
			POORLY GRADED SAND (SP), trace clay, fine to medium grained, brown, medium dense		▽		14	3-5-7 N=12	3			7.0			
							12	6-8-8 N=16	4			12.3			
				10											
							10	6-8-6 N=14	5			17.9			
			loose below about 19 feet	15											
							10	1-1-4 N=5	6			17.3			
				20											
							10	1-2-2 N=4	7			18.8			
		26.0	969	25											
			Boring Terminated at 26 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ 8' while drilling

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-20-2022

Boring Completed
12-20-2022

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 2

Location: See Exploration Plan

Latitude: 42.4994° Longitude: -91.0590°

Depth (Ft.) Elevation: 996 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.5 **CRUSHED LIMESTONE**, approx. 6" 995.5											
2		**FILL - SANDY LEAN CLAY**, trace crushed limestone, brown and dark brown			18	7-6-6 N=12	1			18.0			
					16	3-7-8 N=15	2			18.4			
		5.5 990.5											
3		**LEAN CLAY (CL)**, trace organics, dark brown, stiff			18	3-6-7 N=13	3	5.0		31.5			
		8.0 988											
		LEAN CLAY (CL), gray and brown, medium stiff			16	2-3-3 N=6	4			22.9			
		13.0 983											
4		**POORLY GRADED SAND (SP)**, trace clay and gravel, fine to coarse grained, gray, loose to medium dense			4	3-6-3 N=9	5			16.4			
					15	5-6-9 N=15	6			17.7			
		22.0 974											
		POORLY GRADED SAND (SP), trace clay, fine to medium grained, brown, loose to medium dense			15	3-3-5 N=8	7			16.6			

5 10 15 20 25

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 2

Location: See Exploration Plan

Latitude: 42.4994° Longitude: -91.0590°

Depth (Ft.) Elevation: 996 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
		POORLY GRADED SAND (SP), trace clay, fine to medium grained, brown, loose to medium dense *(continued)* 28.0 / 968											
		POORLY GRADED SAND (SP), trace clay and gravel, fine to coarse grained, brown, medium dense			17	5-8-12 N=20	8			16.3			
4		**SILTY SAND (SM)**, with limestone fragments, fine grained, light brown, medium dense (residual soil) 33.0 / 963			13	5-8-15 N=23	9			13.9			
		40.0 / 956			14	13-5-13 N=18	10			16.8			
		Boring Terminated at 40 Feet											

30 35 40

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 3

Location: See Exploration Plan

Latitude: 42.4991° Longitude: -91.0595°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 994.5 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		2.0	**CRUSHED LIMESTONE**, approx. 24" 992.5												
2		3.5	**FILL - LEAN CLAY WITH SILT**, trace sand, dark brown 991				12	7-7-6 N=13	1	5.6		6.4 17.0			
3		7.0	**LEAN CLAY (CL)**, trace sand, dark brown 987.5	5			15		2		2120	25.4	89		
3		10.0	**LEAN CLAY (CL)**, gray and brown, soft to medium stiff 984.5				12	1-2-2 N=4	3			26.8			
3		12.0	**LEAN TO FAT CLAY (CL/CH)**, dark gray, medium stiff 982.5	10			24		4		1260	35.9	82	36-19-17	
4		25.5	**POORLY GRADED SAND (SP)**, trace clay and gravel, fine to coarse grained, gray brown, very loose to loose 969	15			3	0-1-1 N=2	5			15.6			
				20			14	1-2-4 N=6	6			18.6			
				25			12	2-3-5 N=8	7			18.4			
			Boring Terminated at 25.5 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-19-2022

Boring Completed
12-19-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 4

Location: See Exploration Plan

Latitude: 42.4991° Longitude: -91.0591°

Depth (Ft.) Elevation: 994 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		**CRUSHED LIMESTONE**, approx. 12" 1.0 (993)											
2		**FILL - SANDY LEAN CLAY**, trace crushed limestone, dark brown and brown			17	24-20-18 N=38	1			16.8			
					15	6-7-9 N=16	2			13.8			
		5.0 (989)											
3		**LEAN CLAY (CL)**, trace organics, gray, medium stiff to stiff			8	3-4-4 N=8	3	4.8		31.1			
		8.0 (986)											
		LEAN CLAY (CL), gray and brown, soft to medium stiff			17	1-2-2 N=4	4			19.7			
		12.0 (982)											
4		**POORLY GRADED SAND (SP)**, trace gravel, fine to coarse grained, gray to brown, loose to medium dense			4	0-2-3 N=5	5			14.5			
		with clay at Sample 6			18	5-2-3 N=5	6			18.9			
					18	5-8-11 N=19	7			13.3			

5
10
15
20
25

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 4

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 42.4991° Longitude: -91.0591° Depth (Ft.) Elevation: 994 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
4		**POORLY GRADED SAND (SP)**, trace gravel, fine to coarse grained, gray to brown, loose to medium dense *(continued)*	30			18	3-5-9 N=14	8			16.8			
			35			18	10-9-13 N=22	9			16.9			
		dense at Sample 10 40.0 954	40			18	9-15-19 N=34	10			12.9			
		Boring Terminated at 40 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 5

Location: See Exploration Plan

Latitude: 42.4988° Longitude: -91.0592°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 992 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.6	**CRUSHED LIMESTONE**, approx. 7" 991.4												
3			**LEAN CLAY (CL)**, with organics, dark gray				19		1	5.5		36.0		35-22-13	87
		5.0	987	5			10	2-1-3 N=4	2			25.2			
			LEAN CLAY (CL), gray and brown												
		7.0	985				9		3			23.3			
4			**POORLY GRADED SAND (SP)**, trace clay and gravel, fine to coarse grained, brown, loose to medium dense				8	3-5-3 N=8	4			16.7			
				10											
			with clay at Sample 5	15			10	5-7-7 N=14	5			19.8			
				20			12	2-2-4 N=6	6			15.7			
		25.5	966.5	25			14	7-8-12 N=20	7			13.0			
			Boring Terminated at 25.5 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
7" while drilling

11' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-20-2022

Boring Completed
12-20-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 6

Location: See Exploration Plan

Latitude: 42.4988° Longitude: -91.0586°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 996 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		1.0	**CRUSHED LIMESTONE**, approx. 12" 995												
2		3.0	**FILL - CLAYEY SAND**, trace crushed limestone, dark gray 993				16	13-19-12 N=31	1			16.1			
		5.0	**FILL - SANDY LEAN CLAY**, trace crushed limestone, brown and dark gray 991				16	5-7-9 N=16	2			26.7			
3		8.0	**LEAN CLAY (CL)**, trace sand and fine roots, gray to dark gray, stiff 988	5			18	3-6-6 N=12	3			22.5			
		12.0	**LEAN CLAY (CL)**, with sand, gray and brown, medium stiff 984				13	2-3-4 N=7	4			16.5			
4		20.0	**POORLY GRADED SAND (SP-SC)**, with clay, trace gravel, fine grained, brown gray, loose to medium dense 976	10			6	8-8-6 N=14	5			11.6			
			POORLY GRADED SAND (SP), trace gravel, fine to coarse grained, brown, medium dense	15											
				20			4	2-2-2 N=4	6			20.1			
				25			13	5-10-12 N=22	7			16.8			

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 6

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 42.4988° Longitude: -91.0586° Depth (Ft.) Elevation: 996 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
4		**POORLY GRADED SAND (SP)**, trace gravel, fine to coarse grained, brown, medium dense *(continued)*	30			18	5-9-16 N=25	8			14.7			
			35			16	9-6-12 N=18	9			16.4			
		40.0 956	40			16	5-6-6 N=12	10			19.1			
		Boring Terminated at 40 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 7

