Division of Finance and Business Operations

Wayne State University

Intramural Field

WSU Project Number 080-326346

Prevailing Wage Work

Electronic Bid Submission

FOR:
Board of Governors
Wayne State University
Detroit, Michigan

Owner's Representative:
Alycsa Valentine , Project Manager
Facilities Planning & Management
Design & Construction Services
5454 Cass
Wayne State University
Detroit, Michigan 48202

Owner's Agent:
Robert Kuhn, Sr. Buyer
WSU – Procurement & Strategic Sourcing
5700 Cass, Suite 4200
Detroit, Michigan 48202
313-577-7 – 3712 / 313-577-3747 fax
ac6243@wayne.edu and copy ab4889@wayne.edu

Consultant:
SMITHGROUP
201 Depot St., 2nd Floor
Ann Arbor, MI 48104

September 23, 2019

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INFORMATION FOR BIDDERS

OWNER:	Board of Governors Wayne State University
PROJECT:	**Intramural Field** **Project No. 080-326346**
LOCATION:	Wayne State University Trumbull and Edsel Ford Freeway, Detroit Michigan 48202 Detroit, Michigan 48202
OWNER'S AGENT:	Robert Kuhn, Sr. Buyer WSU – Procurement & Strategic Sourcing 5700 Cass, Suite 4200 Detroit, Michigan 48202 313-577-7 – 3712 / 313-577-3747 fax ac6243@wayne.edu & copy ab4889@wayne.edu
OWNER'S REPRESENTATIVE:	Alycsa Valentine , Project Manager Facilities Planning & Management Design & Construction Services Wayne State University 5454 Cass Avenue Detroit, Michigan 48202
Architect:	SMITHGROUP 201 Depot St., 2nd Floor Ann Arbor, MI 48104

SPECIAL NOTE: Right to reject any and all proposals, either in whole or in part and to waive any irregularities therein is reserved by the Owner.

BIDS ADVERTISED: September 23, 2019

BIDDING: Bidding documents may be obtained by vendors from the University Purchasing Web Site at **http://go.wayne.edu/bids** beginning **September 23, 2019**. When visiting the Web Site, click on the "**Construction**" link in green. Copies of the RFP will not be available at the pre-proposal meeting.

MANDATORY Pre-Bid Conference: 11:00 – 12:30 pm, local time, September 30, 2019 to be held at **Wayne State University – 5454 Cass Avenue, Conference Room 3, Detroit, MI, 48202**. Late Arrivals may not be permitted to submit bids.

OPTIONAL Second Walk Through (if needed): **To be determined at the conclusion of the pre-bid conference, by those in attendance.**

DUE DATE FOR QUESTIONS: Due Date for questions shall be **October 2, 2019 at 12:00 Noon.** All questions must be reduced to writing and emailed to the attention of **Robert Kuhn**, **Sr. Buyer** at **ac6243@wayne.edu**, copy to **Valerie Kreher**, **Sr. Buyer** at: **ab4889@wayne.edu**.

Bids Due: Sealed proposals for lump-sum General Contract will be received at the office of the Procurement & Strategic Sourcing **by electronic submission on October 7, 2019,** until 2:00 p.m. (local time). The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**. Vendors are strongly encouraged to combine documents into one PDF for the ease of distribution within the University, and to ensure no portion of your response is inadvertently omitted in transmission to the University or internally to the end user department.

No public bid opening will be held.

Bid Qualification Meeting: Bidders must be available for bid prequalification meeting the day following the bid opening. The lowest qualified bidder will be contacted and requested to meet with Facilities Planning & Management at their office located at 5454 Cass Avenue, Detroit, MI 48202. During the bid qualification, the Vendor must provide a Project Schedule and a Schedule of Values, including a list of Contractor's suppliers, subcontractors and other qualifications.

An unsigned contract will be given to the successful Contractor at the conclusion of the bid qualification meeting, if all aspects of the bid are in order. The Contractor has 5 business days to return the contract to the Project Manager for University counter signature. The contractor must also submit a Performance Bond as outlined above and a Certificate of Insurance in the same 5 business day period. In the event the Contractor fails to return the documents in this 5 day period, the University reserves the right to award the contract to the next most responsive bidder.

All available information pertaining to this project will be posted to the Purchasing web site at **http://go.wayne.edu/bids**.
Information that is not posted to the website is not available/not known

INSTRUCTIONS TO BIDDERS

OWNER: Board of Governors
Wayne State University

PROJECT: **Intramural Field**
Project No. 080-326346

LOCATION: Wayne State University
Trumbull and Edsel Ford Freeway, Detroit Michigan 48202,
Detroit, Michigan 48202

OWNER'S AGENT: Robert Kuhn, Sr. Buyer
WSU – Procurement & Strategic Sourcing
5700 Cass, Suite 4200
Detroit, Michigan 48202
313-577-7 – 3712 / 313-577-3747 fax
ac6243@wayne.edu & copy ab4889@wayne.edu

1. PROPOSALS

A. The Purchasing Agent will receive sealed Proposals for the work as herein set forth at the place and until the time as stated in the "Information for Bidders", a copy of which is bound herewith in theses specifications. **No public bid opening will be held.**

B. Proposals shall be for a **lump-sum General Contract for the entire work of the Project as provided in the Form of Proposal.**

C. Proposals shall be submitted **by electronic submission** on forms furnished with the Bidding documents. The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019.** The forms must be fully filled out in ink or typewritten with the signature in longhand, and the completed forms shall be without alterations, interlineations, or erasures. Forms shall contain no recapitulations of the work to be done. Each proposal shall be delivered in an opaque sealed envelope, marked **"PROPOSAL"** AND SHALL BEAR THE NAME OF THE PROJECT AND THE NAME OF THE BIDDER. Proposals submitted by telephone or telegraph will not be accepted. Modifications by telephone or telegraph to previously submitted proposals will not be accepted.

D. (***revised 5-29-2009***) All base bids must be conforming to the detailed specifications and drawings provided by the University, including any Addenda issued. Voluntary Alternates will only be considered if the Contractor has also submitted a conforming base bid. Any stipulation of voluntary alternates or qualifications contrary to the Contract requirements made by the Bidder in or accompanying his proposal as a condition for the acceptance of the Contract will not be considered in the award of the Contract and will cause the rejection of the entire Proposal.

E. **The competency and responsibility of Bidders will be considered in making the award. The Owner does not obligate himself to accept the lowest or any other bids. The Owner reserves the right to reject any and all bids and to waive any informalities in the Proposals**.

2. PROPOSAL GUARANTEE *(revised 3-22-2012)*

A. A certified check or bank draft payable to the Owner, or satisfactory Bid Bond executed by the Bidder and Surety Company, in an amount equal to not less than five percent (5%) of the maximum proposal amount shall be submitted with each Proposal, which amount may be forfeited to the Board of Governors, Wayne State University, if the successful Bidder refuses to enter into a Contract within ninety (90) days from receipt of Proposals.

B. Bond must be issued by a Surety Company with an "A rating as denoted in the AM Best Key Rating Guide"

C. The bid deposit of all bidders except the lowest three will be returned within three (3) days after the bids are opened. After the formal Contract and bonds are approved, the bid deposit will be returned to the lowest three bidders, except when forfeited.

D. Bid bonds shall be accompanied by a Power of Attorney authorizing the signer of the bond to do so on behalf of the Surety Company.

E. Withdrawal of Proposals is prohibited for a period of ninety (90) days after the actual date of opening thereof.

3. CONTRACT SECURITY *(revised 3-22-2012)*

A. The successful Bidder will be required to furnish a Performance Bond and Labor and Material Payment bond in an amount equal to 100% of the contract award amount, and include such cost in the Proposal, complying with the laws of the State of Michigan. The graduated formula no longer applies.

B. Performance Bond and Labor and Material Payment Bond shall be from a surety company acceptable to the Owner and made payable as follows:

(1) A bond for 100% of the contract award amount to the Board of Governors of Wayne State University, and guaranteeing the payment of all subcontractors and all indebtedness incurred for labor, materials, or any cause whatsoever on account of the Contractor in accordance with the laws of the State of Michigan relating to such bonds.

(2) A bond for 100% of the contract award amount to the Board of Governors of Wayne State University to guarantee and insure the completion of work according to the Contract.

C. The only acceptable Performance Bond shall be the AIA A312 – 2010.

D. Bond must be issued by a Surety Company with an "A rating as denoted in the AM Best Key Rating Guide".

4. BOND CLARIFICATION

For bids below $50,000.00,

A. Bid bond will not be required.
B. Performance Bond will not be required.

5. INSPECTION

A. Before submitting his Proposal, each Bidder shall be held to have visited the site of the proposed work and to have familiarized himself as to all existing conditions affecting the execution of the work in accordance with the Contract Documents. No allowance or extra consideration on behalf of the Contractor will subsequently be made by reason of his failure to observe the Conditions or on behalf of any subcontractor for the same reason.

6. EXPLANATION TO BIDDERS AND ADDENDA

A. Neither the Owner nor Representative nor Purchasing Agent will give verbal answers to any inquiries regarding the meaning of drawings and specifications, and any verbal statement regarding same by any person, previous to the award, shall be unauthoritative.

B. Any explanation desired by Bidders must be requested of the Purchasing Agent in writing, and if explanation is necessary, a reply will be made in the form of an Addendum, a copy of which will be forwarded to each Bidder registered on the Bidders' List maintained by Procurement & Strategic Sourcing.

C. All addenda issued to Bidders prior to date of receipt of Proposals shall become a part of these Specifications, and all proposals are to include the work therein described.

7. INTERPRETATION OF CONTRACT DOCUMENTS

A. If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the drawings, specifications, or other Contract Documents, he may submit to the Purchasing Agent, a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the Contract Documents will be made by an addendum duly issued. A copy of such addendum will be mailed and delivered to each registered Bidder. Each proposal submitted shall list all addenda, by numbers, which have been received prior to the time scheduled for receipt of proposal.

8. SUBSTITUTION OF MATERIALS AND EQUIPMENT*

A. Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalog numbers, or the like, it is so identified for the purpose of establishing a standard, and any material, article, or piece of equipment of other manufacturers or vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided that the material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance and function. It shall not be purchased or installed by the Contractor without the Architect's written approval.

9. TAXES

A. The Bidder shall include in his lump sum proposal and make payment of all Federal, State, County and Municipal taxes, including Michigan State Sales and Use Taxes, now in force or which may be enacted during the progress and completion of the work covered. Information regarding the State of Michigan sales and use tax laws can be found in SOM Revenue Administrative Bulletin 2016-18.

10. REQUIREMENTS FOR SIGNING PROPOSALS AND CONTRACTS

A. The following requirements must be observed in the signing of proposals that are submitted:

(1) Proposals that are not signed by individuals making them shall have attached thereto a Power of Attorney, evidencing the authority to sign the Proposal in the name of the person for whom it is signed.

(2) Proposals that are signed for partnership shall be signed by all of the partners or by an Attorney-in-Fact. If signed by an Attorney-in-Fact, there must be attached to the Proposal a Power of Attorney evidencing authority to sign the Proposal, executed by the partners.

(3) Proposals that are signed for a corporation shall have the correct corporate name thereof and the signature of the President or other authorized officer of the corporation, manually written in the line of the Form of Proposal following the words "signed by". If such a proposal is signed by an official other than the President of the Corporation, a certified copy of resolution of the Board of Directors, evidencing the authority of such official to sign the bid, shall be attached to it. Such proposal shall also bear the attesting signature of the Secretary of the Corporation and the impression of the corporate seal.

11. QUALIFICATIONS OF BIDDERS

A. The Owner may request each of the three (3) low bidders to submit information necessary to satisfy the Owner that the Bidder is adequately prepared to fulfill the Contract. Such information may include past performance records, list of available personnel, plant and equipment, description of work that will be done simultaneously with the Owner's Project, financial statement, or any other pertinent information. This information and such other information as may be requested will be used in determining whether a Bidder is qualified to perform the work required and is responsible and reliable.

12. SPECIAL REQUIREMENTS

A. The attention of all Bidders is called to the General Conditions, Supplementary General Conditions, and Special Conditions, of which all are a part of the Specifications covering all work, including Subcontracts, materials, etc. Special attention is called to those portions dealing with Labor Standards, including wages, fringe benefits, Equal Employment Opportunities, and Liquidated Damages.

B. Prior to award of the project, the apparent low bidder will be required to produce a schedule of values which will include the proposed subcontractors for each division of work and whether the subcontractor is signatory or non-signatory. A contract will not be issued to the apparent low bidder until this document is provided. A contractor will have one week to produce this document. If the required document is not received within this time, the bidder will be disqualified.

13. NOTICE OF AWARD/ACCEPTANCE OF BID PROPOSAL *(revised 12-15-2009)*

A. The Proposal shall be deemed as having been accepted when a copy of the Contract (fully executed by both the vendor and the appropriate signatory authority for the University), with any/all Alternates, Addenda, and Pre-Contract Bulletins, as issued by the office or agent of the Owner has been duly received by the Contractor. After signing the Contracts, the Contractor shall then return all copies, plus any required bonds and certificates of insurance, to the office of the Owner's Representative, at 5454 Cass, Wayne State University, Detroit, MI 48202. Construction will begin when the fully-executed contract has been returned to the Contractor.

14. TIME OF STARTING AND COMPLETION

A. It is understood that the work is to be carried through to substantial completion with the utmost speed consistent with good workmanship and to meet the established start and completion dates.

B. The Contractor shall begin work under the Contract without delay, upon receipt of a fully-executed contract from the Owner, and shall substantially complete the project ready for unobstructed occupancy and use of the Owner for the purposes intended within the completion time stated in the Contract.

C. The Contractor shall, immediately upon receipt of fully-executed contract, schedule his work and expedite deliveries of materials and performance of the subcontractors to maintain the necessary pace for start and completion on the aforementioned dates.

15. CONTRACTOR'S PERFORMANCE EVALUATION *(2-2015)*

In an effort to provide continuous process improvement regarding the construction of various university projects, Wayne State University is embarking upon a process of evaluating the contractor's overall performance following the completion of work. At the conclusion of the construction project a subjective evaluation of the Contractor's performance will be prepared by the Project Manager and the supervising Director of Construction. The evaluation instrument that will be used in this process is shown in Section **00440-01 - Contractor's Performance Evaluation**.

16. BIDDING DOCUMENTS

A. Bid specifications are not available at the University, but are available beginning **September 23, 2019** through Wayne State University Procurement & Strategic Sourcing's Website for Advertised Bids: **http://go.wayne.edu/bids**. The plans for this project can be viewed in advance and/or printed from the above website. Copies of the RFP will not be available at the pre-proposal meeting.

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B. **DOCUMENTS ON FILE *(revised 12-2007)***

(1) *Wayne State University Procurement & Strategic Sourcing's Website.*
All available information pertaining to this project will be posted to the Purchasing web site at **http://go.wayne.edu/bids**.
Information that is not posted to the website is not available/not known.

(2) Notification of this Bid Opportunity has been sent to those entities registered with our ListServ. Available ListServs can be found at **http://www.forms.procurement.wayne.edu/Adv_bid/Adv_Bid_Listserve.html**

(3) Please note: Effective December 1, 2007, bid notices will be sent only to those Vendors registered to receive them via our Bid Opportunities list serve. To register, to **http://go.wayne.edu/bids**, and click on the "Join our Listserve" link at the top of the page.

15. Smoke and Tobacco-Free Policies *(9-2015)*

On August 19, 2015, Wayne State joined hundreds of colleges and universities across the country that have adopted smoke- and tobacco-free policies for indoor and outdoor spaces. Contractors are responsible to ensure that all employees and all subcontractors' employees are in compliance anytime they are on WSU's main, medical, or extension center campuses. The complete policy can be found at http://wayne.edu/smoke-free/policy/.

NOTICE OF MANDATORY PRE-BID CONFERENCE

PROJECT: **Intramural Field**,

PROJECT NOS.: **WSU PROJECT NO. 080-326346**

It is **MANDATORY** that each Contractor proposing to bid on this work must attend a pre-bid conference at the following location:

Wayne State University
5454 Cass Avenue, Conference Room 3
Detroit MI 48202

11:00 – 12:30, local time, September 30, 2019

Please use our online registration form at **https://forms.wayne.edu/5aa587e3de04c#form-9162**, to indicate your attendance at our mandatory Pre-proposal meeting to be held on, **September 30, 2019** at **11:00 – 12:30 pm** and your intent to submit a proposal for the services listed.

The purpose of this conference is to clarify the procedures, scope of work, and to identify any omissions and/or inconsistencies that may impede preparation and submission of representative competitive bids.

In the event that less than 4 individual contractor firms attend the pre-bid conference, the University reserves the right, at its sole discretion, to either reschedule the pre-bid conference or proceed and offer a second pre-bid conference date. (Attendance at only one pre-bid conference will be required).

An attendance list shall be prepared and minutes of the conference shall be furnished to all those attending.

Any clarifications or corrections that cannot be made at the conference will be by Addendum.

For your convenience a map of the University and appropriate parking lots can be downloaded and printed from: **http://campusmap.wayne.edu/**. Guest parking in any of the University student and guest lots is **$8.50**. A detailed list of Cash & Coin operated lots can be viewed at **http://procurement.wayne.edu/cash_and_credit_card_lots.php**. Cash lots dispense change in quarters. Due to time constraints, Vendors are encouraged to avoid parking at meters on the street (especially blue "handicapped" meters).

All available information pertaining to this project will be posted to the Purchasing web site at
http://go.wayne.edu/bids.
Information that is not posted to the website is not available/not known.

AGENDA

I. Welcome and Introductions
A. Wayne State University Representatives
B. Vendor Representatives

C. Sign in Sheet- be sure to include your company name and representative in attendance on the sign in sheet.

II. Brief Overview of Wayne State University
A. Purpose and Intent of RFP.
B. Detailed review of the RFP and the requirements for a qualified response.
C. Review of all pertinent dates and forms that are REQUIRED for a qualified response.

III. Vendor Questions/Concerns/Issues
A. Questions that can be answered directly by the appropriate person in this meeting will be answered and both question and answer will be recorded in the minutes of the meeting.

B. Questions that need to be researched will be answered and a nature of clarification will be emailed to the appropriate ListServ. See **http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_Bid_Listserve.html** for a list of ListServ Bid Lists.

C. Minutes will be emailed to the appropriate ListServ.

D. Questions and concerns that come up after this meeting are to be addressed to **Robert Kuhn**, Procurement & Strategic Sourcing. Discussion with other University members is seriously discouraged and could lead to disqualification from further consideration. All questions and answers will be recorded and emailed to all participants of the RFP.

E. Due date for questions is **October 2, 2019,** 12:00 noon.

IV. Minimum Participation
A. Pre-registration for the Pre-Bid meeting is required. In the event that we do not have four (4) or more eligible bidders pre-registered, the University reserves the right to postpone the Pre-bid meeting with up to 4 business hour notice.

B. If less than 4 individual contractor firms attend the mandatory pre-bid meeting, the University reserves the right, at its sole discretion, to either reschedule the pre-bid conference or proceed and offer a second pre-bid conference date. (Attendance at only one pre-bid conference will be required).

C. On the day of the bid opening, if less than 3 sealed bids are received, the University reserves the right, at its sole discretion, to rebid the project in an effort to obtain greater competition. If the specifications are unchanged during the rebid effort, any contractor who submitted a bid will be given the option of keeping its bid on file for opening after the second bid effort, or of having the bids returned to them unopened.

V. Proposal Due Date**-** **October 7, 2019** , 2:00 p.m.

VI. Final Comments

VII. Adjourn

VENDOR NAME_____

GENERAL CONTRACT - PROPOSAL FORM *(revised 8 - 2019)*

Sealed proposals for lump-sum General Contract will be received at the office of the Procurement & Strategic Sourcing **by electronic submission on October 7, 2019,** until 2:00 p.m. (local time). The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**.

Please Note – Vendors must Pre-qualify themselves when responding to this bid opportunity. Our Prequalification questions can be found on page 4 of this section.

OWNER:	Board of Governors Wayne State University
PROJECT:	**Intramural Field**
PROJECT NO.:	**WSU PROJECT NO. 080-326346**
PROJECT TYPE:	**General Contractor Work**
PURCHASING AGENT:	Robert Kuhn, Sr. Buyer WSU – Procurement & Strategic Sourcing 5700 Cass, Suite 4200 Detroit, Michigan 48202 313-577-7 – 3712/ 313-577-3747 fax ac6243@wayne.edu & copy ab4889@wayne.edu
OWNER'S REPRESENTATIVE:	Alycsa Valentine , Project Manager Design & Construction Services Facilities Planning & Management 5454 Cass Avenue Detroit, Michigan 48202
TO:	Board of Governors Wayne State University Detroit, Michigan

BASE PROPOSAL:

The undersigned agrees to enter into an Agreement to complete the entire work of the Intramural Field project (WSU Project No. 080-326346) in accordance with the Bidding Documents for the following amounts:

_____ $ _____ Dollars

ALTERNATES: The following alternates to the base proposal(s) are required to be offered by the respective bidder. The undersigned agrees that the following amounts will be added to or deducted from the base bid as indicated, for each alternate which is accepted.

ALTERNATE NO. 1: Synthetic Turf

The undersigned agrees to enter into an agreement to complete the Alternate # 1 work of the Intramural Field project and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

Only fill out the Unit Pricing numbers. Alternate No. 1 Synthetic Turf for naming purposes only.

ALTERNATE NO. 2: Add Light Pole Foundations (MUSCO-See appendix for preliminary engineering Musco foundations)

The undersigned agrees to enter into an agreement to complete the Alternate # 2 work of the Intramural Field project and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

(select one) ADD _____ $ _____ Dollars

or
DEDUCT _____ $ _____ Dollars

ALTERNATE NO. 3: Add Poured-in-Place Light Pole Foundations for Bolted Assembly

The undersigned agrees to enter into an agreement to complete the Alternate # 2 work of the Intramural Field project and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

(select one) ADD _____ $ _____ Dollars

or
DEDUCT _____ $ _____ Dollars

ALTERNATE NO. 4: Remove netting system and foundations (6'-0" chain link fence only)

The undersigned agrees to enter into an agreement to complete the Alternate # 2 work of the Intramural Field project and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

(select one) ADD _____ $ _____ Dollars

or
DEDUCT _____ $ _____ Dollars

ALTERNATE NO. 5: Remove – Bollards, Foundations, HD Concrete and striping west of maintenance area

The undersigned agrees to enter into an agreement to complete the Alternate # 2 work of the Intramural Field project and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

(select one) ADD _____ $ _____ Dollars

or
DEDUCT _____ $ _____ Dollars

ALTERNATE NO. 6: Remove all ornamental trees and mulch, replace with lawn

The undersigned agrees to enter into an agreement to complete the Alternate # 2 work of the Intramural Field project and to provide all labor and material associated with the work in accordance with the Bidding Documents for the following amounts:

(select one) ADD _____ $ _____ Dollars

or
DEDUCT _____ $ _____ Dollars

UNIT PRICING (as listed in the detailed specifications, section - _____).

Item No.	Description	**Price per**
Unit Price 1	Synthetic Turf – 2 ¼" Pile – Slit Film – **FIELDTURF: XT-57**	**$ / sq ft**
Unit Price 2	Synthetic Turf – 2 ¼" Pile – Slit Film – **ASTROTURF: Rhino 42**	**$ / sq ft**
Unit Price 3	Synthetic Turf – 2 ¼" Pile – Slit Film – **SHAW: Momentum SD**	**$ / sq ft**
Unit Price 4	Synthetic Turf – 2 ¼" Pile – **FIELDTURF: FieldTurf Classic HD 57**	**$ / sq ft**
Unit Price 5	Synthetic Turf – 2" Pile – **ASTROTURF: Rootzone 3D3 Blend 52**	**$ / sq ft**
Unit Price 6	Synthetic Turf – 2" Pile – **SHAW: Legion HP Dual Fiber**	**$ / sq ft**
Unit Price 7	Removal of unsatisfactory soil and replacement with satisfactory soil material.	**$ / cu yd**
Unit Price 8	Earthwork	**$ / cu yd**
Unit Price 9	Concrete Containment Curb (for synthetic turf)	**$ / lf**
Unit Price 10	Concrete Walks (Heavy Duty)	**$ / cu yd**
Unit Price 11	6'-0" Chain Link Fence and Foundations	**$ / lf**
Unit Price 12	Re-spread of 6" depth topsoil	**$ / cu yd**
Unit Price 13	Concrete Curb and Gutter	**$ / lf**

Allowance:

Area of Concern allowance and material to be added in the following amount as per Specification Section 012100. The allowance expenditure must be accounted for and approved **in advance** by WSU and the architect during the construction phase of the project:

$ 10,000 Dollars

TOTAL BASE PROPOSAL WITH ALLOWANCE:

$ Dollars

PREVAILING WAGES:

Did your company quote based upon **Union or Prevailing Wage Rates** as required?
Yes _____ No _____

CONFICT OF INTEREST:

Are you or any Officer, Owner or Partner in this company an employee of Wayne State University, or have you been an employee within the past 24 months? If Yes, explain below.
Yes _____ No _____

Are any immediate family members of any Officer, Owner or Partner in this company employees of Wayne State University? If Yes, explain below.
Yes _____ No _____

LAWN REPLACEMENT:

The undersigned agrees that, in the event of existing lawn or landscaping damage, due to the Contractor's work, that has not been properly addressed and repaired to the satisfaction of the University, the University may repair/replace the lawn and/or landscaping, and that the expense will be at a **unit cost of $10.00 per square yard for lawn, and landscaping at a rate of 1.5 times the cost of said repairs**, the full cost of which shall be reimbursed by the contractor.

CONTRACT CHANGE ORDERS:

The undersigned agrees to the following pricing formula and rates for changes in the contract work:

Where changed Work is performed, the Contractor may add to the total estimated actual cost for such Work no more than ten (10%) for subcontractor mark-up and seven and one-half percent (7.5%) for self-performed trade work for profit, overhead, insurance, taxes, indirect supervision, bonds, and any other costs not allowed by section 4.02.01

Within 14 days of the project's contract execution Contractor shall provide to the Owner; Subcontractor's hourly labor rate breakdown details. This requirement shall extend to the lowest level of subcontractor participation.

* Job and general overhead includes supervision and executive expenses; use charges on small tools, scaffolding, blocking, shores, appliances, etc., and other miscellaneous job expenses.

** Net labor cost is the sum of the base wages, fringe benefits established by governing trade organizations, applicable payroll taxes, and increased expense for contractor's liability insurance (Workman's Compensation, P.L. and P.D.).

TIME OF COMPLETION:

The Contract is expected to be fully executed on or about 25 calendar days after successful bidder qualification and recommendation of award. The undersigned agrees to start construction **immediately after** receipt of a fully executed contract, and to complete the work as follows:

Substantial Completion will be completed no later than **May 6, 2020.**

LIQUIDATED DAMAGES:

It is understood and agreed that, if project is not completed within the time specified in the contract plus any extension of time allowed pursuant thereto, the actual damages sustained by the Owner because of any such delay, will be uncertain and difficult to ascertain, and it is agreed that the reasonable foreseeable value of the use of said project by Owner would be the sum of **$250.00, Two Hundred Fifty Dollars per day**, and therefore the contractor shall pay as liquidated damages to the Owner the sum of **$250.00, Two Hundred Fifty Dollars per day** for each day's delay in substantially completing said project beyond the time specified in the Contract and any extensions of time allowed thereunder.

TAXES:

The undersigned acknowledges that prices stated above include all applicable taxes of whatever character or description. Michigan State Sales Tax is applicable to the work. Bidder understands that the Owner reserves the right to reject any or all bids and to waive informalities or irregularities therein.

ADDENDA:

The undersigned affirms that the cost of all work covered by the following Addenda are included in the lump sum price of this proposal.

Addendum No._____Date_____ Addendum No._____Date_____

Addendum No._____Date_____ Addendum No._____Date_____

Addendum No._____Date_____ Addendum No._____Date_____

Addendum No._____Date_____ Addendum No._____Date_____

Addendum No._____Date_____ Addendum No._____Date_____

CONTRACTOR'S PREQUALIFICATION STATEMENT & QUESTIONNAIRE:

Our Minimum Requirements for Construction Bids are:

WSU considers this project: General Contractor Work.

Criteria	Small Project bid less than $50,000	Medium Project bid between $50,001 and $250,000	Large Project bid between $250,001 and $2 million	Very Large Project bid greater than $2 million
EMR Rating **(Experience Modification Rating)**	1.0 or Less	1.0 or Less	1.0 or Less	1.0 or Less
Bondable Vendor	N.A.	Required	Required	Required
Length of Time in Construction Business	2 Years	3 Years	5 Years	5 Years
Demonstrated Experience in Projects	1 or more	1 or more	2 or more	3 or more

Similar in Scope and Price in the last 3 years				
Unsuccessful Projects on Campus in last 3 years	None Allowed	None Allowed	None Allowed	None Allowed
Failure to comply with Prevailing Wage and/or Project Labor requirements	None Allowed	None Allowed	None Allowed	None Allowed
Withdrawn University Bid (with or without Bond forfeiture) within the last 3 years **	1 or less	1 or less	1 or less	1 or less
Company currently not in Chapter 11 of the US Bankruptcy Code	1 Year	2 Years	3 Years	3 Years

** Withdrawal of a bid is subject to the University suspension policy, for a period up to one year.

Contractors must complete the following information to determine their eligibility to participate in this bid. This information is required with your Bid to the University

Failure to complete this form in its entirety will result in your bid being disqualified.

Check one of the following on the makeup of your company:

_____ Corporation _____ Individual

_____ Partnership _____ Joint Venture

_____ Other (Explain below):

_____

_____

_____

Diversity Classification: Please indicate the appropriate diversity classification for your company. The University recognizes the following groups as diverse or disadvantaged:

- Majority Owned _____
- Minority Business Enterprises (MBE) _____
- Women Business Enterprises (WBE) _____
- Disabled Veteran Enterprises (DVBE) _____
- Disabled Person Enterprises (DBE) _____
- Veteran Owned Businesses (VBE) _____
- Small Businesses per the US Small Business Administration (SBE) _____
- Other (Please Explain): _____ _____

1. How many years has your organization been in business as a contractor? _____
2. How many years has your organization been in business under its present business name? _____
3. List states in which your organization is legally qualified to do business. _____

   _____
4. Provide the Name and Address of your Liability Insurance Carrier. _____

5. What is your current EMR Rating? _____
   The minimum requirement is an EMR Rating of 1.0 or less for all projects. Bidders with a rating higher than 1.0 understand that their bid may be disqualified, at the sole discretion of the University.

6. What percentage of work performed on projects are by company employees; excluding any hired subcontracting and outsourced relationships, for the bid submitted? _____ %

7. What percentage of work performed on your companies behalf are by subcontracted business relationships; disallowing 1099 contracting work forces, for the bid submitted? _____ %

8. Have you ever failed to complete any work awarded to you? If so, attach a separate sheet of explanation. Include the name of the Project, the customer, the dates of the work, and the amount of the contract?

9. Have you withdrawn a bid after a University bid opening and/or refused to enter into a contract with the University upon notification of award within the last 3 years? If so, state the Project Name and Number, and the date of bid submission below.

10. Has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a construction contract? If so, attach a separate sheet of explanation.

11. List the construction experience of the principals and superintendents of your company.

    Name: _____ Title: _____

    Name: _____ Title: _____

    Name: _____ Title: _____

12. List the construction Projects, and approximate dates, when you performed work similar in Scope to this project.

    Project: _____ Owner: _____

    Contract Amount: _____ Date Completed: _____

    Project: _____ Owner: _____

    Contract Amount: _____ Date Completed: _____

    Project: _____ Owner: _____

    Contract Amount:_____ Date Completed: _____

13. List the construction Projects, and approximate dates, when you performed work similar in Dollar Amount to this project.

    Project:_____ Owner:_____

    Contract Amount: _____ Date Completed: _____

    Project: _____ Owner: _____

    Contract Amount: _____ Date Completed: _____

    Project: _____ Owner: _____

    Contract Amount: _____ Date Completed: _____

14. Is your Company "bondable"? Yes _____ No_____

15. What is your present bonding capacity? $ _____

16. Who is your bonding agent?

    NAME: _____

    ADDRESS: _____

    PHONE: (_____)_____

    CONTACT: _____

17. Does your company agree to provide financial reports to the University upon request? Failure to agree may result in disqualification of your bid? (select one): Yes _____ No _____

18. Does your company agree that all of the Terms and Conditions of this RFP and Vendor's Response Proposal become part of any ensuing agreement? (select one): Yes _____ No _____

19. Does your company agree to execute a contract containing the clauses shown in Section 00500 "Agreement Between Contractor and Owner for Construction"? (select one):Yes _____ No _____

    If "No", clearly note any exceptions to any information contained in the contract documents and include with your proposal. Otherwise, a "No" response without documentation will be considered a non-responsive proposal. In addition, any proposed exceptions may or may not be accepted by the University.

20. Does your company agree to comply with the University **Smoke and Tobacco Free Policies**? Yes _____ No_____

Note: Contractors submitting proposals for this project may, at the discretion of the University, be required to submit references including contact information to be used to assist in the post bid evaluation process for the subject project

ACKNOWLEDGEMENT OF MINIMUM QUALIFICATIONS:

The undersigned has read and understands the minimum qualifications for University construction projects, and has completed the Prequalification section completely and accurately. The undersigned understands that a contractor, who fails to meet the minimum qualifications **in the category identified for this project, will be disqualified from consideration for the project**.

ACCEPTANCE OF PROPOSAL:

The undersigned agrees to execute a Contract, being the Wayne State University standard form titled "Agreement Between Contractor and Owner for Construction" (see section 00500 of the bid documents), provided that we are notified of the acceptance of our Proposal within sixty (60) days of the date set for the opening thereof.

The undersigned below understands that the bid will be disqualified if the Prequalification information above is not completed in its entirety.

NAME OF COMPANY: _____

OFFICE ADDRESS: _____

PHONE NUMBER: _____ DATE_____

SIGNED BY: _____
Signature

_____
(Please print or type name here)

TITLE _____

EMAIL ADDRESS: _____@_____

PREVAILING WAGE RATE SCHEDULE *(revised 11-01-2018)*

POLICY

Wayne State University requires all project contractors, including subcontractors, who provide labor on University projects to compensate at a rate no less than prevailing wage rates.

The rates of wages and fringe benefits to be paid to each class of laborers and mechanics by each VENDOR and subcontractor(s) (if any) shall be not less than the wage and fringe benefit rates prevailing in Wayne County, Michigan, as determined by the United States Secretary of Labor. Individually contracted labor commonly referred to as "1099 Workers" and subcontractors using 1099 workers are not acceptable for work on any of Wayne State's properties. Rates for all counties are available at https://www.wdol.gov/, and Procurement will post the schedules quarterly that pertain to Wayne County on its website at http://procurement.wayne.edu/vendors/wage-rates.php.

Certified Payroll must be provided for each of the contractor's or subcontractor's payroll periods for work performed on any University project. Certified Payroll must accompany Pay Applications, and be fully reconciled with the final Pay Application. Failure to provide certified payroll will constitute a material breach of contract, and pay applications will be returned unpaid, and remain unpaid until satisfactory supporting documents are provided.

Additional information can be found on the University Procurement & Strategic Sourcing's web site at the following URL address: http://procurement.wayne.edu/vendors/wage-rates.php

PROCEDURE

Construction Bids and other Bids or Proposals for work that includes construction shall contain a Prevailing Wage clause outlining a contractor's responsibilities under University policy. Each bid solicitation shall include reference to the most current prevailing wage schedule that contractors can use when preparing their bids.

When compensation will be paid under prevailing wage requirements, the University shall require the following:

- The contractor shall obtain and keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each laborer and mechanic employed in connection with this contract.

- The contractor shall submit a completed certified payroll document [U.S. Department of Labor Form WH 347] verifying and confirming the prevailing wage and benefits rates for all employees and subcontractors for each payroll period for work performed on this project. The certified payroll form can be downloaded from the Department of Labor website at http://www.dol.gov/whd/forms/wh347.pdf.

- A properly executed sworn statement is required from all tiers of contractors, sub-contractors and suppliers which provide services or product of $10,000.00 or greater. Sworn statements must accompany applications for payment. All listed parties on a sworn statement as a subcontractor must submit Partial or Full Conditional Waivers for the amounts invoiced on the payment application. A copy of the acceptable WSU Sworn Statement and Waiver will be provided to the awarded contractor.

If the VENDOR or subcontractor fails to pay the prevailing rates of wages and fringe benefits and does not cure such failure within 10 days after notice to do so by the UNIVERSITY, the UNIVERSITY shall have the right, at its option, to do any or all of the following:

- Withhold a portion of payments due the VENDOR as may be considered necessary by the UNIVERSITY to pay laborers and mechanics the difference between the rates of wages and fringe benefits required by this contract and the actual wages and fringe benefits paid.

- Terminate the contract and proceed to complete the contract by separate agreement with another vendor or otherwise, in which case the VENDOR and its sureties shall be liable to the UNIVERSITY for any excess costs incurred by the UNIVERSITY.

- Propose to the Director of Purchasing that the Vendor be considered for Debarment in accordance with the University's Debarment Policy, found on our website at https://policies.wayne.edu/appm/2-8-debarment-policy-on-non-responsible-vendor-in-procurement-transactions

Terms identical or substantially similar to this section of this RFP shall be included in any contract or subcontract pertaining to this project.

Prior to award of the project, the apparent low bidder will be required to produce a schedule of values which will include the proposed subcontractors for each division of work and whether the subcontractor is signatory or non-signatory. A letter of intent or contract will not be issued to the apparent low bidder until this document is provided. The apparent low bidder will have one week to produce this document. If the required document is not received within this time, the bidder will be disqualified, and the next low bidder will be required to provide this schedule of values.

APPENDIX A FOR THE
PREVAILING WAGE SCHEDULE FOR THIS PROJECT

See web site:

http://go.wayne.edu/bids

Key Performance Indicator Tracking
Sworn Statement Requirements

The University tracks it's level of spend along a number of socio-economic categories. This includes it's spend with Diverse organizations, it's spend with Detroit based organizations, and it's spend with Michigan based organizations. To assist with this, The University has the following requirements for submission of your bid and for Pay Applications submitted by the successful contractor**.**

Submission of Bid

1. **Diverse or disadvantaged prime contractor:** Please specify in your bid whether ownership of your company is a certified diverse or disadvantaged business, according to the categories listed previously in section 00300. In accordance with guidelines from the MMSDC and GL-WBC, the University considers a business to be diverse when it is at least 51% owned, operated, and controlled by one or more members of a diverse classification. Section 00300 has a place for this information on page 00300-3.

2. **Detroit based and Michigan Based contractor:** It is presumed that the contractor is headquartered at the location we submit our Purchase Orders to, and that it should be the same address as listed in Section 00300 at the signature line. If a supplier is headquartered elsewhere, please make note of this information, so we do not inaccurately include or exclude spend.

Pay Applications and Sworn Statements

1. **Applicability:** The University requires Sworn Statements with Pay Applications for all construction projects that use
   - Subcontractors greater than $10,000.00
   - Significant suppliers (those with a purchase value of $10,000 or more).

2. **Sworn Statements:** The Supplier must submit applicable monthly sworn statements to the Project Manager and the Buyer of Record, in the format shown on page 2 of Section 00420. Sworn Statements are "always required" for this project, and are to be submitted to ***(Project_Manager),*** the project manager, and to **Robert Kuhn**, **Sr. Buyer**

3. **Inclusion**: Sworn Statements are to detail the inclusion of recognized diverse and disadvantaged groups in the following 2 categories; Subcontracts or Suppliers. The University recognizes the following groups as diverse or disadvantaged:

   - Minority Business Enterprises (MBE)
   - Women Business Enterprises (WBE)
   - Disabled Veteran Enterprises (DVBE)
   - Disabled Person Enterprises (DBE)
   - Veteran Owned Businesses (VBE)
   - Small Businesses per the US Small Business Administration (SBE)

   1.
4. A complete set of the University's Supplier Diversity Program, which includes complete definitions of each of the above, can be downloaded from our web site at **http://policies.wayne.edu/administrative/04-02-supplier-diversity.php**.

WAYNE STATE UNIVERSITY

Intramural Field
WSU Project No. 080-326346

STATE OF MICHIGAN

Sworn Statement

COUNTY OF _____ } §

_____ , being duly sworn, deposes and says that (s)he makes the Sworn Statement on behalf of _____, who is the Contractor for an improvement to the following described real property situated in _____ County, Michigan, and described as follows:

That the following is a statement of each subcontractor and supplier and laborer, for which laborer the payment of wages or fringe benefits and withholdings is due but unpaid, with whom _____ has subcontracted for performance under the contract with the Owner or lessee thereof, and that the amounts due to the persons as of the date thereof are correctly and fully set forth opposite their names, as follows. (Subcontracts or suppliers of values of less than $1,000 are omitted.)

NO.	SUBCONTRACTOR (Name, Address, Telephone Number) SUPPLIER OR LABORER	S=Supplier C=Contractor	Type of Entity *see below	TYPE OF IMPROVEMENT FURNISHED	TOTAL CONTRACT PRICE	CONTRACT CHANGE +/-	ADJUSTED CONTRACT AMOUNT	AMOUNT PAID TO DATE	AMOUNT CURRENTLY OWING	BALANCE TO COMPLETE
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12	_____									
				TO TALS						

* Type of Entity: MBE=Minority Business Enterprises; WBE=Women Business Enterprises; DVBE=Disabled Veteran Enterprises; DBE=Disabled Person Enterprises; VBE=Veteran Owned Businesses; SBE=Small Businesses per the US Small Business Administration

Please attach additional sheets if the number of items exceeds the page limit.

That _____ has not procured material from, or subcontracted with, any person other than those set forth above and owes no money for the improvement.

Deponent further says that _____ makes the foregoing statement as a representative of _____, for the purpose of representing to the owner or lessee of the above-described premises and his or her agents that the above-described property is free from claims of construction liens, or the possibility of construction liens, except as specifically set forth above and except for claims of construction liens by laborers which may be provided pursuant to section 109 of the construction lien act, Act No. 497 of the Public Acts of 1980, as amended, being section 570.1109 of the Michigan Compiled Laws.

Deponent Signature

WARNING TO OWNER: AN OWNER OR LESSEE OF THE ABOVE-DESCRIBED PROPERTY MAY NOT RELY ON THIS SWORN STATEMENT TO AVOID THE CLAIM OF A SUBCONTRACTOR, SUPPLIER, OR LABORER WHO HAS PROVIDED A NOTICE OF FURNISHING OR A LABORER WHO MAY PROVIDE A NOTICE OF FURNISHING PURSUANT TO SECTION 109 OF THE CONSTRUCTION LIEN ACT TO THE DESIGNEE IS NOT NAMED OR HAS DIED.

ON RECEIPT OF THIS SWORN STATEMENT, THE OWNER OF LESSEE, OR THE OWNER'S OR LESSEE'S DESIGNEE, MUST GIVE NOTICE OF ITS RECEIPT, EITHER IN WRITING, BY TELEPHONE, OR PERSONALLY, TO EACH SUBCONTRACTOR, SUPPLIER AND LABORER WHO HAS PROVIDED A NOTICE OF FURNISHING UNDER SECTION 109 OR, IF A NOTICE OF FURNISHING IS EXCUSED UNDER SECTION 108 OR 108A, TO EACH SUBCONTRACTOR, SUPPLIER OR LABORER WHO HAS PROVIDED A NOTICE OF FURNISHING OR WHO IS NAMED IN THE SWORN STATEMENT MAKES A REQUEST, THE OWNER, LESSEE, OR DESIGNEE SHALL PROVIDE THE REQUESTER A COPY OF THE SWORN STATEMENT WITHIN 10 BUSINESS DAYS AFTER RECEIVING THE REQUEST.

WARNING TO DEPONENT: A PERSON, WHO WITH INTENT TO DEFRAUD, GIVES A FALSE STATEMENT IS SUBJECT TO CRIMINAL PENALTIES AS PROVIDED IN SECTION 110 OF THE CONSTRUCTION LIEN, ACT, ACT NO. 497 OF THE PUBLIC ACTS OF 1980, AS AMENDED, BEING SECTION 570.2220 IF THE MICHIGAN COMPILED LAWS.

(NOTARY STAMP BELOW)

Subscribed and sworn to before me this _____ day of _____

Notary Public _____

_____ County, Michigan - My commission expires: _____

Rev.4_06.05.15

WAYNE STATE UNIVERSITY
PAYMENT PACKAGE DOCUMENT REQUIREMENTS *(Revised 7-23-2015)*:

Review and comply with Section 410 of Bid Front End Documents.
Review and comply with Article 15 of the Supplemental General Conditions.

PAYMENT APPLICATION - AIA document G702 & G703 (or equivalent) –Checklist:

- Correct Project Name – Found on your contract.
- Correct Project Number – Found on your contract.
- Purchase Order Number – Required prior to beginning work.
- Correct Application Number.
- Correct Period Reporting Dates – Applications support docs must be sequential and within application range.
- Approved & Executed Change Orders Listed. (Cannot invoice for unapproved Change Orders)
- Schedule of Values percentages and amounts match the approved Pencil Copy Review – Signed by the Architect, Contractor, and University Project Manager.
- Correct Dates – Back dating not accepted.
- Signed and Notarized.

SWORN STATEMENT – Checklist:

- List all contractors, sub-contractors, suppliers… ≥ $10,000.00
- A sworn statement is required from every Sub Contractor on the job with a material purchase or sub-contract of $10,000 or more. (All tiers.)
- Purchase Order Number
- Dates – Back dating not accepted.
- Signed and Notarized.

CERTIFIED PAYROLL - Dept. of Labor Form WH-347 – Checklist: (Union and Non-Union)

- For every contractor & sub-contractors work, for each week within the application reporting period.
- Correct Project Number
- List ALL workers on-site.
- Make sure their addresses are listed.
- Social Security Numbers MUST be blackened out or listed in XXX-XX-1234 format.
- Work classifications based on the job specific Prevailing Wage Schedule descriptions.
- For any workers paid at the Apprenticeship rates - proof of enrolled program and current completion required.
- Rate of Pay verified against the Prevailing Wage Schedule with an hourly cost breakdown of fringes paid.
- Authorized signatures on affidavit.
- Dates – must represent the weeks within the application period.

APPLICATION PACKAGE SUPPORTING DOCUMENTATION –

- ***Proof of Ownership*** for any ‘Owner Operator’ contractors not wishing to claim their time on prevailing wage. – (Must list their hours and dates worked on the WH-347 Form and enter EXEMPT on the income brackets.) The Owner must provide copies of “DBA” registration form confirming status as exempt from prevailing wage requirements.

- ***Proof of Stored Materials*** – Bill of Lading, Delivery Receipts, Pictures, Certificate of Insurance or endorsement pate specifically insuring stored material at location, and pictures with materials clearly

separated and labeled for WSU. The University reserves the right to on site verification of stored materials.

- ***Partial Conditional Waivers*** – The contractor shall provide covering the entire amount of the application. For non-bonded projects all sub-contractors must provide for all applications which they have a draw.

- ***Partial Unconditional Waivers*** – Must release amount paid for work and be delivered starting with application #2 and in no case after payment application #3, through all sequential applications for contractors, sub-contractors, and suppliers listed on the Sworn Statements.

- ***Full Unconditional Waivers*** – Must be delivered with final payment application, releasing all contractors, sub-contractors, suppliers listed on the sworn statements and any legitimate notice of furnishings reconciled.

FINAL PAYMENT APPLICATION – Checklist:

- Clear and concise As-Built drawings.
- Operation and Maintenance Manuals
- Process and training directions (if applicable).
- Warranty of work in accordance with project documents.
- Submittals log and samples installed on the job.
- Certificate of Substantial Completion
- Full Unconditional Waiver
-

The Project Manager may provide additional requirements as may apply to individual jobs

Revised 11-01-2018

Contractor Performance Evaluation

In an effort to provide continuous process improvement regarding the construction of various university projects, Wayne State University is embarking upon a process of evaluating the contractor's overall performance following the completion of work. At the conclusion of the construction project a subjective evaluation of the Contractor's performance will be prepared by the Project Manager and the supervising Director of Construction. The evaluation instrument that will be used in this process is presented below:

Contractor Evaluation Sheet

Contractor Name : _____ Project Name: _____
Contractor's PM:_____ PM Name:_____
Superintendent:_____ Project Number:_____ PO#:_____
Designer:_____

EVALUATION SCORING: 1 = Unacceptable, 2 = Less than Satisfactory, 3 = Satisfactory or Neutral, 4 = Good, 5 = Excellent
Note: Comments are REQUIRED if any score is less than 3. Write comments on the back of the evaluation.

		Score					Weight	Total
Field Management								
1)	Work Planning / Schedule:	1	2	3	4	5	8	
2)	Compliance with Construction Documents:	1	2	3	4	5	8	
3)	Safety Plan & Compliance:	1	2	3	4	5	5	
4)	Compliance with WSU procedures:	1	2	3	4	5	7	
5)	Effectiveness of Project Supervision:	1	2	3	4	5	8	
6)	Project Cleanliness:	1	2	3	4	5	3	
7)	Punch List Performance:	1	2	3	4	5	5	
8)	Contractor Coordination with WSU Vendors:	1	2	3	4	5	3	
9)	Construction Quality:	1	2	3	4	5	8	
Administrative Management								
10)	Responsiveness:	1	2	3	4	5	4	
11)	Contractor communication:	1	2	3	4	5	4	
12)	Contractor Professionalism:	1	2	3	4	5	3	
13)	Subcontractor Professionalism:	1	2	3	4	5	3	
14)	Compliance with Contract Requirements:	1	2	3	4	5	3	
15)	Submittal\RFI Process:	1	2	3	4	5	4	
16)	Close-out - Accuracy of Documents	1	2	3	4	5	7	
Invoice and Change Management								
17)	Change Management	1	2	3	4	5	7	
18)	Applications for Payment	1	2	3	4	5	6	
19)	Timely payment of Subs/Suppliers:	1	2	3	4	5	4	
							Total 100	**Total**
20)	Level of Self-Performance:	Low		Med		High		
21)	Would you work with this Contractor again?			Yes		No		
22)	Would you work with this team again?			Yes		No		
One year follow up								
23)	Warranty Support:	1	2	3	4	5		

Evaluator

Signature_____ Date:_____
Title:
Name:
Please Print

Rev. 2-17-2015 RGP

We are providing the evaluation instrument at this time to allow the bidder's to review and understand the criterion that the University's project management team will use to evaluate the successful bidder's performance at the conclusion of the project. It is the intent of the university to utilize the results of this evaluation to determine if it will continue to conduct business with the Contractor in future bidding opportunities.

The scoring range is between 100 to 500 points, with 100 being low and 500 being high. Each question has an associated 'weight' factor, and the higher the weight; the greater the importance of satisfactory performance on the final score. At the conclusion of the project, and after the Project Manager and the supervising Director has prepared their independent evaluation, the University's project representative will meet with the Contractor to review the results. Acceptable contractor performance is essential to avoid having the University decline future work with the Contractor. An appeals process is available for Contractor disagreement with evaluation scores.

Contractors engaged in work are encouraged to maintain an open and regular dialog with the Design and Construction Department over the course of the construction project to ensure that the final evaluation is an accurate representation of the Contractor's performance.

CONSOLIDATED AGREEMENT FOR CONSTRUCTION GENERAL CONTRACTING

BOARD OF GOVERNORS OF WAYNE STATE UNIVERSITY
DETROIT, MICHIGAN

With

[GENERAL CONTRACTOR'S NAME]

For

[NAME PROJECT]

Wayne State University Contract Number _____

This Agreement is entered into on _____, 20__, by and between the Board of Governors of Wayne State University, called "University" in this Agreement, and [CONTRACTOR NAME], called "Contractor" in this Agreement, to provide construction labor and materials as outlined in the Bid accepted [ENTER DATE HERE], attached to this Agreement as Exhibit A, for the Project described in this Agreement.

[ENTER A BRIEF DESCRIPTION OF THE PROJECT]

1.00 CONTRACT DOCUMENTS

The Contract Documents shall consist of this Agreement, the Contractor's Bid or Proposal attached to this Agreement as Exhibit A only insofar as consistent with the other Contract Documents, the General Conditions of Construction, the Supplementary General Conditions, the approved plans and specifications, and other documents listed in Article 11, Inclusion by Reference. In the case of conflicts between the Contractor's Bid and this Agreement or other Contract Documents, the language of this Agreement and the other Contract Documents shall prevail over the Contractor's Bid or Proposal.

2.00 DESIGN PROFESSIONAL

The Design Professional for this Project is:

[NAME]
[ADDRESS]

The University intends that the relationship between the Contractor, Design Professional and University will be one of mutual cooperation and respect in order to promote efficiency and quality in the Project work.

3.00 CONTRACTOR'S RESPONSIBILITIES

3.01 Scope of Work

The Contractor shall furnish all labor, materials, equipment, project management and construction superintendent services necessary to construct the Work in accordance with the approved Contract Documents and executed Change Orders, including requirements reasonably inferable therefrom.

3.02 Skill and Judgment

The Contractor covenants with the University to furnish its best skill and judgment in furthering the interests of the University as defined in the Contract Documents. The Contractor shall perform all obligations under the Contract Documents using efficient business administration, superintendence and best efforts to facilitate the expeditious and timely completion of the Project consistent with the interests of the University as expressed in the Contract Documents. The Contractor acknowledges that significant effort will be invested in complying with the Contractor's Construction Schedule, and in maintaining construction quality. Accordingly, the Contractor further acknowledges that the greatest degree of professionalism is expected from the Contractor and the Design Professional in accomplishing their respective contractual obligations and that when potential conflicts exists, each shall demonstrate appropriate respect, professionalism and cooperation with each other in resolving such conflicts.

3.03 Scheduling

The Contractor shall develop a Contractor's Construction Schedule that clearly indicates the interrelationship of activities and defines the critical path of the entire Project. The Contractor shall submit a preliminary Contractor's Construction Schedule, by the earlier of fifteen (15) days from either the Notice to Proceed or the execution of this Agreement. The Contractor shall provide iterative updates to the Contractor's Construction Schedule with each Application for Payment, but no less than monthly. Upon request by the

University, the Contractor shall prepare and submit a resource-loaded Contractor's Construction Schedule to the University and Design Professional for approval.

3.04 Construction

3.04.1 Subcontracts and Purchase Agreements

The Subcontracts shall be solely between the Contractor and the Subcontractors. Nothing in any Subcontract shall establish any contractual relationship between the University and any Subcontractor. However, the University is an intended third-party beneficiary of all Subcontracts, purchase orders and other agreements; the Contractor shall incorporate the obligations of the Contract Documents into its respective Subcontracts, supply agreements and purchase orders.

The Contractor will screen and pre-qualify, utilizing appropriate industry standards, potential Subcontractors for the Work keeping in mind the requirement to recruit and encourage Minority/Women Business Enterprise participation. The University shall have the right to review and approve all Subcontractors qualified or rejected for qualification by the Contractor. The Contractor shall notify the University of all Subcontractors to be used, and the Contractor shall remove any Subcontractor to which the University has an objection.

The Contractor shall obtain appropriate guarantees and warranties acceptable to the University from the Subcontractors, which shall be for the direct benefit of the University.

3.04.2 Construction Supervision

a) The Contractor shall establish sufficient on-site organization, staffing and support as well as clear lines of authority in order to expeditiously complete the Project in accordance with the Contract Documents, in every aspect, on a totally coordinated basis.

b) The Contractor shall maintain a competent full-time staff available at the site while Work is being performed to supervise, schedule and coordinate the performance of the Work of all Subcontractors in accordance with the University's objectives including cost, time for completion and quality of the Work. Contractor’s Staffing Plan is attached as Exhibit D to this Agreement. The Staffing Plan shall not be changed, except with the written consent of the University’s Representative unless members of the Project Staff cease to be in the employ of the Contractor.

c) The Contractor shall notify the University of the dates, times and locations of conferences with Subcontractors and schedule and conduct regular progress meetings to be attended by all parties in interest including the University to discuss such matters as procedures, progress, job problems, scheduling, coordination, changes, and related matters.

d) The Contractor shall take, transcribe and promptly distribute to all parties, including the University, minutes of such progress meetings with the Subcontractors, weekly job meetings and monthly management meetings.

e) The Contractor shall maintain an on-site daily log of construction progress, problems and items of special interest. The Contractor shall provide digital photographic files and digital recording showing Project status or progress. Such logs, records, photographs and videos shall be immediately available to the University upon request.

f) The Contractor shall furnish monthly written progress reports on the Subcontractors' work in a form acceptable to the University and assist the Design Professional and the University with periodic and final inspections of the Work. At all inspections preceding the final inspection, the Contractor shall furnish a detailed report to the University of observed discrepancies, deficiencies, and omissions in the Work

performed by any Subcontractor.

g) The Contractor shall provide and maintain a correct layout of the structures and monitor the Work to verify that all lines and levels are adhered to by the Subcontractors. The Contractor shall immediately report in writing all discrepancies with respect to design details for prompt resolution by the Design Professional.

h) The Contractor shall submit any Request for Information (RFI) to the Design Professional and University only after attempting to determine if the requested clarification is contained in the Contract Documents; any RFI shall contain sufficient detail to allow a response within seven (7) calendar days of when the RFI is submitted. In no event shall the response to an RFI be considered delayed unless more than fourteen days have passed since the RFI was submitted.

i) The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract Documents or that which is reasonably inferable for the completion of the Project.

j) The Contractor shall be responsible to the University for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing any portion of the Work related to a contract with the Contractor.

k) The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities of the University, Design Professional, or by tests, inspections or approvals required or performed by persons other than the Contractor, except where such relief is authorized by the University in writing in accordance with this Agreement.

l) The Contractor shall inspect portions of Work performed or portions of existing facilities being renovated in this Project to determine that such portions are in proper condition to receive subsequent Work. Further, the Contractor shall plan for and call for the review of the Work by the University's commissioning agents as required. The Contractor's Construction Schedule shall include activities that recognize this coordination responsibility.

3.04.2.1 Safety

The Contractor shall protect adjoining property and nearby buildings, roads, and other facilities and improvements from dust, dirt, debris and other nuisances arising out of Contractor’s operations or storing practices. Dust shall be controlled by sprinkling, negative pressure exhausting or other effective methods acceptable to University. Fugitive dust from interior demolition shall be controlled by negative pressure exhausting. An erosion and sedimentation control program shall be initiated, which includes measures addressing erosion caused by wind and water and sediment in runoff from site. A regular watering program shall be initiated to adequately control the amount of fugitive dust.

The Contractor is knowledgeable of and understands that the University may intend to maintain occupancy of certain portions of the existing facility. The Contractor shall exercise precaution at all times for the protection of persons and their property. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (1) employees on the Work and other persons who may be affected thereby; (2) the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor’s subcontractors or sub-subcontractors; and (3) other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction. The Contractor shall install adequate safety guards and protective

devices for all equipment and machinery, whether used in the Work or permanently installed as part of the Project.

The Contractor shall also provide and adequately maintain all required means of egress, including but not limited to, proper temporary walks, roads, guards, railings, lights, and warning signs. The Contractor shall comply with all applicable laws relating to safety precautions. The Contractor shall establish, maintain and update a Project Specific Safety Program.

The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the University and Design Professional.

The Contractor shall require each and every one of its subcontractors and Trade subcontractors to comply with all of the provisions of this section.

The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in the Contract.

3.04.2.2 Hazardous Condition

The University and/or the Design Professional may bring to the attention of the Contractor a possible hazardous situation in the field regarding the safety of personnel on the site. The Contractor shall be responsible for verifying that all local, state, and federal workplace safety guidelines are being observed. In no case shall this right to notify the Contractor absolve the Contractor of its responsibility for monitoring safety conditions. Such notification shall not imply that anyone other than the Contractor has assumed any responsibility for field safety operations.

Explosives shall not be used without first obtaining written permission from the University and then shall be used only with the utmost care and within the limitations set in the written permission and in accordance with prudence and safety standards required by law. Storage of explosives on the Project site or University is prohibited. Powder activated tools are not explosive for purposes of this Article; however, such tools shall only be used in conformance with State safety regulations.

The Contractor shall immediately make a report to the University's Police Department and report in writing to the University's Representative, within eight (8) hours, all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site but on University property, which caused death, personal injury or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger. If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall report promptly the facts in writing to the University's Representative, giving full details of the claim.

3.04.2.3 University's Right to Stop the Work

If the Contractor fails to correct work which is not in accordance with the requirements of the Contract Documents as required, or persistently fails to carry out work in accordance with the Contract Documents, the University Representative, by written order may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the University to stop the

Work shall not give rise to a duty on the part of the University to exercise this right for the benefit of the Contractor or any other person or entity.

It is understood that while the Contractor is fully responsible for the safety of the Work, and for the methods of its execution, if the University deems that the Contractor is failing to provide safe conditions, the University may stop the Work under such conditions. However, this ability shall not create such duty on the University. Under no circumstance shall the Contractor be granted a time extension or Contract Sum increase for conditions resulting by a stop work order.

3.04.2.4 University's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a three (3) day period after receipt of written notice from the University to commence and continue correction of such default or neglect with diligence and promptness, the University may after such three (3) day period, without prejudice to other remedies the University may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Design Professional's additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the University.

3.04.3 Document Management

The Contractor shall maintain at the job site, on a current basis, all Project documents including plans, specifications, shop drawings, samples, submittal, purchase orders, Subcontracts, material specifications, and any other related documents, and revisions thereto, which arise out of or relate to the Project, this Agreement or the Work. Prior to final payment, copies of all such records shall be provided to the University.

The Contractor shall be responsible for reviewing, processing and paying applications by Subcontractors for progress and final payment. The University will compensate the Contractor monthly based on the requirements of Article 4.04, Application For Payment.

The Contractor shall prepare and submit to the University every three months a report of the total M/WBE participation in the Project to demonstrate compliance with Paragraph 3.04.6 together with a projection of M/WBE participation through Final Completion.

3.04.3.1 Review of Contract Documents and Field Conditions by Contractor

Execution of the Contract by the Contractor is a representation that the Contractor shall have thoroughly and carefully examined the site of the of Work; investigated any and all conditions which can affect the Work or its cost, including but not limited to, availability of labor, materials, supplies, water, electrical power, roads, access to the site, University episodic and scheduled closures, uncertainties of weather, water tables, the character of equipment and facilities needed to perform the Work, and local conditions under which the Work is to be performed; and further, that the Contractor shall insure that the documents issued for bidding by Trade Contractors reflect the results of this investigation and are adequate to complete the Work. It is the responsibility of the Contractor to be familiar with the materials, equipment, or procedures to be used in the Work, or which in any other way could affect the completion of the Work. Any failure to properly familiarize themselves with the proposed Work shall not relieve the Contractor from the responsibility for completing the Work in accordance with the Contract Documents.

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Project. Contract Documents are complementary, and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to be consistent with the

Contract Documents and the highest standard of care. In the case of an inconsistency between, or perceived omission or error in the Drawings, Specifications, or other Contract Documents which is not clarified by addendum or RFI, or should the Contractor be in doubt as to their exact meaning, the Contractor shall notify the Design Professional and the University prior to performing any related Work. The University shall not be responsible for the Contractor's misinterpretations of Drawings and Specifications and/or other Contract Documents.

The Contractor shall have a continuing duty to read, carefully study and compare the Contract Documents and product data with each other and with information furnished by the University, and shall at once report to the Design Professional and the University errors, inconsistencies, ambiguities and omissions before proceeding with the affected Work. The Contractor shall be liable to the University for damage resulting from errors, inconsistencies or omissions in the Contract Documents, relating to constructability if the Contractor recognized or should have recognized such error, inconsistency, ambiguity or omission and failed to report it to the Design Professional and the University. If the Contractor performs any construction activity which involves such error, inconsistency, ambiguity or omission in the Contract Documents relating to constructability, without such notice to the Design Professional and the University, the Contractor shall assume responsibility for such performance and shall bear all costs attributable for correction. If the Contractor submits authorized substitutes that cost in excess of the Contract Sum which cause coordination conflicts, the Contractor shall bear all costs attributable to correction.

The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Design Professional prior to performing any affected Work.

The Contractor shall perform the Work in accordance with the Contract Documents.

3.04.4 Cash Flow Estimates and Cost Control

At the University's request, the Contractor shall prepare a Cash Flow Estimate indicating the anticipated schedule of payment application amounts within fifteen (15) days after the Contractor's Bid has been accepted. The Cash Flow Estimate shall be revised periodically, at least every three months, unless significant deviations are expected or otherwise more frequently as requested by the University.

The Contractor shall review requests for changes with the University, and with the University's approval, obtain quotations from affected Subcontractors. Bulletins to Subcontractors shall define the scope of the change and require pricing using either lump sum, time and materials or cost of Work for all items of Work, including overhead and profit as may be defined in the Bid and this Agreement and shall include costs related to schedule delays, if applicable. Where both additions and deductions are involved, each should be calculated separately. Contractor shall be responsible for reviewing the pricing submitted by Subcontractors for accuracy, completeness, and reasonableness.

3.04.5 Minority/Women Business Enterprise Participation

The University makes a continuous effort to strongly encourage Minority Business Enterprise (MBE) and Women Business Enterprise (WBE) contractors and supplier to bid on and participate in University contracts. To the fullest extent permitted under federal and Michigan law, you are strongly encouraged to retain the services of WBE and MBE Subcontractors and suppliers of goods and services in connection with performance of this Contract. For purposes of this Contract, MBE is defined as a business entity in which 51% or minority individuals hold more of the voting shares and interest in the enterprise. The minority ownership of the enterprise shall have management and investment control of the company. WBE is defined as a business entity in which 51% or a woman or women hold more of the voting shares and interest in the enterprise.

The female ownership of the enterprise shall have management and investment control of the company.

3.04.7 Time of Completion

The Contractor acknowledges that time is of the essence in performing and completing the Work on the Project. Accordingly, the Contractor shall comply with the activity and milestone completion dates as defined in the Contractor's Construction Schedule as mutually agreed by the Contractor, the University and the Design Professional. The Contractor shall provide, prepare and/or participate in developing schedules, submittals, shop drawings, construction schedules, close out documents, or other activities consistent with the conditions of the Contract Documents and as set forth below:

A. Substantial Completion: [ENTER COMPLETION DATE]

B. Punchlist Completion: [ENTER COMPLETION DATE]

C. Final Completion: [ENTER COMPLETION DATE]

3.04.8 Timely Completion

Contractor acknowledges that the University has scheduled use of the Project immediately following the Dates of Substantial Completion. In scheduling that use, the University may have signed contracts and otherwise made financial commitments relating to the use of the Project no later than the date of Substantial Completion. In the event that the Contractor fails to complete on or before the date for Substantial Completion, the Contractor shall be responsible to reimburse the University for all direct, indirect and administrative costs and expenses incurred in locating, coordinating and securing alternate sites, refunding deposits, and taking any other reasonable action as a consequence of the Contractor's failure to achieve Substantial Completion by the date stated in this Agreement.

The University shall be entitled to retain from the Contractor those damages incurred upon the Contractor's default of Substantial Completion, as provided above.

The Contractor further agrees to complete 100% of all punchlist items, documented on the Substantial Completion certificate, within forty-five (45) days of the date of Substantial Completion. Nothing in this Article 3.04.08 shall be construed as a limitation or waiver on such other rights as the University may have.

3.04.8.1 Substantial Completion

"Substantial Completion" shall mean the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the University can occupy or utilize the Work for its intended use. Substantial Completion shall only be determined as described in the Contract Documents.

3.04.8.2 Final Completion

"Final Completion" means the completion of all the Work in accordance with the Contract Documents and the acceptance thereof by the University. Completion of the Work includes (1) full performance of all Contract terms; (2) acceptance of the Work by University; (3) resolution of all outstanding Changes of Contract; (4) completion of all "punch-list" items; and (5) delivery of all Close-out Documents.

3.05 Contractor's Insurance

The Contractor shall not commence Work under this Contract until it has obtained all the insurance required by the Contract Documents and such insurance has been approved by the University; likewise, no subcontractor or subconsultant shall be allowed to commence Work until the insurance required has been obtained. The Contractor shall, at its expense, purchase and maintain in full force and effect such insurance as will protect itself and the University from claims, such as for bodily injury, death, and property damage, which may arise out of or result from the Work required by the Contract Documents, whether such Work is done by the Contractor, by any subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. The types of such insurance and any additional insurance requirements are specified herein with the amounts and limits set forth in the Supplementary General Conditions.

3.05.1 Policies and Coverage

The following policies and coverages shall be furnished by the Contractor promptly upon request by the University:

(1) Comprehensive or Commercial Form General Liability Insurance covering all Work done by or on behalf of the Contractor and providing insurance for bodily injury, personal injury, property damage, and Contractual liability. Except with respect to bodily injury and property damage included within the products and completed operations hazards, the aggregate limit shall apply separately to work required of the Contractor by these Contract Documents. This insurance shall include the contractual obligations assumed under the Contract Documents and specifically section 4.06.

(2) Business Automobile Liability Insurance on an “Occurrence” form covering owned, hired, leased, and non-owned automobiles used by or on behalf of the Contractor and providing insurance for bodily injury, property damage, and Contractual liability.

(3) Worker’s Compensation and Employer’s Liability Insurance as required by Federal and Michigan law. The Contractor shall also require all of its Subcontractors to maintain this insurance coverage.

(4) The Umbrella Excess Liability insurance must be consistent with and follow the form of the primary policies, except that Umbrella Excess Liability insurance shall not be required for the Medical Expense Limit.

(5) Builder's Risk Insurance.

(6) Professional Liability Insurance (Errors and Omissions).

3.05.2 Proof of Coverage

Certificates of Insurance, or other evidence of the insurance required by these Contract Documents or requested by the University, shall be submitted by the Contractor to the University. The Certificates of Insurance shall state the scope of coverage and deductible, identify any endorsements to the policies and list the University as an additional named insured. Any deductible shall be the Contractor's liability. The Certificates of Insurance shall provide for no cancellation or modification of coverage without thirty (30) days prior written notice to the University. Acceptance of Certificates of Insurance by the University shall not in any way limit the Contractor’s liabilities under the Contract Documents. In the event the Contractor does not comply with these insurance requirements, the University may, at its option, provide insurance coverage to protect the University; the cost of such insurance shall be deducted from the Contract Sum or otherwise paid by the Contractor. Renewal certifications shall be filed in a timely manner for all coverage until the Project is accepted as complete. Upon the University's request, the Contractor shall provide copies of the policies obtained from the insurers.

3.05.3 Subcontractor's Insurance

The Contractor shall either require subcontractors to carry the insurance or the Contractor shall insure the activities of the subcontractors in the amount, types and form of insurance required by the Contract Documents. If the Contractor elects to have its subcontractors purchase individual insurance policies, the Contractor's subcontracts shall include a clause requiring that copies of any insurance policies which provide coverage to the Work shall be furnished to the University. The Contractor shall supply the University with a list of all subcontractors showing whether or not they have individual insurance policies and certifying that those subcontractors without individual insurance policies are insured by the Contractor.

3.05.4 Scope of Insurance Coverage

The Contractor's insurance as required by the Contract Documents (including subcontractors' insurance), by endorsement to the policies and the Certificates of Insurance, shall include the following and may be presented in the form of a rider attached to the Certificates of Insurance:

(1) The Board of Governors of Wayne State University, the University, their officers, employees, representatives and agents including the Design Professional, shall be included as additional named insureds for and relating to the Work to be performed by the Contractor and subcontractors. This shall apply to all claims, costs, injuries, or damages.