Location: See Exploration Plan

Latitude: 42.4987° Longitude: -91.0587°

Depth (Ft.) Elevation: 994.5 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.7 **CRUSHED LIMESTONE**, approx. 8" 993.8											
2		**FILL - SANDY LEAN CLAY**, trace crushed limestone, brown			10	5-4-3 N=7	1			18.6		35-20-15	
		4.0 990.5											
3		**LEAN CLAY (CL)**, gray to dark gray, very stiff			18		2		4080	19.0	102		
		6.0 988.5											
4		**CLAYEY SAND (SC)**, fine grained, gray brown, medium dense			12	3-8-7 N=15	3			12.8			
		9.0 985.5											
		POORLY GRADED SAND (SP), trace clay and gravel, fine to coarse grained, brown gray, loose to medium dense			10	5-5-3 N=8	4			13.8			
					12	6-5-7 N=12	5			17.3			
					10	3-8-8 N=16	6			17.0			
					14	10-8-7 N=15	7			13.7			
		25.5 969											
		Boring Terminated at 25.5 Feet											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
6' while drilling
13' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-20-2022

Boring Completed
12-20-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 8

Location: See Exploration Plan

Latitude: 42.4988° Longitude: -91.0581°

Model Layer	Depth (Ft.)	Elevation: 996 (Ft.) +/-	Sample Number	Recovery (In.)	Field Test Results	Water Content (%)
1	1.0	**TOPSOIL**, approx. 12" 995				
2	3.5	**FILL - POORLY GRADED SAND**, with clay, trace gravel, fine to medium grained, brown, medium dense 992.5	1	13	4-6-7 N=13	9.8
4	5.0	**CLAYEY SAND (SC)**, fine to medium grained, dark brown, loose 991	2	15	3-3-4 N=7	17.2
3	8.0	**LEAN CLAY (CL)**, with sand, dark brown, medium stiff 988	3	16	3-3-4 N=7	21.8
4	18.0	**POORLY GRADED SAND (SP-SC)**, with clay, trace gravel, fine grained, brown and gray, medium dense 978	4	13	3-4-6 N=10	18.8
		loose at Sample 5	5	5	3-4-5 N=9	19.6
		POORLY GRADED SAND (SP), trace gravel, fine grained, brown, loose to medium dense	6	13	2-2-2 N=4	14.0
		medium grained at Sample 7	7	18	5-10-11 N=21	15.2

Depth (Ft.): 5, 10, 15, 20, 25

Water Level Observations: 12' cave in after drilling

Organic Content (%) | Unconfined Compressive Strength (psf) | Dry Unit Weight (pcf) | Atterberg Limits (LL-PL-PI) | Percent Fines

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 8

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 42.4988° Longitude: -91.0581° Depth (Ft.) Elevation: 996 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
4		**POORLY GRADED SAND (SP)**, trace gravel, fine grained, brown, loose to medium dense *(continued)*	30											
						18	9-8-7 N=15	8			16.2			
			35											
						18	9-10-12 N=22	9			14.2			
		dense at Sample 10												
		40.0 956	40			13	10-28-40 N=68	10			14.4			
		Boring Terminated at 40 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
12' while drilling
12' after drilling
12' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
748

Hammer Type
Automatic

Driller
LW

Logged by
RP

Boring Started
12-28-2022

Boring Completed
12-28-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 9

Location: See Exploration Plan

Latitude: 42.4991° Longitude: -91.0574°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 996 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.8	**TOPSOIL**, approx. 10" 995.2												
2		2.5	**FILL - LEAN CLAY**, trace gravel, dark brown 993.5				12	3-2-6 N=8	1			12.4			
4		6.5	**SILTY SAND (SM)**, trace gravel, fine to medium grained, brown, loose 989.5	5	▽		10	3-3-4 N=7	2			15.6			19
		13.0	**POORLY GRADED SAND (SP)**, trace gravel, fine to medium grained, brown, loose to medium dense 983				8	4-7-7 N=14	3			17.4			
				10	▽		14	3-4-3 N=7	4			19.6			
		23.6	**SILTY GRAVEL (GM)**, with clay seams, brown, loose (residual soil) 972.4	15	▨		9		5			20.4			
				20			6	2-2-3 N=5	6			17.9			
								50/1"	7						
			Boring Terminated at 23.6 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ 5 1/2' while drilling
▽ 13 ' after drilling
▨ 18' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-21-2022

Boring Completed
12-21-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 10

Location: See Exploration Plan

Latitude: 42.4997° Longitude: -91.0572°

Model Layer	Depth (Ft.)	Elevation: 1000 (Ft.) +/-	Recovery (In.)	Field Test Results	Sample Number	Water Content (%)
1	1.0	999				
2	2.0	998				
4			12		1	8.1
			12	5-5-5 N=10	2	7.0
			14	5-6-18 N=24	3	11.3
	9.0	991				
			12	6-21-20 N=41	4	13.4
	13.0	987				
5			1	50/3"	5	
	15.0	985				
			47	REC: 78% RQD: 8%	R1	
			59	REC: 98% RQD: 17%	R2	

TOPSOIL, approx. 12"

FILL - LEAN CLAY, dark brown and gray

POORLY GRADED SAND (SP), trace gravel, fine grained, brown, medium dense

SILTY GRAVEL (GM), light brown, dense (residual soil)

WEATHERED LIMESTONE, with silt and sand, light brown

LIMESTONE, light brown to grayish brown, thin bedding, moderately weathered

vertical fracture at about 20½ feet

fractured at about 25 feet

Organic Content (%) | Unconfined Compressive Strength (psf) | Dry Unit Weight (pcf) | Atterberg Limits LL-PL-PI | Percent Fines

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
- 9; while drilling
- 10' after drilling
- 10' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger from 0 to 15 feet.
Rock Core from 15 feet to end of boring.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719/748

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-21-2022

Boring Completed
12-29-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 10

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 42.4997° Longitude: -91.0572° Depth (Ft.) Elevation: 1000 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
5		**LIMESTONE**, light brown to grayish brown, thin bedding, moderately weathered *(continued)* fractured at about 28 and 29 feet				60	REC: 100% RQD: 50%	R3						
			30											
		vertical joint at about 32½ and 33 feet				55	REC: 92% RQD: 83%	R4						
		35.0 965												
		Boring Terminated at 35 Feet	35											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
9; while drilling
10' after drilling
10' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger from 0 to 15 feet.
Rock Core from 15 feet to end of boring.