(2) A Severability of Interest Clause stating that, "The term 'insured' is hereby used severally and not collectively, but the inclusion herein of more than one insured shall not operate to increase the limits of the insurer's or insurers' liability."

(3) A Cross Liability Clause stating that, "In the event of claims being made under any of the coverages of the policy or policies referred to herein by one or more insured hereunder for which another or other insured hereunder may be liable, then the policy or policies shall cover such insured or insured against whom a claim is made or may be made in the same manner as if separate policies had been issued to each insured hereunder. Nothing contained herein, however, shall operate to increase the insurer's limits of liability as set forth in the insuring agreements."

(4) The Board of Governors of Wayne State University, the University, their officers, employees, representatives and agents, shall not by reason of their inclusion as insured incur liability to the insurance carriers for payment of premiums for such insurance. However, the Board of Governors of Wayne State University may, in their sole discretion after receiving a notice of cancellation for nonpayment, elect to pay the premium due and deduct such payment from any sums due to the Contractor or recover the amount paid from the Contractor if the sums remaining are insufficient.

(5) Coverage provided is primary and is not in excess of or contributing with any insurance or self-insurance maintained by the Board of Governors of Wayne State University, the University, their officers, employees, representatives and agents.

3.05.5 Miscellaneous Insurance Provisions

The form and substance of all insurance policies required to be obtained by the Contractor shall be subject to approval by the University. All such policies shall be issued by companies lawfully authorized to do business in Michigan and be acceptable to the University. All property insurance policies to be obtained by the Contractor shall name the University as loss payee as its interest, from time to time, may appear.

The Contractor shall, by mutual agreement with the University and at the University's cost, furnish any additional insurance as may be required by the University. The Contractor shall provide appropriate endorsements evidencing such additional insurance.

In the event that the scope of Work includes asbestos abatement, the Contractor or subcontractor, as appropriate, shall provide $1,000,000 asbestos liability insurance.

The University is not required to provide or purchase any additional insurance with respect to this Project or the Work required of the Contractor for the Project.

3.05.6 Loss Adjustment

Any insured loss is to be adjusted with the University and made payable jointly to the University and the Contractor. The Contractor shall cooperate with the University in a determination of the actual cash value or replacement value of any insured loss. Any deductible amount shall be the responsibility of the Contractor to resolve.

3.05.7 Compensation Distribution

The University upon the occurrence of an insured loss shall account for any money so received and shall distribute it in accordance with such agreement as the interested parties may reach. Claim payments received shall be distributed proportionately according to the actual percentages of losses to both. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate contract change order. Any dispute shall be resolved by the University.

3.05.8 No Waiver of Subrogation

The University does not waive any rights of Subrogation that it may possess on this Project.

3.06 Indemnification

3.06.1

To the fullest extent permitted by law, the Contractor shall hold harmless, defend, and indemnify the Board of Governors of Wayne State University, the University, and officers, employees, representatives and agents of each of them, from and against any and all claims or losses arising out of or are alleged to be resulting from, or relating to (1) the failure of the Contractor to perform its obligations under the Contract or the performance of its obligation in a willful or negligent manner; (2) the inaccuracy of any representation or warranty by the Contractor given in accordance with or contained in the Contract Documents; and (3) any claim of damage or loss by any subcontractor, or supplier, or laborer against the University arising out of any alleged act or omission of the Contractor or any other subcontractor, or anyone directly or indirectly employed by the Contractor or any subcontractor.

3.06.2

To the fullest extent permitted by law, the Contractor shall be liable for and hereby agrees to defend, discharge, fully indemnify and hold the University harmless from and against any and all claims, demands, damages, liability, actions, causes of action, losses, judgments, costs and expenses of every nature (including investigation costs and/or expenses, settlement costs, and attorney fees and expenses incident thereto) sustained by or asserted against the University arising out of, resulting from, or attributable to the performance or nonperformance of any Work and/or obligation covered by the Contract or to be undertaken in connection with the construction of the Project contemplated by the Contract (collectively, "Claim"), including, but not limited to, any Claim for: (a) any personal or bodily injury, illness or disease, including death at any time resulting therefrom of any person, (including, but not limited to, employees of the University, the Contractor, any subcontractor, and any materialman and the general public); (b) any loss, damage or destruction of any property; (c) any loss or damage to the University's operations, arising out of, resulting from, or attributable in whole or in part to (i) any negligence or other act or omission of the Contractor, and

any subcontractor, any materialman and/or any other person or any of the directors, officers, employees or agents of any of them or (ii) any defects in material or equipment furnished hereunder; (d) any payments allegedly owed to subcontractors, sub-subcontractors or materialmen; (e) any acts or omissions relative to conditions of safety and protection of persons on the Project site; and/or (f) any act or omission relative to the Contractor's breach of obligations and regarding non-discrimination as set forth in these General Conditions. The Contractor shall not be liable hereunder to indemnify the University against liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence or willful misconduct of the University, its agents or employees. The Contractor, at its own cost and expense, shall take out and maintain at all times during the effective period of the Contract, contractual liability insurance insuring the performance by the Contractor of its contractual duties and obligations under this Article, which insurance shall name the University as additional insured and shall be in form and amount and from an insurance company satisfactory to the University. The Contractor's duty to fully indemnify the University shall not be limited in any way by the existence of this insurance coverage.

3.06.3

The Contractor shall also be liable for and hereby agrees to pay, reimburse, fully indemnify and hold the University harmless from and against all costs and expenses of every nature (including attorney fees and expenses incident thereto) incurred by the University in collecting the amounts due from the Contractor, or otherwise enforcing its rights, under the indemnifications described in this Article.

3.06.4

In claims against any person or entity indemnified under this Article made by an employee of the Contractor or a Subcontractor, supplier or indirectly employed by any of them, or anyone for whose acts is made liable, the indemnification obligation under this Article shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor, Subcontractor or supplier under workers compensation laws, disability benefit laws, or other laws providing employee benefits.

3.06.5

The indemnification obligations under this Article shall not be limited by any assertion or finding that the person or entity indemnified is liable by reason of a non-delegable duty.

3.06.6

The Contractor shall hold harmless, defend, and indemnify the University from and against losses resulting from any claim of damage made by any separate contractor of the University against the University arising out of any alleged acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by either the Contractor or subcontractor, or anyone for whose acts either the Contractor or subcontractor may be liable.

3.06.7

The Contractor shall hold harmless, defend, and indemnify the separate Contractors of the University from and against losses arising out of the negligent acts or omissions or willful misconduct of the Contractor, a subcontractor, anyone directly or indirectly employed by the Contractor or subcontractor, or anyone for whose acts the Contractor or subcontractor may be liable.

3.07 Guarantee

The Contractor unconditionally guarantees the Work under this Contract to be in conformance with the Contract Documents and to be and remain free of defects in workmanship and materials not inherent in the

quality required or permitted. Contractor shall repair or replace any Work, together with any adjacent Work which may be displaced in so doing, which is not in accordance with the requirements of the Contract or which is defective in its workmanship or material, all without any expense whatsoever to the University for a period of one (1) year / two (2) years from the date of Substantial Completion, unless a longer guarantee period is stipulated in the Contract Documents or otherwise available from the manufacturer ("Repair Period").to.

Special guarantees that are required by the Contract Documents shall be signed by the Contractor who is responsible for the entire work and countersigned by the subcontractor who performs the work.

The Contractor further agrees that within five calendar days after being notified in writing by the University of any Work not in accordance with the requirements of the Contract Documents or of any defects in the Work, it shall commence and prosecute with due diligence all Work necessary to fulfill the terms of this guarantee and to complete the Work in accordance with the requirements of the Contract with sufficient manpower and material to complete the repairs as expeditiously as possible. The Contractor, in the event of failure to so comply, does hereby authorize the University to proceed to have the Work done at the Contractor's expense, and it agrees to pay the cost thereof upon demand. The University shall be entitled to all costs necessarily incurred upon the Contractor's refusal to pay the above cost.

Notwithstanding the foregoing paragraph, in the event of an emergency constituting an immediate hazard to health, safety or damage of the University's employees, property, or licenses, the University may undertake at the Contractor's expense, without prior notice, all Work necessary to correct such hazardous conditions caused by the Work of the Contractor not being in accordance with the requirements of this Contract.

The Contractor shall require a similar guarantee in all subcontracts, including the requirement that the University be reimbursed for any damage or loss to the Work or to other Work resulting from such defects.

If required by the Contract Documents, the Maintenance and Guarantee Bond shall be in full force and effect during the entire Repair Period, unless a longer bond period is stipulated in the Contract Documents.

4.00 CONTRACTOR'S COMPENSATION

4.01 Basis of Compensation

In consideration of the full performance of this Agreement by the Contractor, the University shall compensate the Contractor as stated in Exhibit B.

4.02 Change Orders and Construction Change Directives

4.02.1 Generally

The University reserves the right to issue written orders whether through a formal Change Order or Construction Change Directive, directing changes in the Contract at any time prior to the acceptance of the Project without voiding the Contract, and Contractor shall promptly comply with such order. A Construction Change Directive may be issued in writing by the University directing the Contractor to perform changed Work in the absence of a final agreement on a Change Order and the costs will be calculated as provided in 6.01.4. The Contractor may request changes in the Work, but shall not act on the changes until approved in writing by the University. Any change made without authority in writing from the University shall be the responsibility of the Contractor.

Any such changes in the Work that have a cost impact shall only be authorized by Change Orders approved by the University. No action, conduct, omission, prior failure or course of dealing by the University shall act to waive, modify, change or alter the requirement that Change Orders must be in writing and signed by the University and Contractor and that such written Change Orders are the exclusive method for changing or altering the Contract Sum or Contract Time. The University and Contractor understand and agree that the

Contract Sum and Contract Time cannot be changed by implication, oral agreements, actions, inaction, course of conduct or Construction Change Directive.

On the basis set forth herein, the Contract Sum may be adjusted for any Change Order requiring a different quantity or quality of labor, materials or equipment from that originally required, and the partial payments to the Contractor, set forth in section 8.01, may be adjusted to reflect the change. Whenever the necessity for a change arises, the Contractor shall take all necessary steps to mitigate the effect of the ultimate change on the other Work in the area of the change. Changed Work shall be performed in accordance with the original Contract requirements except as modified by the Change Order. Except as herein provided, the Contractor shall have no claim for any other compensation including lost productivity or increased overhead expenses due to changes in the Work. The amounts set forth in the Change Order constitute full compensation for both direct and indirect costs of the Work described in the Change Order. Payment by the University pursuant to the Change Order shall constitute full satisfaction of any and all claims for compensation and extension of time by the Contractor for the performance of the Work by the Contractor and all subcontractors.

4.02.2 Proposed Change Orders

The Design Professional, with approval of the University, shall issue to the Contractor a cost request Bulletin for a proposed change order describing the intended change and shall require the Contractor to indicate thereon a proposed amount to be added to or subtracted from the Contract Sum due to the change supported by a detailed estimate of cost. Upon request by the University, the Contractor shall permit inspection of the original Contract estimate, subcontract agreements, or purchase orders relating to the change. Any request for adjustment in Contract Time which is directly attributable to the changed Work shall be included with substantiating detailed explanation by the Contractor in its response to the cost request bulletin. Failure by Contractor to request adjustment of Contract Time in the response to the cost request Bulletin shall waive any right to subsequently claim an adjustment of the Contract Time based on the changed Work. The Contractor shall submit the response to the cost request Bulletin with detailed estimates and any time extension request thereon to the Design Professional and the University's Representative within ten (10) calendar days after issuance of the cost request bulletin. Upon its submission the Design Professional will review it and advise the University who will make the decision. If the Contractor fails to submit the response within the required ten (10) calendar days, and the Contractor has not obtained the Design Professional's and the University's permission for a delay in submission, the University may order the Contractor in writing to begin the Work immediately, and the Contract Sum shall be adjusted in accordance with the University's estimate of cost. In that event, the Contractor, within fifteen days following completion of the changed Work, may present information to the University that the University's estimate was in error; the University, in its sole discretion, may adjust the Contract Sum. The Contractor must keep and submit to the University time and materials records verified by the University to substantiate its costs. The University may require the Contractor to proceed immediately with the changed Work in accordance with section 4.02.4, "Failure to Agree as to Cost" or section 4.02.6 "Emergency Changes."

When the University and the Contractor agree on the amount to be added to or deducted from the Contract Sum and the time to be added to or deducted from the Contract Time and an Impact Report or a Contract Change Order is signed by the University and the Contractor, the Contractor shall proceed with the changed Work. If agreement is reached as to the adjustment in compensation for the performance of changed Work but agreement is not reached as to the time adjustment for such Work, the Contractor shall proceed with the Work at the agreed price, reserving the right to further pursue its Claim for a time adjustment. Any costs incurred to acquire information relative to a proposed Change Order shall not be borne by the University.

4.02.3 Allowable Costs Upon Change Orders

The only estimated or actual costs that will be allowed because of changed Work and the manner in which those costs shall be computed is described by this section.

4.02.3.1 Labor

Costs are allowed for the actual payroll cost to the Contractor for direct labor, engineering or technical services directly required for the performance of the changed Work, (but not site management such as field office estimating, clerical, project engineering, management or supervision) including payments, assessments, or benefits required by lawful labor union collective bargaining agreements, compensation insurance payments, contributions made to the State pursuant to the Unemployment Insurance Code, and for taxes paid to the federal government required by the Social Security Act of August 14, 1935, as amended, unless the time of completion adjustments affect the general condition inclusion of the Contract Sum.

No labor cost will be recognized at a rate in excess of the appropriate wage rates established for that portion of the Work, nor will the use of a classification which would increase the labor cost be permitted unless the Contractor established to the satisfaction of the University the necessity for payment at a higher rate.

4.02.3.2 Materials

Costs are allowed for the actual cost to the Contractor for the materials directly required for the performance of the changed Work. Such cost of materials may include the costs of transportation, sales tax, and delivery if necessarily incurred. However, overhead costs shall not be included. If a trade discount by the actual supplier is available to the Contractor, it shall be credited to the University. If the materials are obtained from a supply or source owned wholly or in part by the Contractor, payment therefor will not exceed the current wholesale price for such materials.

If, in the opinion of the University, the cost of materials is excessive, or if the Contractor fails to furnish satisfactory evidence of the cost from the actual suppliers thereof, then in either case the cost of the materials shall be deemed to be the lowest wholesale price at which similar materials are available in the quantities required at the time they were needed.

4.02.3.3 Equipment

Costs are allowed for the actual cost to the Contractor for the use of equipment directly required in the performance of the changed Work except that no payment will be made for time while equipment is inoperative due to breakdowns or for non-working days. The rental time shall include the time required to move the equipment to the Project site from the nearest available source for rental of such equipment, and to return it to the source. If such equipment is not moved by its own power, then loading and transportation costs will be paid. However, neither moving time nor loading and transportation costs will be paid if the equipment is used on the Project in any other way than upon the changed Work. Individual pieces of equipment having a replacement value of $500.00 or less shall be considered to be tools or small equipment, and no payment therefor will be made.

For equipment owned or furnished by the Contractor, no cost therefor shall be recognized in excess of the rental rates established by distributors or equipment rental agencies in the locality where the Work is performed. Blue Book rates shall not be used for any purpose.

The amount to be paid to the Contractor for the use of equipment as set forth above shall constitute full compensation to the Contractor for the cost of fuel, power, oil, lubrication, supplies, small tools, small equipment, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor (except for equipment operators who shall be paid for as provided in Article 4.02.3.1) and any and all costs to the Contractor incidental to the use of such equipment.

4.02.3.4 Work by Subcontractors and Vendors

For any portion of the changed Work which is to be performed by a subcontractor, the Contractor shall furnish to the University a detailed estimate prepared and signed by subcontractor of the cost to subcontractor for performing the changed Work. At the sole discretion of the University, a lump sum estimate of such cost to subcontractor may be accepted in lieu of the detailed estimate. The combined costs for subcontractor's overhead, profit, taxes, indirect supervision, insurance, bonds shall not exceed ten percent (10%). Estimates of the amount to be deleted from subcontractor's portion of the Work shall be gross cost of the deducted Work plus eight percent (8%). For changed Work to be furnished by a supplier, the Contractor shall furnish upon demand of the University, a lump sum estimate of the cost of the items including taxes and cartage to the Contractor prepared by the supplier. No supplier mark-up for overhead, profit, layout, supervision or bonds will be allowed for changed Work furnished by a supplier.

4.02.3.5 Contractor Mark-up for Added Work

Where changed Work is performed, the Contractor may add to the total estimated actual cost for such Work no more than ten (10%) for subcontractor mark-up and seven and one-half percent (7.5%) for self-performed trade work for profit, overhead, insurance, taxes, indirect supervision, bonds, and any other costs not allowed by section 4.02.01.

4.02.3.6 Credit for Deleted Work

The amount to be deducted from the Contract Sum shall be the total estimated actual cost of the deducted Work plus eight percent (8%).

Where an entire item or section of Work is deleted from the Contract, the entire subcontract cost or bid cost shall be considered the appropriate deduction less the value of Work performed. If the subcontract cost or bid cost is not identifiable, then estimates of the amount to be deducted from the Contract Sum shall be the gross cost of the deducted work plus six percent (6%) for saved overhead, bonds, insurance, and taxes.

For proposed change orders which involve both added and deleted Work, the Contractor shall separately estimate the cost of the added Work before mark-ups, and separately estimate the cost of the deleted Work before allowance of a credit. If the difference between the costs results in an increase to the Contract Sum, the mark-up for added Work shall be applied to the difference, and if the difference in the costs results in a decrease, then the mark-up for deleted Work shall be applied to the difference.

4.02.3.7 Market Values

Cost for added Work shall be no more than market values prevailing at the time of the change, unless the Contractor can establish to the satisfaction of the University that it investigated all possible means of obtaining Work at prevailing market values and that the excess cost could not be avoided.

When a change order deletes Work from the Contract, the computation of the cost thereof shall be the values which prevailed at the time bids for the Work were opened or the Contract Sum established.

4.02.4 Failure to Agree as to Cost

4.02.4.1 For Added Work

Notwithstanding the failure of the University and the Contractor to agree as to the cost of the proposed Change Order, the Contractor, upon written order from the University, shall proceed immediately with the changed Work. A Construction Change Directive or letter signed by the University shall be used for this written order. At the start of each day's Work on the change, the Contractor shall notify the University in writing as to the size of the labor force to be used for the changed Work and its location. Failure to so notify may result in the non-acceptance of the costs for that day. At the completion of each day's Work, the

Contractor shall furnish to the University a detailed summary of all labor, materials, and equipment employed in the changed Work. The University will compare his/her records with Contractor's daily summary and may make any necessary adjustments to the summary. After the University and the Contractor agree upon and sign the daily summary, the summary shall become the basis for determining costs for the additional Work. The sum of these costs when added to an appropriate mark-up will constitute the payment for the changed Work. Subsequent adjustments, however, may be made based on later audits by the University. When changed Work is performed at locations away from the job site, the Contractor shall furnish in lieu of the daily summary, a summary submitted at the completion of the Work containing a detailed statement of labor, material, and equipment used in the Work. This latter summary shall be signed by the Contractor who shall certify thereon that the information is true.

The Contractor shall maintain and furnish on demand of the University itemized statements of cost from all vendors and subcontractors who perform changed Work or furnish materials and equipment for such Work. All statements must be signed by the vendors and the subcontractors.

4.02.4.2 For Deleted Work

When a proposed Change Order contains a deletion of any Work, and the University and the Contractor are unable to agree upon the cost thereof, the University's estimate shall be deducted from the Contract Sum and may be withheld from any payment due the Contractor until the Contractor presents adequate substantial information to the University that the University's estimate was in error. The amount to be deducted shall be the actual costs to the Contractor for labor, materials, and equipment which would have been used on the deleted Work together with an amount for mark-up as defined in the Contract Documents.

4.02.5 Allowable Time Extensions

For any change in the Work, the Contractor shall only be entitled to such adjustments in Contract Time due solely to performance of the changed Work. The procedure for obtaining an extension of time is set forth in Section 4.08 of these General Conditions. No extension of time shall be granted for a change in the Work unless the Contractor demonstrates to the satisfaction of the University that the Work is on the critical path and submits an updated CPM schedule showing that an extension of time is required and that the Contractor is making, or has made, every reasonable effort to guarantee completion of the additional Work called for by the change within the time originally allotted for the Contract. Failure by the Contractor to make the required submission or showing constitutes a waiver of any possible adjustment in Contract Time.

Any adjustment in Contract time shall specify the exact calendar day.

4.02.6 Emergency Changes

Changes in the Work made necessary due to unforeseen site conditions, discovery of errors in plans or specifications requiring immediate clarification in order to avoid a serious Work stoppage, changes of a kind where the extent cannot be determined until completed, or under any circumstances whatsoever when deemed necessary by the University are kinds of emergency changes which may be authorized by the University in writing to the Contractor. The Contractor shall commence performance of the emergency change immediately upon receipt of written direction from the University.

If agreement is reached as to compensation adjustment for the purpose of any emergency change, then compensation will be as provided in this section relating to ordinary changes. If agreement is not reached as to compensation at the time of commencing the emergency change, then compensation will be as provided in section 4.02.4, that is, time and materials records and summaries shall be witnessed and maintained until either a lump sum payment is agreed upon, or the changed Work is completed.

4.03 Records and Audit

4.03.1

Contractor's records, which shall include but not be limited to accounting records (hard copy, as well as computer readable data if it can be made available), written policies and procedures; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets, correspondence; change order files (including documentation covering negotiated settlements); backcharge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other supporting evidence deemed necessary by the University to substantiate changes related to the Agreement (collectively referred to as "Records") shall be maintained in accordance with Generally Accepted Accounting Principles and open to inspection and subject to audit and/or reproduction by University's agent or its authorized representative to the extent necessary to adequately permit evaluation and verification of Cost of the Work, and any invoices, change order, payments or claims submitted by the Contractor or any of his payees pursuant to the execution of the contract.

4.03.2

Such audits may require inspection and copying from time to time and at reasonable times and places of any and all information, materials and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, recordings, agreements, purchase order, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in University's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Contract Documents. Such records subject to audit shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs, (including overhead allocations) as they may apply to costs associated with this Agreement.

4.03.3

The University or its designee shall be afforded access to all of the Contractor's Records, and shall be allowed to interview any of the Contractor's employees, pursuant to the provisions of this article throughout the term of this contract and for a period of six (6) years after Final Payment or longer if required by law. To the extent University deems is allowed by law, the Contractor's records shall remain confidential. Contractor recognizes and agrees that University will disclose documents it deems is required or appropriate pursuant to law, defense against lawsuits or other claims, or other reason deemed necessary by University.

4.03.4

Contractor shall require all Subcontractors, insurance agents, and material suppliers (payees) to comply with the provisions of this article by insertion of the requirements hereof in a written contract agreement between Contractor and payee. Such requirements will also apply to Subcontractors and all lower tier Subcontractors. Contractor will cooperate fully and will cause all of Contractor's Subcontractors (including those entering into lump sum contracts, payees or lower tier Subcontractors) to cooperate fully by furnishing or making available to University from time to time whenever requested in an expeditious manner any and all such information, materials and data.

4.03.5

University's agent or its authorized representative shall have access to the Contractor's facilities, shall have access to all records deemed necessary by University; and shall be provided adequate and appropriate work space, in order to conduct review or audits in compliance with this article.

4.03.6

Contractor agrees that University's designee shall have the right to examine the Contractor's records (during the contract period and up to six(6) years after Final Payment is made on the contract) to verify the accuracy and appropriateness of the pricing data used to price change proposals or claims. Contractor agrees that if the University determines the cost and pricing data submitted (whether approved or not) was inaccurate, incomplete, not current or not in compliance with the terms of the contract regarding pricing of change orders, an appropriate contract price reduction shall be made. Such post-approval contract price adjustments will apply to all levels of Contractors and/or Subcontractors and to all types of change order proposals specifically including lump sum change orders, unit price change orders and cost-plus change orders.

4.03.7

If an audit, inspection or examination in accordance with this article, discloses overcharges (of any nature) by the Contractor to the University in excess of one percent (1%) of the total contract billings, the actual cost of the University's audit shall be reimbursed to the University by the Contractor. Any adjustments and/or payments which must be made as a result of any such audit or inspection of the Contractor's invoices and/or records shall be made within a reasonable amount of time (not to exceed 90 days) from presentation of University's findings to Contractor.

4.03.8

If this Agreement is determined to be subject to Section 1861(v)(1)(I) of the Social Security Act, as amended from time to time, the Contractor agrees that for a period of four (4) years following the expiration or earlier termination of this Agreement, the Contractor shall retain and make available to the Secretary of Health and Human Services, the Comptroller General of the United States, or any of their duly authorized representatives, this Agreement, and any books, documents, and records of the Contractor which are necessary to certify the nature and extent of amounts paid by the University pursuant to this Agreement. In the event access to books, documents, and records is requested by the Secretary, the Comptroller General, or any of their duly authorized representatives, the Contractor shall immediately notify the University and make such books, documents and records available to the University unless prohibited by law.

4.04 Applications for Payment

The Contractor shall prepare and deliver to the University monthly an itemized Application for Payment. The University shall pay the Contractor within thirty (30) days of receipt of a properly submitted, complete and correct Application for Payment. The Applications for Payment shall include a Schedule of Values describing the services included and Work completed in the Application for Payment. No interest shall accrue on any unpaid portion of the Applications for Payment or any other sums that the Contractor or any Subcontractor or supplier claim are or may be due under this Agreement.

The Application for Payment shall constitute a representation by the Contractor to the University that the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment. No progress payment, partial use or entire use of the Project by the University shall constitute acceptance of work not in strict conformity with the Contract Documents.

The Contractor shall keep records of cost and expense to support the Contractor's Applications for Payment, including without limitation records of staff time, material costs, and reimbursable expense items in connection with the Work. Financial records shall be kept on a generally recognized accounting basis, as

approved by the University. Contractor shall make them readily available to the University or its representatives for inspection and audit for a period of six (6) years after the Project Close-out and Final Payment to the Contractor.

The Application for Payment shall be accompanied by a Sworn Statement completed by the Contractor, together with Certified Payrolls prepared in accordance with Section 5.02, as well as other documentation that may be required by the University, stating that all Subcontractors and suppliers have been paid in full for Work performed through the last or most recent progress payment.

4.05 Retainage

Payments to the Contractor shall be subject to retainage of ten percent (10%) of the Cost of Work for each Application for Payment until the Work is fifty percent (50%) complete; at that time, no further retainage will be deducted from the Applications for Payment. Draws on retainage may only be submitted after Substantial Completion and in the following quantities: (1) at the completion of all Punchlist items, the retainage may be reduced to two percent (2%); and (2) at delivery of all Closeout Documents and warranties, the remainder of the retainage may be paid to the Contractor. Any release of retainage shall be at the sole discretion of the University.

4.06 Final Payment

Issuance of Final Payment shall be expressly conditioned on certification of Substantial Completion, certification of Punchlist completion and written acceptance of closeout documents by the Design Professional and University.

5.00 PREVAILING WAGES

5.01 Applicable Wage Rates

The Contractor acknowledges and shall abide by the University's prohibition on use of 1099 independent contractors and owner / operator business entities wherein such individuals or entities are not able to secure and maintain workers compensation insurance. The Contractor shall ensure that all classifications of laborers and construction mechanics performing Work on the Project job site are employees of the Contractor or any subcontractor for any tier thereof, and that each worker is covered by workers compensation insurance.
For this project, it is a University requirement that the Contractor and all Subcontractors and sub-subcontractors who provide labor on this project shall compensate each worker, regardless of their employment status, not less than the wage and fringe benefit rates prevailing in the locality in which the work is to be performed. At the time of advertising for bids on the project, the University shall provide the prevailing rates of wages and fringe benefits for all classes of construction mechanics called for in the Contract. A schedule of these rates shall be made a part of the specifications for the work to be performed and shall be printed on the bidding forms where the work is to be done by contract. Contractor shall also post on site, in a conspicuous place, a copy of all applicable wage and benefit rates, and shall provide the University with a copy of the applicable wage and benefit rates posted.

5.02 Certified Payroll Records and Supporting Documents

The Contractor and each Subcontractor shall keep an accurate record showing the name and occupation of and the actual benefits and wages paid to each laborer and mechanic working in connection with this contract and shall be submitted with each pay application in accordance with Section 4.04. Contractor shall be required to 1) collect all certified payroll records from Contractor and Subcontractors and sub-subcontractors; 2) provide and require Subcontractors and sub-subcontractors to provide the University

access to supporting documentation, and 3) shall provide this information, records, and/or access to documentation to the University or its agent(s) or auditors for review or audit promptly on request. Contractor shall, and shall also require all subcontractors and sub-subcontractors to, promptly provide information relating to payroll and job classification and work duties to University upon request. The University reserves the right to audit Contractor, Subcontractors, and sub-subcontractors for compliance with wage and hour requirements, prevailing wage, employee classifications and other applicable requirements.

5.02.1 Audit

In connection with the prevailing wage rate audit conducted by the University, the Contractor is required to maintain and/or promptly obtain the following information, records and documentation from Contractor, all Subcontractors, and all sub-subcontractors and to promptly provide them to the University upon request:

1. Canceled payroll checks
2. Pay stubs
3. Weekly time cards on time sheets
4. Payroll registers
5. Employee handbook
6. Fringe benefit plan documents
7. Minutes of Board of Directors meetings
8. Worksheets for calculation of non-cash fringe benefit amounts included in compensation
9. Apprentice certificates and other documents to verify registration of all apprentices in recognized apprentice program certified by the Bureau of Apprenticeship and Training (B.A.T.) of the U.S. Dept. of Labor or an acceptable equivalent
10. Other related documents as requested by the University.

5.02.2 Failure to Comply with Audit

If the requested information and/or records are not promptly provided pursuant to University's request, in addition to all other rights and remedies it has pursuant to law, equity and contract, the University, by written notice to Contractor and the sureties of the contractor known to the University may, but has no obligation or duty to, 1) terminate the contract with Contractor and University owe Contractor and be liable only for that prorated portion of satisfactorily completed work up to the date of termination; 2) withhold further payments owed until Contractor supplies the requested information and records and/or otherwise complies with the request for records and/or access to documentation; and 3) inform the Vice-President for Finance and Business Operations of what has been requested and what has not been provided by Contractor and/or subcontractor or sub-subcontractor. Contractor is hereby given express notice that failure to comply with University's requests for information and records may disqualify Contractor and/or non-complying Subcontractors/sub-subcontractors from bidding and/or receiving work on future University projects. The University may proceed to complete this contract by separate agreement with another contractor or otherwise and the original Contractor and its sureties shall be liable to the University for any excess cost occasioned thereby.

5.03 Classification of Workers

All apprentices utilized on this University project must be registered in a recognized apprentice program, i.e., one that is certified by the Bureau of Apprenticeship (B.A.T.), U.S. Department of Labor. The workers used on a University project by either Contractor or a Subcontractor must be employees of the Contractor or Subcontractor and not individuals claimed as subcontractors or independent contractors, such as individuals whose compensation is reflected on IRS form 1099. The use of individuals as independent contractors is prohibited without express written permission of the University.

5.04 Failure to Pay

If a Contractor or subcontractor fails to pay the prevailing rates of wages and fringe benefits and does not cure such failure within fourteen (14) days after notice to do so by the University, the University shall have the right, at its option, to do any or all of the following:

5.04.1

Withhold all or any portion of payments due the Contractor as may be considered necessary by the University to pay laborers and mechanics the difference between the rates of wages and fringe benefits required by this Agreement and the actual wage and fringe benefits paid.

5.04.2

Terminate part or all of this Agreement or any subcontract and proceed to complete the Agreement or subcontract by separate agreement with another contractor or otherwise, in which case the Contractor and its sureties shall be liable to the University for any excess costs incurred by the University.

5.04.3 University's Rights Cumulative

It is expressly understood by both parties that the above are in addition to University's other rights and remedies, and University retains all other rights and remedies it has pursuant to this Agreement, or otherwise, to enforce its rights to require that prevailing wages and fringe benefits be paid for the construction work on this Project, but the University shall have no duty or contractual obligation to enforce these provisions. Contractor agrees that it shall be solely responsible for ensuring that these requirements are met and shall handle and defend all complaints or claims regarding wage payments to construction mechanics without assistance or involvement of the University. Contractor shall permit its employees and workers, and its Subcontractors and sub-subcontractors and their employees and workers, to discuss payment and work duty information with University staff, but otherwise Contractor shall continually prohibit its employees and workers, and all subcontractors and sub-subcontractors and their employees and workers, from directing or making any claims or complaints regarding the payment of wages to any employee or official of the University, and shall indemnify and reimburse University for all expenses and fees, including attorney fees, which it incurs for defending or representing itself against such claims or complaints. The University shall not be asked to nor be responsible to address or resolve any disputes with or between Subcontractors on the Project.

5.05 Application to Subcontractors

The Contractor shall include terms identical or substantially similar to this section in all Subcontracts, Purchase Orders and other agreements pertaining to the Project.

6.00 OWNERSHIP OF ELECTRONIC OR HARD-COPY DOCUMENTS

All drawings and specifications and other data and materials prepared and furnished whether in electronic or hard-copy format by the University, the Design Professional and/or the Contractor shall become the property of the University. The Contractor shall have no claim for further employment or additional compensation as a result of exercise by the University of its full rights to ownership of such documents, information, data and materials. The Contractor shall not use or copy such documents, information, data or materials in any format for any purpose other than for the Project.

7.00 SUCCESSORS AND ASSIGNS

This Agreement shall be binding upon and inure to the benefit of the parties to this Agreement and their respective successors and assigns; provided, however, that none of the parties hereto shall assign this Agreement without the prior written consent of the other.

8.00 CLAIMS, DISPUTES AND GOVERNING LAW

8.00 CLAIMS AND DISPUTES

8.01 Claims Definition

A Claim is a demand or assertion by one of the parties seeking adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term “Claim” also includes other disputes and matters in question between the parties arising out of or relating to the Contract. Claims must be made by written notice within a specified time period. The responsibility to substantiate Claims shall rest with the party making the Claim.

8.01.1 Policy of Cooperation

The parties shall endeavor to resolve all of their claims and disputes amicably and informally through open communication and discussion of all issues relating to the Project. To the greatest extent possible, the parties shall avoid invoking the formal dispute resolution procedures contained in the Contract Documents.

8.02 Recommendation of Design Professional

Claims must be referred initially to the Design Professional for action as provided in paragraph 8.10 as an express condition precedent to proceeding further in resolving any claim.

8.03 Time Limits on Claims

Claims must be made within 5 business days after occurrence of the event giving rise to such Claim or within 5 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been resolved by Change Order will not be valid.

8.04 Continuing Contact Performance

Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the University shall continue to make payments in accordance with the Contract Documents subject to the University's rights relative to payments, withholding of payments, termination, or all other rights afforded it in the Contract Documents.

8.05 Claims for Concealed or Unknown Conditions

If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then written notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 24 hours after first observance of the conditions. The Design Professional will promptly investigate such conditions and, if the conditions differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, the Design Professional will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Design Professional determines that the conditions at the site are not materially different from those indicated in the

Contract Documents and that no change in the terms of the Contract is justified, the Design Professional shall so notify the University and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 5 days after the Design Professional has issued such determination. If the University and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Design Professional for initial determination, subject to further proceedings pursuant to Paragraph 8.09.

8.06 Claims for Additional Cost

Any Claim by the Contractor for an increase in the Contract Sum shall be submitted in writing as required by the Contract Documents before proceeding to execute the Work. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Design Professional, (2) an order by the University to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Design Professional, (4) failure of payment by the University, (5) termination of the Contract by the University, (6) University's suspension or (7) changes in the scope of Work, the Contractor's claim shall be filed in strict accordance with the procedure established herein.

8.07 Claims for Additional Time

Any Claim by Contractor for an increase in the Contract Time shall be submitted in writing as required by this provision and the Contract Documents. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

As a precondition for the Claim to be considered by the University, Contractor must identify the precise activities affected as located on the approved network Project Schedule. Contractor must also describe the efforts that it has made to mitigate the effects of any negative schedule impact.

If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and location and could not have been reasonably anticipated, and that the abnormal weather conditions had an adverse effect on the scheduled construction.

8.08 Injury or Damage to Person or Property

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 5 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in the Contract Documents.

8.09 Verification of Claims Submitted

With respect to any Claim asserted by Contractor for itself or on behalf of a Subcontractor for additional time or cost, the Contractor shall evaluate the claim and verify that any amounts claimed are valid, compiled in accordance with generally accepted accounting principles and are consistent with the terms of the existing contractual agreements regarding entitlement before presentation of the Claim to the Owner. Any Claim not verified in accordance with this requirement shall be denied without further recourse by the Contractor or Subcontractor.

8.10 Resolution of Claims and Disputes

8.10.1 Review by Design Professional

Design Professional will review all Claims and take one or more of the following preliminary actions within 10 days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Design Professional expects to take action, (3) reject the Claim in whole or in part, stating reasons for rejection, (4) recommend approval of the Claim by the other party or (5) suggest a compromise. The Design Professional may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

If a Claim has been resolved, the Design Professional will prepare or obtain appropriate documentation. If a Claim has not been resolved, the party making the Claim shall, within 10 days after the Design Professional's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Design Professional, (2) modify the initial Claim or (3) notify the Design Professional that the initial Claim stands.

If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Design Professional, the Design Professional will notify the parties in writing that the Design Professional's opinion will be rendered within 5 days. Upon expiration of such time period, the Design Professional will render to the parties the Design Professional's written opinion relative to the Claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Design Professional may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy. The opinion of the Design Professional shall be subject to the review of the Vice-President for Finance and Business Operations Wayne State University (VPFBO).

8.10.2 Review by Vice-President for Finance and Business Operations

The Vice-President for Finance and Business Operations (VPFBO) shall review the Design Professional's opinion and the supporting information submitted by the parties for the purpose of upholding the Design Professional's opinion, modifying the Design Professional's opinion, or rejecting the Design Professional's opinion. The VPFBO shall render a decision within forty-five days of the completion of any submissions by the parties. The decision of the VPFBO is final unless it is challenged by either party by filing a lawsuit in the Court of Claims of the State of Michigan within one year of the issuance of the decision.

8.10.3 Jurisdiction

Jurisdiction over all claims, disputes, and other matters in question arising out of or relating to this Contract or the breach thereof, shall rest in the Court of Claims of the State of Michigan. No provision of this agreement may be construed as the University's consent to submit any claim, dispute or other matter in question for dispute resolution pursuant to any arbitration or mediation process, whether or not provisions for dispute resolution are included in a document which has been incorporated by reference into this agreement.

8.10.4 Condition Precedent

The process and procedures described in Section 8.10 are an express condition precedent to filing or pursuing any legal remedy including litigation. Pursuing litigation prior to exhaustion of the Dispute Resolution process set forth herein shall be premature and a material breach of this Agreement.

8.10.5 Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the State of Michigan.

9.00 NON-DISCRIMINATION

9.01 General

The Contractor shall not discriminate against any job applicant, contractor, or employee because of race, color, religion, national origin, age, sex (including gender identity) height, weight, or familial, disability, or veteran status, and shall include terms identical or substantially similar to this section in all Subcontracts, Purchase Orders and other agreements pertaining to the Project.

9.02 Solicitation/Advertisements

The Contractor shall in all solicitation or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, age, sex (including gender identity), height, weight, or familial, disability or veteran status.

9.03 Rules/Laws

The Contractor shall comply with all applicable federal and state laws, and current published rules, regulations, directives, and orders of the Michigan Civil Rights Commission and other governmental agencies/departments.

9.04 Reports

The Contractor shall furnish and file compliance reports within such time and upon such forms as provided by the Michigan Civil Rights Commission; these forms may also elicit information as to the practices, policies, program, and employment statistics of the Contractor and of each Subcontractor. The Contractor shall permit access to all books, records, and accounts by the Michigan Civil Rights Commission and/or its agents, for purposes of investigation to ascertain compliance with this contract and with rules, regulations, and orders of the Michigan Civil Rights commission.

9.05 Persons with Disabilities

The Contractor shall comply with the provisions of the Michigan Persons with Disabilities Civil Rights Act (M.C.L. 37.1101, et seq.).

9.06 Contract Provisions

The Contractor shall include, or incorporate by reference, the provisions of this Article in every Subcontract, Subcontract and purchase order unless exempted by the rules, regulations or orders of the Michigan Civil Rights Commission, and shall provide in every Subcontract, subcontract or purchase order that said provisions shall be binding upon each Subcontractor, subcontractor or seller.

10.00 ADDITIONAL PROVISIONS

10.01 Prohibited Contracts or Subcontracts due to Unfair Labor Practices

Public Act No. 278 of 1980 prohibits State of Michigan from awarding Contract or Subcontract to employer who has been found in contempt of court by a Federal court of appeals, on not less than three (3) occasions involving different violations during preceding seven (7) years, for failure to correct unfair labor practice as prohibited by Section 8 of Chapter 372 of National Labor Relations Act, 29 U.S.C. 158. Contractor may not in relation to that Contract subcontract with such employer. The University may rescind, or require Contractor to rescind a contract if the employer or Subcontractor, manufacturer, or supplier of employer subsequently appears in register of such employers which will be compiled by

Michigan's Department of Licensing and Regulatory Affairs, pursuant to Section 2 of Public Act No. 278 of 1980.

10.02 Buy-American

University endeavors to buy products made in the United States of America whenever an American-made product is available that meets or exceeds the specifications requested and the price is equal to or lower than foreign-made product. Vendors and Contractors are instructed to bid American-made products and/or services whenever available. Vendors and Contractors may bid foreign-made products or services when:

1. those products or services are specified, or
2. as an alternate as long as the products or services are technically acceptable to the University and American-made goods or services that are competitively price and of comparable quality are not available.

A product or service shall be considered "American-made" if more than 50% of the product is manufactured or assembled in the United States or more than 50% of the services are performed in the United States.

10.03 Michigan Products

Contractor and its Subcontractors and suppliers shall utilize Michigan-made products whenever possible where price, quality and performance are equal to or better than non-Michigan products.

10.04 Drug and Alcohol Testing

The University is a "DRUG FREE WORKPLACE", and the University requires Contractors, Subcontractors and sub-subcontractors with access to the work site to abide by the University's policies on drugs, alcohol and tobacco, which can be found at http://bog.wayne.edu/code/2_20_04.php and http://policies.wayne.edu/administrative/00-03-smoke-free-campus.php. All costs for initial and periodic testing shall be borne by the Contractor.

1. The Contractor and University shall reserve the right to administer drug and alcohol tests to any and/or all site personnel at random periods and without notice.

a. The Contractor shall be responsible for all costs including wages for those individuals testing drug or alcohol-free at the Contractor's direction.

b. Subcontractors shall be responsible for all costs including wages for those individuals not testing drug or alcohol-free at the direction of the Contractor, and the Subcontractor shall immediately remove those individuals from the site.

4. Any individual not testing drug or alcohol-free shall not be allowed to return to the site under any circumstances.

10.05 Other University Policies

The University's policies related to Duty to Report Criminal Acts and Weapons on Campus shall apply to this Project and Contractor shall include this requirement in all Subcontracts, purchase orders and supply agreements.

10.06 University Representative

The University's Representative shall be the Associate Vice President of Facilities Planning and Management, the Senior Director of Design and Construction Services, the Director of Design and Construction Services and the Project Manager . Any project decision on behalf of the University may only be in accordance with the Authorization Matrix that is attached as Exhibit C and incorporated by reference.

11.00 INCLUSION BY REFERENCE

This Contract and Contract Documents hereby include and incorporate by reference the General Conditions of Construction and Supplementary General Conditions, the Request for Proposal by University, the approved plans and specifications, Contractor's Bid or Proposal insofar as it is not inconsistent with the other Contract Documents and other Project documents attached as Exhibits.
Exhibit A – Contractor's Bid or Proposal
Exhibit B – Basis of Compensation
Exhibit C - Authorization Matrix
Exhibit D – Staffing Plan

12.00 TERMINATION

12.01 Termination by the University for Cause

12.01.1

The University may terminate the Contract if the Contractor: (a) becomes insolvent; (b) files or has filed against it any Petition in Bankruptcy or makes a general assignment for the benefit of its creditors; (c) fails to pay, when due, for materials, supplies, labor, or other items purchased or used in connection with the Work; (d) refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will ensure the completion of the Work in accordance with the Master Project Schedule; (e) in the University's opinion, persistently fails, refuses or neglects to supply sufficient labor, material or supervision in the prosecution of the Work; (f) interferes with or disrupts, or threatens to interfere with or disrupt the operations of the University, or any other Contractor, supplier, subcontractor, or other person working on the Project, whether by reason of any labor dispute, picketing, boycotting or by any other reason; or (g) commits any other breach of this Contract.

When any of the above reasons exist, the University may, without prejudice to any other rights or remedies of the University and after giving the Contractor and the Contractor's surety, if any, three days written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety: (1) take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor; (2) accept assignment of subcontracts; and (3) finish the Work by whatever reasonable method the University may deem expedient.

When the University terminates the Contract for one of the stated reasons, the Contractor shall not be entitled to receive further payment until the Work is finished.

12.01.2

If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Design Professional's services and expenses made necessary thereby, the remaining balance shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the University. The amount to be paid to the Contractor or University, as the case may be, shall be certified by the Design Professional, upon application, and this obligation for payment shall survive termination of the Contract.

12.02 Suspension by the University for Convenience

12.02.1

The University may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the University may determine.

12.02.2

An adjustment shall be made for increases in the cost and/or time of performance of the Contract, including profit on the increased cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent: (1) that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or (2) that an equitable adjustment is made or denied under another provision of this Contract.

Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

12.03 Termination By The University For Convenience

12.03.1

The University, with or without cause, may terminate all or any portion of the services by the Contractor under this Agreement, upon giving the Contractor 30 days written notice of such termination. In the event of termination, the Contractor shall deliver to the University all reports, estimates, schedules, subcontracts, Contract assignments, purchase order assignments, and other documents and data prepared by it, or for it, pursuant to this Agreement.

12.03.2

Unless the termination is for cause, the Contractor shall be entitled to receive only the payments provided for in Article 4, pro-rated to the date of termination (including payment for the period of the 30-day notice) plus reimbursement for approved and actual costs and expenses incurred by the Contractor to the date of termination. Prior to payment, the Contractor shall furnish the University with a release of all claims against the University.

12.04 Termination By The Contractor

12.04.1

The Contractor may terminate the Contract if the Work is stopped for a period of 60 days through no act or fault of the Contractor or a subcontractor, sub-subcontractor or their agents or employees or any other persons performing portions of the Work under Contract with the Contractor, for any of the following reasons: (1) issuance of an order of a court or other public authority having jurisdiction; (2) an act of government, such as a declaration of national emergency, making material unavailable; (3) because the Design Professional has not approved a Certificate for Payment and has not notified the Contractor of the reason for withholding approval, or because the University has not made payment of undisputed amounts on an approved Certificate for Payment within the time stated in the Contract Documents; (4) if repeated suspensions, delays or interruptions by the University constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

If one of the above reasons exists, the Contractor may, upon seven additional days' written notice to the University and Design Professional, terminate the Contract and recover from the University payment for

Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead and profit.

12.04.2

If the Work is stopped for a period of 60 days through no act or fault of the Contractor or a subcontractor or their agents or employees or any other persons performing portions of the Work under Contract with the Contractor because the University has persistently failed to fulfill the University's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the University and the Design Professional, terminate the Contract and recover from the University as provided in Subparagraph 12.03.2

13.00 COMPLETE AGREEMENT

The Contract Documents constitute the entire agreement between the parties and supersede any prior discussions or negotiations. Any modification of these Contract Documents must be in writing and signed by the duly authorized representatives of the parties.

IN WITNESS WHEREOF, each of the parties has caused this Agreement to be executed by its duly authorized representative on the dates shown beside their respective signatures, with the contract to be effective upon the date set forth above.

CONTRACTOR		Wayne State University	
By:	_____	By:	_____
Name:	_____	Name:	William R. Decatur
Title:	_____	Title:	VP Finance & Business Operations
Date:	_____	Date:	_____

Exhibit A – Contractor's Bid or Proposal

[GENERAL CONTRACTOR'S NAME] bid/proposal dated _____.

Exhibit B – Basis of Compensation

a. The University shall pay the Contractor a not to exceed amount of $$$$$$$ ("Amount in words 00" /100 dollars) based on unit pricing in the proposal which will be adjusted to reflect actual units used for the performance of all work associated with the Contractor's Base Bid "and Alternates (List)" .

b. List of Alternates. The University may, at its sole discretion, during the life of the contract, award the following alternates at the amounts indicated: (If this section is not used, delete all text and enter_ Deleted)

	Description	Amount
Alternate 1		
Alternate 2		
Alternate 3		

c. List of unit prices. In the event additional work becomes necessary, the following unit prices will apply:
"(If section 3.3 is not used, delete all text and enter_Deleted"

Work Item	Unit Price
1.	
2.	

d. Liquidated Damages. It is understood and agreed that, if the project is not completed within the time specified in the Agreement plus any extension of time allowed pursuant thereto, the actual damages sustained by the University because of any such delay will be uncertain and difficult to to ascertain, and it is agreed that the reasonable foreseeable value of the use of said project by the University would be the sum of $_____ (_____ Hundred 00/100 dollars) per day. Therefore, the Contractor shall pay as liquidated damages to the University the sum of $_____ (_____ Hundred 00/100 dollars) per day for each day's delay in substantially completing said project beyond the time specified in this Agreement and any extensions of time allowed thereunder.

WAYNE STATE UNIVERSITY
GENERAL CONDITIONS OF CONSTRUCTION

GENERAL CONDITIONS (Revised 7-2018)

GENERAL CONDITIONS OF CONSTRUCTION

1.00 DEFINITIONS

Bulletin - A bulletin is defined as a compilation of changes to the scope of the work issued by the Design Professional or University which requests the Contractor to submit a quote for the changes.

Change Order - A written agreement entered into after the award of the Contract which alters or amends the executed Contract.

Claim - A Claim is a demand or assertion by one of the parties seeking adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the parties arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

Close-out Documents - Close-out Documents shall include as-built record drawings and specifications, Operations and Maintenance Manuals, Requests for Information (RFIs), submittals, shop drawings, coordination drawings, warranties, unconditional lien waivers and governing approvals.

Cost of Work - The term Cost of Work, as used herein, is that portion of the Project Cost, that is the estimated or actual labor and material costs of that Work performed (or to be performed) on the Project by the Contractor and all subcontractors, and is inclusive of the cost of construction as described by divisions of the Construction Specifications Institute or other standard format, which constitutes the Direct Cost of Work. However, Cost of Work shall not include the Indirect Cost of Work as herein defined.

Contract - The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a duly executed written Change Order.

Contract Documents - The Contract Documents consist of the bonds, insurance certificates, plans, specifications, drawings, bulletins, addenda, Agreement, General Conditions of Construction, Supplementary General Conditions, Change Orders, Contractor's Bid, and to the extent not otherwise inconsistent with any other Contract Document.

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Project. Contract Documents are complementary, and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to be consistent with the Contract Documents and the highest standard of care. In the case of an inconsistency between, or perceived omission or error in the Drawings, Specifications, or other Contract Documents which is not clarified by addendum or Requests for Information (RFI), or should the Contractor be in doubt as to their exact meaning, the Contractor shall notify the Design Professional and the University at once. The University shall not be responsible for the Contractors misinterpretations of Drawings and Specifications and/or other Contract Documents.

Nothing contained in the Contract Documents shall create a contractual relationship between University and any third party; however, the University is an intended third-party beneficiary of all contracts for design and engineering services, all subcontracts, purchase orders and other agreements between Contractor or Design

Professional and third parties. The Contractor and Design Professional shall incorporate the obligations of the Contract Documents into its respective subcontracts, agreements and purchase orders.

Contractor: The term “Contractor” as used in the General Conditions shall include the term “Construction Manager” as used in the Contract for Construction Management Services.

Contractor's Construction Schedule- The construction schedules required by the Contract Documents shall be a logic network prepared in the critical path method or other sequential network in use within the construction industry and shall depict: (1) a sequence of operations mutually agreeable to the University, Design Professional and Contractor; (2) the dates of commencement and completion of each task of the Work (including lead time activities, drawing and sample submissions, bidding, awarding Trade Contracts, manufacturing and shipping); (3) delivery dates for materials and equipment; and (4) at the University’s request shall include all Finish Work to be performed by separate Contractors. The construction schedule includes a complete itemized breakdown of the Work.

Contract Sum- The Contract Sum shall be the total dollar value of the Agreement between the University and Contractor.

Delay – A delay shall be recognized as a time of completion impact on the performance of the Work by the Contractor that extends the overall duration of the Project beyond the substantial completion and final completion dates specified in the Agreement. A delay shall not be recognized if the time of completion impact on the performance of the Work occurs on a non-critical path activity, and does not extend the overall duration of the Project.

Day - “Days” means calendar days unless specifically provided to the contrary herein or in the Construction Agreement; provided, however, if any day falls on a weekend or a holiday, same shall refer to the next business day thereafter.

Design Professional - The Design Professional is the person lawfully licensed to practice architecture or engineering or an entity lawfully practicing architecture or engineering identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term “Design Professional” means the Design Professional or the Design Professional’s authorized representative.

Final Completion - “Final Completion” means the completion of all the Work in accordance with the Contract Documents and the acceptance thereof by the University. Completion of the Work includes (1) full performance of all Contract terms; (2) acceptance of the Work by University; (3) resolution of all outstanding Changes of Contract; (4) completion of all “punch-list” items; and (5) delivery of all Close-out Documents.

Incomplete Construction List – The Incomplete Construction List is prepared by the Contractor for review by Design Professional and University identifying Work remaining to be completed at the time of Substantial Completion and the date by which Contractor shall complete the Work on the Incomplete Construction List.

Knowledge - The terms "knowledge," "recognize" or "discover," their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows or should know, recognizes or should reasonably recognize and discovers or should reasonably discover in exercising the care, skill and diligence required by the Contract Documents.

Master Project Schedule - The Master Project Schedule shall show the sequence, duration in calendar days, interdependence for the complete performance of all Work. The Master Project Schedule shall begin with the date of issuance of the Notice to Proceed and conclude with the date of final completion.

Notice to Proceed - A "Notice to Proceed" means written notice given by the University to the Contractor fixing the date on which the Contract Time will commence to run and/or on which Contractor shall start to

perform Contractor's obligations under the Contract Documents. A Notice to Proceed by the University shall authorize all or a portion of the Work for the Costs so defined.

Persistently fails - The phrase "persistently fails" and other similar expressions, as used in reference to the Contractor, shall be interpreted to mean any combination of acts and omissions, which cause the University to reasonably conclude that the Contractor will not complete the Work within the Contract Time, or for the Contract Sum or in substantial compliance with the requirements of the Contract Documents.

Plans - The drawings prepared by the Design Professional and accepted by the University which include elevations, sections, details, schedules, diagrams, information, notes, or reproductions or any of these, and which show the location, character, dimension, or details of the Work. These include the graphic and pictorial portions of the Contract Documents as listed in the Agreement.

Preliminary Project Cost and Schedule Impact Report – The direction from the University to perform changed Work in the absence of agreement between the University and Contractor, which may result in a Change Order upon agreement of the cost or schedule impact.

Project - The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the University or by separate Contractors.

Punchlist - Punchlist items shall include all Work remaining on the Contractor's Incomplete Construction List and additional items documented by the Design Professional, Contractor and University and issued to the Contractor and may be issued with a Certificate of Substantial Completion. It is understood and accepted that the Punchlist included with the Certificate of Substantial Completion may not represent all remaining Work for which the Contractor is obligated and that Punchlist may be expanded prior to Final Completion.

Reasonably inferable - The phrase "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a Contractor familiar with the Project and exercising the care, skill and diligence required by Contract Documents.

Site - The area specified in the Contract Documents and the area made available for the Contractor's operation.

Soft Costs - "Soft Costs" are those costs derived by the University and shall include, but not be limited to, items such as Environmental services, State administration fees, Design Professional fees, moving furniture, fixtures and equipment, and telecommunications, unless otherwise agreed to by the Parties.

Specifications - The term Specifications shall mean the written instructions and requirements prepared by the Design Professional which complement the plans and which describe the manner of executing the Work or the qualities and types of materials to be furnished.

Statement of Probable Cost - The Statement of Probable Cost, as developed by the Contractor, is essential to the budgetary and management processes of the University. The Statement of Probable Cost, once established and accepted by the University, is relied upon by the University for its subsequent budgetary planning and financial needs for the Project.

The Statement of Probable Cost, applicable to either an estimated or actual cost, is the sum of all costs for a completely constructed, functionally ready-for-use project, in accordance with the scope, scheme, concept, and statement, as developed, documented and accepted by the University, and as constructed by the accepted contracting method or methods. The Contractor shall provide Statements of Probable Cost as needed during the Project to aid the University and Design Professional in making scope of work selection decisions, especially during design phase and minimally at the end of each design phase of the Project and shall include all costs included in the Contract Sum. The University shall be responsible for the derivation and provision of all Soft Costs that comprise the Project scope and budget.

Subcontractor - The term "subcontractor" shall mean any business entity under contract to the Contractor for services on or regarding the Project. The term “Subcontractor” as used in the General Conditions shall be synonymous with the term “Trade Contractor” as used in the Contract for Construction Management Services. Nothing contained in this contract shall create any contractual relationship between the University and any subcontractor. However, the University is the intended third-party beneficiary of all contracts for design, engineering or consulting services, all Trade Contracts, subcontracts, purchase orders and other agreements between the Contractor and third parties. The Contractor shall incorporate the obligations of this Agreement into its respective Trade Contracts, subcontracts, supply agreements and purchase orders.

Substantial Completion - "Substantial Completion" shall mean the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the University can occupy or utilize the Work for its intended use. Substantial Completion shall only be determined as described in the Contract Documents.

Unsafe Persons – Unsafe persons shall be those individuals that present a safety hazard to themselves or others.

University - The University is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term “University” means the University or the University’s authorized representative. Any reference to “Board of Governors” shall be considered to mean “University.”

University's Representative - The University's Representative shall include the Associate Vice President for Facilities Planning and Management, the Senior Director of Design and Construction Services, the Director of Design and Construction Services and the Project Manager. Any project decision on behalf of the University may only be in accordance with the Authorization Matrix.

Vice President of Finance and Business Operations - The Vice President of Finance and Business Operations shall be the level of review over the Associate Vice President of Facilities Planning & Management.

Work - The term “Work” means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, licenses, permits, insurance and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

2.00 BIDDING

2.01 Duty to Carefully Examine These Instructions

Prospective bidders for this project shall carefully examine the instructions contained herein and be cognizant of and satisfied with the conditions which must be satisfied prior to submitting a proposal and to the conditions which affect the award of the Contract.

2.02 Disclosure of Bidders

The Contractor shall only accept proposals from Subcontractors who are acceptable to the University.

2.03 Clarification During Bidding

The Contractor shall examine the plans and specifications in preparing the bid and shall immediately report to the Design Professional any omissions, discrepancies, or apparent errors found in the plans and specifications. Prior to the date of bid opening, bidders shall submit a written request for clarification in accordance with the instruction contained in the request for bids. If time permits, such clarification shall be issued in the form of addenda to all bidders.

2.04 Bidding Documents

2.04.1 Bid Proposal Package

Each bidder will receive a bid proposal package containing a standard proposal form which shall be used for bidder's proposal. Each proposal shall give the prices proposed in the manner required by the proposal and shall be signed by the bidder or the bidder's duly authorized representative, with its address and telephone number. If the proposal is made by an individual, the individual's name, postal address, and telephone number must be shown. If made by a partnership, the proposal shall have the signature of all partners or an affidavit signed by all partners empowering one partner as an agent to act in their behalf and the address and telephone number of the partnership. A proposal submitted by a corporation shall show the name of the state in which the corporation is chartered, the name of the corporation, its address and telephone number, and the title of the person who signs on behalf of the corporation.

2.04.2 Listing of Proposed Subcontractors Acceptable to the University

The Contractor will require every subcontractor to provide the name and location of the place of business of each Subcontractor and subordinate Subcontractor which will perform work or labor or render services for the Project.

2.04.3 Bidder's Security

All bids shall be presented under sealed cover and have enclosed an amount as directed in the instructions to bidders as bid security. The bid security may be a cashier's check made payable to Wayne State University or as otherwise directed in the instructions to bidders.

2.05 Bid Proposals

2.05.1 Submission of Proposals

Proposals shall be submitted to the office indicated on the bid proposal. It is the responsibility of the bidder to see that its bid is received in the proper time. Delays in timely receipt of the bid caused by the United States or the University mail system, independent carriers, acts of God, or any other cause shall not excuse late

receipt of a bid. Any bid received after the scheduled closing time for receipt of bids shall not be considered and will be rejected by the University, opened, retained by the University or returned to the bidder unopened.

2.05.2 Withdrawal of Proposals

Any bid may be withdrawn at any time prior to the time fixed for receiving bids but only by a written request from the bidder or its authorized representative filed with the University. An oral, faxed, or telephonic request to withdraw a bid proposal is not acceptable. The withdrawal of a bid shall not prejudice the right of a bidder to file a new bid. This paragraph does not authorize the withdrawal of any bid after the time fixed for receiving bids.

2.05.3 Public Opening of Proposals – SECTION DELETED

2.05.4 Rejection of Irregular Proposals

Proposals may be rejected if they show any alterations of forms, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind. If the bid amount is changed after the amount has been once inserted, the change shall be initialed.

2.05.5 Power of Attorney or Agent

When proposals are signed by an agent, a power of attorney shall either be on file with the University prior to the opening of bids or be submitted with the proposal. Failure to submit a power of attorney may result in the rejection of the proposal as irregular and unauthorized. A power of attorney is not necessary in the case of a general partner of a partnership.

2.05.6 Waiver of Irregularities/University's Right to Reject Bids

The University reserves the right to waive any or all irregularities in proposals submitted. The University reserves the right to reject any or all of the bids submitted.

2.05.7 Exclusion from Contract Documents

Nothing in any of the bidding documents, including but not limited to Request for Proposal form, Notice to Contractors, Proposal by Contractor and Design Professional and bids including any attachments or exhibits by Contractor, shall be considered part of the Contract Documents unless specifically incorporated.

2.06 Mistake in Bid

A bidder shall not be relieved of a bid nor shall any change be made in a bid because of mistakes without consent of the University. Failure by the Contractor to honor its proposal following the opening of bids for any reason shall result in the forfeiture of the Bid Security and possible suspension from future work consideration by and with the University.

2.07 Non-Discrimination

Wayne State University is an affirmative action/equal opportunity employer. The University has a strong commitment to the principle of diversity in all areas.

The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, color, religion, national origin, age, sex (including gender identity), height, weight or familial, disability or veteran status. The Contractor will ensure that applicants are employed and that employees are treated during employment, without regard to their race, color, religion, national origin, age, sex (including gender identity), height, weight or familial, disability, or veteran status. Such action shall

include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor shall, in all solicitation or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, age, (including gender identity), height, weight or familial, disability or veteran status.

The Contractor shall comply with all requirements of the Elliott-Larsen Civil Rights Act being 1976 PA 453, as amended.

The Contractor shall also comply with the Persons with Disabilities Civil Rights Act being 1976 PA 220, as amended.

The Contractor shall include, or incorporate by reference, the provisions of this Article 2.07 in each and every subcontract or purchase order and shall provide in each and every subcontract or purchase order that said provisions will be binding upon each and every subcontractor and Supplier and Vendor.

Any breach of the requirements and covenants of this Article 2.07 shall constitute a material breach of the Contract Documents.

3.00 AWARD AND EXECUTION OF CONTRACT

3.01 Contract Bonds and Insurance

3.01.1 Payment and Performance

The Contractor shall forward to the University fully executed Payment & Performance Bonds in the amount of 100 percent of the Contract value on the AIA Form 312 or an equivalent form that is acceptable to the University and in compliance with MCL 129.201 et seq. within five (5) days after execution of the Agreement.

In the same five (5) day period the Contractor shall present to the University, in an acceptable form, evidence of the insurance as required by the Contract Documents. Actual Work shall not commence until the bond and insurance is received by the University. Failure to provide the bond and insurance in the time-frame allowed shall not be cause for an extension of Contract Time.

All alterations, extensions of time, extra and additional work, and other changes authorized by any part of the Contract, including determinations made under Article 7.00, Claims and Disputes, shall be made without securing the consent of the surety or sureties on the Contract bonds.

Whenever the University has cause to believe that the surety has become insufficient, the University may demand in writing that the Contractor provide such further bonds or additional surety, not exceeding that originally required, as in the University's opinion is necessary, considering the extent of the work remaining to be done. Thereafter no payment shall be made to the Contractor or any assignee of the Contractor until the further bonds or additional surety have been furnished.

Contract bonds shall remain in full force and effect during the repair and guarantee period required by the Contract Documents.

3.02 Execution of Contract

The Contract shall be signed by the Contractor in three (3) duplicate counterparts and returned to the University within five days of receipt from the University, not including Saturdays, Sundays, or legal holidays. No Contract shall be binding upon the University until it has been executed by the Contractor and a University official in accordance with the Authorization Matrix.

3.03 Failure or Refusal to Execute Contract

Failure or refusal by the Contractor to execute the Contract within the time set in Section 3.02 shall be just cause for the rescission of the award and the forfeiture of bidder's security. Failure or refusal to file acceptable bonds within the time set in Section 3.01 constitutes a failure or refusal to execute the Contract. If the Contractor fails or refuses to execute the Contract, the University may award the Contract to another contractor and the Contractor shall forfeit his Cashier's Check.

4.00 RESPONSIBILITIES OF THE PARTIES

4.01 University

4.01.1 Information and Services Required of the University

The University shall make available existing surveys describing physical characteristics, legal limitations and utility locations for the site of the Project. The University does not warrant or guarantee the accuracy of the information provided.

Unless otherwise agreed to, the University shall be responsible for the abatement of asbestos containing materials and/or site related environmental hazards. The University will provide documentation regarding the presence of asbestos containing materials or other possible environmental hazards to the Contractor. Second opinions on previously documented clean conditions shall be provided at the Contractor's expense. Positive results regarding environmental hazards shall become the University's obligation. If, during the execution of the Work, previously unknown environmental hazards are encountered, the University shall be allowed a reasonable amount of time to abate environmental hazards.

The University shall provide available information regarding requirements for the Project including plans and specifications for the buildings and a survey of the site where required. The Contractor shall review the plans and specifications and survey, if provided, for errors, inconsistencies, ambiguities or omissions as required by Article 4.02.2, Review of Contract Documents and Field Conditions by Contractor. In the event errors, inconsistencies, ambiguities or omissions in the plans, drawings, and specifications were not reasonably identifiable in the Contractor's review as specified in Article 4.02.2, Review of Contract Documents and Field Conditions by Contractor, and such errors, inconsistencies, ambiguities or omissions result in changes in time and cost, the University may make reasonable adjustment in the Contract Sum in accordance with Article 6.00, CHANGES IN THE WORK of the General Conditions.

Except for permits and fees, which are the responsibility of the Contractor under the Contract Documents, the University shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

Information or services under the University's control shall be furnished by the University with reasonable promptness to avoid delay in orderly progress of the Work.

All reproduction required for construction is the obligation of the Contractor.

4.01.2 University's Right to Stop the Work

If, in the University's determination, the Contractor fails to correct work which is not in accordance with the requirements of the Contract Documents as required, or persistently fails to carry out work in accordance with the Contract Documents, the University Representative, by written order may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the University to stop the Work shall not give rise to a duty on the part of the University to exercise this right for the benefit of the Contractor or any other person or entity.

It is understood that while the Contractor is fully responsible for the safety of the jobsite, and for the methods of its execution, if the University deems that the Contractor is failing to provide safe conditions, the University may stop or restrict the Work under such conditions. However, this right shall not create such duty on the University. Under no circumstance shall the Contractor be granted a time extension or Contract Sum increase for conditions resulting by a stop work order occurring as a consequence of the Contractor's failure to maintain safe working conditions.

4.01.3 University's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a three (3) day period after receipt of written notice from the University to commence and continue correction of such default or neglect with diligence and promptness, the University may after such three (3) day period, without prejudice to other remedies the University may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Design Professional's additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the University.

4.01.4 University's Right to Audit

4.01.4.1

Contractor's records, which shall include but not be limited to accounting records (hard copy, as well as computer readable data if it can be made available), written policies and procedures; subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.); original estimates; estimating work sheets, correspondence; change order files (including documentation covering negotiated settlements); backcharge logs and supporting documentation; general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends; and any other supporting evidence deemed necessary by the University to substantiate changes related to the Agreement (collectively referred to as "Records") shall be maintained in accordance with Generally Accepted Accounting Principles and open to inspection and subject to audit and/or reproduction by University's agent or its authorized representative to the extent necessary to adequately permit evaluation and verification of Cost of the Work, and any invoices, change order, payments or claims submitted by the Contractor or any of his payees pursuant to the execution of the contract that are or have been charged on a basis other than a lump sum approved in writing by the University.

4.01.4.2

Such audits may require inspection and copying from time to time and at reasonable times and places of any and all information, materials and data of every kind and character, including without limitation, records, books, papers, documents, subscriptions, recordings, agreements, purchase order, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers and memoranda, and any and all other agreements, sources of information and matters that may in University's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Contract Documents. Such records subject to audit shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs, (including overhead allocations) as they may apply to costs associated with this Agreement.

4.01.4.3

The University or its designee shall be afforded access to all of the Contractor's Records, and shall be allowed to interview any of the Contractor's employees, pursuant to the provisions of this article throughout the term of this contract and for a period of five (5) years after Final Payment or longer if required by law. To the extent feasible, the Construction Manager's records shall remain confidential, and the University's third party auditors will enter into a confidentiality agreement between and among the University, the third-party auditor and the Contractor prior to any audits being conducted.

4.01.4.4

Contractor shall require all Subcontractors and material suppliers (payees) to comply with the provisions of this article by insertion of the requirements hereof in a written agreement between Contractor and payee so as to allow the University to verify any amounts charged to the Project by a payee on a basis other than a lump sum approved in writing by the University. Such requirements will also apply to Subcontractors and all lower tier Subcontractors. Contractor shall cooperate fully and shall cause all of Contractor's Subcontractors to cooperate fully by furnishing or making available to University from time to time whenever requested in an expeditious manner any and all such information, materials and data.

4.01.4.5

University's agent or its authorized representative shall have access to the Contractor's facilities, shall have access to all necessary records; and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this article.

4.01.4.6

Contractor agrees that University's designee shall have the right to examine the Contractor's records (during the contract period and up to five (5) years after Final Payment is made on the contract) to verify the accuracy and appropriateness of the pricing data used to price change proposals or claims. Contractor agrees that if the University determines the cost and pricing data submitted (whether approved or not) was inaccurate, incomplete, not current or not in compliance with the terms of the contract regarding pricing of change orders, an appropriate contract price reduction will be made. Such post-approval contract price adjustments will apply to all levels of contractors and/or subcontractors and to all types of change order proposals specifically including lump sum change orders, unit price change orders and cost-plus change orders.

4.01.4.7

If an audit, inspection or examination in accordance with this article, discloses overcharges (of any nature) by the Contractor to the University in excess of five percent (5%) of the total contract billings, the actual cost of the University's audit shall be reimbursed to the University by the Contractor. Any adjustments and/or payments which must be made as a result of any such audit or inspection of the Contractor's invoices and/or records shall be made within a reasonable amount of time (not to exceed 90 days) from presentation of University's findings to Contractor.