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719/748

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-21-2022

Boring Completed
12-29-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 11

Location: See Exploration Plan

Latitude: 42.5000° Longitude: -91.0579°

Depth (Ft.) Elevation: 1007 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		**TOPSOIL**, approx. 12" 1.0 / 1006											
2		**FILL - LEAN CLAY**, trace organics, dark brown 4.0 / 1003			12	2-2-3 N=5	1			28.2			
3		**LEAN CLAY (CL)**, dark brown to brown, stiff 6.0 / 1001			13		2		2330	17.4	93		
4		**POORLY GRADED SAND (SP)**, trace gravel, fine grained, brown, loose 9.0 / 998			10	3-3-2 N=5	3			15.7			
		SILTY GRAVEL (GM), brown, medium dense (residual soil) 16.0 / 991			12	8-13-17 N=30	4			11.6			
5		**WEATHERED LIMESTONE**, with silt and sand 16.2 / 990.8			12	18-20-15 N=35	5			9.8			
		Boring Terminated at 16.2 Feet				50/2"	6						

5
10
15

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
Not recorded during or after drilling

13' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-21-2022

Boring Completed
12-21-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 12

Location: See Exploration Plan

Latitude: 42.4999° Longitude: -91.0588°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 995 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.5	**CRUSHED LIMESTONE**, approx. 6" 994.5												
2		1.0	994												
4			**FILL - LEAN CLAY***, dark brown and gray												
			POORLY GRADED SAND (SP), trace gravel, fine grained, brown, medium dense				10	6-12-7 N=19	1			5.0			
				5			12	3-6-5 N=11	2			9.0			
					▽		12	4-5-6 N=11	3			16.4			
				10			12	6-8-7 N=15	4			20.2			
		12.5	982.5												
			SILTY GRAVEL (GM), light brown, medium dense to dense (residual soil)				10	6-11-18 N=29	5			12.4			
				15	▨										
							14	9-34-18 N=52	6			16.5			
		21.5	973.5	20			0	50/1"	7						
5			**LIMESTONE**, light brown to light gray, thin bedding, moderately weathered fractured from about 21½ to 23½, and 25 feet				9	REC: 25% RQD: 0%	R1						
			rock unconfined compressive strength: 8,601 psi at about 24 feet	25											

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ 6 1/2' while drilling

▨ 16' cave in after drilling

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-19-2022

Boring Completed
12-19-2022

Notes

Elevation Reference: Elevations were interpolated from a topographic site plan.

*Soil description is based on the driller's field classification of disturbed samples and on drilling characteristics.

Advancement Method
Continuous-Flight Hollow-Stem Auger from 0 to 9 feet.
Mud Rotary from 13 feet to 21.5 feet.
Rock Core from 21.5 feet to end of boring.

Abandonment Method
Boring backfilled with auger cuttings and bentonite-cement grout.

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 12

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 42.4999° Longitude: -91.0588° Depth (Ft.) Elevation: 995 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
5		**LIMESTONE**, light brown to light gray, thin bedding, moderately weathered *(continued)*				88	REC: 92% RQD: 57%	R2						
		clay seam at about 30½ feet	30			12	REC: 100% RQD: 100%	R3						
		rock unconfined compressive strength: 13,490 psi at about 37.5 feet	35			120	REC: 100% RQD: 98%	R4						
		41.5 953.5	40											
		Boring Terminated at 41.5 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ 6 1/2' while drilling

16' cave in after drilling

Notes

Elevation Reference: Elevations were interpolated from a topographic site plan.

*Soil description is based on the driller's field classification of disturbed samples and on drilling characteristics.

Advancement Method
Continuous-Flight Hollow-Stem Auger from 0 to 9 feet.
Mud Rotary from 13 feet to 21.5 feet.
Rock Core from 21.5 feet to end of boring.

Abandonment Method
Boring backfilled with auger cuttings and bentonite-cement grout.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-19-2022

Boring Completed
12-19-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 13

Location: See Exploration Plan

Latitude: 42.5001° Longitude: -91.0594°

Depth (Ft.) Elevation: 994.5 (Ft.) +/-

Model Layer	Graphic Log	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.7											
2		1.0											
4		5			14	6-8-8 N=16	1			5.1			
					11	2-4-4 N=8	2			4.8			
					12	3-7-7 N=14	3			5.9			
		10	▽		13	5-6-7 N=13	4			12.8			
		15			10	4-4-3 N=7	5			17.2			

CRUSHED LIMESTONE, approx. 8" — 993.8

FILL - LEAN CLAY*, trace gravel, dark brown — 993.5

POORLY GRADED SAND (SP), trace gravel, fine grained, brown, loose to medium dense

fine to medium grained at Sample 5

15.5 — 979

Boring Terminated at 15.5 Feet

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

▽ 10 1/2' while drilling

9' cave in after drilling

Notes

Elevation Reference: Elevations were interpolated from a topographic site plan.

*Soil description is based on the driller's field classification of disturbed samples and on drilling characteristics.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-21-2022

Boring Completed
12-21-2022

Field of Dreams - Stadium Study
28995 Lansing Road | Dyersville, Iowa
Terracon Project No. 07225161

Terracon
870 40th Ave
Bettendorf, IA

Boring Log No. 14

Location: See Exploration Plan

Latitude: 42.4996° Longitude: -91.0603°

Model Layer	Graphic Log	Depth (Ft.)	Elevation: 996 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.8	**CRUSHED LIMESTONE**, approx. 10" 995.2												
2		4.0	**FILL - LEAN CLAY**, trace gravel, dark brown 992				11	4-3-4 N=7	1			13.5			
4		14.0	**POORLY GRADED SAND (SP)**, trace gravel, fine grained, brown, medium dense 982	5			12		2			5.2			
							10	3-4-6 N=10	3			8.6			
				10			14	4-7-6 N=13	4			15.1			
		15.5	**CLAYEY SAND (SC)**, fine to medium grained, brown, medium dense 980.5	15			12	3-5-5 N=10	5			21.8			
			Boring Terminated at 15.5 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
9' while drilling

9' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

Boring Started
12-21-2022

Boring Completed
12-21-2022

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870 40th Ave
Bettendorf, IA

Boring Log No. 15

Model Layer	Graphic Log	Location: See Exploration Plan Latitude: 42.4992° Longitude: -91.0604° Depth (Ft.) Elevation: 994 (Ft.) +/-	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Sample Number	Organic Content (%)	Unconfined Compressive Strength (psf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
1		0.5 **TOPSOIL**, approx. 6" 993.5												
4		**POORLY GRADED SAND (SP-SC)**, with clay, trace gravel, fine grained, brown, loose to medium dense				12	2-3-3 N=6	1			5.7			6
						14	5-4-5 N=9	2			7.0			
			5			12	4-5-6 N=11	3			6.2			
				▽		14	3-4-5 N=9	4			17.1			
		14.0 980	10											
		CLAYEY SAND (SC), fine grained, brown, loose				12	2-3-2 N=5	5			21.1			
		15.4 978.6	15											
		Boring Terminated at 15.4 Feet												

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
▽ 9' while drilling

11' cave in after drilling

Notes
Elevation Reference: Elevations were interpolated from a topographic site plan.

Advancement Method
Continuous-Flight Hollow-Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
719

Hammer Type
Automatic

Driller
DL

Logged by
ZS

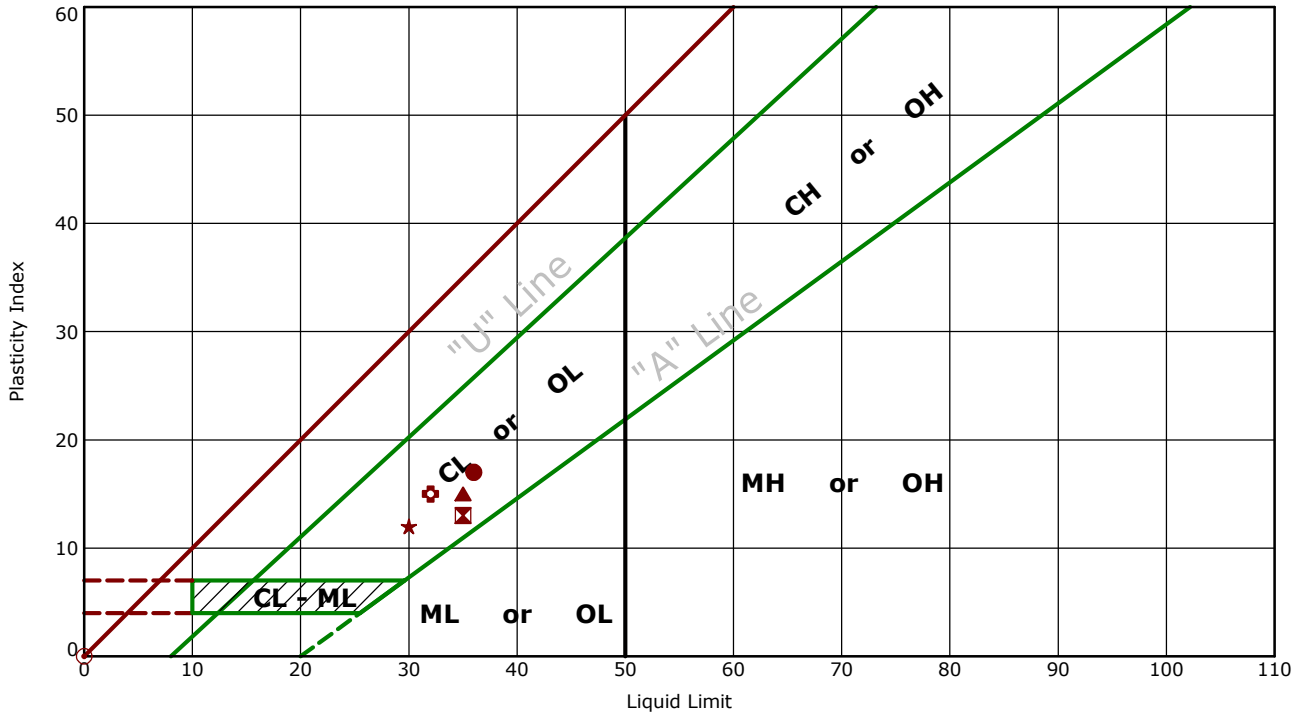
Boring Started
12-21-2022

Boring Completed
12-21-2022

Terracon
870 40th Ave
Bettendorf, IA

Atterberg Limit Results

ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	3	9 - 11	36	19	17		CL	LEAN CLAY
⊠	5	1.5 - 3.5	35	22	13	87.0	CL	LEAN CLAY
▲	7	1.5 - 3	35	20	15		CL	SANDY LEAN CLAY
★	Boring 7 Bulk	6 - 11.2	30	18	12	75.6	CL	LEAN CLAY with SAND
⊙	Boring 13 Bulk	1 - 5	NP	NP	NP	10.6	SP-SC	POORLY GRADED SAND with CLAY
✿	Boring 14 Bulk	1 - 4	32	17	15	59.1	CL	SANDY LEAN CLAY

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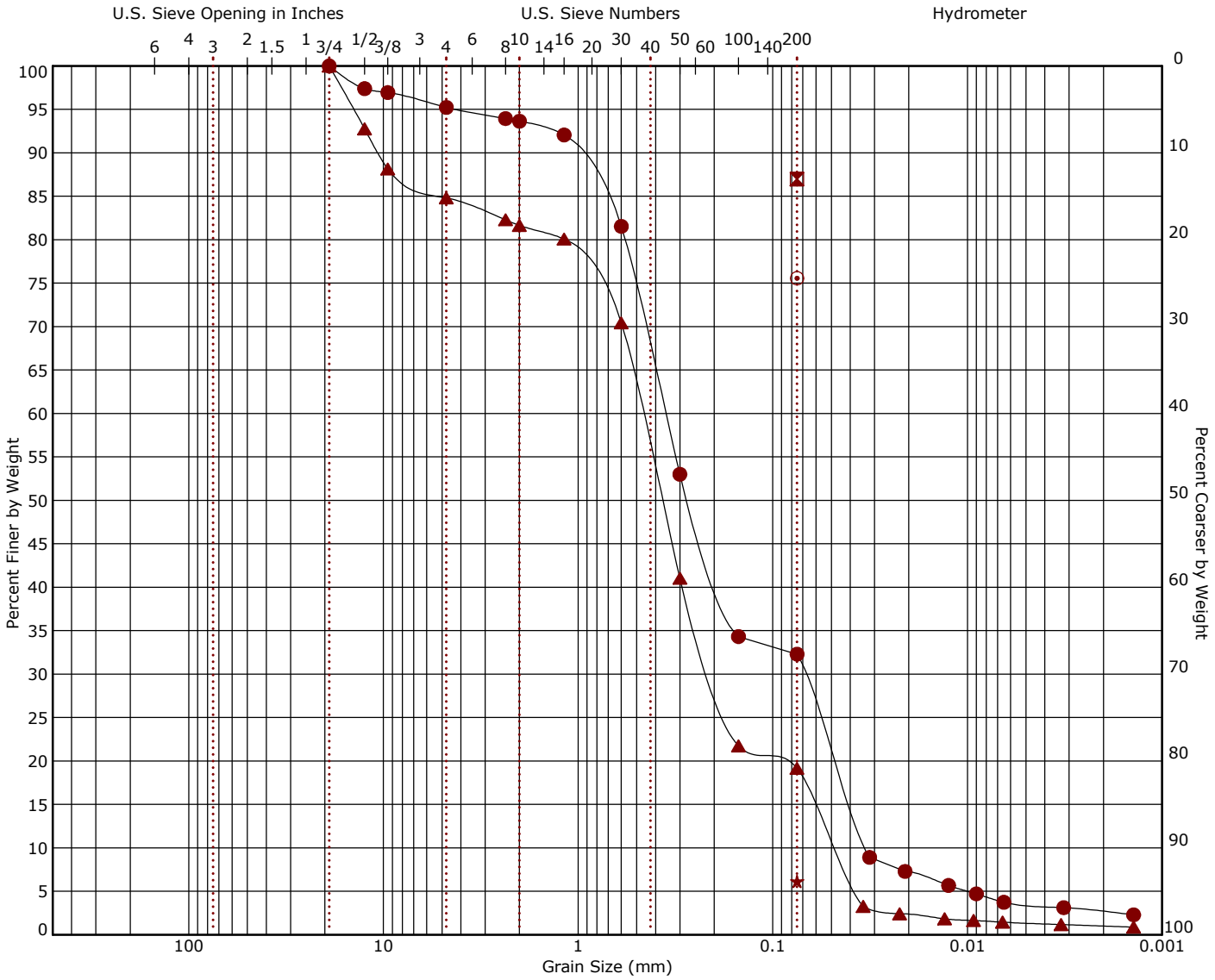
Grain Size Distribution

ASTM D422 / ASTM C136



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	1	4 - 6	SILTY SAND	SM				0.40	10.74
⊠	5	1.5 - 3.5	LEAN CLAY	CL	35	22	13		
▲	9	4 - 5.5	SILTY SAND	SM				1.82	9.82
★	15	1.5 - 3	POORLY GRADED SAND with CLAY	SP-SC					
⊙	Boring 7 Bulk	6 - 11.2	LEAN CLAY with SAND	CL	30	18	12		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	1	4 - 6	19	0.356	0.069	0.033	0.0	4.8	62.9		28.8	3.5
⊠	5	1.5 - 3.5	0.075							87.0		
▲	9	4 - 5.5	19	0.469	0.202	0.048	0.0	15.2	65.7		17.8	1.3
★	15	1.5 - 3	0.075							6.1		
⊙	Boring 7 Bulk	6 - 11.2	0.075							75.6		