4.02 Contractor

The Contractor recognizes the relationship of trust and confidence established between the University and the Contractor by this Contract. The Contractor shall furnish the University with its best skill and judgment and fully cooperate with the University in furthering its best interests. All the Work is to be done in the best manner by persons skilled in the type of Work to be performed.

4.02.1 Contractor's Responsibility for the Work

The Contractor shall be responsible to the University for all Work performed under this Contract. For purposes of assessing responsibility to the Contractor by the University, all persons engaged in the Work shall be considered employees of the Contractor. The Contractor shall give its personal attention to the fulfillment of the Contract and keep all phases of the Work under its control.

4.02.2 Review of Contract Documents and Field Conditions by Contractor

The Contractor shall have a continuing duty to read, carefully study and compare the Contract Documents as defined in Article 1.00, DEFINITIONS, and product data with each other and with information furnished by the University. The Contractor shall perform construction coordination and constructability review of the Contract Documents and shall at once report to the Design Professional and the University, any errors, inconsistencies, ambiguities and omissions before proceeding with the affected Work. The Contractor shall be liable to the University for damage resulting from the Contractor's failure to properly perform such reviews or failure to promptly report any errors, inconsistencies, ambiguities or omissions identified in the Contract Documents to the Design Professional and the University. If the Contractor performs any construction activity that involves such error, inconsistency, ambiguity or omission in the Contract Documents without such notice to the Design Professional and the University, the Contractor shall assume responsibility for such performance and shall bear all costs attributable for correction. If the Contractor submits authorized substitutes that cost in excess of the Contract Sum or which cause coordination conflicts, the Contractor shall bear all costs attributable to correction.

The Contractor shall perform the Work in accordance with the Contract Documents.

The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Design Professional and University at once.

4.02.3 Supervision and Construction Procedures

The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible to the University for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

The Contractor shall be responsible to the University for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons performing portions of the Work under a Contract with the Contractor.

The Contractor agrees to furnish efficient business administration, coordination, supervision and superintendence of the Work and to furnish at all times a competent and adequate administrative and supervisory staff and an adequate supply of workmen and materials to perform the Work in the best and most sound way in the most expeditious and economical manner consistent with the interests of the University. The Contractor agrees from time to time at the University's request to furnish estimates and technical advice as to construction methods and equipment to the University and Design Professional.

The Contractor agrees to cooperate with the Design Professional, University's Representative, commissioning agents, and all persons or entities retained by the University to provide consultation and advice, and to coordinate the Work with the Work of such parties so that the Project shall be completed in the most efficient and expeditious manner. In the event that Contractor's failure to efficiently sequence or coordinate the Work results in additional costs to the University, the Contractor shall promptly reimburse the University for the actual costs incurred. Contractor shall remain responsible for any delays resulting from its failure to efficiently coordinate and schedule the Work; any delays or extensions shall be addressed as provided in Sections 4.08, 4.09 and 4.10 of these General Conditions.

4.02.4 Quality Control

The Contractor shall be fully responsible for the quality of materials and workers' skill in the Project. The Contractor shall not rely upon the inspection and testing provided by the University or Design Professional other than those special inspections and tests performed at the University's direction for which there are written reports. Reports issued by the University's commissioning agent are to be considered complementary in nature and in no way relieve the Contractor of its responsibility to deliver Work in compliance with the Contract Documents.

The Contractor shall inspect the Work of the subcontractors on the Project, while the Work is being performed through final completion and acceptance of the Project by the University to assure that the Work performed and the materials furnished are in strict accordance with the drawings and specifications; the Contractor shall also inspect the Work to verify that Work on the Project is progressing on schedule.

The Contractor shall be responsible for inspection of portions of Work performed under this Contract to determine that such portions are in proper condition to receive subsequent Work. In the event that it becomes necessary to interpret the meaning and intent of the plans and specifications during construction and the meaning is not reasonably inferable, the Contractor shall submit as a Request for Information (RFI) to the Design Professional to make the interpretation in writing and transmit same to appropriate Subcontractors and the University in accordance with the procedures established in section 5.02 of these General Conditions.

The Contractor shall not be relieved of obligations to performing the Work in accordance with the Contract Documents either by activities or duties of the Design Professional in the Design Professional's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

4.02.5 Labor and Materials

The Contractor shall provide an analysis of the types and quantity of labor required for the Project and review the availability of the appropriate categories of labor required for all Work, and the Contractor shall be responsible to provide the necessary and adequate labor needed to complete the Project by the Contract Time. During the course of the Project, the Contractor shall endeavor to maintain harmonious labor relations on the Project.

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, , transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

Unless otherwise noted in the Information to Bidders, the Contractor shall provide and pay for water, heat, electric and other utilities.

The Contractor shall enforce strict discipline and good order among the Contractor's employees and Subcontractors and others carrying out the Work of the Contract. The Contractor shall not permit employment of unsafe persons or persons not skilled in tasks assigned to them.

4.02.6 Disputes with Subcontractors

Wherever any provision of any section of the Plans and Specifications conflicts with any agreement or regulation of any kind at any time in force among members of any Trade Associations, Unions or Councils which regulate or distinguish what Work shall or shall not be included in the Work of any particular trade, the Contractor shall make all necessary arrangements to reconcile any such conflict without delay, damage, increase to the Contract Sum or recourse to the University. The University will not arbitrate disputes among subcontractors nor between the Contractor and one or more subcontractors concerning responsibility for performing any part of the Project.

In case the progress of the Work is affected by any undue delay in furnishing or installing any items of material or equipment required under the Contract Documents because of conflict involving any agreement or regulation of the type described above, the University's Representative may require that other material or equipment of equal kind and quality be provided at no additional cost to the University.

4.02.7 Project Manager and Superintendent

The Contractor shall have at the Project site, during the full term of the Contract, an approved, competent project staff, which may include a Project Manager and Superintendent, and any necessary assistants, all satisfactory to the University's Representative and in accordance with the Contract Documents and the Contractor's Staffing Plan. The Project Manager or the Superintendent shall not be changed, except with the written consent of the University's Representative unless the Project Manager or the Superintendent ceases to be in the employ of the Contractor. The Project Manager or the Superintendent shall represent the Contractor and all directions given to either of them by the University or the University's Representative shall be as binding as if given to the Contractor. All directions and communications shall be confirmed in writing.

If a Project Manager or a Superintendent approved by the University's Representative ceases to be in the Contractor's employ, the Contractor shall immediately replace him with a person acceptable to the University's Representative. The University in its sole discretion shall have the right to require the removal of any agent or employee of the Contractor or any subcontractor without cause at any time.

4.02.8 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect and such taxes are included in the Contract Sum.

4.02.9 Permits and Notices

The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, policies and lawful orders of public authorities and the University bearing on performance of the Work.

4.02.10 Allowances

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such stated amounts including identified unit cost, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection. Unless otherwise provided in the Contract Documents:

1. materials and equipment under an allowance shall be selected promptly by the University to avoid delay in the Work;

2. allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

3. the Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the allowances;

4. if allowance assumptions prove inappropriate, the Contract Sum may be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual costs and the allowances.

4.02.11 Use of Site

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The site shall be safely maintained and kept clean, orderly and neat.

4.02.12 Safety

The Contractor shall protect adjoining property and nearby buildings, roads, and other facilities and improvements from dust, dirt, debris and other nuisances arising out of Contractor's operations or storing practices. Dust shall be controlled by sprinkling, misting or other effective methods acceptable to University and in accordance with legal requirements. An erosion and sedimentation control program shall be initiated, which includes measures addressing erosion caused by wind and water and sediment in runoff from site. A regular watering program shall be initiated to adequately control the amount of fugitive dust.

The Contractor is knowledgeable of and understands that the University may intend to maintain occupancy of certain portions of the existing facility. The Contractor shall exercise caution at all times for the protection of persons and their property. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (1) employees on the Work site together with Subcontractors and other persons who may be affected thereby; (2) the Work and materials and equipment to be incorporated therein, whether in storage on or offsite, under care, custody or control of the Contractor or the Contractor's Subcontractors or sub-subcontractors; and (3) other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction. The Contractor shall install adequate safety guards and protective devices for all equipment and machinery, whether used in the Work or permanently installed as part of the Project.

The Contractor shall also provide and adequately maintain all proper temporary walks, roads, guards, railings, lights, and warning signs. The Contractor shall comply with all applicable laws relating to safety precautions. The Contractor shall establish and maintain and update as required a Project Specific Safety Program.

The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the University and Design Professional.

The Contractor shall require each and every one of its subcontractors and Trade Contractors to comply with all of the provisions of this section.

The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in the Contract.

4.02.13 Hazardous Condition

The University and/or the Design Professional may bring to the attention of the Contractor a possible hazardous situation in the field regarding the safety of personnel on the site. The Contractor shall be responsible for verifying that all local, state, and federal workplace safety guidelines are being observed. In no case shall this right to notify the Contractor absolve the Contractor of its responsibility for monitoring safety conditions. Such notification shall not imply that anyone other than the Contractor has assumed any responsibility for field safety operations.

Explosives shall not be used without first obtaining written permission from the University and then shall be used only with the utmost care and within the limitations set in the written permission and in accordance with prudence and safety standards required by law. Storage of explosives on the Project site or University is prohibited. Powder activated tools are not explosive for purposes of this Article; however, such tools shall only be used in conformance with State safety regulations.

The Contractor shall report in writing to the University's Representative, within eight (8) hours, all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether occurring on or off the Site, which caused death, personal injury or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the University Representative and the University Police at (313) 577-2222. If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall report promptly the facts in writing to the University's Representative, giving full details of the claim.

4.02.14 Cutting, Patching and Sequencing

The Contractor shall be responsible for all cutting, fitting or patching required to complete the Work and to ensure the complete and effective coordination of the Work.

The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the University or separate Contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the University or a separate Contractor except with written consent of the University and of such separate Contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the University or a separate Contractor the Contractor's consent to cutting or otherwise altering the Work.

4.02.15 Access to Site

The Contractor shall at all times permit the University and the Design Professional to visit and observe the Work, and the shops where Work is in preparation, and shall maintain proper facilities and provide safe access for such observation. Work requiring testing, observation or verification shall not be covered up without such test, observation, or approval. Appropriate advance coordination of such testing, observation or verification is expected. University must provide prior written approval for any work to be performed on a Saturday, Sunday, or holiday. In the event that Contractor desires to perform Work on a weekend or holiday, Contractor shall provide a minimum of 48 hours written notice to the University of such desire prior to performing such Work. However, if the Work involves an actual or potential interruption to a utility or service, the Contactor shall provide no less than seven (7) days' written notice to the University.

The Contractor acknowledges that during the performance of the Work, the affected building and surrounding campus buildings will remain occupied and will require access by the public. The Contractor further acknowledges that other Contractors will be working on or near the Project site to accomplish the University's purposes and projects. To the greatest extent possible, the Contractor shall cooperate fully with the University and its guests, students, employees, invitees, and other Contractors in performing the Work required under the Contract. The Contract Sum includes any and all reasonably necessary costs expended to minimize interference with the University's activities as well as to coordinate schedules with other contractors' projects as required by the University.

4.02.16 Burden for Damage

From the issuance of the official Notice to Proceed until the formal acceptance of the Project by the University, the Contractor shall have the charge and care of and shall bear all risk of damage to the Project

and materials and equipment for the Project other than damage directly caused by the University or the University's other contractors.

4.02.17 Payments by Contractor

The Contractor agrees to promptly pay all subcontractors upon receipt of each progress payment, unless otherwise agreed in writing by the parties, the respective amounts allowed Contractor on account of the Work performed by its subcontractors to the extent of each such subcontractor's interest therein.

In the event the University becomes informed that the Contractor has not paid a subcontractor as herein provided, the University shall have the right, but not the duty, to issue future checks in payment to the Contractor of amounts otherwise due hereunder naming the Contractor and such subcontractor as joint payees. Such joint check procedure, if employed by the University, shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit or obligate the University to repeat the procedure in the future. This provision shall not supersede the procedures set forth in Article 8.00 of these General Conditions.

4.02.18 Responsibility to Secure and Pay for Permits, Licenses, Utility Connections, Etc.

The Contractor shall secure all permits and licenses required for any operations required under this Contract and shall pay all costs relating thereto as well as all other fees and charges that are required by the United States, the State, the county, the city, a public utility, telephone company, special district, or quasi-governmental entity. It is the responsibility of the Contractor to ascertain the necessity of such permits and licenses in preparing its bid, Contract Sum and include in its bid, Contract Sum the cost thereof, as well as any time requirements for securing such permits and licenses.

4.02.19 Patented or Copyrighted Materials

The Contractor shall pay all royalties and license fees for the use of patented or copyrighted processes or materials. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the University and Design Professional harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Design Professional and University in writing.

4.02.20 Property Rights in Materials and Equipment

Nothing in the Contract shall be construed as vesting in the Contractor any property right in the materials or equipment after the materials or equipment have been attached to or permanently placed in or upon the Work or the soil or after payment has been made for fifty percent or more of the value of the materials or equipment delivered to the site of the Work whether or not they have been so attached or placed. All such materials or equipment shall become the property of University upon being so attached or placed, or upon payment of fifty percent or more of the value of the materials or equipment delivered on the site but not yet installed and the Contractor warrants that all such property shall pass to the University free and clear of all liens, claims, security interests, or encumbrances.

4.02.21 Utilities

The Contractor shall refer to and abide by the policies included in the Supplementary General Conditions and shall provide the notices as required by University's Utility Disturbance and Interruption Request form.

The Contractor shall provide as-built drawings of all utilities encountered and constructed for the University, indicating the size, horizontal location, and vertical location based on the Project bench mark or a stable datum.

Unless otherwise specifically stated, the Contractor shall provide or otherwise make all arrangements for utilities required to deliver the Work. .

4.02.22 Asbestos and Hazardous Materials

The Contractor is prohibited from installing any asbestos containing materials or products, and other prohibited and hazardous materials in the Work. The Contractor shall be responsible for removal and replacement costs should it be determined this provision has been violated, regardless of whether the job has been completed.

4.02.23 Photographic Site Survey

Contractor shall perform a photographic survey of construction site and adjoining structures prior to commencing Work. The survey shall be provided to the University and shall include photographs of pathways, flat concrete paving, foundations, walls, landscaping.

4.02.24 Compliance with University Policies on Drugs, Alcohol and Tobacco.

The University requires Contractors, Subcontractors and sub-subcontractors with access to the work site to abide by the University's policies on drugs, alcohol and tobacco, which can be found at: http://bog.wayne.edu/2_20_04.php and http://policies.wayne.edu/administrative/00-03-smoke-free-campus.php. All costs for initial and period testing shall be borne by the Contractor

1. The Contractor and University shall reserve the right to test any and/or all site personnel at random periods and without notice.

    a. The Contractor shall be responsible for all costs including wages for those individuals testing drug or alcohol-free at the Contractor's direction.

    b. Subcontractors shall be responsible for all costs including wages for those individuals not testing drug or alcohol-free at the direction of the Contractor, and the Subcontractor shall immediately remove those individuals from the site.

2. Any individual not testing drug or alcohol-free shall not be allowed to return to the site under any circumstances.

4.03 Design Professional

4.03.1 Design Professional's Administration of Contract

The Design Professional will provide one or more Project Representatives to assist in the administration of the Contract as described in the Contract Documents, and to assist the University's Representative (1) during the construction, (2) until final payment is due and (3) with the University's concurrence, from time to time during the correction and warranty period. The Design Professional will advise and consult with the University on issues relating to contract performance and interpretation. The Design Professional will have no authority to act on behalf of the University except as provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

The Design Professional will visit the site at intervals defined in the Design Professional's Proposal to become familiar with the progress and quality of the completed Work and to determine if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. On the basis of on-site observations, the Design Professional will keep the University and Contractor informed of progress of the Work by written field reports, and will endeavor to guard the University against defects and deficiencies in the Work.

The Design Professional will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Design Professional will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Design Professional will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.03.2 Communications Facilitating Contract Administration

The Design Professional and Contractor shall communicate directly concerning the Project and shall keep the University advised of their communications. Communications by and with the Design Professional's consultants shall be through the Design Professional. Communications by and with subcontractors and material suppliers shall be through the Contractor. Communications by and with separate Contractors shall be through the University.

4.03.3 Evaluation of Applications for Payment

Based on the Design Professional's observations and evaluations of the Contractor's Applications for Payment, the Design Professional must approve and sign any Contractor Applications for Payment as an express condition precedent to release of any progress or final payment. In the absence of Design Professional, the University will review and authorize applications for payment.

The Design Professional will have authority to reject Work which does not conform to the Contract Documents. Whenever the Design Professional considers it necessary or advisable for implementation of the intent of the Contract Documents, the Design Professional will have authority to require additional observation or testing of the Work in accordance with section 5.06, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Design Professional nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Design Professional to the Contractor, subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.03.4 Review of Shop Drawings, Product Data and Samples

The Design Professional shall review and approve or take other appropriate action upon the Contractor's submittal of Shop Drawings, Product Data and Samples. The Design Professional's action will be taken within 10 days from receipt so as not to cause delay in the Work or in the activities of the University, Contractor or separate Contractors, while allowing sufficient time in the Design Professional's professional judgment to permit adequate review. Review of such submittal is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Design Professional's review of the Contractor's submittal shall not relieve the Contractor of the obligations under Article 5.04. The Design Professional's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Design Professional, of any construction means, methods, techniques, sequences or procedures. The Design Professional's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.03.5 Site Observations to Determine Substantial and Final Completion

The Design Professional will conduct observations to determine the date or dates of Substantial Completion and the date of Final Completion, will receive and forward to the University for the University's review and retention all written warranties and related documents required by the Contract and assembled by the Contractor, and will issue an approval of final payment upon compliance with the requirements of the Contract Documents.

4.04 Delegation of Performance and Assignment of Money Earned

The performance of all or any part of this Contract may not be delegated by the Contractor or Design Professional without the written consent of the University. Consent will not be given to any proposed delegation which would relieve the Design Professional, the Contractor or its surety of their responsibilities under the Contract.

The Contractor may assign moneys due or to become due under the Contract, only upon written consent of the University. Assignments of moneys earned by the Contractor shall be subject to proper retention in favor of the University and to all deductions provided for in the Contract and such moneys shall be subject to being used by the University for the completion of the Work in the event the Contractor is in default. Any assignment attempted without the written consent of the University shall be void.

4.05 Contractor's Insurance

The Contractor shall not commence Work under this Contract until it has obtained all the insurance required by the Contract Documents and such insurance has been approved by the University; likewise, no subcontractor or subconsultant shall be allowed to commence Work until the insurance required has been obtained. The Contractor shall, at its expense, purchase and maintain in full force and effect such insurance as will protect itself and the University from claims, such as for bodily injury, death, and property damage, which may arise out of or result from the Work required by the Contract Documents, whether such Work is done by the Contractor, by any subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. The types of such insurance and any additional insurance requirements are specified herein with the amounts and limits set forth in the Supplementary General Conditions.

4.05.1 Policies and Coverage

The following policies and coverages shall be furnished by the Contractor:

(1) Comprehensive or Commercial Form General Liability Insurance on an "Occurrence" form covering all Work done by or on behalf of the Contractor and providing insurance for bodily injury, personal injury, property damage, and Contractual liability. Except with respect to bodily injury and property damage included within the products and completed operations hazards, the aggregate limit shall apply separately to work required of the Contractor by these Contract Documents. This insurance shall include the contractual obligations assumed under the Contract Documents and specifically section 4.06.

(2) Business Automobile Liability Insurance on an "Occurrence" form covering owned, hired, leased, and non-owned automobiles used by or on behalf of the Contractor and providing insurance for bodily injury, property damage, and Contractual liability.

(3) Worker's Compensation and Employer's Liability Insurance as required by Federal and Michigan law. The Contractor shall also require all of its Subcontractors to maintain this insurance coverage. The Contractor acknowledges and shall abide by the University's prohibition on the use of 1099 independent contractors and owner/operator business entities wherein such individuals are not able

to secure and maintain such insurance. The Contractor shall ensure that all classifications of laborers and construction mechanics performing Work on the Project job site are traditional employees of the Contractor or any Trade Contractor for any tier thereof, and that each is covered by such insurance.

(4) The Umbrella Excess Liability insurance must be consistent with and follow the form of the primary policies, except that Umbrella Excess Liability insurance shall not be required for the Medical Expense Limit.

(5) Builder's Risk Insurance: The Contractor, at his sole expense, shall purchase and maintain property insurance upon the entire Project for the full replacement cost at the time of any loss. This insurance shall include “All Risk” coverage against physical loss or damage including the perils of Fire and Extended Coverage, Theft, Vandalism, and Malicious Mischief, Transit and Collapse. The Contractor will be responsible for any co-insurance penalties and/or deductibles.

(6) Professional Liability (Errors and Omissions) including tail-coverage for claims made after final completion.

4.05.2 Proof of Coverage

Certificates of Insurance or Declarations pages as may be requested by the University, as evidence of the insurance required by these Contract Documents, shall be submitted by the Contractor to the University. The Certificates of Insurance and Declarations shall state the scope of coverage and deductible, and list the University as an additional insured as required by Section 4.05.04 below. Any deductible shall be the Contractor's liability. The Declarations shall provide for no cancellation or modification of coverage without thirty (30) days prior written notice to the University. Acceptance of Certificates of Insurance or Declarations pages by the University shall not in any way limit the Contractor’s liabilities under the Contract Documents. The Contractor shall maintain required insurance for the entire duration of the Contract. In the event the Contractor does not comply with these insurance requirements, the University may, at its option, provide insurance coverage to protect the University; the cost of such insurance shall be deducted from the Contract Sum or otherwise paid by the Contractor. Renewal certifications shall be filed in a timely manner for all coverage until the Project is accepted as complete as requested by the University. Upon the University's request, the Contractor shall provide copies of the policies obtained from the insurers.

4.05.3 Subcontractor's Insurance

The Contractor shall either require Subcontractors to carry insurance as set forth in the CCIP Insurance Manual and the Subcontract, or the Contractor shall insure the activities of the Subcontractors in the amount, types and form of insurance required under by the Contract Documents. If the Contractor elects to have its Subcontractors purchase individual insurance policies, the Contractor shall cause its trade contracts and subcontracts to include a clause requiring that copies of any insurance policies which provide coverage to the Work shall be furnished to the University upon request. The Contractor shall supply the University with a list of all Subcontractors, including those enrolled in the CCIP coverage, and copies of the enrolled Subcontractors’ certificates of insurance evidencing coverage, showing whether or not they have individual insurance policies and certifying that those subcontractors without individual insurance policies are insured by the Contractor.

4.05.4 Scope of Insurance Coverage

The Contractor’s insurance as required by the Contract Documents (including subcontractors’ insurance), by endorsement to the policies and the Certificates of Insurance, shall include the following and may be presented in the form of a rider attached to the Certificates of Insurance:

(1) The Board of Governors of Wayne State University, the University, their officers, employees, representatives and agents including the Design Professional, shall be included as additional insured under the general liability, builder's risk and automobile liability policies for and relating to the Work to be performed by the Contractor and subcontractors. This shall apply to all claims, costs, injuries, or damages.

(2) A Severability of Interest Clause stating that, "The term 'insured' is hereby used severally and not collectively, but the inclusion herein of more than one insured shall not operate to increase the limits of the insurer's or insurers' liability."

(3) A Cross Liability Clause stating that, "In the event of claims being made under any of the coverages of the policy or policies referred to herein by one or more insured hereunder for which another or other insured hereunder may be liable, then the policy or policies shall cover such insured or insured against whom a claim is made or may be made in the same manner as if separate policies had been issued to each insured hereunder. Nothing contained herein, however, shall operate to increase the insurer's limits of liability as set forth in the insuring agreements."

(4) The Board of Governors of Wayne State University, the University, their officers, employees, representatives and agents, shall not by reason of their inclusion as insured incur liability to the insurance carriers for payment of premiums for such insurance. However, the Board of Governors of Wayne State University may, in their sole discretion after receiving a notice of cancellation for nonpayment, elect to pay the premium due and deduct such payment from any sums due to the Contractor or recover the amount paid from the Contractor if the sums remaining are insufficient.

(5) Coverage provided is primary and is not in excess of or contributing with any insurance or self-insurance maintained by the Board of Governors of Wayne State University, the University, their officers, employees, representatives and agents.

4.05.5 Miscellaneous Insurance Provisions

The form and substance of all insurance policies required to be obtained by the Contractor shall be subject to approval by the University. All such policies shall be issued by companies lawfully authorized to do business in Michigan and be acceptable to the University. All property insurance policies to be obtained by the Contractor shall name the University as loss payee as its interest, from time to time, may appear.

The Contractor shall, by mutual agreement with the University and at the University's cost, furnish any additional insurance as may be required by the University. The Contractor shall provide Certificates of Insurance evidencing such additional insurance.

Should the Project involve asbestos abatement, the Contractor or subcontractor, as appropriate, shall provide asbestos liability insurance.

The Contractor acknowledges that the University is self-insured and participates in the Michigan Universities Self-Insurance Corporation program and the Contractor agrees that the University is not required to provide or purchase any additional insurance with respect to this Project or the Work required by the Contractor for the Project.

4.05.6 Loss Adjustment

Any insured loss is to be adjusted with the Contractor and made payable jointly to the University and the Contractor. The Contractor shall cooperate with the University in a determination of the actual cash value or replacement value of any insured loss. Any deductible amount shall be the responsibility of the Contractor.

4.05.7 Compensation Distribution

The University upon the occurrence of an insured loss shall account for any money so received and shall distribute it in accordance with such agreement as the interested parties may reach. Claim payments received shall be distributed proportionately according to the actual percentages of losses to both. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate contract change order. Any dispute shall be resolved by the University.

4.05.8 Waivers of Subrogation

The University and Contractor waive all rights against (1) each other and any of their subcontractors, subcontractors, agents and employees, each of the other, and (2) the Design Professional, Design Professional's consultants, separate Contractors if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this paragraph or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the University as fiduciary. The University or Contractor, as appropriate, shall require of the Design Professional, Design Professional's consultants, separate Contractors, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

4.06 Indemnification

4.06.1

To the fullest extent permitted by law, the Contractor shall hold harmless, defend, and indemnify the Board of Governors of Wayne State University, the University, and officers, employees, representatives and agents of each of them, from and against any and all claims or losses arising out of or are alleged to be resulting from, or relating to (1) the failure of the Contractor to perform its obligations under the Contract or the performance of its obligation in a willful or negligent manner; (2) the inaccuracy of any representation or warranty by the Contractor given in accordance with or contained in the Contract Documents; and (3) any claim of damage or loss by any subcontractor, or supplier, or laborer against the University arising out of any alleged act or omission of the Contractor or any other subcontractor, or anyone directly or indirectly employed by the Contractor or any subcontractor.

4.06.2

To the fullest extent permitted by law, the Contractor shall be liable for and hereby agrees to defend, discharge, fully indemnify and hold the University harmless from and against any and all claims, demands, damages, liability, actions, causes of action, losses, judgments, costs and expenses of every nature (including investigation costs and/or expenses, settlement costs, and attorney fees and expenses incident thereto) sustained by or asserted against the University arising out of, resulting from, or attributable to the performance or nonperformance of any Work and/or obligation covered by the Contract or to be undertaken in connection with the construction of the Project contemplated by the Contract (collectively, "Claim"), including, but not limited to, any Claim for: (a) any personal or bodily injury, illness or disease, including death at any time resulting therefrom of any person, (including, but not limited to, employees of the University, the Contractor, any subcontractor, and any materialman and the general public); (b) any loss, damage or destruction of any property; (c) any loss or damage to the University's operations, arising out of, resulting from, or attributable in whole or in part to (i) any negligence or other act or omission of the Contractor, and any subcontractor, any materialman and/or any other person or any of the directors, officers, employees or agents of any of them or (ii) any defects in material or equipment furnished hereunder; (d) any payments

allegedly owed to subcontractors, sub-subcontractors or materialmen; (e) any acts or omissions relative to conditions of safety and protection of persons on the Project site; and/or (f) any act or omission relative to the Contractor's breach of obligations and regarding non-discrimination as set forth in these General Conditions. The Contractor shall not be liable hereunder to indemnify the University against liability for damages arising out of bodily injury to persons or damage to property caused by or resulting from the sole negligence or willful misconduct of the University, its agents or employees. The Contractor, at its own cost and expense, shall take out and maintain at all times during the effective period of the Contract, contractual liability insurance insuring the performance by the Contractor of its contractual duties and obligations under this Article, which insurance shall name the University as additional insured and shall be in form and amount and from an insurance company satisfactory to the University. The Contractor's duty to fully indemnify the University shall not be limited in any way by the existence of this insurance coverage.

4.06.3

The Contractor shall also be liable for and hereby agrees to pay, reimburse, fully indemnify and hold the University harmless from and against all costs and expenses of every nature (including attorney fees and expenses incident thereto) incurred by the University in collecting the amounts due from the Contractor, or otherwise enforcing its rights, under the indemnifications described in this Article.

4.06.4

In claims against any person or entity indemnified under this Article made by an employee of the Contractor or a subcontractor, or indirectly employed by either of them, or anyone for whose acts either made by liable, the indemnification obligation under this Article shall not be limited by any limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a subcontractor under workers compensation laws, disability benefit laws, or other laws providing employee benefits.

4.06.5

The indemnification obligations under this Article shall not be limited by any assertion or finding that the person or entity indemnified is liable by reason of a non-delegable duty.

4.06.6

The Contractor shall hold harmless, defend, and indemnify the University from and against losses resulting from any claim of damage made by any separate Contractor of the University against the University arising out of any alleged acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by either the Contractor or subcontractor, or anyone for whose acts either the Contractor or subcontractor may be liable.

4.06.7

The Contractor shall hold harmless, defend and indemnify the Design Professional and the separate Contractors of the University from and against losses to the extent they arise from the negligent acts or omissions or willful misconduct of the Contractor, a subcontractor, anyone directly or indirectly employed by the Contractor or subcontractor, or anyone for whose acts the Contractor or subcontractor may be liable.

4.07 Occupancy by University Prior to Acceptance

The University may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the University and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security,

maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a description of the area substantially complete to the Design Professional. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the University and Contractor or, if no agreement is reached, by decision of the Design Professional.

Immediately prior to such partial occupancy or use, the University together with the Contractor and Design Professional shall jointly observe and/or inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents. Likewise, partial occupancy or use of a portion or portions of the Work shall not alter, change or modify the requirements for Substantial or Final Completion within Contract Time.

4.08 Contract Time

4.08.1 Time of the Essence

All time limits specified in this Contract are of the essence of the Contract.

4.08.2 Starting and Completion Date

The University shall designate in the Notice to Proceed the starting date of the Contract on which the Contractor shall immediately begin and thereafter diligently prosecute the Work to completion. The Contractor agrees to complete the Work on the date specified for completion of the Contractor's performance in the Contract unless such time is adjusted, in writing, by change order issued by the University. The Contractor may complete the Work before the completion date if it will not interfere with the University or their other Contractors engaged in related or adjacent Work. The date of Substantial Completion shall be used as the commencement date of the guarantee.

4.08.3 Delay

Within ten (10) days from the commencement of a delay, Contractor shall submit to the University's Representative a written notice of the delay. Such notice of delay shall describe the nature and cause of the delay, provide a preliminary estimate of the impact of said delay on the construction schedule and provide a recovery plan to mitigate the delay. The Contractor's failure to give such notice to the University shall constitute a waiver by the Contractor of its ability to request an extension of time. In the case of a continuing cause of delay, only one claim shall be necessary. The giving of such notice shall not of itself establish the validity of the cause of delay or of the extension of the time for completion. Submission of reports and/or updates required at regularly scheduled meetings or as a part of a regularly submitted report shall not constitute such required notice.

The Contractor expressly agrees that delays to construction activities which do not affect the overall time of completion of the Work shall not entitle the Contractor to an extension of the Contract Time or provide a basis for additional cost or damages. No delay, obstruction, interference, hindrance, or disruption, from whatever source or cause in the progress of the Contractor's Work shall be a basis for an extension of time unless the delay, obstruction, interference, hindrance, or disruption is without the fault and not the responsibility of the Contractor and directly affects the overall completion of the Work as reflected in the Contractor's updated and accepted Project schedule.

Within fifteen (15) days from the submittal to the University of the notice of delay detailed in the previous paragraphs, Contractor shall submit to the University's Representative a request for an extension of time which shall include all documentation supporting the request. Such submittal shall include a detailed description of all changes in activity duration, logic, sequence, or otherwise in the Project schedule. The filing of such a request for an extension of time shall not of itself establish the validity of the cause of delay or of the extension of time for completion. Submission of construction reports and/or updates required by these General and Supplementary Conditions shall not constitute such a request.

4.08.4 Adjustment of Contract Time and Cost

If the Contractor is delayed, obstructed or hindered at any time in the progress of the Work by any act or neglect of the University or by any contractor employed by the University, or by changes ordered in the scope of the Work, or by fire, adverse weather conditions not reasonably anticipated, or any other causes beyond the control of the Contractor with the exception of labor disputes or strikes of the Contractor's or a Subcontractor's own personnel, then the duration set forth in the Master Project Schedule, and established for Substantial and Final Completion may be extended as agreed to by the University, Contractor and Design Professional. When such delays result in an agreement to adjust the Time of Completion, then the Contractor may also request, and the University may make a reasonable adjustment to the Contract Sum for Project costs directly attributable to the delay pursuant to Article 6.00, CHANGES IN THE WORK. It will be the Contractor's obligation to demonstrate to the complete satisfaction of the University, that the direct Project costs associated with such delays are justified, fair, and reasonable.

The University will not recognize labor disputes, strikes, work stoppages, picketing or boycotting by employees of or under the control or direction of the Contractor or its subcontractors, to be cause for extending the Construction Project Schedule or the Contract Time or adjusting the Contract Sum. The University may recognize labor disputes, strikes, work stoppages, picketing or boycotting that are not within the Contractor's or its subcontractors' control as cause for extending the Construction Project Schedule or Contract Time. Pursuant to section 9.01.1 such labor disputes, strikes, work stoppages, picketing or boycotts may constitute grounds for termination of the Contractor.

4.08.5 Contractor to Fully Prosecute Work

No extension of time will be granted unless the Contractor demonstrates to the satisfaction of the University that the Contractor has made every reasonable effort to complete all Work under the Contract not later than the date prescribed.

4.08.6 University's Adjustment of Contract Time

Even though the Contractor has no right to an extension of time for completion, the University may in the exercise of its sole discretion extend the time at the request of the Contractor if it determines it to be in the best interest of the University. .

4.08.7 Adjustment of Contract Time and Cost Due to Reasons Beyond University Control

Should the University be prevented or enjoined from proceeding with Work either before or after the start of construction by reason of any litigation or other reason beyond its control, the Contractor may request an adjustment in the Time of Completion and/or Contract Sum by reason of said delay. The University may make a reasonable adjustment in the Time of Completion and/or Contract Sum for time and costs directly attributable to the delay. It will be the Contractors obligation to demonstrate to the complete satisfaction of the University, that all Time of

Completion and Contract Sum adjustments associated with such delays are justified, fair, and reasonable.

4.09 Progress Schedule

4.09.1

The Contractor shall prepare and submit to the University the Contractor's Construction Schedule utilizing the Critical Path Method within ten (10) days after starting date on the Notice to Proceed. It shall be the Contractor's responsibility to use its best efforts and to act with due diligence to maintain the progress of the Work in accordance with the schedule. The time for completion may be extended only by a written Change Order executed by the University and the Contractor. The work activities making up the schedule shall be of sufficient detail to assure that adequate planning has been done for proper execution of the Work and such that, in the sole judgment of the University, it provides an appropriate basis for monitoring and evaluating the progress of the Work. The Construction Schedule shall include the time periods required for utility and service interruptions, including compliance with the notice periods stated in the Utility Disturbance and Disruption Request. The Contractor shall also submit a separate progress schedule listing all submittals required under the Contract and the date by which each submittal will be submitted allowing 10 days for the Design Professional's review ("submittal schedule").

4.09.4

Float, slack time, or contingency within the schedule at the activity level and total float within the overall schedule, is not for the exclusive use of either the University or the Contractor, but is jointly owned by both and is a resource available to and shared by both parties as needed to meet Contract milestones and the Contract completion date.

4.09.5

The Contractor shall not sequester shared float through such strategies as extending activity duration estimates to consume available float, using preferential logic, or using extensive crew/resource sequencing, etc. Since float time within the construction schedule is jointly owned, it is acknowledged that University caused delays on the Project may be offset by University caused time savings (i.e., critical path submittals returned in less time than allowed by the Contract, approval of substitution requests which result in a savings of time to the Contractor, etc.). In such an event, the Contractor shall not be entitled to receive a time extension until all University caused time savings are exceeded and the Contract completion date is also exceeded.

4.09.6

Regardless of which schedule method the Contractor elects to use in formulating the Contractor's Construction Schedule, an updated construction schedule shall be submitted to the University five (5) days prior to the submittal of the Contractor's monthly payment request. The submission of the updated construction schedule satisfying the requirements of this Article, accurately reflects the status of the Work, and incorporates all changes into the schedule, including actual dates, shall be a condition precedent to the processing of monthly payment applications. Updated schedules shall also be submitted at such other times as the University may direct. Upon approval of a change order or issuance of a direction to proceed with a change, the approved change shall be reflected in the next schedule update submitted by the Contractor.

4.09.7

If completion of any part of the Work, the delivery of equipment or materials, or issuance of the Contractor submittals is behind the updated Construction Schedule and will cause the end date of the Work to be later

than the Contract completion date, the Contractor shall submit in writing a plan acceptable to the University for completing the Work on or before the current Contract completion date.

4.09.8

No time extensions shall be granted unless the delay can be clearly demonstrated by the Contractor on the basis of the updated Construction Schedule current as of the month the change is issued or the delay occurred, and the delay cannot be mitigated, offset, or eliminated through such actions as revising the intended sequence of Work or other means.

4.09.9

As a condition precedent to the release of retained funds, the Contractor shall, after completion of the Work has been achieved, submit a final Construction Schedule which accurately reflects the manner in which the Project was constructed and includes actual start and completion dates for all Work activities on the Project schedule together with a full and unconditional waiver and release of claims for payment in a form acceptable to the University.

4.10 Coordination With Other Work

The University reserves the right to do other Work in connection with the Project or adjacent thereto and the Contractor shall at all times conduct the Work so as to impose no hardship on the University or others engaged in the University's Work nor to cause any unreasonable delay or hindrance thereto.

Where two or more Contractors are employed on related or adjacent work, each shall conduct their operation in such a manner as not to cause delay or additional expense to the other.

The Contractor shall be responsible to others engaged in the related or adjacent work for all damage to Work, to persons and to property, and for loss caused by failure to complete the Work within the specified time for completion. The Contractor shall coordinate its Work with the Work of others so that no discrepancies shall result in the Project.

4.11 As-built Drawings Reflecting Actual Construction

During the course of construction, the Contractor shall maintain drawings kept up each day to show the Project as it is actually constructed. Every sheet of the plans and specifications which differs from the actual construction shall be marked and sheets so changed shall be noted on the title sheets of the plans and specifications. All change orders shall be shown by reference to sketch drawings, and any supplementary drawings or change order drawings shall be included. The Contractor shall review the "As-built" drawings with the University at least once a month to demonstrate that all changes that have occurred are being fully and accurately recorded. The altered Contract drawings shall be sufficiently detailed so that future Work on the Project or in adjacent areas may be conducted with a minimum of difficulty. Prior to the completion of the Project, and prior to release of the final retention payments, the "As-built" drawings and specifications shall be transmitted in hard copy and electronic format as directed by the University to the University or the Design Professional for further review. A copy of the transmittal shall be sent to the University and included in the formal Close-out documents.

4.12 Cleanup of Project and Site

The Contractor shall, on a daily basis, keep the premises and surrounding area free from accumulation of waste materials, combustibles, or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, combustibles, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

If the Contractor fails to clean up as provided in the Contract Documents, the University may do so and the cost thereof shall be charged to the Contractor. Any additional cleaning requirements are as stated in the Supplementary General Conditions.

Upon completion of the Work, the Contractor shall promptly remove from the premises construction equipment and any waste materials not previously disposed of, leaving the premises thoroughly clean and ready for occupancy.

When two or more Contractors are engaged in work at or near the site, each shall be responsible for cleanup and removal of its own rubbish, equipment, and any waste materials not previously disposed.

In the event the Contractor does not maintain the Project or the site clear of debris and rubbish in a manner acceptable to the Design Professional or University, the University may, at its option, cause the Project or site to be properly cleaned and may withhold the incurred expense from payments due the Contractor or otherwise receive reimbursement from the Contractor.

4.13 [Not used]

4.14 Project Sign, Advertising

If included as a requirement in the project documents, Contractor shall furnish and install a project sign as designed by the Design Professional and accepted by the University as part of the Work under the Contract. As a minimum, the sign shall be four feet by eight feet, made from three-quarter inch plywood. The sign shall identify the Project name, the University including the individual members of the Board of Governors, the Design Professional, and the Contractor. No advertising is permitted on the Project or site without written permission from the University. If the Project is funded by a State of Michigan capital appropriation, the Contractor shall also provide a project sign which satisfies the requirements of the State of Michigan as stipulated in the Department of Technology Management and Budget's Major Project Design Manual, current edition.

5.00 INTERPRETATION OF AND ADHERENCE TO CONTRACT REQUIREMENTS

5.01 Interpretation of Contract Requirements

5.01.1 Conflicts

In the event of conflict in the Contract Documents, the priorities stated below shall govern:

(1) Addenda shall govern over all other Contract Documents and subsequent addenda shall govern over prior addenda only to the extent that they modify prior addenda. Such addenda shall only govern the scope of Work, Contract Sum, and Time of Completion, and shall not be deemed to amend the Contract, General Conditions of Construction, or Supplementary General Conditions of Construction.

(2) In case of conflict between plans and specifications, the specifications take precedence over drawings for the specific type or quality of materials or the quality of installation; the drawings take precedence over the specifications with regard to quantities, locations or detail of installation.

(3) Conflicts within the plans:
   (a) Schedules, when identified as such, shall govern over all other portions of the plans.

   (b) Specific notes shall govern over all other notes and all other portions of the plans except the schedules described in Article 5.01.1, above.

   (c) Larger scale drawings shall govern over smaller scale drawings.

   (d) Figured or numerical dimensions shall govern over dimensions obtained by scaling. Scaling the drawings is prohibited.

(4) Conflicts within the specifications:
   “General Conditions for Construction” shall govern over all sections of the specifications except for specific modifications thereto that may be stated in Supplementary General Conditions or addenda. No other section of the specifications shall modify the General Conditions for Construction.

(5) In the event provisions of codes, safety orders, Contract Documents, referenced manufacturer's specifications or industry standards are in conflict, the more restrictive or higher quality shall govern.

5.01.2 Omissions

If the Contract Documents are not complete as to any minor detail of a required construction system or with regard to the manner of combining or installing of parts, materials, or equipment, but there exists an accepted trade standard for good and skillful construction, such detail shall be deemed to be an implied requirement of the Contract Documents in accordance with such standard. “Minor Detail” shall include the concept of substantially identical components, where the price of each such component is small even though the aggregate cost or importance is substantial, and shall include a single component which is incidental, even though its cost or importance may be substantial.

The quality and quantity of the parts or material so supplied shall conform to trade standards and be compatible with the type, composition, strength, size, and profile of the parts of materials otherwise set forth in the Contract Documents.

5.01.3 Miscellaneous

Portions of the Work which can be best illustrated by the Drawings may not be included in the Specifications and portions best described by the Specifications may not be depicted on the Drawings.

If an item or system is either shown or specified, all material and equipment normally furnished with such items and needed to make a complete operating installation shall be provided whether mentioned or not, even though such materials and equipment are not shown on the drawings or described in the specifications, omitting only such parts as are specifically excepted. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

The General Conditions and Supplementary General Conditions are a part of each and every section of the Specifications.

All drawings, Project Plans and Specifications, renderings and models or other documentation, and copies thereof, furnished by the University or any agent, employee or consultant of the University, or Design Professional, are and shall remain the property of the University. They are to be used only with respect to this Project and are not to be used on any other project.

5.01.4 Interpreter of Documents

The University's Representative shall be the Interpreter, with the advice of the Design Professional, of the Contract Documents and shall be the judge of the performance of the Contractor and subcontractors. Subject to the provisions Article 7, claims, disputes and other matters of controversy relating to the Contract Documents or the Work shall be decided by the University's Representative. The decision of the University's Representative shall be final.

5.02 Issuance of Interpretations, Clarifications, Additional Instructions (Requests for Information)

Should the Contractor discover any conflicts, omissions, or errors in the Contract or have any question concerning interpretation or clarification of the Contract Documents, the Contractor shall request in writing an interpretation, clarification, or additional detailed instructions before proceeding with the Work affected. The written request shall be given to the Design Professional and University within 5 days of discovery.

The Design Professional, with review as required by the University, shall, within 10 days or other reasonable time, issue in writing the interpretation, clarification, or additional detailed instructions requested. In the event that the Contractor believes that the progress of the Work is being delayed by a Request for Information or a response to a Request for Information, Contractor shall comply with the procedures stated in section 4.08 of these General Conditions for an extension of time.

Should the Contractor proceed with the Work affected before receipt of the interpretation, clarification, or instructions from the Design Professional, the Contractor shall replace or adjust any Work not in conformance therewith and shall be responsible for any resultant damage or added cost.

Should any interpretation, clarification, or additional detailed instructions, in the opinion of the Contractor, constitute Work beyond the scope of the Contract, the Contractor must submit written notice thereof to the Design Professional and University within five (5) calendar days following receipt of such interpretation, clarification, or additional detailed instructions and in any event prior to commencement of Work thereon. The Contractor shall submit an explanation of how the interpretation, clarification, or additional detailed instruction constitutes work beyond the scope of the Contract, along with a detailed cost breakdown and an explanation of any delay impacts. The Design Professional shall consider such notice and make a recommendation to the University. If, in the judgment of the University, the notice is justified, the interpretation, clarification or additional detailed instructions shall either be revised or the extra work authorized by Contract change order or by field instruction with a change order to follow. If the University

decides that the request is not justified and the Contractor does not agree, the Contractor shall nevertheless perform such Work upon receipt from the University of written authorization to do so. In such case, the Contractor shall have the right to have the Claim later determined only pursuant to the requirements of this Contract. However, any such Claim for additional compensation because of such interpretation, clarification, or additional detailed instruction is waived, unless the Contractor gives written notice to the Design Professional and University within five (5) calendar days as specified above.

5.03 Product and Reference Standards

5.03.1 Product Designation

When descriptive catalog designations, including the manufacturer's name, product brand name, or model number are referred to in the Contract Documents, such designations shall be considered as being those found in industry publications of current issue at the date of Contract execution.

5.03.2 Reference Standards

When standards of the federal government, trade societies, or trade associations are referred to in the Contract Documents by specific date of issue, these shall be considered a part of this Contract. When such references do not bear a date of issue, the current and most recently published edition at the date of Contract execution shall be considered a part of this Contract.

5.04 Shop Drawings, Samples, Alternatives or Equals, Substitutions

5.04.1 Submittal Procedure

Shop drawings include drawings, diagrams, illustrations, schedules, performance charts, brochures and catalogs and other data prepared by the Contractor or any subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the Work. In accordance with the submittal schedule, the Contractor shall promptly review and approve all shop drawings and then submit the shop drawings to the Design Professional together with samples as required by the Contract Documents and shall also submit any offers of alternatives or substitutions. The Design Professional shall have 10 days to respond with an acknowledgement of approval, clearly defined exceptions, or rejections. Rejections shall be cause for re-submission and no contract time adjustments will be granted for such requirements. At least six copies of brochures, one copy of shop drawings and one PDF digital file of shop drawings shall be submitted as well as additional copies as required by Design Professional. All such submittals shall be sent to Design Professional at the address given in the instructions to the Contractor at the job start meeting. A letter shall accompany the submitted items which shall contain a list of all matters submitted and shall identify all deviations shown in the shop drawings and samples from the requirements of the Contract Documents. Failure by the Contractor to identify all deviations may render void any action taken by the Design Professional on the materials submitted. Whether to void such action shall be in the discretion of the Design Professional. The letter and all items accompanying it shall be fully identified as to project name and location, the Contractor's name, and the University's Project number. By submitting the approved shop drawings and samples, the Contractor warrants and represents that the data contained therein have been verified with conditions as they actually exist and that the shop drawings and samples have been checked and coordinated with the Contract Documents.

5.04.2 Samples

Samples are physical examples furnished by the Contractor to illustrate materials, equipment, color, texture, or worker ship, and to establish standards by which the Work will be judged. Unless otherwise approved, at least two samples will be submitted for each item requiring samples to be submitted.

The Work shall be in accordance with the samples and reviewed by Design Professional. Samples shall be removed by the Contractor from the site when directed. Samples not removed by the Contractor, will become the property of the University and will be removed or disposed of by the University at the Contractor's expense.

5.04.2.1 Mock-ups as may be required by the Contract Documents

Mock-ups, models or temporary construction as may be required by the University shall be removed and disposed of by the Contractor at Contractor's sole cost and expense from the site when directed.

5.04.3

5.04.3 Substitutions

For convenience in designation on the plans or in the specifications, certain materials or equipment may be designated by a brand or trade name or the name of the manufacturer together with catalog designation or other identifying information, hereinafter referred to generically as "designated by brand name." Alternative material or equipment which is of equal quality and of the required characteristics for the purpose intended may be proposed for use provided the Contractor complies with the requirements stated in this section. If the Contractor proposes a product that is of lesser or greater quality or performance than the specified material or equipment, Contractor must both comply with the provisions of section 5.04 and submit any cost impact. The Contractor shall submit its proposal to University and the Design Professional for an alternative in writing within the time limit designated in the Contract, or if not so designated, then within a period which will cause no delay in the Work. By submitting a substitute, the Contractor waives any rights to claim a delay due to the processing of this substitution.

The Contractor may offer a substitution of a specified or indicated item if it presents complete information concerning the substitution and the benefits thereof to the University by reason of lower cost or improved performance, or both, over the specified or indicated item. However, such submission of a proposed substitution does not relieve the Contractor from its obligations under the Contract. In proposing a substitution, the Contractor warrants that the substitution is, at a minimum, equivalent in performance to the specified or indicated item. A substitution shall not be effective unless accepted in writing by the University.

Any additional costs and changes to the Work (including, but not limited to the Work of other Contractors and additional design costs which may be affected thereby) which may result from the proposed substitution shall be disclosed at the time the substitution is proposed to the University. Changes to the Work and any additional costs therefrom shall be the sole responsibility of the Contractor and shall not increase the Contract Sum.

The Contractor's substitution proposals shall include written descriptions of the items to be substituted (including drawings and/or specifications) and referenced information of the proposed substitution. The Design Professional and University's Representative's signature on this proposal is required for acceptance. Shop Drawings will not be considered a substitution proposal pursuant to this section. Verbal approvals or approved Shop Drawings will not be considered as acceptance of proposed substitutions.

5.05 Quality of Materials, Articles and Equipment

Materials, articles and equipment furnished by the Contractor for incorporation into the Work shall be new unless otherwise specified in the Contract Documents. When the Contract requires that materials, articles or equipment be furnished, but the quality or kind thereof is not specified, the Contractor shall furnish materials, articles or equipment at least equal to the kind or quality or both of materials, articles or equipment which are specified.

5.06 Testing Materials, Articles, Equipment and Work

Materials, articles, equipment or other Work requiring tests are specified in the Contract Documents. Materials, articles and equipment requiring tests shall be delivered to the site in ample time before intended use to allow for testing and shall not be used prior to testing and receipt of written approval. The Contractor shall be solely responsible for notifying the University where and when materials, articles, equipment and Work are ready for testing. Should any such materials, articles, equipment or Work be covered without testing and approval, if required, they shall be uncovered at the Contractor's expense. The University has the right to order the testing of any other materials, articles, equipment or Work at any time during the progress of the Work. Unless otherwise directed, all samples for testing shall be taken by the University from materials, articles or equipment to be used on the project or from Work performed. All tests will be under the supervision of, and at locations convenient to, the University. The University shall select the laboratories for all tests. Decisions regarding the adequacy of materials, articles, equipment or Work shall be issued to the University in writing. The University may decide to take further samples and tests, and if the results show that the Work was not defective, the University shall bear the costs of such samples and tests. In the event the results of such additional samples and tests show that the Work was defective, the Contractor shall bear the cost of such samples and tests. Samples that are of value after testing shall remain the property of the Contractor. All retesting and reinspection costs may be back charged to the Contractor by the University.

5.07 Rejection

Should any portion of the Work or any materials, articles or equipment delivered to the Project fail to comply with the requirements of the Contract Documents, such Work, materials, articles or equipment shall be rejected in writing and the Contractor shall immediately correct the deficiency to the satisfaction of the Design Professional and the University at no additional expense to the University. Any Work, materials, articles or equipment which is rejected shall immediately be removed from the premises at the expense of the Contractor. The University may retain one and one-fourth times the cost of the rejected materials, articles, equipment, and Work from any payments due the Contractor until such time as the deficiency is made acceptable to the Design Professional and University.

5.08 Responsibility for Quality

The testing and inspection provided by the University shall not relieve the Contractor of its responsibility for the quality of materials and workmanship provided by the Contractor, and the Contractor shall make good all defective Work discovered during or after completion of the Project.

6.00 CHANGES IN THE WORK

6.01 Change Orders

6.01.1 Generally

The University reserves the right to issue written orders whether through a formal Change Order or Preliminary Project Cost and Schedule Impact Report, directing changes in the Contract at any time prior to the acceptance of the Project without voiding the Contract, and Contractor shall promptly comply with such order or direction. The Contractor may request changes in the Work, but shall not act on the changes until approved in writing by the University. Any change made without authority in writing from the University shall be the responsibility of the Contractor.

Any such changes in the Work that have a cost impact shall only be authorized by Change Orders approved by the University. No action, conduct, omission, prior failure or course of dealing by the University shall act to waive, modify, change or alter the requirement that Change Orders must be in writing and signed by the University and Contractor and that such written Change Orders are the exclusive method for changing or altering the Contract Sum or Contract Time. The University and Contractor understand and agree that the Contract Sum and Contract Time cannot be changed by implication, oral agreements, actions, inactions, course of conduct or Preliminary Project Cost and Schedule Impact Report.

On the basis set forth herein, the Contract Sum may be adjusted for any Change Order requiring a different quantity or quality of labor, materials or equipment from that originally required, and the partial payments to the Contractor, set forth in section 8.01, may be adjusted to reflect the change. Whenever the necessity for a change arises, and when so ordered by the University in writing, the Contractor shall take all necessary steps to mitigate the effect of the ultimate change on the other Work in the area of the change. Changed Work shall be performed in accordance with the original Contract requirements except as modified by the Change Order. Except as herein provided, the Contractor shall have no claim for any other compensation including lost productivity or increased overhead expenses due to changes in the Work.

6.01.2 Proposed Change Orders

The Design Professional, with approval of the University, shall issue to the Contractor a cost request Bulletin for a proposed change order describing the intended change and shall require the Contractor to indicate thereon a proposed amount to be added to or subtracted from the Contract Sum due to the change supported by a detailed estimate of cost. Upon request by the University, the Contractor shall permit inspection of the original Contract estimate, Trade Contract agreements, or purchase orders relating to the change. Any request for adjustment in Contract Time which is directly attributable to the changed Work shall be included with substantiating detailed explanation by the Contractor in its response to the cost request bulletin. Failure by Contractor to request adjustment of Contract Time on the response to the cost request Bulletin shall waive any right to subsequently claim an adjustment of the Contract Time based on the changed Work. The Contractor shall submit the response to the cost request Bulletin with detailed estimates and any time extension request thereon to the Design Professional within ten (10) days after issuance of the cost request Bulletin. Upon its submission, the Design Professional will review it and advise the University who will make the decision regarding the request. The University retains sole discretion to accept, reject, or modify the proposed change. If the Contractor fails to submit the response within the required ten (10) days, and the Contractor has not obtained the Design Professional's and the University's permission for a delay in submission, the University may order the Contractor in writing to begin the Work immediately, and the Contract Sum shall be adjusted in accordance with the University's estimate of cost. In that event, the Contractor, within fifteen days following completion of the changed Work, may present information to the University that the University's estimate was in error; the University, in its sole discretion, may adjust the Contract Sum. The Contractor must keep and submit to the University time and materials records verified by the University to substantiate its costs. The University may require the Contractor to proceed immediately

with the changed Work in accordance with section 6.01.4, “Failure to Agree as to Cost” or section 6.02 “Emergency Changes.”

When the University and the Contractor agree on the amount to be added to or deducted from the Contract Sum and the time to be added to or deducted from the Contract Time and a Contract Change Order is signed by the University and the Contractor, the Contractor shall proceed with the changed Work. If agreement is reached as to the adjustment in compensation for the performance of changed Work but agreement is not reached as to the time adjustment for such Work, the Contractor shall proceed with the Work at the agreed price, reserving the right to further pursue its Claim for a time adjustment. Any costs incurred to acquire information relative to a proposed Change Order shall not be borne by the University.

6.01.3 Allowable Costs Upon Change Orders

The identification of and manner in which costs will be allowed because of changed Work shall be computed as described by this section.

6.01.3.1 Labor

Costs are allowed for the actual payroll cost to the Contractor for direct labor, engineering or technical services directly required for the performance of the changed Work, (but not site management such as field office estimating, clerical, project engineering, management or supervision) including payments, assessments, or benefits required by lawful labor union collective bargaining agreements, compensation insurance payments, contributions made to the State pursuant to the Unemployment Insurance Code, and for taxes paid to the federal government required by the Social Security Act of 1935, as amended, unless the time of completion adjustments affect the general condition inclusion of the Contract Sum.

No labor cost will be recognized at a rate that deviates from the prevailing wages in the locality of Wayne County, Michigan as provided by the University at the time the Work is performed, or of wage and benefit rates associated with trade union collective bargaining agreements prevailing at the time of the change, and the the use of a classification which would increase the labor cost may not be permitted unless the Contractor established to the satisfaction of the University the necessity for payment at a higher rate.

6.01.3.2 Materials

Costs are allowed for the actual cost to the Contractor for the materials directly required for the performance of the changed Work. Such cost of materials may include the costs of transportation, sales tax, and delivery if necessarily incurred. However, overhead costs shall not be included. If a trade discount by the actual supplier is available to the Contractor, it shall be credited to the University. If the materials are obtained from a supply or source owned wholly or in part by the Contractor, payment therefor will not exceed the current wholesale price for such materials.

If, in the opinion of the University, the cost of materials is excessive, or if the Contractor fails to furnish satisfactory evidence of the cost from the actual suppliers thereof, then in either case the cost of the materials shall be deemed to be the lowest wholesale price at which similar materials are available in the quantities required at the time they were needed.

6.01.3.3 Equipment

Costs are allowed for the actual cost to the Contractor for the use of equipment directly required in the performance of the changed Work except that no payment will be made for time while equipment is inoperative due to breakdowns or for non-working days. The total rental cost shall not exceed seventy-five percent (75%) of the market value of the rented equipment. The rental time shall include the time required to move the equipment to the Project site from the nearest available source for rental of such equipment, and to return it to the source. If such equipment is not moved by its own power, then loading and transportation

costs will be paid. However, neither moving time nor loading and transportation costs will be paid if the equipment is used on the Project in any other way than upon the changed Work. Individual pieces of equipment having a replacement value of $500.00 or less shall be considered to be tools or small equipment, and no payment therefor will be made.

For equipment owned or furnished by the Contractor, no cost therefor shall be recognized in excess of the rental rates established by distributors or equipment rental agencies in the locality where the Work is performed. Blue Book rates shall not be used for any purpose.

The amount to be paid to the Contractor for the use of equipment as set forth above shall constitute full compensation to the Contractor for the cost of fuel, power, oil, lubrication, supplies, small tools, small equipment, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor (except for equipment operators who shall be paid for as provided in Article 6.01.3.1) and any and all costs to the Contractor incidental to the use of such equipment.

6.01.3.4 Change Order Mark-up Allowance

For Change Order scope whose cost is derived according to the Cost of Work plus a Fee as defined in 6.01.3.1 through 6.01.3.3, the mark-up allowance shall be as defined in the Contract. Lump-sum conditions shall include the mark-up allowance. When agreement as to cost cannot be reached, the Contractor shall execute the Work according to time and materials with the Contractor and University acknowledging such costs by signature on a daily basis, and as set forth below.

6.01.3.5 Credit for Deleted Work

For proposed change orders which involve both added and deleted Work, the Contractor shall separately estimate the cost of the added Work before mark-ups, and separately estimate the cost of the deleted Work before allowance of a credit. If the difference between the costs results in an increase to the Contract Sum, the mark-up for added Work shall be applied to the difference, and if the difference in the costs results in a decrease, then the mark-up for deleted Work shall be applied to the difference.

6.01.3.6 Market Values

Cost for added Work shall be no more than market values prevailing at the time of the change, unless the Contractor can establish to the satisfaction of the University that it investigated all possible means of obtaining Work at prevailing market values and that the excess cost could not be avoided.

When a change order deletes Work from the Contract, the computation of the cost thereof shall be the values which prevailed at the time bids for the Work were opened or the Contract Sum established.

6.01.4 Failure to Agree as to Cost

6.01.4.1 For Added Work

Notwithstanding the failure of the University and the Contractor to agree as to the cost of the proposed Change Order, the Contractor, upon written order from the University, shall proceed immediately with the changed Work. A Preliminary Project Cost and Schedule Impact Report or letter signed by the University shall be used for this written order. At the start of each day's Work on the change, the Contractor shall notify the University in writing as to the size of the labor force to be used for the changed Work and its location. Failure to so notify may result in the non-acceptance of the costs for that day. At the completion of each day's Work, the Contractor shall furnish to the University a detailed summary of all labor, materials, and equipment employed in the changed Work. The University will compare his/her records with Contractor's daily summary and may make any necessary adjustments to the summary. After the University and the Contractor agree upon and sign the daily summary, the summary shall become the basis for determining

costs for the additional Work. The sum of these costs when added to an appropriate mark-up will constitute the payment for the changed Work. Subsequent adjustments, however, may be made based on later audits by the University. When changed Work is performed at locations away from the job site, the Contractor shall furnish in lieu of the daily summary, a summary submitted at the completion of the Work containing a detailed statement of labor, material, and equipment used in the Work. This latter summary shall be signed by the Contractor who shall certify thereon that the information is true.

The Contractor shall maintain and furnish on demand of the University itemized statements of cost from all vendors and subcontractors who perform changed Work or furnish materials and equipment for such Work. All statements must be signed by the vendors and the subcontractors.

6.01.4.2 For Deleted Work

When a proposed Change Order contains a deletion of any Work, and the University and the Contractor are unable to agree upon the cost thereof, the University's estimate shall be deducted from the Contract Sum and may be withheld from any payment due the Contractor until the Contractor presents adequate substantial information to the University that the University's estimate was in error. The amount to be deducted shall be the actual costs to the Contractor for labor, materials, and equipment which would have been used on the deleted Work together with an amount for mark-up as defined in the Contract Documents.

6.01.5 Allowable Time Extensions

For any change in the Work, the Contractor shall only be entitled to such adjustments in Contract Time due solely to performance of the changed Work. The procedure for obtaining an extension of time is set forth in Section 4.08 of these General Conditions. No extension of time shall be granted for a change in the Work unless the Contractor demonstrates to the satisfaction of the University that the Work is on the critical path and submits an updated Critical Path Method schedule showing that an extension of time is required and that the Contractor is making, or has made, every reasonable effort to guarantee completion of the additional Work called for by the change within the time originally allotted for the Contract. Failure by the Contractor to make the required submission or showing constitutes a waiver of any possible adjustment in Contract Time.

Any adjustment in Contract time shall specify the exact impact on the date of Substantial Completion and Final Completion.

6.02 Emergency Changes

Changes in the Work made necessary due to unforeseen site conditions, discovery of errors in plans or specifications requiring immediate clarification in order to avoid a serious Work stoppage, changes of a kind where the extent cannot be determined until completed, or under any circumstances whatsoever when deemed necessary by the University are kinds of emergency changes which may be authorized by the University in writing to the Contractor. The Contractor shall commence performance of the emergency change immediately upon receipt of Preliminary Project Cost and Schedule Impact Report issued by the University.

If agreement is reached as to compensation adjustment for the purpose of any emergency change, then compensation will be as provided in this section relating to ordinary changes. If agreement is not reached as to compensation at the time of commencing the emergency change, then compensation will be as provided in section 6.01.4, that is, time and materials records and summaries shall be witnessed and maintained until either a lump sum payment is agreed upon, or the changed Work is completed.

6.03 Preliminary Project Cost and Schedule Impact Report

The Contractor shall perform Work as directed by the University through a Preliminary Project Cost and Schedule Impact Report. The cost of the changed Work is to be determined as stated in the Preliminary Project Cost and Schedule Impact Report or pursuant to section 6.01.4.

7.00 CLAIMS AND DISPUTES

7.01 Policy of Cooperation

The parties shall endeavor to resolve all of their claims and disputes amicably and informally through open communication and discussion of all issues relating to the Project. To the greatest extent possible, the parties shall avoid invoking the formal dispute resolution procedures contained in the Contract Documents.

7.02 Recommendation of Design Professional

Claims, including those alleging an error or omission by the Design Professional, must be referred initially to the Design Professional for action as provided in paragraph 7.09 as an express condition precedent to proceeding further in resolving any claim.

7.03 Time Limits on Claims

Claims must be made within 5 days after occurrence of the event giving rise to such Claim or within 5 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been resolved by Change Order will not be valid.

7.04 Continuing Contract Performance

Pending final resolution of a Claim, unless otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the University shall continue to make payments in accordance with the Contract Documents subject to the University's rights relative to payments, withholding of payments, termination, or all other rights afforded it in the Contract Documents.

7.05 Claims for Concealed or Unknown Conditions

If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then written notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 48 hours after first observance of the conditions. The Design Professional will promptly investigate such conditions and, if the conditions differ materially and cause an increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, the Design Professional will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Design Professional determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Design Professional shall so notify the University and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 10 days after the Design Professional has issued such determination. If the University and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Design Professional for initial determination, subject to further proceedings pursuant to Paragraph 7.09.

7.06 Claims for Additional Cost

Any Claim by the Contractor for an increase in the Contract Sum shall be submitted in writing as required by the Contract Documents before proceeding to execute the Work. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Design Professional, (2) an order by the University to stop the Work where the Contractor was not at fault, (3) a

written order for a minor change in the Work issued by the Design Professional, (4) failure of payment by the University, (5) termination of the Contract by the University, (6) University's suspension or (7) changes in the scope of Work, the Contractor's claim shall be filed in strict accordance with the procedure established herein.

7.07 Claims for Additional Time

Any Claim by Contractor for an increase in the Contract Time shall be submitted in writing as required by the Contract Documents. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction.

7.08 Injury or Damage to Person or Property

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 5 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in the Contract Documents.

7.09 Resolution of Claims and Disputes

7.09.1 Review by Design Professional

Design Professional will review all Claims and take one or more of the following preliminary actions within 10 days of receipt of a Claim: (1) request additional supporting data from the Claimant, (2) submit a schedule to the parties indicating when the Design Professional expects take action, (3) reject the Claim in whole or in part, stating reasons for rejection, (4) recommend approval of the Claim by the other party or (5) suggest a compromise. The Design Professional may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

If a Claim has been resolved, the Design Professional will prepare or obtain appropriate documentation. If a Claim has not been resolved, the party making the Claim shall, within 10 days after the Design Professional's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Design Professional, (2) modify the initial Claim or (3) notify the Design Professional that the initial Claim stands.

If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Design Professional, the Design Professional will notify the parties in writing that the Design Professional's opinion will be rendered within 5 days. Upon expiration of such time period, the Design Professional will render to the parties the Design Professional's determination relative to the Claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Design Professional may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy. The determination by the Design Professional shall be subject to the review and approval of the Associate Vice President of Facilities Planning and Management at Wayne State University.

7.09.2 Review by Associate Vice President of Facilities Planning and Management

The determination by the Design Professional shall be subject to the review and approval of the Associate Vice President of Facilities Planning and Management at Wayne State University who may request additional information from the Claimant for review and consideration. The Associate Vice President of Facilities Planning and Management may issue a schedule for further discussions, review or decision. Upon decision by the Associate Vice President of Facilities Planning and Management, if the Claimant seeks further review, the matter shall be submitted to the Vice-President of Finance and Business Operations.

7.09.3 Review Vice-President of Finance and Business Operations

If the determination by the Design Professional and the decision of the Associate Vice President does not resolve the Claim, the Claimant may appeal to the Vice President of Finance and Business Operations who shall review such determination and the supporting information submitted by the parties for the purpose of upholding, modifying, or rejecting the determination. The Vice President of Finance and Business Operations shall render a decision within forty-five days of the completion of any submissions by the parties. The decision of the Vice President of Finance and Business Operations is final unless it is challenged by either party by filing a lawsuit in the Court of Claims of the State of Michigan within one year of the issuance of the decision.

7.09.4 Jurisdiction

Sole and exclusive jurisdiction over all claims, disputes, and other matters in question arising out of or relating to this Contract or the breach thereof, shall rest in the Court of Claims of the State of Michigan. No provision of this agreement may be construed as the University's consent to submit any claim, dispute or other matter in question for dispute resolution pursuant to any arbitration or mediation process, whether or not provisions for dispute resolution are included in a document which has been incorporated by reference into this agreement.

7.09.5 Condition Precedent

The process and procedures described in Article 7.09 are an express condition precedent to the Contractor filing or pursuing any legal remedy, including litigation. Pursuing litigation by the Contractor prior to exhaustion of the procedures set forth herein shall be premature and a material breach of this Agreement.

8.00 PAYMENT AND COMPLETION

8.01 Progress Payments

To assist in computing partial payments, the Contractor shall submit to the Design Professional and University a detailed "Schedule of Values" for review and approval by the University. The cost breakdowns shall be in sufficient detail for use in estimating the Work to be completed each month and shall be submitted within 10 days after the date of commencement of Work given in the Notice to Proceed.

Once each month during the progress of the Work, the Contractor shall submit to the Design Professional a partial payment request for review and approval. The partial payment request shall be based on the cost of the Work completed plus the acceptable materials delivered to or stored on the site under the control of the Contractor and not yet installed. The Design Professional and University shall review and certify by signature as to the validity of the request, and approving payment. Partial payments shall not be construed as acceptance of any Work which is not in accordance with the requirements of the Contract. Once the partial payment request has been certified by the Design Professional, it shall be submitted to the University for approval and processing.

The Contractor warrants that title to the Work, materials and equipment covered by an Application for Payment shall pass to the University upon the earlier of either incorporation in construction or receipt of payment by Contractor; that Work, materials and equipment covered by previous Applications for Payment are free and clear of liens, claims, security interests or encumbrances; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by Contractor or by any other person performing Work at the Project or furnishing materials or equipment for the Project subject to an agreement under which an interest or encumbrance is retained by the seller or otherwise imposed on the Contractor or buyer.

All Applications for Payment shall be accompanied by sworn statements and waivers executed by Contractor, Subcontractors and suppliers whose work is included in the Application for Payment, as well as other documentation that may be required by the University, stating that all have been paid in full for Work performed through the last or most recent progress payment: The Contractor and each subcontractor shall also provide properly completed certified payroll form WH-347 to the University's with each application for payment request.

8.02 Format of Application for Payment

In addition to a schedule of values or detailed outline for the Cost of Work that is acceptable to the Contractor and University, other specific requirements for Application for Payment format and calculations include.