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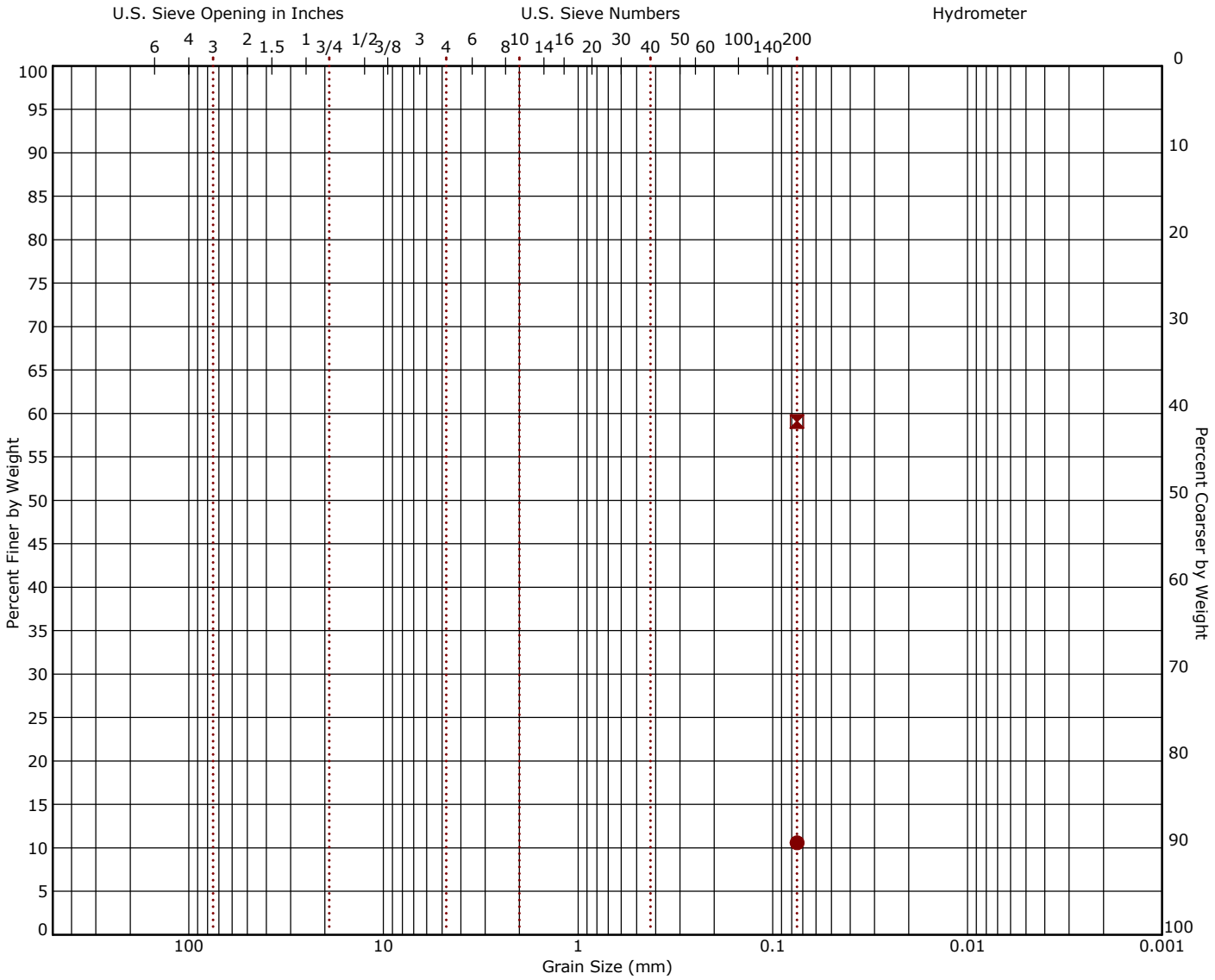
Grain Size Distribution

ASTM D422 / ASTM C136



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID	Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
Boring 13 Bulk	1 - 5	POORLY GRADED SAND with CLAY	SP-SC	NP	NP	NP		
Boring 14 Bulk	1 - 4	SANDY LEAN CLAY	CL	32	17	15		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
Boring 13 Bulk	1 - 5	0.075							10.6		
Boring 14 Bulk	1 - 4	0.075							59.1		

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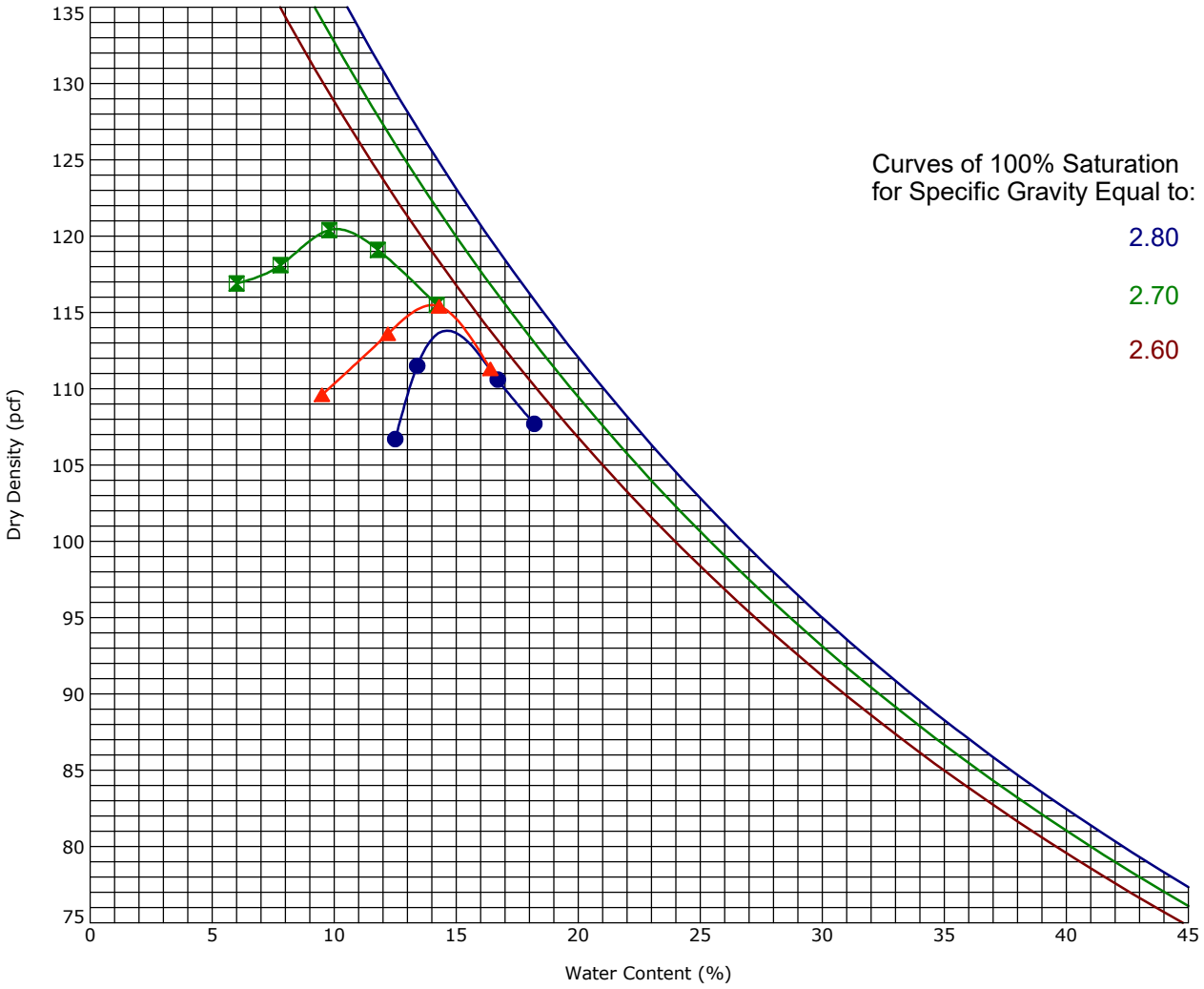
Moisture-Density Relationship

ASTM D698/D1557



	Boring ID	Depth (Ft)	Fines (%)	LL	PL	PI	Description of Materials
●	Boring 7 Bulk	6 - 11.2	76	30	18	12	LEAN CLAY with SAND (CL)
⊠	Boring 13 Bulk	1 - 5	11	NP	NP	NP	POORLY GRADED SAND with CLAY (SP-SC)
▲	Boring 14 Bulk	1 - 4	59	32	17	15	SANDY LEAN CLAY (CL)

	Boring ID	Depth (Ft)	Test Method	Max DD (pcf)	Optimum WC (%)
●	Boring 7 Bulk	6 - 11.2	ASTM D698 Method B	113.8	14.6
⊠	Boring 13 Bulk	1 - 5	ASTM D698 Method B	120.5	10.1
▲	Boring 14 Bulk	1 - 4	ASTM D698 Method B	115.5	14.0

California Bearing Ratio Test (CBR)

2640 12th Street SW
Cedar Rapids, Iowa 52404
(319) 366-8321

Client Name:	City of Dyersville	Project No.:	07225161	Date:	1/10/2023
Project Name:	Field of Dreams - Stadium Study				
Location:	Dyersville, Iowa				

Boring Number	B-7
Depth	6-11.5
Sample Description:	Lean Clay with Sand, dark brown

Proctor Compaction Data:

Proctor Test Procedure:	ASTM D 698	
Maximum Dry Density	113.2	pcf
Optimum Moisture Content	14.5	%
USCS Classification	CL	

CBR Specimen Compaction Data:

CBR Test Procedure:	ASTM D 1883	**Soaked**
Initial Moisture Content	14.6	%
Dry Density Before Soaking	107.7	pcf
Percent Compaction	95.1%	%
Moisture Content After Compaction	14.3	%
Dry Density After Soaking	104.1	pcf
Moisture Content After Soaking	24.2	%
CBR at 0.100 inches penetration	4.0	%
CBR at 0.200 inches penetration	3.9	%

Soil Index Properties:

Liquid Limit:	30	% Passing No. 200	76 %
Plasticity Index:	12		
Plastic Limit:	18		

Specimen Swell Data:

Surcharge Load	10	lb
Compaction	92.0	%
Swell (96 Hours)	1.961	%

California Bearing Ratio Test (CBR)

2640 12th Street SW
Cedar Rapids, Iowa 52404
(319) 366-8321

Client Name:	City of Dyersville	Project No.:	07225161	Date:	1/10/2023
Project Name:	Field of Dreams - Stadium Study				
Location:	Dyersville, Iowa				
Boring Number	B-13				
Depth	1-5 ft.				
Sample Description:	Poorly Graded Sand with Clay, Dark Brown				

Proctor Compaction Data:

Proctor Test Procedure:	ASTM D 698	
Maximum Dry Density	120.6	pcf
Optimum Moisture Content	10.5	%
USCS Classification	SP-SC	

CBR Specimen Compaction Data:

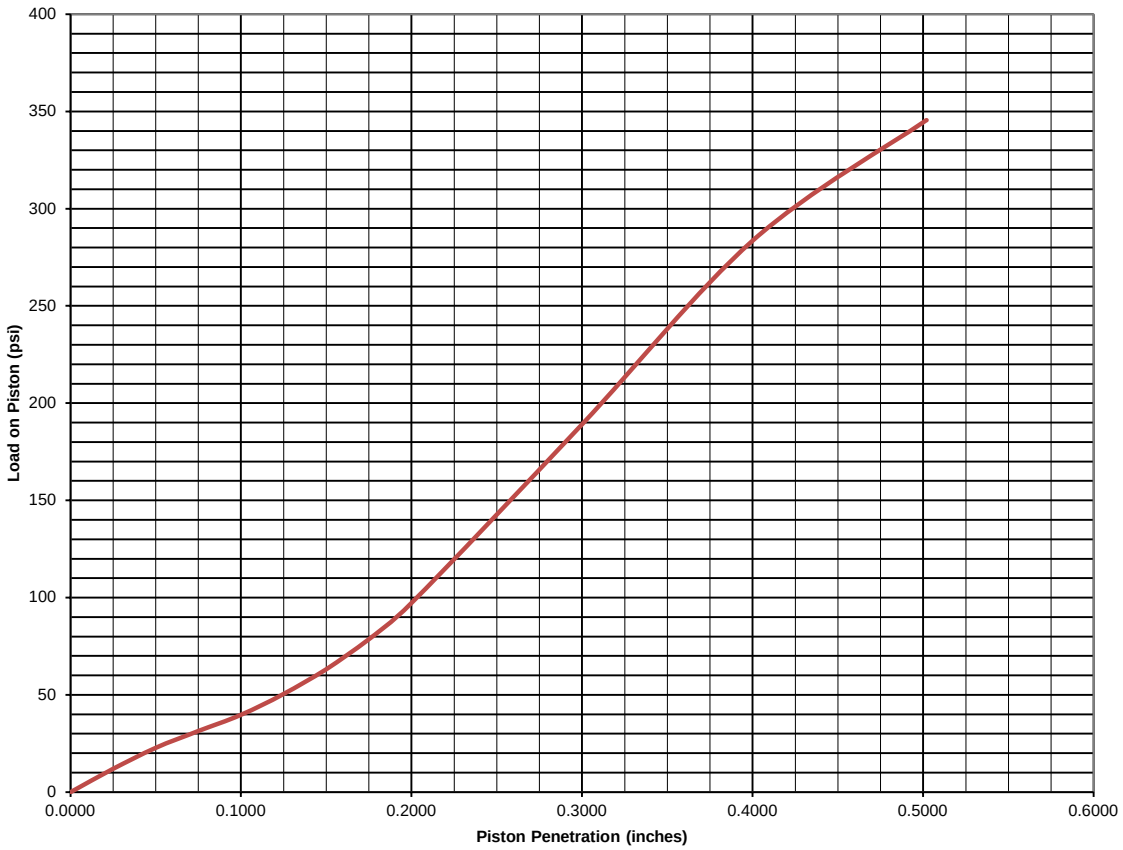
CBR Test Procedure:	ASTM D 1883	**Soaked**
Initial Moisture Content	10.4	%
Dry Density Before Soaking	114.6	pcf
Percent Compaction	95.1%	%
Moisture Content After Compaction	10.4	%
Dry Density After Soaking	116.9	pcf
Moisture Content After Soaking	10.7	%
CBR at 0.100 inches penetration	4.0	%
CBR at 0.200 inches penetration	6.5	%

Soil Index Properties:

Liquid Limit:	NP	% Passing No. 200	11 %
Plasticity Index:	NP		
Plastic Limit:	NP		

Specimen Swell Data:

Surcharge Load	10	lb
Compaction	97.0	%
Swell (96 Hours)	-0.087	%



California Bearing Ratio Test (CBR)