- Applications for Payment shall first present the itemized Cost of Work.
    - For any portion of the Work being performed according to unit pricing or time and materials pricing, invoicing and Applications for Payment must be accompanied by acceptable supporting documentation to evidence accurate quantities of actual labor, materials and equipment. Any allowed mark-ups to the actual cost of Work performed will be added to these costs separately and not included in the actual cost.
    - Change Orders executed between the Contractor and University shall be reported as separate line items within the Application for Payment and directly under applicable Subcontractor Cost of Work items. Change Orders affecting multiple Subontractors' Cost of Work items shall be similarly numbered to permit ease of tracking. These requirements shall run through Subcontractor Applications for Payment to the Contractor to permit ease of tracking. Change Orders within a Subcontractor Application for Payment shall be appropriately labeled as being initiated by the Contractor or University to permit ease of tracking.

- The Contractor's General Conditions, Overhead and Profit shall next be calculated as the balance of the Application for Payment.

8.03 Substantial Completion, Incomplete Construction List and Punchlist

When the Contractor considers that the Work, or a portion thereof which the University agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Design Professional a comprehensive Incomplete Construction List of items to be completed or corrected, in a form agreed by the University and the Design Professional. The Contractor shall proceed promptly to complete and correct items on the Incomplete Construction List. Failure to include an item on such Incomplete Construction List does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Upon receipt of the Contractor's Incomplete Construction List, the Design Professional, with the University's Representative, will make an observation to determine whether the Work or designated portion thereof is substantially complete and will identify observable items inconsistent with the Contract Documents to be included in the Punchlist. If the Design Professional's or University Representative's observation discloses any item, whether or not included on the Contractor's Incomplete Construction List, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item, upon notification by the Design Professional.

The Contractor shall then submit a request for another observation by the Design Professional to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Design Professional will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the University and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time, generally 45 days, within which the Contractor shall finish all remaining Incomplete Construction List and Punchlist items accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the University and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

8.03.1 Partial Completion

From time to time, as portions of the Work are completed by the Contractor, the University shall have the right, upon giving the Contractor prior written notice, to accept any portion of the Work that the University desires to use and occupy. Such partial acceptance shall be made in writing and thereafter the Contractor shall have no further obligation with respect to the Work accepted, except to correct the Work subsequently found to have been improperly done, to replace defective materials or equipment, or as defined by Substantial Completion, Incomplete Construction List and Punchlist requirements.

8.04 Completion and Final Payment

Upon the Final Completion of the Work by the Contractor, the acceptance of the Work by the University, and the release of all claims against the University and the Work by the Contractor and its subcontractors and suppliers (which releases shall be evidenced by final waivers and releases or other documents acceptable to the University), the Contractor shall file a request for Final Payment.

8.04.1 Final Application for Payment

Upon the receipt of the Contractor's Final Application for Payment, including any and all waivers required by the University and the Contractor's provision of all Close-out Documents, and training requirements, the University shall promptly make a final inspection, and if the University finds the Work acceptable and complete in strict accordance with the Contract Documents, the University shall issue Final Payment. Final

Payment shall be made upon Completion of the Work and shall indicate the University's Final Acceptance of the Work and its acknowledgment that the Work (excluding any further warranty and guaranty obligations) has been completed and is accepted under the terms and conditions of the Contract Documents. If prior to the making of Final Payment the University finds deficiencies in the Work, the University shall promptly notify the Contractor thereof in writing, describing such deficiencies in detail. After the Contractor has remedied any deficiencies noted by the University, the Contractor shall request a final inspection and the University shall make such inspection and follow the procedure set forth in this Paragraph.

8.04.2 Final Payment by the University

The making of Final Payment shall constitute a waiver of all claims by the University except those arising from: (1) unsettled liens; (2) faulty or defective work appearing after completion; (3) failure of the work to comply with the requirements of the Contract Documents; (4) terms of any special or extended warranties required by the Contract Documents; or (5) the obligations of the Contractor under the indemnification provisions of Paragraph 4.06 hereof.

The acceptance of Final Payment shall constitute a waiver of all claims by the Contractor.

8.05 Guarantee

The Contractor unconditionally guarantees the Work under this Contract to be in conformance with the Contract Documents and to be and remain free of defects in workmanship and materials not inherent in the quality required or permitted for a period required by the contract documents beginning from the date of Substantial Completion. The Subcontractors unconditionally guaranty the Work under the subcontracts to be in conformance with the Contract Documents and to be and remain free of defects in workmanship and materials for the same period from the date of Substantial Completion, unless a longer guarantee period is stipulated in the Contract Documents. By this guarantee the Contractor and Subcontractors agree, within their respective guarantee periods, to repair or replace any Work, together with any adjacent Work which may be displaced in so doing which is not in accordance with the requirements of the Contract or which is defective in its workmanship or material, all without any expense whatsoever to the University. The Contractor shall be responsible for the coordination of all such guarantee work performance or repairs.

Special guarantees that are required by the Contract Documents shall be signed by the Contractor or Subcontractor who performs the work.

Within their respective guaranty periods, the Contractor and Subcontractors further agree that within five calendar days after being notified in writing by the University of any Work not in accordance with the requirements of the Contract Documents or of any defects in the Work, it shall commence and prosecute with due diligence all Work necessary to fulfill the terms of this guarantee and to complete the Work in accordance with the requirements of the Contract with sufficient manpower and material to complete the repairs as expeditiously as possible. The Contractor, in the event of failure to so comply, does hereby authorize the University to proceed to have the Work done at the Contractor's expense, and it agrees to pay the cost thereof upon demand. The University shall be entitled to reimbursement of all costs necessarily incurred upon the Contractor's or Subcontractor's refusal to pay the above cost.

Notwithstanding the foregoing paragraph, in the event of an emergency constituting an immediate hazard to health, safety or damage of the University's employees, property, or licenses, the University may undertake at the Contractor's or Subcontractor's respective expense, without prior notice, all Work necessary to correct such hazardous conditions caused by the Work of the Contractor not being in accordance with the requirements of this Contract.

The Contractor and Subcontractor shall require a similar guarantee in all subcontracts, including the requirement that the University be reimbursed for any damage or loss to the Work or to other Work resulting from such defects.

9.00 TERMINATION

9.01 Termination by the University for Cause

9.01.1

The University may terminate the Contract if the Contractor: (a) becomes insolvent; (b) files or has filed against it any Petition in Bankruptcy or makes a general assignment for the benefit of its creditors; (c) fails to pay, when due, for materials, supplies, labor, or other items purchased or used in connection with the Work; (d) refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will ensure the completion of the Work in accordance with the Master Project Schedule; (e) in the University's opinion, fails, refuses or neglects to supply sufficient labor, material or supervision in the prosecution of the Work; (f) interferes with or disrupts, or threatens to interfere with or disrupt the operations of the University, or any other Contractor, supplier, subcontractor, or other person working on the Project, whether by reason of any labor dispute, picketing, boycotting or by any other reason; or (g) commits any other breach of the Contract Documents.

When any of the above reasons exist, the University may, without prejudice to any other rights or remedies of the University and after giving the Contractor and the Contractor's surety, if any, three days written notice and a reasonable opportunity to cure, terminate employment of the Contractor and may, subject to any prior rights of the surety: (1) take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor; (2) accept assignment of subcontracts; and (3) finish the Work by whatever reasonable method the University may deem expedient.

9.01.2

If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Design Professional's services and expenses made necessary thereby, the remaining balance shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the University. The amount to be paid to the Contractor or University, as the case may be, shall be certified by the Design Professional, upon application, and this obligation for payment shall survive termination of the Contract. The Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss or consequential damages arising out of or resulting from such termination. However, the University shall be entitled to retain whatever amount is remaining unpaid to the Contractor in order to correct the cause for termination; such action is in addition to any other right or remedy which the University may have.

9.02 Suspension by the University for Convenience

9.02.1

The University may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the University may determine.

9.02.2

An adjustment shall be made for increases in the Contract Sum and/or Time of Completion of the Contract, including profit on the increased cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent: (1) that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or (2) that an equitable

adjustment is made or denied under another provision of this Contract. The Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss or consequential damages arising out of or resulting from such termination.

Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

9.03 Termination By The University For Convenience

9.03.1

The University, with or without cause, may terminate all or any portion of the services by the Contractor under this Agreement, upon giving the Contractor 30 days written notice of such termination. In the event of termination, the Contractor shall deliver to the University all reports, estimates, schedules, subcontracts, Contract assignments, purchase order assignments, and other documents and data prepared by it, or for it, pursuant to this Agreement.

9.03.2

Unless the termination is for cause, the Contractor shall be entitled to receive only the payments provided for in Article 8, pro-rated to the date of termination (including payment for the period of the 30 day notice) plus reimbursement for approved and actual costs and expenses incurred by the Contractor to the date of termination. Prior to payment, the Contractor shall furnish the University with a release of all claims against the University. The Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss or consequential damages arising out of or resulting from such termination.

9.04 Termination By The Contractor

9.04.1

The Contractor may terminate the Contract if the Work is stopped for a period of 60 days through no act or fault of the Contractor or a subcontractor, sub-subcontractor or their agents or employees or any other persons performing portions of the Work under Contract with the Contractor, for any of the following reasons: (1) issuance of an order of a court or other public authority having jurisdiction; (2) an act of government, such as a declaration of national emergency, making material unavailable; (3) because the Design Professional has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification, or because the University has not made payment on a Certificate for Payment within forty-five (45) days of the time stated in the Contract Documents; (4) if repeated suspensions, delays or interruptions by the University constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

If one of the above reasons exists, the Contractor may, upon fourteen (14) additional days' written notice to the University and Design Professional, terminate the Contract and recover from the University payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead and profit.

9.04.2

If the Work is stopped for a period of 60 days through no act or fault of the Contractor or a subcontractor or their agents or employees or any other persons performing portions of the Work under Contract with the Contractor due to University actions or inaction, the Contractor may, upon fourteen additional days' written notice to the University and the Design Professional, terminate the Contract and recover from the University as provided in Subparagraph 9.03.2

10.00 MISCELLANEOUS

10.01

These Contract Documents supersede all previous agreements between the University and the Contractor concerning this Work.

10.02

No action or failure to act by the University shall constitute a waiver of a right afforded it under these General Conditions, nor shall such action or failure to act constitute approval or acquiescence of a breach of these General Conditions, except as may be specifically agreed in writing.

10.03

The invalidity or unenforceability of any provision of these General Conditions shall not affect the validity or enforceability of any other provision.

-End of General Conditions for Construction-

-End of General Conditions for Construction-

SUPPLEMENTARY GENERAL CONDITIONS

OF

CONSTRUCTION

Facilities Planning & Management - Design & Construction Services

Wayne State University

Complete Documents can be downloaded at
http://www.forms.procurement.wayne.edu/RFPs/Supplementary_General_Conditions_General_Contractor_1-3-2017.docx

SUPPLEMENTARY GENERAL CONDITIONS OF CONSTRUCTION *(REVISED 7-2018)*

Where any article of the General Conditions of the Contract for Construction is supplemented in these Supplementary General Conditions, the original article shall remain in full force and effect and all supplementary provisions shall be considered as added thereto. Where any such article is modified, superseded or deleted here, provisions of such article not so specifically modified, superseded or deleted shall remain in full force and effect.

4.00 RESPONSIBILITIES OF THE PARTIES

Add the following to 4.02.3

.1 Temporary Facilities

.a The Contractor shall be responsible for arranging and providing general services and temporary facilities as specified herein and as required for the Design Professional, the University, all Subcontractors, Separate Contractors and Contractor's staff for the proper and expeditious prosecution of the Work, including, but not limited to, temporary offices and toilets; temporary storage; temporary electrical lighting and power; temporary voice and data communications, temporary water; temporary enclosures; temporary heating and ventilation; temporary openings; material hoists; temporary ladders, ramps and runways; temporary fire protection, protective coverings; temporary fire protection, protective coverings; and construction sign(s). The Contractor shall, at its own expense but included within the Cost of the Work, make all temporary connections to utilities and services in locations acceptable to the University, Design Professional and local authorities having jurisdiction thereof; furnish all necessary labor and materials, and make all installations in a manner subject to the acceptance of such authorities and the Design Professional; maintain such connections; remove the temporary installation and connections when no longer required; and restore the services and sources of supply to proper operating conditions.

.b The Contractor shall make all arrangements with the University and/or the local electrical utility company for temporary electrical service to the Site, shall provide all equipment necessary for temporary power and lighting, and shall pay all charges for this equipment and installation thereof. The electrical service shall be of adequate capacity for all construction tools and equipment without overloading the temporary facilities and shall be made available to all trades. The Contractor shall furnish, install and maintain a temporary lighting system to satisfy minimum requirements of safety and security.

.c Temporary weathertight enclosures and temporary heating shall be provided by the Contractor as required pursuant to the Construction Schedule or Master Project Schedule to complete the Work on or before the Completion Date, to make the building weathertight and suitable working conditions for the construction operations of all trades. Under no circumstances shall the temperature be allowed to reach a level which will cause damage to any portion of the Work which may be subject to damage by low temperatures. Unless otherwise indicated in the Construction Documents, the Contractor shall pay for all fuel, maintenance and attendance required in connection with the portable unit heaters without additional cost or expense to University. Any surface, interior or exterior, damaged by the use of these space heaters shall be replaced by new materials or be refinished to the satisfaction of the Design Professional and University without additional cost to the University.

.d All temporary equipment and conduits for same shall be in accordance with the applicable provisions of the governing codes. All temporary wiring and power conduits shall be maintained in a safe manner and utilized so as not to constitute a hazard to persons or property. All temporary equipment, wiring and conduits shall be completely removed after they are no longer necessary and prior to completion. At the conclusion of use or at the conclusion of the project, any materials or products purchased for the temporary facilities and temporary utilities and paid for, either directly

or indirectly, by the University shall become the property of the University and shall, at the option of the University, be delivered to the University's designated location.

.e Where temporary facilities and associated utilities, and for utilities used in performance of this Agreement can be reasonably provided from existing University services, the University shall bear the cost of such utility consumption. However, for conditions that require the Contractor to use electrical generators or equipment fueled by an independent fuel source, the Contractor shall bear all such costs.

Add the following to 4.02.12

.1 Safety and Protection

.a Contractor shall provide fences, pedestrian walks, barriers, etc. to ensure safety of the general public and Contractor's personnel or as directed by University.

.b Contractor will provide perimeter protection at wall and floor openings, elevator shafts, stairwells, and floor perimeters in accordance with MIOSHA requirements.

.c Combustible rubbish shall be removed daily and shall not be disposed of by burning on site. The entire premises and area adjoining and around the operation shall be kept in a safe and sanitary condition and free of accumulation of trash, rubbish, nuts, bolts, small tools, and other equipment not in use. Contractor is responsible to provide trash containers and fund the removal/disposal of construction debris and general trash.

.d Contractor will regularly ensure that 1) excess material/trash are removed from work sites; 2) passageways (e.g., sidewalks, hallways) are cleared of obstructions; 3) equipment is shut down and secured; and 4) lighted barricades are erected where necessary.

.e All existing means of egress, including stairways, egress doors, panic hardware, aisles, corridors, passageways, and similar means of egress shall, at all times, be maintained in a safe condition and shall be available for immediate use and free of all obstructions.

.f The space under the temporary trailer shall not be used for the storage or placement therein of flammable gases, liquids, or gas and liquid fuel powered equipment. This area shall be kept free of accumulations of any rubbish or trash.

.g In temporary trailers, all exit doors shall be open for egress whenever the unit is occupied. Draw bolts, hooks and other similar locking devices shall be prohibited on all egress doors.

.h On site storage of combustible or flammable liquids shall be limited to one day supply. Indoor storage of propane containers is prohibited.

.i Prior to working in confined spaces on campus, the Contractor must have its written Confined Spaces Program and Permit System reviewed by the University and the documents must meet minimum acceptable standards under the current MIOSHA regulation(s). The Contractor must provide its own atmospheric testing, personal protection, ventilating and rescue equipment as required. The Contractor should seek information from University on any known hazards of the confined spaces to be entered. All manholes and utility tunnels are considered confined spaces.

.j Compressed gas cylinders belonging to Contractor must be properly segregated and secured (with chains or similarly reliable restraining devices) to wall or floor mounted support systems, cylinder storage racks etc., when not in transit. Protective caps must be in place during transit or when not in use.

.k Contractor must follow all of OSHA's lockout/tagout requirements of 29 CFR 1910.147, provide its own lockout/tagout supplies, and be able to demonstrate that its employees have received formal instruction in "lock-tag-try" procedures. Copies of Contractor's written Lockout/Tagout Program shall be made available to the University upon request.

.l Contractor may not use any University sinks, drains or catch basins for the washing of any equipment, tools or supplies, or the disposal of any liquids, (excluding consumable products and hand-soap/water) without the express permission of University. This restriction applies to all sinks (including water fountains) in laboratories, offices and maintenance areas. Additionally, no polluting or hazardous liquids (such as motor oils, cleaners, solvents, paints, diesel fuels, antifreeze, etc.) may be drained onto roads, parking lots, ditches, wetlands, dirt piles or other soil, or into storm or sanitary sewers.

.m Contractor transporting hazardous materials (e.g. reclaimed materials, chemicals, fuels, oils, concrete) to and from campus must follow all applicable Department of Transportation [State or Federal] regulations. This includes proper shipping papers, placarding, material segregation and weight limits.

.n Contractor is also responsible for the proper collection, labeling, transporting, manifesting and disposal of polluting or hazardous wastes such as solvents, paints, oil or antifreeze (and rags contaminated with any of these materials) which are the result of Contractor's activities, as required by State and Federal laws and regulations. Copies of all manifests should remain available for University review upon request. Under no circumstances may hazardous wastes be disposed of in University-owned dumpsters, waste containers, drains or sewers, or drained onto roads, parking lots, ditches, wetlands, dirt piles or other soil.

.o Neither the University nor the Design Professional is responsible for conducting safety inspections or observations, but may make recommendations concerning safety to the Contractor.

.p Fire Protection

(1) All reasonable precautions shall be taken against fire throughout all the Contractor's and Trade Contractors' operations. Flammable material shall be kept at an absolute minimum. Any such materials shall be properly handled and stored.

(2) Construction practices, including cutting, welding and grinding, and protection during construction shall be in accordance with the applicable published standards. During such operations the Contractor shall provide a fire watch person. The University requires a "Hot Work" permit for such activities. The Contractor shall provide a sufficient number of approved portable fire extinguishers, distributed about the Project and in cold weather, non-freeze type portable fire extinguishers shall be used.

(3) Gasoline and other flammable liquids shall be stored in and dispensed from Underwriter's Laboratories listed safety containers in conformance with the National Board of Fire Underwriters recommendations and applicable State laws. Storage, however, shall not be within or immediately adjacent to the building. Storage shall be in a lockable, non-combustible, suitably rated cabinet or structure no less than 25 feet distant from any University building.

(4) The Contractor shall schedule the Work so that the permanent standpipe system shall be installed and made operable at the earliest possible date.

4) All tarpaulins that may be used for any purpose during construction of the Work shall be made of material which is water and weather resistant and fire retardant treated. All tarpaulins shall be Underwriters' Laboratories labeled with flame spread rating of fifteen (15) or less and shall be approved by the University's Representative prior to use.

Add the following to 4.02.13

Hazard Communication: University requires the Contractor to be in full compliance with all applicable Federal and State of Michigan regulations regarding Material Safety Data Sheets ("MSDS"). Upon request, copies of these MSDS must also be provided to the University no less than two weeks prior to the onset of activities. Failure to submit MSDS may result in suspension of Work activities until the MSDS are obtained. If Contractor is to work with hazardous products, it shall notify and update the Project Manager of a) proposed work schedules, b) what to expect in terms of noises/odors, and c) how to access MSDS. The Contractor must also be able to demonstrate that its employees have received "Haz Com" (i.e. Michigan Right-to-Know), and thereby possess a broad understanding of MSDS language. Contractor-owned chemical containers must be labeled with the product name and hazards.

Hazardous Materials: In addition to complying with the Michigan Right-to-Know Law, the Contractor must use and store hazardous materials in accordance with all local, state and federal regulations. Special attention must be paid to the segregation of incompatible materials and the handling/storage of flammable and/or volatile materials. At the end of each work day, hazardous materials must be properly secured, stored in MIOSHA approved containers, and placed in locations authorized by the University or removed from University's property.

Add the following to 4.02.21

.1 Excavation Policy

The policy prescribed herein shall be adhered to for all earth excavation, manual or power, on the University campus that penetrates the surface of the soil by a depth of 6 inches or greater.

.a Non-emergency Situation

(1) In non-emergency situations (i.e., scheduled maintenance or construction) the Contractor shall contact the University a minimum of seven days in advance of the scheduled excavation.

(2) The Contractor shall contact Miss Dig, as defined by Public Act 174 of 2013, being MCL 460.721 – MCL 460.733, at least three full business days prior to the scheduled excavation, to ascertain and stake the actual location for all utilities within 50 feet of the limits of the proposed excavation. Actual staking shall be performed not more than three (3) days prior to the excavation.

(3) Excavation shall commence only with the approval of the University Representative after a complete examination of the site utility drawings and a field observation of the staked site.

.b Emergency Situation

1. In an emergency situation (i.e., loss of services on campus or to a building), the Contractor shall immediately contact the University Representative, examine the site utility drawings to determine the potential interferences, and contact Miss Dig and private stakers, if appropriate, to ascertain and stake the actual location of all utilities within 50 feet of the limits of the proposed excavation. The Contractor shall also immediately contact the local natural gas supplier in addition to Miss Dig, upon a natural gas line failure.

2. Contact the University's Police Department at the emergency number: (313) 577-2222.

3. Excavation shall recommence only with the approval of the University's Representative who will grant approval only after a complete examination of the site utility drawings and a field observation of the staked site and clearance from the utility and University Police Department.

.c Pumping and Draining

The Contractor shall provide and maintain a temporary drainage system and pumping equipment as required to keep all excavation areas within the Site free from water from any source. As the Work progresses, all water shall be removed from basement areas, tunnels, pits, trenches and similar areas as required for proper performance of the Work and to prevent damage to any part of the construction utility. Permanent sump pumps shall not be used for this purpose; however, the Contractor may install temporary pumps in the sump pits until the permanent pumps are installed, providing that it cleans sump pits and drain lines satisfactorily after temporary use. The Contractor shall provide and maintain all pumping and draining equipment as required for the installation of all underground piping and utility conduit systems. Pumping and draining shall be performed in a manner to avoid endangering concrete footings or any adjacent construction or property. Such methods shall be subject to the review of the Design Professional.

.d Post-Excavation

(1) Provide appropriate pipe protection (wraps, and/or cathodic protection) as originally installed.

(2) Provide backfill material and compaction in 12-inch lifts to a minimum 95% Maximum Dry Density or higher as required by the Specifications.

(3) Backfill material shall be as specified; or engineered fill free of all deleterious materials and rubbish of any type. Reuse of excavated material, unless otherwise specifically noted on the drawings, is unacceptable.

(4) Provide plastic tape trace 24" (12" for shallow trenches) above all utilities indicating utility type by Miss Dig color code and name defined as follows:

Utility	Color	Lettering
Electric	Red	Elect
Oil/Natural Gas	Yellow	Gas
Telephone & Fiber Optic	Orange	Tele
Cable TV	Brown	TV
Water	Blue	Water
Steam	Yellow	Steam
Sewer	Green	Sewer

(5) Return grade to pre-excavation condition.

Add the following to 4.05.1

The insurance furnished by the Contractor under this Article 4.05.1 shall provide coverage not less than the following:

.1 Workers' Compensation with Employers' Liability & Alternate Employers Endorsement:
(a) Statutory Limits & Employer's Liability $1,000,000

.2 Commercial General Liability
(a) $1,000,000 per occurrence and $2,000,000 aggregate
(b) University added as additionally insured on

.3 Contractors' Pollution Liability:
(a) $1,000,000 per claim

.4 Professional Liability:
(a) $2,000,000 per claim and $4,000,000 aggregate

.5 Auto Liability with Pollution & Legal Liability
(a) $1,000,000

(b) University added as additionally insured on

.6 Excess Liability (Umbrella):
(a) $2,000,000

.7 Builder's Risk Insurance in the amount equal to the Contract Sum.

Any deductible or self-insured reserve shall not be refunded to the Contractor from project contingency or other project funds.

Add the following to 4.12

Elevator shafts, electrical closets, pipe and duct shafts, chases, furred spaces and similar spaces which are generally unfinished, shall be cleaned by the Contractor and left free from rubbish, loose plaster, mortar drippings, extraneous construction materials, dirt and dust before preliminary inspection of the Work.

All areas of the Project in which painting and finishing work is to be performed shall be cleaned throughout just prior to the start of this work, and these areas shall be maintained in satisfactory condition for painting and finishing. This cleaning shall include the removal of trash and rubbish from these areas; broom cleaning of floors; the removal of any plaster, mortar, dust and other extraneous materials from all finished surfaces, including but not limited to, all exposed structural steel, miscellaneous metal, woodwork, plaster, masonry, concrete, mechanical and electrical equipment, piping, duct work, conduit, and also all surfaces visible after all permanent fixtures, induction unit covers, convector covers, covers for finned tube radiation, grilles, registers, and other such fixtures or devices are in place.

In addition to all cleaning specified above and the more specific cleaning which may be required, the Project shall be prepared for occupancy by a thorough final cleaning throughout including washing or cleaning of all surfaces on which dirt or dust has collected. Glass and curtain wall shall be washed and cleaned on both sides by a window cleaning subcontractor specializing in such work. Contractor shall, at University's request, delay such washing of exterior surfaces to such time as requested by University. Recleaning will not be required after the Work has been inspected and accepted unless later operations of the Contractor, in the opinion of the University, make re-cleaning of certain portions necessary.

5.00 INTERPRETATION OF AND ADHERENCE TO CONTRACT REQUIREMENTS

Add the following to 5.04.1

.1 Contractor Requirements

.a Signature: Each item submitted shall be thoroughly reviewed by the Contractor and have a stamp or note describing the Contractor's action, signed by the person authorized by the Contractor to do the checking with that person's name clearly printed.

.b Contractor Responsibility: Contractor shall review each submittal for completeness, conformance to the Contract Documents and coordination with other parts of the Work and the Construction Schedule. By providing and submitting to the Design Professional shop drawings, product data, warranties and samples, the Contractor is representing that he or his Subcontractor, has determined and verified (a) the availability of all materials, and (b) field measurements and field construction criteria related thereto, and (c) that he has checked and coordinated the information contained within such submittals with the requirements of the Work, the Contract Documents and

the Construction Schedule and that such shop drawings, samples, warranties and data conform to the Contract Documents.

.c Limited Acceptance by University and Design Professional: Acceptance is for general design only. Quantities, size, field dimensions and locations are some of the required characteristics which are not part of the acceptance and will not be checked. Accordingly, the limited acceptance shall in no way relieve the Contractor from his obligation to conform his work to required characteristics and to the requirements of the Contract Documents.

.d Delays: The Design Professional may return incomplete submittals with no action taken. The Contractor shall have no claim for any damages or for an extension of time due to delay in the Work resulting from the rejection of materials or from the rejection, correction, and resubmittal of Shop Drawings, samples and other data, or from the untimely submission thereof.

.2 Approvals

The Design Professional's approval shall not indicate approval of dimensions, quantities or fabrication processes unless specific notations are made by the Design Professional regarding same. The Design Professional will check one of the following notations on the Shop Drawing and Sample Review Stamp:

.a "REVIEWED-NO EXCEPTIONS NOTED", indicating final action by the Design Professional. When reviewing resubmitted shop drawings the Design Professional assumes that there are no revisions from the previous submittal, except as provided by 5.04.1 and his review of resubmittals is only for the corrections requested with the approval of the balance of the shop drawing being based on the original submission. Where the Contractor directs specific action to revisions, as provided by 5.04.1 the approval includes these also.

.b "REVIEWED WITH CORRECTIONS NOTED", indicating final action by the Design Professional with the same conditions as "REVIEWED-NO EXCEPTIONS NOTED". Unless he takes exception to the corrections noted, the Contractor may begin that portion of the Work for which the shop drawing was required.

.c "REVISE AND SEND RECORD COPY", requiring that the Design Professional be sent a copy of the revised shop drawing in accordance with the noted corrections, at the same time it is issued for the Work.

.d "NOT APPROVED-RESUBMIT", indicating that the Contractor shall not begin that portion of the Work until the reason indicated for disapproval has been corrected and the revised shop drawing submitted, reviewed and approved by the Design Professional.

.e "NO ACTION REQUIRED", indicating that Contract Documents do not require the Design Professional to review or take any action with this submittal.

.f Where more than one action has been checked, each shall apply to that portion of the shop drawing for which the action is indicated.

8.00 PAYMENT AND COMPLETION

Add the following to 8.01

8.01.1 Monthly Payment Applications

At a meeting mutually agreed upon between the University's Representative and the Contractor, but no less than monthly, the Contractor shall distribute, in triplicate, draft copies of the proposed Payment Application for review and comment. The review, comment and mutual concurrence will be an

agenda item at that meeting. The Contractor will prepare the formal Application for submission from the comments made on the Draft and will present the formal application as provided for herein, including all required back-up materials, such as waivers of claim, release of claim on bond, sworn statement, documentation for stored materials, certified payroll reports and other documents required by the University Representative.

8.01.2 Offsite Materials

If an Application for Payment is made for materials not installed in the Work, but suitably stored off-site at a location acceptable to the University's Representative, such application shall be accompanied by legally acceptable paid invoices or conditional bills of sale and copies of delivery tickets, signed by the Contractor, indicating the Contractor verified that the materials shown on the delivery tickets are at the location accepted by the University and are adequately insured. Failure of the Contractor to furnish paid invoices, conditional bills of sale and proof of insurance shall be cause for withholding such amounts from payment until such paid invoices or bills of sale have been received by the University. The University reserves the right to examine the stored items prior to payment.

Add the following to subparagraph 8.03

The following submittals shall be bound in three (3) sets, plus one electronic file of all materials:

.1 Project Closeout Documents

.a The Contractor shall submit to the Design Professional, a written guarantee, which shall be in accordance with Section 8.04 and such additional guarantees, in writing, as are required by the Specifications.

.b The Contractor shall submit complete instruction for the care and maintenance of all finish materials under the contract, including, but not limited to floor finishes and coverings, wainscot and wall finishes, acoustical treatment, metal finishes, painted surfaces, flooring, hardware, and finishes on mechanical and electrical equipment. Instructions shall contain the manufacturer's or supplier's recommendations with respect to cleaning agents, preservative treatment and such other instructions as may be beneficial to the maintenance, usage, appearance and durability of the product. The recommendations shall further contain cautions on the use of certain cleaners and coatings which may be detrimental to the product.

.c The Contractor shall prepare and submit operating and maintenance instructions, coordination drawings, and shop drawings for all mechanical and electrical equipment, and other special items, as called for in the specifications.

.d All of the above described documents shall be checked by Contractor for conformance with the specifications and shall be submitted in uniform size, bound and indexed for cross-reference.

.e The Contractor shall also submit "As-Built" drawings as specified in Section 4.11.

.f Copies of all "Attic Stock" transmittals signed by appropriate University personnel accepting the attic stock material.

.2 Project Closeout Training

a. The University and the Contractor will coordinate, schedule and present formal training for University personnel for all equipment, systems, devices, and building features.

b. Training shall be scripted to include all important aspects of the equipment and its installation and maintenance. Trainers shall be suitably prepared and experienced in the features of the equipment and the equipment's installation within the project.

c. The Contractor, all product vendors, subcontractors, suppliers and materialmen shall consent to and participate in the recording of the training as determined by the University and the Contractor.

d. The University may supplement training with outside providers to meet the training requirements of the project should a vendor, subcontractor, or supplier fail to provide the required training. The University shall be reimbursed by the Contractor for any such costs for supplemental training.

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The Technical Specifications dated **September 23, 2019** and the following List of Drawings represent the scope of work as defined in the Contract Documents from Article 4.

DRAWINGS

Drawing No.:	**Description**

SECTION 003132 - GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 Summary

A. Soil borings were taken on-site by SME. See attached report dated August 6, 2019.

B. Ground Penetration Report was developed. See attached report dated July 25, 2019.

C. Phase II report was developed by SME. See attached report dated August 21, 2019.

D. The Geotechnical Report and boring logs, Ground Penetration Radar Report and Phase II have been included in project manual as an Appendix.

1.2 Use of Data

A. Soil borings were completed only for the use of design and are not part of the contract documents.

B. Bidders should visit the site and acquaint themselves with all existing conditions. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but all such investigations shall be performed only under time schedules and arrangements approved in advance by the Owner's Representative.

C. The Contractor shall assume full responsibility for interpreting testing data and for the conclusions drawn from the information furnished, and from inspection of available information at the site.

END OF SECTION

SECTION 003143 - PERMIT APPLICATION

PART 1 - GENERAL

1.1 PERMIT SUBMITTALS

A. Contractor to obtain SESC permit from Wayne County Department of Public Services

B. Contractor to obtain a Notice of Coverage Permit through E.G.L.E / State of Michigan

C. Contractor to submit and pay for all listed and unexpected permits.

END OF SECTION

GENERAL REQUIREMENTS

GENERAL

A. CONTRACTOR'S RESPONSIBILITY

It is not the responsibility of the Architect/Engineer or Owner's Representative to notify the Contractor or subcontractors when to commence, to cease, or to resume work; nor in any way to superintend so as to relieve the Contractor of responsibility or of any consequences of neglect or carelessness by him or his subordinates. All material and labor shall be furnished at times best suited for all Contractors and subcontractors concerned, so that the combined work of all shall be properly and fully completed on the date fixed by the Contract.

The Contractor shall be responsible for all items contained in both the specifications and on the drawings for all trades. He shall be responsible for the proper division of labor according to current labor union agreements regardless of the division of responsibility implied in the contract documents.

B. CODES AND STANDARDS

Reference to standard specifications for workmanship, apparatus, equipment and materials shall conform to the requirements of latest specifications of the organization referenced, i.e., American Society for Testing Materials (ASTM), Underwriters Laboratories, Inc. (UL), American National Standards Institute, Inc. (ANSI), and others so listed in the Technical Specifications.

C. PERMITS, FEES AND NOTICES

See General Conditions, Article 4.02.18

D. MEASUREMENTS

Before proceeding with each Work Item, Contractor shall locate, mark and measure any quantity or each item and report quantities to Engineer. If measured quantities exceed Engineer’s estimate, Contractor shall obtain written authorization to proceed from Owner before executing Work required for that Work Item.

Measurement of quantities for individual Work Items will be performed by Contractor and reviewed by Engineer. Coordinate measurements with inspection as required in Section “Coordination.”

Cost of Work included in Work Item for quantities as indicated in Contract Documents shall be included in Base Bid.

1. Additions to or deductions from lump sum price for quantities of each Work Item added to or deducted from Work respectively shall be at unit prices indicated in Bid Form and shall constitute payment or deductions in full for all material, equipment, labor, supervision and incidentals necessary to complete Work.

E. CONTRACTOR'S MEASUREMENTS

Before ordering material, preparing Shop Drawings, or doing any work, each Contractor shall verify, at the building, all dimensions which may affect his work. He assumes full responsibility for the accuracy of his figures. No allowance for additional compensation will be considered for minor discrepancies between dimensions on the drawings and actual field dimensions.

F. CONTINUITY OF SERVICE *(Revised 3-26-2012)*

Continuity of all existing services in the building shall be maintained throughout the construction period. Where it is necessary to tie into the existing electrical service, water or waste systems, it shall be done as directed by the Architect/Engineer. This Contract shall also provide temporary lines or bypasses that may be required to maintain continuous service in the building. All utility shutdowns must be approved by the Owners Representative / Project Manager, not less than **7 business days** prior to the event, so that proper notification can be posted.

G. SUBMITTALS

All submittals (except Shop Drawings) and samples required by the Specifications shall be submitted in triplicate unless otherwise specified for a particular item under an individual Specification Section.