2640 12th Street SW
Cedar Rapids, Iowa 52404
(319) 366-8321

Client Name:	City of Dyersville	Project No.:	07225161	Date:	1/10/2023
Project Name:	Field of Dreams - Stadium Study				
Location:	Dyersville, Iowa				
Boring Number	B-14				
Depth	1-4 ft.				
Sample Description:	Sandy Lean Clay trace Gravel, dark gray				

Proctor Compaction Data:

Proctor Test Procedure:	ASTM D 698	
Maximum Dry Density	115.9	pcf
Optimum Moisture Content	14.0	%
USCS Classification	CL	

CBR Specimen Compaction Data:

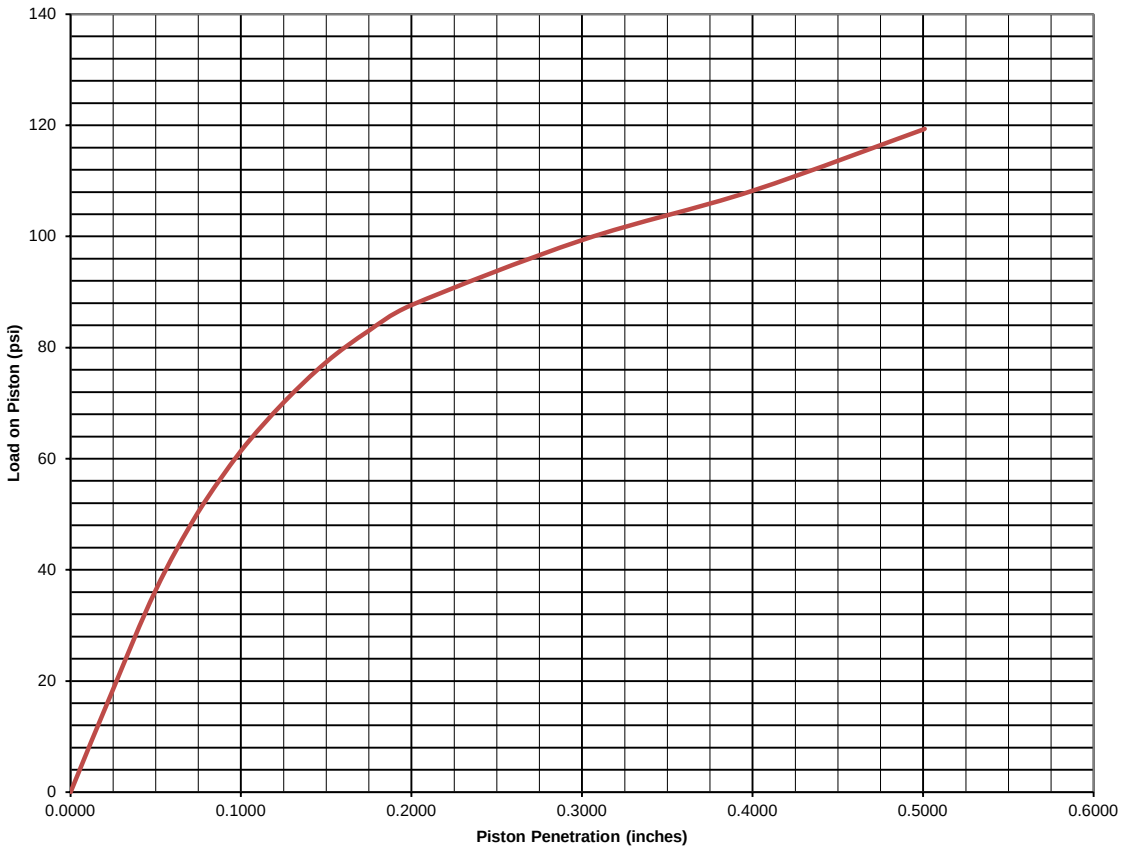
CBR Test Procedure:	ASTM D 1883	**Soaked**
Initial Moisture Content	13.8	%
Dry Density Before Soaking	110.0	pcf
Percent Compaction	95.0%	%
Moisture Content After Compaction	14.1	%
Dry Density After Soaking	108.3	pcf
Moisture Content After Soaking	18.9	%
CBR at 0.100 inches penetration	6.1	%
CBR at 0.200 inches penetration	5.8	%

Soil Index Properties:

Liquid Limit:	32	% Passing No. 200	59 %
Plasticity Index:	15		
Plastic Limit:	17		

Specimen Swell Data:

Surcharge Load	10	lb
Compaction	93.4	%
Swell (96 Hours)	0.632	%



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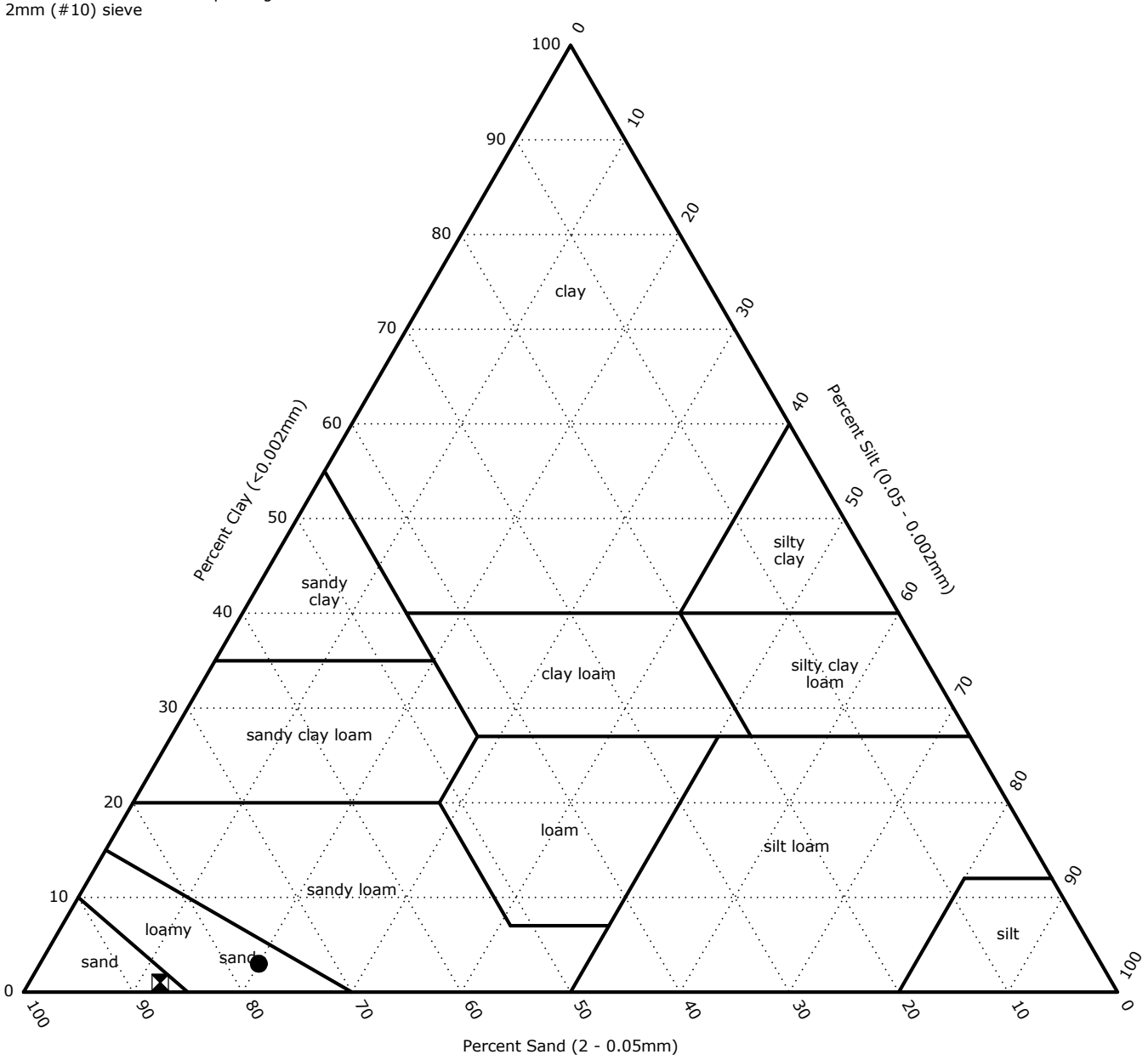
USDA Textural Classification

Fractions normalized to 100% passing the 2mm (#10) sieve



	Borehole	Depth (ft)	USDA Classification	Sand (%)	Silt (%)	Clay (%)
●	1	4 - 6	LOAMY SAND	77.3	19.9	2.8
⊠	9	4 - 5.5	SAND	86.6	12.1	1.2

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

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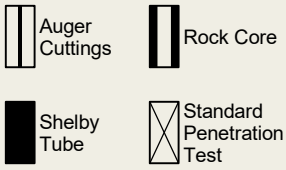
870 40th Ave
Bettendorf, IA

General Notes

Sampling



Water Level

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

Field Tests

N	Standard Penetration Test Resistance (Blows/Ft.)
(HP)	Hand Penetrometer
(T)	Torvane
(DCP)	Dynamic Cone Penetrometer
UC	Unconfined Compressive Strength
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		**Consistency of Fine-Grained Soils** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			**Bedrock**	
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**Consistency**	**Unconfined Compressive Strength Qu (psf)**	**Standard Penetration or N-Value (Blows/Ft.)**	**Standard Penetration or N-Value (Blows/Ft.)**	**Consistency**
Very Loose	0 - 3	Very Soft	less than 500	0 - 1	< 20	Weathered
Loose	4 - 9	Soft	500 to 1,000	2 - 4	20 - 29	Firm
Medium Dense	10 - 29	Medium Stiff	1,000 to 2,000	4 - 8	30 - 49	Medium Hard
Dense	30 - 50	Stiff	2,000 to 4,000	8 - 15	50 - 79	Hard
Very Dense	> 50	Very Stiff	4,000 to 8,000	15 - 30	>79	Very Hard
		Hard	> 8,000	> 30		

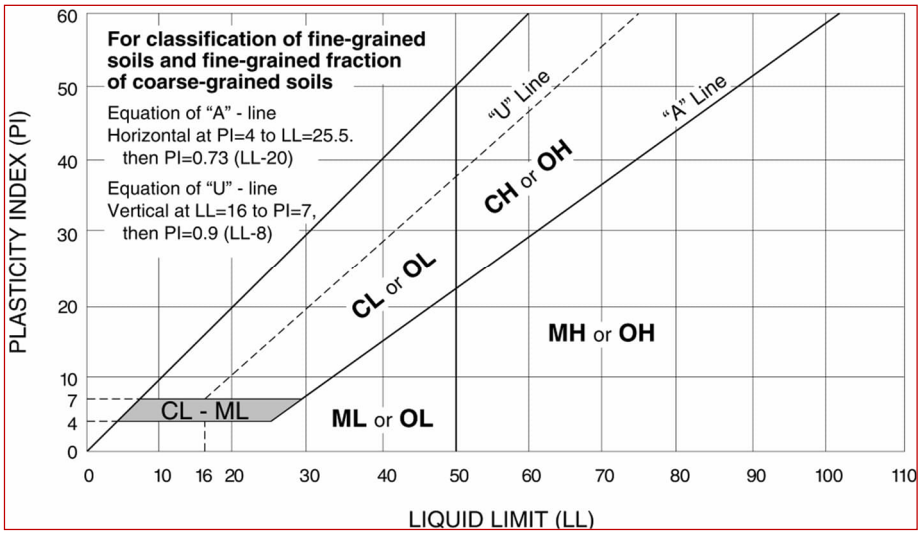
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 4 sieve	Gravels: More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels: Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	Clean Sands: Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	Silts and Clays: Liquid limit less than 50	Inorganic:	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried}$ < 0.75	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	Inorganic:	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried}$ < 0.75	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Rock Classification Notes

WEATHERING	
Term	**Description**
Fresh	Mineral crystals appear bright; show no discoloration. Features show little or now staining on surfaces. Discoloration does not extend into intact rock.
Slightly weathered	Rock generally fresh except along fractures. Some fractures stained and discoloration may extend <0.5 inches into rock.
Moderately weathered	Significant portions of rock are dull and discolored. Rock may be significantly weaker than in fresh state near fractures. Soil zones of limited extent may occur along some fractures.
Highly weathered	Rock dull and discolored throughout. Majority of rock mass is significantly weaker and has decomposed and/or disintegrated; isolated zones of stronger rock and/or soil may occur throughout.
Completely weathered	All rock material is decomposed and/or disintegrated to soil. The rock mass or fabric is still evident and largely intact. Isolated zones of stronger rock may occur locally.

STRENGTH OR HARDNESS		
Description	**Field Identification**	**Uniaxial Compressive Strength, psi**
Extremely strong	Can only be chipped with geological hammer. Rock rings on hammer blows. Cannot be scratched with a sharp pick. Hand specimens require several hard hammer blows to break.	>36,000
Very strong	Several blows of a geological hammer to fracture. Cannot be scratched with a 20d common steel nail. Can be scratched with a geologist's pick only with difficulty.	15,000-36,000
Strong	More than one blow of a geological hammer needed to fracture. Can be scratched with a 20d nail or geologist's pick. Gouges or grooves to ¼ inch deep can be excavated by a hard blow of a geologist's pick. Hand specimens can be detached by a moderate blow.	7,500-15,000
Medium strong	One blow of geological hammer needed to fracture. Can be distinctly scratched with 20d nail. Can be grooved or gouged 1/16 in. deep by firm pressure with a geologist's pick point. Can be fractured with single firm blow of geological hammer. Can be excavated in small chips (about 1-in. maximum size) by hard blows of the point of a geologist's pick;	3,500-7,500
Weak	Shallow indent by firm blow with geological hammer point. Can be gouged or grooved readily with geologist's pick point. Can be excavated in pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.	700-3,500
Very weak	Crumbles under firm blow with geological hammer point. Can be excavated readily with the point of a geologist's pick. Pieces 1-in. or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.	150-700

DISCONTINUITY DESCRIPTION			
Fracture Spacing (Joints, Faults, Other Fractures)		Bedding Spacing (May Include Foliation or Banding)	
Description	**Spacing**	**Description**	**Spacing**
Intensely fractured	< 2.5 inches	Laminated	< ½-inch
Highly fractured	2.5 – 8 inches	Very thin	½ – 2 inches
Moderately fractured	8 inches to 2 feet	Thin	2 inches – 1 foot
Slightly fractured	2 to 6.5 feet	Medium	1 – 3 feet
Very slightly fractured	> 6.5 feet	Thick	3 – 10 feet
		Massive	> 10 feet

ROCK QUALITY DESIGNATION (RQD) [1]	
Description	**RQD Value (%)**
Very Poor	0 - 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 - 100

1. The combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length.