Each sample shall be clearly identified on a tag attached, showing the name of the Project Consultant, the project number and title, the names of the Contractor, manufacturer (and supplier if same is not the manufacturer), the brand name or number identification, pattern, color, or finish designation and the location in the work.

Each submittal shall be covered by a transmittal letter, properly identified with the project title and number and a brief description of the item being submitted.

Contractor shall be responsible for all costs of packing, shipping and incidental expenses connected with delivery of the samples to the Project Consultant or other designated address.

If the initial sample is not approved, prepare and submit additional sets until approval is obtained.

Materials supplied or installed which do not conform to the appearance, quality, profile, texture or other determinant of the approval samples will be rejected, and shall be replaced with satisfactory materials at the Contractor's expense.

H. GENERAL/STANDARD ELECTRONIC EQUIPMENT AND INFRASTRUCTURE REQUIREMENTS *(Revised 11-2008)*

1. Compliance with WSU Standards for Communications Infrastructure

   A. All applicable work, products, materials and methods shall comply with the latest version of the “WSU Standards for Communications Infrastructure” except as where noted.

   B. This document is available at the following website/URL: https://computing.wayne.edu/docs/wsu-communications-standards.pdf

2. Automation System Program Code

   A. All automation system uncompiled and compiled program codes, source codes, custom modules, graphical user interface screen shots and any other automation system programming data and material (Program Code) shall be provided to the UNIVERSITY in hard copy and on CD Rom in an unencrypted format acceptable to the UNIVERSITY.

   B. Copyright for the Program Code shall be assigned to the UNIVERSITY for purposes of system maintenance.

PROTECTION OF OCCUPANCY *(Revised 3-2006)*

A. **FIRE PRECAUTIONS**

Take necessary actions to eliminate possible fire hazards and to prevent damage to construction work, building materials, equipment, temporary field offices, storage sheds, and other property.
During the construction, provide the type and quantity of fire extinguishers and fire hose to meet safety and fire prevention practices by National Fire Protection Association (NFPA) Codes and Standards (available at http://www.nfpa.org/)

In the event that construction includes "hot work", the contractor shall provide the Owner's Representative with a copy of their hot work policy, procedures, or permit program. No hot work activity (temporary maintenance, renovation, or construction by operation of a gas or electrically powered equipment which produces flames, sparks or heat that is sufficient to start a fire or ignite combustible materials) shall be performed until such documents are provided. During such operations, all highly combustible or flammable materials shall be removed from the immediate working area, and if removal is impossible, same shall be protected with flame retardant shield.

Not more than one-half day's supply of flammable liquids such as gasoline, spray paint and paint solvent shall be brought into the building at any one time. Flammable liquids having a flash point of 100 degrees F. or below which must be brought into the building shall be confined in an Underwriters Laboratories (UL) labeled safety cans. The bulk supply of flammables shall be stored at least 75 feet from the building and other combustible materials. Spigots on drums containing flammable liquids are prohibited on the project site. Drums shall be equipped with approved vented pumps, and be grounded and bonded.

Only a reasonable working supply of combustible building materials shall be located inside the building.

All oil-soaked rags, papers, and other similar combustible materials shall be removed from the building at the close of each day's work, or more often if necessary, and placed in metal containers, with self-closing lids.

Materials and equipment stored in cardboard cartons, wood crates or other combustible containers shall be stored in an orderly manner and accessibly located, fire-fighting equipment of approved types shall be placed in the immediate vicinity of any materials or equipment stored in this type of crate or carton.

No gasoline, benzene, or like flammable materials shall be poured into sewers, manholes, or traps.

All rubbish shall be removed from the site and legally disposed of. Burning of rubbish, waste materials or trash on the site shall not be permitted.

The contractor shall be responsible for the conduct of employees relative to smoking and all smoking shall be in the area designated by the Architect/Engineer.

B. **GENERAL SAFETY AND BUILDING PRECAUTIONS**

Provide and maintain in good repair barricades, railings, etc., as required by law for the protection of the Public. All exposed material shall be smoothly dressed.

At dangerous points throughout the work environment provide and maintain colored lights or flags in addition to above guardrails.

Isolate Owner's occupied areas from areas where demolition and alteration work will be done, with temporary, dustproof, weatherproof, and fireproof enclosures as conditions may require and as directed by the Architect/Engineer.

Cover and protect furniture, equipment and fixtures to remain from soiling, dust, dirt, or damage when demolition work is performed in rooms or areas from which such items have not been removed.

Protect openings made in the existing roofs, floors, and other construction with weatherproof coverings, barricades, and temporary fire rated partitions to prevent accidents.

Repair any damage done to existing work caused by the construction and removal of temporary partitions, coverings, and barricades.

The Contractor will be held responsible for all breakage or other damage to glass up to the time the work is completed.

Provide protection for existing buildings, interior and exterior, finishes, walls, drives, landscaping, lawns (see below), etc. All damages shall be restored to match existing conditions to the satisfaction of the Architect/Engineer.

The Contractor and Owner will define the anticipated area of lawn damage at the project Pre-Construction Meeting. Whether the lawn is sparse or fully developed, any lawn damaged due to the Contractor's work will be replaced with sod by the University. The University's unit cost of $10.00 per square yard and landscaping at a rate of 1.5 times the cost of the sod repairs, the full cost of which will be assessed against the Contractor. At the completion of the project, a deductive Change Order reflecting this cost will be issued.
The Contractor is to include an allowance in his bid for this corrective work.

C. **INTERFERENCE WITH OWNER'S OPERATIONS**

The Owner will be utilizing the Building Facilities to carry on his normal business operation during construction. The Contractor shall schedule performance of the work necessary to complete the project in such a way as to interfere as little as possible with the operation during construction. The Contractor shall schedule performance of the work necessary to complete the project in such a way as to interfere as little as possible with the operation of the Owner.

Work which will interfere with the Owner's occupancy, including interruptions to the Owner's mechanical and electrical services, and essentially noisy operations (such as jackhammering) shall be scheduled in advance. The schedule of alterations shall be approved by the Architect/Engineer and the work shall be done in accordance with the approved schedule.

It is understood that the work is to be carried through to completion with the utmost speed consistent with good workmanship and to meet the construction schedule.

The Contractor shall begin work under the Contract without delay upon receipt of the fully-executed contract and shall substantially complete the project ready for unobstructed occupancy and use of the Owner for the purposes intended within the completion time stated in the contract.

The Contractor shall, immediately upon award of contract, schedule his work and expedite deliveries of materials and performance of subcontractors to maintain the necessary pace to meet the construction schedule.

CONTRACTOR'S REPRESENTATION AND COORDINATION

A. FIELD SUPERINTENDENT

Contractor shall assign a full time project manager/superintendent for the duration of the project. This person shall be experienced and qualified in all phases of the work and shall be present at the site during Contractor's working hours. The project manager shall have Contractor's full authority to represent Contractor in all routine operations including payment, changes to the work, and scheduling. Contractor shall not re-assign this individual without prior written permission of the Owner.

B. MEETINGS

When directed by the Architect/Engineer, meetings shall be held for the purpose of coordinating and expediting the work. The invited contractors or subcontractors will be required to have qualified representatives at these meetings, empowered to act in their behalf.

C. COORDINATION

The Contractor shall also provide a staff adequate to coordinate and expedite the work properly and shall at all times maintain competent supervision of its own work and that of its subcontractors to insure compliance with contract requirements.

The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the work under the Contractor.

D. CONSTRUCTION SCHEDULE

The Construction Schedule shall be prepared after the award of contract. Soon after, a pre-construction meeting is held with the Owner and the Architect/Engineer to determine the areas to which the Contractor will be allowed access at any one time.

The Contractor is alerted to the fact that areas in which he will be working will be occupied by students and employees of the University as well as the general public. The Contractor's access, to and from the project site, will be confined to limited areas so as not to unduly disrupt the normal activities of the University.

TEMPORARY FACILITIES

A. GENERAL

The following temporary facilities descriptions represent standard conditions. Verify accuracy with Architect/Engineer at time of bids.

B. CONTRACTOR'S OFFICE

Provide field offices as required. Locate temporary field offices on site where directed by Architect/Engineer.

Appearance and location of field offices shall be approved by the Architect/Engineer.

Provide for all other administrative facilities and storage off the Owner's property.

C. STORAGE OF MATERIALS

All materials shall be stored in areas designated by the Architect/Engineer. All stored materials shall be arranged for the minimum disruption to occupants and to allow full access to and throughout the building. Materials stored outdoors shall be neat and orderly and covered to prevent damage or vandalism.

D. **PARKING**

1. **GENERAL**

University parking regulations will be strictly enforced.

Maintain Owner's parking areas free of dirt and debris resulting from operations under the contract.

2. **STANDING AND UNLOADING/LOADING VEHICLES**

All Contractors are to call Wayne State University Public Safety at 577-2222, and give at least 24 hours advance notice that they have vehicles that must be at the job site.

Vehicles will be permitted at the project site only as long as the vehicles are needed for loading/unloading, and must be immediately moved upon completion.

All unauthorized and/or unattended standing vehicles will be subject to ticketing and removal by University Police. Towed vehicles may be reclaimed by calling 577-2222, and paying any assessed charges.

3. COMPLIMENTARY PARKING

There is no complimentary parking for Contractor’s employee vehicles.

4. **WAYNE STATE UNIVERSITY PUBLIC/STUDENT PARKING AREAS**

Public Parking, on a first-come first-served basis is available. Contact the office of the One Card System, at 313.577.9513 for information on availability of parking on a contractual basis.

E. **TOILET FACILITIES**

The Owner's designated existing toilet facilities may be used by workers on the project. Contractor shall maintain such facilities in a neat and sanitary condition.

F. **TELEPHONE USE**

If required, the Contractor shall provide and pay for a temporary telephone within the building for his use and that of his subcontractors.

No use of the Owner's telephone (except pay telephones) will be permitted.

G. **ACCESS DEVICES**

The Contractor shall furnish and maintain temporary hoists, ladders, railings, scaffolds, runways, and the like as required for safe, normal access to the permanent construction until the permanent facilities are complete. Each trade shall furnish such additional means of access as may be required for the progress and completion of the work. Such temporary access devices shall meet all applicable local, state, and federal codes and regulations.

H. **HEAT AND VENTILATION**

Provide cold weather protection and temporary heat and ventilation as required during construction to protect the work from freezing and frost damage.

Provide adequate ventilation as required to maintain reasonable interior building air conditions and temperatures, to prevent accumulation of excess moisture, and to remove construction fumes.

Tarpaulins and other materials used for temporary enclosures. Coverings and protection shall be flameproofed.

I. **WATER SERVICE**

Sources of water are available at the site. The Owner will pay for reasonable amounts of water used for construction purposes.

The Contractor shall provide, at the earliest possible date, temporary connections to the water supply sources and maintain adequate distribution for all construction requirements. The Contractor shall protect sources against damage.

Methods of conveying this water shall be approved by the Architect/Engineer and shall not interfere with the Owner's operations.

J. **ELECTRICAL SERVICES**

All charges for reasonable amounts of electrical power energy used for temporary lighting and power required for this work will be paid by the Owner.

The Contractor shall provide and maintain any temporary electrical lighting and power required for this work. At the completion of the work, all such temporary electrical facilities shall be removed and disposed of by the Contractor.

Temporary lighting and power shall comply with the regulations and requirements of the National Electrical Code

INSPECTIONS AND TESTS

The Architect/Engineer shall at all times have access to the work wherever it is in preparation or in progress and the Contractor shall provide proper facilities for such access and for observation.

No failure of the Architect/Engineer, during the progress of the work, to discover or reject materials or work not in accordance with the Contract Specifications and Drawings shall be deemed an acceptance thereof nor a waiver of defects therein. Likewise, no acceptance or waiver shall be inferred or implied due to payments made to contractor or by partial or entire occupancy of the work, or installation of materials that are not strictly in accordance with the Contract Specifications and Drawings.

Where tests are specifically called for in the Specifications, the Owner shall pay all costs of such tests and engineering services unless otherwise stated in the contract.

Where tests are not specifically called for in the Specifications, but are required by the Architect/Engineer or Consultant, the Owner shall pay all costs of such tests and engineering services unless the tests reveal that the workmanship or materials used by the Contractor are not in conformity with the Drawings, Specifications, and/or approved shop drawings. In such event, the Contractor shall pay for the tests, shall remove all work and materials so failing to conform and replace with work and materials that are in full conformity.

CLEAN-UP

The Contractor shall at all times keep the Owner's premises and the adjoining premises, driveways and streets clean of rubbish caused by the Contractor's operations and at the completion of the work shall remove all the rubbish, all of his tools, equipment, temporary work and surplus materials, from and about the premises, and shall leave the work clean and ready for use. If the contractor does not attend to such cleaning immediately upon request, the Architect/Engineer may cause such cleaning to be done by others and charge the cost of same to the Contractor.

The Contractor will be responsible for all damage from fire that originates in, or is propagated by, accumulations of rubbish or debris.

All rubbish and debris shall be disposed of off the Owner's property in an approved sanitary landfill site. No open burning of debris or rubbish will be permitted. Job site shall be left neat and clean at the completion of each day's operation.

PROJECT CLOSE-OUT

A. **RECORD DRAWINGS**

At beginning of job, provide one copy of Working Drawings, and record changes, between Working Drawings and "As Builts", including changes made by Addenda, Change Orders, Shop Drawings, etc. These shall be kept up to date.

Update to indicate make of all mechanical and electrical equipment and fixtures installed. Keep these Record Prints in good condition and available for inspection by the Architect/Engineer.

Upon completion of the job, turn over to the Architect/Engineer Record Prints of Working Drawings showing all job changes.

B. **OPERATING AND MAINTENANCE DATA**

Prepare and furnish to the Architect/Engineer three (3) bound copies of "Operating and Maintenance Manual" on all equipment installed under this Contract.

Manual shall include copies of all Manufacturers' "Operating and Service Instructions", including Parts List, Control Diagrams, Description of Control Systems, Operating, Electrical Wiring, and any other information needed to understand, operate and maintain the equipment. The names and addresses of all subcontractors shall be included. These instructions shall be custom-prepared for this job -- catalog cuts will **not** be accepted. Equipment shall be cross-referenced to Section of Specifications and to location shown and scheduled on drawings.

Include Test-Adjust-Balance Report in the Manual.

C. **FINAL INSPECTION**

Secure final inspections from the State of Michigan as soon as the work is completed and immediately submit such Certificates to the Architect/Engineer.

D. **GUARANTEES (See Sections 00510 and 01781)**

Guarantees on material and labor from the General Contractor and his subcontractors shall be as required in Sections 00510 and 01781.

E. **SWORN STATEMENT AND WAIVER OF LIENS *(revised 4-11-2012)***

Prior to final payment, the General Contractor shall provide a Contractor's Sworn Statement and Full Unconditional Waivers of Liens from all subcontractors for material and labor and from all suppliers who provide materials exceeding $10,000. Sworn Statements and signed waivers from all Subcontractors must accompany Pay Applications or they will be returned for such documentation prior to approval.

ASBESTOS HAZARD

A. The contractor shall not start any work in any area that has not been inspected for asbestos by the Owner's Industrial Hygiene Department, or a qualified representative of the Owner and approval is given for work to be done. If asbestos is found, safety measures as recommended by the Owner's Industrial Hygiene Department, or a qualified representative of the Owner, shall be completed, or approval given for work to be done before work is started. The contractor shall not perform any asbestos removal or containment work under the contract.

KEYS

A. The Owner shall provide the contractor keys on loan to have access to the various spaces in order to complete the contract. Contractor will sign for and be responsible for each key on loan, returnable to Owner upon completion of the contract. In case of any lost keys, the Owner will backcharge the contract $250.00 for each core change. In the event that a Contractor wants access to a secured area, he shall give the Owner a minimum 48-hour notice.

SUMMARY OF WORK

PROJECT: Intramural Field

WSU PROJECT NO.: 080-326346

PROJECT MANAGER: Alycsa Valentine

1. EXAMINATION

   The Contractor shall visit the site and become familiar with conditions under which he will be working. Also meet with the project manager and review site access, storage areas, etc.

2. Description of Work – Project includes Regrade the existing field, rework the existing utilities, and install a new synthetic turf field. Remove existing trees and landscaping to expand the boundaries of the fence. Install new fence and landscaping..

3. The building is located at

   Wayne State University
   Trumbull and Edsel Ford Freeway, Detroit Michigan 48202
   Detroit, Michigan 48202

Below for Purchasing Use Only

WAYNE STATE UNIVERSITY

Division of Finance and Business Operations

Procurement & Strategic Sourcing
5700 Cass Avenue, suite 4200
Detroit, Michigan 48202
(313) 577-3734
FAX (313) 577-3747

September 23, 2019

Dear Vendors:

Wayne State University invites you to participate in the Request for Proposal process, for the **Intramural Field**, for Wayne State University, WSU Project **080-326346**.

Bidding documents may be obtained by vendors from the University Purchasing Web Site at **http://go.wayne.edu/bids** beginning **September 23, 2019**. When visiting the Web Site, click on the "**Construction**" link in green.

If you are interested in participating in this process, please use our online registration form at **https://forms.wayne.edu/5aa587e3de04c#form-9162**, no later than **September 29, 2019** by 4:30 p.m. Use this form to indicate your attendance at our mandatory Pre-proposal meeting to be held on, **September 30, 2019** at **11:00 – 12:30** and your intent to submit a proposal for the services listed. To participate, it is **MANDATORY** that you and/or responsible representatives of your organization attend our pre-bid conference (Tour/Q & A session) to be held:

September 30, 2019, 11:00 – 12:30
Wayne State University
Conference Room 3
5454 Cass Avenue,
Detroit, MI 48202

The balance of the Calendar of Events is as follows:

Issue RFP	**September 23, 2019**
Mandatory Pre-Bid Conference	**September 30, 2019, 11:00 – 12:30**
Secondary walkthrough	(if needed) To be determined at the conclusion of the pre-bid conference, by those in attendance
Deadline for Questions	**October 2, 2019,** 12:00 noon
Receipt of Bids	**October 7, 2019 ,** 2:00 p.m.
Award of Contract	25 calendar days after successful bidder qualification and recommendation of award.
Substantial Completion	**May 6, 2020**

For your convenience a map of the University and appropriate parking lots can be downloaded and printed from: **http://campusmap.wayne.edu/**. Guest parking in any of the University student and guest lots is **$8.50**. A detailed list of Cash & Coin operated lots can be viewed at **http://procurement.wayne.edu/cash_and_credit_card_lots.php**. Cash lots dispense change in quarters. Due to time constraints, Vendors are encouraged to avoid parking at meters on the street.

Minimum Participation

A. Pre-registration for the Pre-Bid meeting is required. In the event that we do not have four (4) or more eligible bidders pre-registered, the University reserves the right to postpone the Pre-bid meeting with up to 4 business hour notice.
B. If less than 4 individual contractor firms attend the mandatory pre-bid meeting, the University reserves the right, at its sole discretion, to either reschedule the pre-bid conference or proceed and offer a second pre-bid conference date. (Attendance at only one pre-bid conference will be required).
C. On the day of the bid opening, if less than 3 sealed bids are received, the University reserves the right, at its sole discretion, to rebid the project in an effort to obtain greater competition. If the specifications are unchanged during the rebid effort, any contractor who submitted a bid will be given the option of keeping its bid on file for opening after the second bid effort, or of having the bids returned to them unopened.

Sealed proposals for lump-sum General Contract will be received at the office of the Procurement & Strategic Sourcing **by electronic submission on October 7, 2019 ,** until 2:00 p.m. (local time). The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**.

Should you have any questions or concerns about this invitation, please contact me at **(313) 577-7 – 3712**. Thank you for your interest in doing business with Wayne State University.

Sincerely,

Robert Kuhn, Sr. Buyer

Cc: **Alycsa Valentine** , Project Manager
Valerie Kreher, **Sr. Buyer**

Attachment

VENDOR LIST: RFP Intramural Field

The attached RFQ was sent to the vendors listed below **September 23, 2019**:

VENDOR LIST:

List Serv:

BIDS-GENERAL_CONSTRUCTION@LISTS.WAYNE.EDU, Landscape (Snow Removal) companies

BIDS-LANDSCAPE_SERVICES@LISTS.WAYNE.EDU

BIDS-SNOW_REMOVAL@LISTS.WAYNE.EDU

Sign-in Sheet/Email Addresses
RFP Intramural Field (Project 080-326346)

Meeting Date: **September 30, 2019, 11:00 – 12:30**
Sign In Sheet **RFP Intramural Field**
WSU Project # 080-326346

Meeting Location:

WAYNE STATE UNIVERSITY

Division of Finance and Business Operations

Procurement & Strategic Sourcing
5700 Cass Avenue, suite 4200
Detroit, Michigan 48202
(313) 577-3734
FAX (313) 577-3747

Xxx,xxx, 2013

Addendum #1 To
Request for Proposal
For Intramural Field: Project 080-326346

Minutes of the Pre-bid Conference
Dated September 23, 2019

The Addendum must be acknowledged on your lump sum bid.

The pre-bid conference for Request for Proposal for **Intramural Field**, Project **080-326346** was held on **September 30, 2019,** at **11:00 – 12:30** (local time) – at Detroit, MI 48202. **Robert Kuhn** reviewed the highlights of the pre-bid package, especially concerning details such as bid due dates and who Contractors may contact during the live bid process. **Alycsa Valentine** and **Mark Woodhurst** from **SMITHGROUP** discussed the technical aspects of the project and bid requirements, and conducted the Q & A session.

NOTE: You must have attended a prebid conference in order to be eligible to bid on a particular project. Receipt of minutes or addenda without being at a prebid conference does not qualify your company to bid.

Numerous simple questions and answers were addressed at the pre-bid meeting. Some of the issues were as follows:

1. Minimum Participation
   A. Pre-registration for the Pre-Bid meeting is required. In the event that we do not have four (4) or more eligible bidders pre-registered, the University reserves the right to postpone the Pre-bid meeting with up to 4 business hour notice.

   B. If less than 4 individual contractor firms attend the mandatory pre-bid meeting, the University reserves the right, at its sole discretion, to either reschedule the pre-bid conference or proceed and offer a second pre-bid conference date. (Attendance at only one pre-bid conference will be required).

   C. On the day of the bid opening, if less than 3 sealed bids are received, the University reserves the right, at its sole discretion, to rebid the project in an effort to obtain greater competition. If the specifications are unchanged during the rebid effort, any contractor who submitted a bid will be given the option of keeping its bid on file for opening after the second bid effort, or of having the bids returned to them unopened.

2. Smoke and Tobacco Free Policies: On August 19, 2015, Wayne State joined hundreds of colleges and universities across the country that have adopted smoke- and tobacco-free policies for indoor and outdoor spaces. Contractors are responsible to ensure that all employees and all subcontractors' employees are in compliance anytime they are on WSU's main, medical, or extension center campuses. The complete policy can be found at http://wayne.edu/smoke-free/policy/
3. Sworn Statement Requirements: The University tracks it's level of spend along a number of socio-economic categories. This includes it's spend with Diverse organizations, it's spend with Detroit based organizations, and it's spend with Michigan based organizations. To assist with this, The University has reporting requirements to be included with the submission of your bid and for Pay Applications submitted by the successful contractor.
4. A bid bond is not required for bids below $50,000. Otherwise, a bid bond (5%) will be required for the full amount of the bid.
5. Performance Bond and Material & Labor Payment Bond requirements are listed in the specifications of the job. Performance & Material & Labor Payment Bonds must be provided by the awarded Contractor with the submission of the signed contract; which will then be submitted to FP&M management for counter signature.
6. The awarded Contractor must provide the required Certificate of Insurance in compliance with Section 700 – General Conditions, article 4.05 – Contractor's Insurance, and Section 800 – Supplementary Conditions, "Add the following to 4.05.1" of the bid specifications prior to commencement of any work.
7. Please review the insurance section carefully, there are some changes in the documents, such as the addition of professional liability insurance and changes in the amounts of required insurance for most of the categories
8. If your company has not previously done business with the University you may go to the Purchasing website at **www.purchasing.wayne.edu** and look for the "new vendor" link under "Information for Vendors" on the left. You may submit a new vendor request form and an IRS form W-9. This will register your company on our vendor list. (NOTE: this does not replace the listserv.)

9. This Project Requires the Contractor and any subcontractors to compensate all employees who come to the job site at no less than Prevailing Wage Rates. A Prevailing Wage Rate Schedule is included as Appendix A to the Bid Specifications. Contractors must review these requirements to be sure they are in compliance with the requirements of the University. Contractors must post wages at the job site in compliance with the complete Prevailing Wage Rate listing provided in Bid Documents.
10. 1099 workers and subcontractors using 1099 workers are NOT acceptable
11. Certified Payroll must be provided with each of the contractor's pay applications for all workers who worked at the job site, in compliance with the University policy. Failure to provide certified payroll will constitute breach of contract and pay applications will be returned unpaid, and remain so until satisfactory supporting documents are provided.
12. Signed waivers from all Subcontractors and suppliers must accompany Pay Applications or they will be returned for such documentation prior to approval.
13. A properly executed sworn statement is required from all tiers of contractors, and sub-contractors indicating sub-contractors and suppliers which provide services or product of $10,000.00 or greater. Sworn statements must accompany applications for payment
14. All documents listed in the Front End Section 0410-2 "Wayne State Prevailing Wage Requirements" must accompany applications for payment. Failure to do so will result in the entire application package returned for correction.
15. A checklist of all Pay Application requirements can be found in Section 00430-1.
16. Note: there is a new section 440 Contractors Performance Evaluation. This is a new part of the contract and will be performed at the end of every job.
17. The competency and responsibility of Bidders will be considered in making the award. The Owner does not obligate himself to accept the lowest or any other bids. The Owner reserves the right to reject any and all bids and to waive any informalities in the Proposals
18. Parking on WSU campus lots and structures are $8.50/access. Contractor must build parking into their lump sum bid. There is no parking allowed on the malls.
19. Section 300, Form of Proposal has changed very recently, review carefully and complete in its entirety to avoid disqualification.
20. The contractors **must** fill out our prequalification form. They can attach additional information if they would like but at a minimum the information requested must be filled in on our form so that we do not have to hunt to find the information.
21. Contractors who have withdrawn a bid after a University bid opening and/or refused to enter into a contract with the University upon notification of award within the last 3 years are not eligible to bid on this project.
22. Project hours of operation are 7:00am – 5:00 pm. Anything else requires advance notice and approval.
23. Prequalification meeting will be held the first business day after bid openings. Contractors must be available. The Project Manager will coordinate the meetings.
24. Prequalification meeting includes Schedule of Values from the Contractor, including a list of Contractor's subcontractors and other qualifications required by the documents.
25. An unsigned contract will be given to the successful Contractor at the conclusion of the Prequalification meeting, if all aspects of the bid are in order. The Contractor has 5 business days to return the contract to the Project Manager for University counter signature. The contractor must also submit a Performance Bond as outlined above and a Certificate of Insurance in the same 5 business day period. In the event the Contractor fails to return the documents in this 5 day period, the University reserves the right to award the contract to the next most responsive bidder.
26. An Optional second walk thru was not scheduled. .
27. Permit requirements are the responsibility of the awarded contractor as listed in General Conditions, Section 700 Article 4.02.18.
28. Contractor must provide their own dumpster if needed, which must be rubber or plywood padded if placed on concrete. Location and duration must be coordinated with the project manager. Dumpster must be tagged with the name of your company clearly displayed. Any lawn damage must be restored.
29. Questions are due by **October 2, 2019** at 12:00 noon
30. Bids are due **by electronic submission on** no later than 2:00 p.m., **October 7, 2019 .** The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**.
    No public bid opening will be held.
31. **Time of Completion:** The Contract is expected to be fully executed on or about 15 calendar days after successful bidder qualification and recommendation of award. The successful bidder (Contractor) agrees to start construction **immediately after** receipt of a fully executed contract and Purchase Order, and to complete the work as follows: Substantial Completion, and State Approved Inspections (if appropriate), no later than **May 6, 2020.**
32. A copy of the sign in sheet is available for downloading from the University Purchasing Web Site at **http://go.wayne.edu/bids**.
33. This is an occupied area, awarded Contractor must be considerate of environment (noise, cleanliness, etc)
34. **IMPORTANT- This is an addendum which MUST be acknowledged on your bid form**

We will require your lump sum proposals, vendor qualification questionnaire and your bid bond documents as a single PDF in your electronic submission.

All questions concerning this project must be emailed to: **Robert Kuhn**, Procurement & Strategic Sourcing. Email: **ac6243@wayne.edu**, and copy **Valerie Kreher**, **Sr. Buyer**, at **ab4889@wayne.edu**.

Bids are due **by electronic submission on** no later than 2:00 p.m., **October 7, 2019 .** The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**.

Do not contact either FP&M or the Design Firm directly as this may result in disqualification of your proposal.

Thank you for interest shown in working with Wayne State University.

Robert Kuhn
Sr. Buyer

CC: **Alycsa Valentine** (Project Manager), **Valerie Kreher**, **Sr. Buyer**, Attendee list.

Sign in Sheet for Pre Bid Meeting

RFP: Intramural Field, PROJECT 080-326346

Date:

	VENDOR/Contact	Company	E-Mail Address
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			

WAYNE STATE UNIVERSITY

Division of Finance and Business Operations

Procurement & Strategic Sourcing
5700 Cass Avenue, suite 4200
Detroit, Michigan 48202
(313) 577-3734
FAX (313) 577-3747

Xxx,xxx, 2013

Addendum #2 To
Request for Proposal
For Intramural Field: Project 080-326346

Dated September 23, 2019

Points of Clarifications during the Pre-proposal Meeting September 30, 2019:

The Addendum must be acknowledged on your lump sum bid.

IMPORTANT – PLEASE NOTE: Effective December 1, 2007, bid notices will be sent only to those Vendors registered to receive them via our Bid Opportunities Listserve service. To register, to **http://go.wayne.edu/bids**, and click on the "Join our Listserve" link at the top of the page. Instructions are at the top of the page, and the Construction Listserv service is under "Construction Bid Opportunities".

NOTE: You must have attended a pre-bid conference in order to be eligible to bid on a particular project. Receipt of minutes or addenda without being at a pre-bid conference does not qualify your company to bid.

There have been alternates added to the package. You will find a new Form of Proposal below.

A copy of this Addendum will be posted to the Purchasing web site at
http://go.wayne.edu/bids.

All questions concerning this project must be emailed to: **Robert Kuhn**, Procurement & Strategic Sourcing. Email: **ac6243@wayne.edu**, and copy **Valerie Kreher**, **Sr. Buyer**, at **ab4889@wayne.edu**.

Bids are due **by electronic submission on** no later than 2:00 p.m., **October 7, 2019 .** The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**.

Thank you,

Robert Kuhn,
Sr. Buyer

WAYNE STATE UNIVERSITY

Division of Finance and Business Operations

Procurement & Strategic Sourcing
5700 Cass Avenue, suite 4200
Detroit, Michigan 48202
(313) 577-3734
FAX (313) 577-3747

Xxx,xxx, 2013

Addendum #3 To
Request for Proposal
For Intramural Field: Project 080-326346

Dated September 23, 2019

Points of Clarifications during the Pre-proposal Meeting September 30, 2019:

The Addendum must be acknowledged on your lump sum bid.

IMPORTANT – PLEASE NOTE: Effective December 1, 2007, bid notices will be sent only to those Vendors registered to receive them via our Bid Opportunities Listserve service. To register, to **http://go.wayne.edu/bids**, and click on the "Join our Listserve" link at the top of the page. Instructions are at the top of the page, and the Construction Listserv service is under "Construction Bid Opportunities".

NOTE: You must have attended a pre-bid conference in order to be eligible to bid on a particular project. Receipt of minutes or addenda without being at a pre-bid conference does not qualify your company to bid.

A copy of this Addendum will be posted to the Purchasing web site at **http://go.wayne.edu/bids**.

All questions concerning this project must be emailed to: **Robert Kuhn**, Procurement & Strategic Sourcing. Email: **ac6243@wayne.edu**, and copy **Valerie Kreher**, **Sr. Buyer**, at **ab4889@wayne.edu**.

Bids are due **by electronic submission on** no later than 2:00 p.m., **October 7, 2019 .** The link for bid submission will be posted with the bid details at **http://go.wayne.edu/bids** beginning **September 23, 2019**.

Thank you,

Robert Kuhn,
Sr. Buyer

I. Welcome and Introduction
   A. Robert Kuhn, Sr. Buyer
   B. Alycsa Valentine , Project Manager
   C. Mark Woodhurst from SMITHGROUP
   D. Other University Attendees
   E. Sign-in Sheet will be posted to the website.
   F. A copy of this presentation will be posted to the website

II. About Wayne State University:
   A. Was founded in 1868
   B. Is committed to preparing its students to excel in a fast-paced and interconnected global society
   C. Has more than 27,000 students
   D. Nearly 350 degree and certificate programs in 13 schools and colleges.
   E. Holds the Carnegie Foundation's highest research and community engagement classifications.
   F. http://mac.wayne.edu/pdf/fastfacts.pdf

III. ListServe Services:
   A. Bid notices are sent only to those Contractors registered to receive them via our Bid Opportunities Listserve service. To register, go to http://go.wayne.edu/bids, and click on the "Join our Listserve" link at the top of the page.

IV. Competency of Bidders
   A. Please Note: The competency and responsibility of Bidders will be considered in making the award. The Owner does not obligate himself to accept the lowest or any other bids. The Owner reserves the right to reject any and all bids and to waive any informalities in the Proposals

V. RFP Opportunity
   A. The University is soliciting proposals for Intramural Field
   B. We are seeking superior quality & competitive pricing
   C. Specifications are in Specifications Book and Drawings on the Website

VI. Calendar of Events
   A. Mandatory Pre-bid meeting - September 30, 2019 at 11:00 – 12:30 .
   B. OPTIONAL Second Walk-Through: TBD (if needed)
   C. Questions due to Procurement & Strategic Sourcing - October 2, 2019 - 12 Noon
   D. Delivery of Proposals - October 7, 2019 by 2:00 pm
   E. Time of Completion - May 6, 2020
   F. Liquidated Damages - $250.00 per day for each day's delay in substantially completing said project.

VII. Bid Due Date
   A. Bids are due by electronic submission on October 7, 2019 at 2:00 pm
   B. The link for bid submission have been posted with the bid details at http://go.wayne.edu/bids beginning September 23, 2019
   C. We require your lump sum proposals, vendor qualification questionnaire and your bid bond documents as a single PDF in your electronic submission
   D. Prices and other requested data must be on Section 300, Form of Proposal
   E. Proposals must acknowledge all Addenda including Pre-Bid Meeting Minutes

VIII. Bid Qualification Meeting – pre award
   A. Bidders should be available for bid qualification meeting the day following the bid opening
   B. Bid qualification meeting includes Project Schedule and Schedule of Values, including a list of Contractor's subcontractors
   C. An unsigned contract will be given to the successful Contractor
   D. The Contractor has 5 business days to return the contract, with
      i. Performance Bond
      ii. Certificate of Insurance
   E. Failure to return within 5 days may disqualify vendor (with consequences)

IX. Section 100: Information for Vendors
   A. Proposals shall be for a lump-sum General Contract
   B. All base bids must be conforming to the detailed specifications and drawings

C. Bid Bond (or Certified Check) in amount of 5% of base bid due with bid

D. Performance Bond and Material & Labor Payment Bond in the amount of 100% of the final amount due with signed construction contract

E. For Base Bids below $50,000, bid bond not required

F. For Contracts below $50,000, performance and material & labor payment bond not required

X. Section 300: Form of Proposal

A. Include company name at top

B. Complete pricing information including any alternates or unit pricing requested

C. Contractor is responsible for damage to lawns or other landscaping

D. Contractor is responsible for their own dumpster for any construction debris

E. Complete Prequalification Matrix and Questionnaire

F. Complete signatory information and have signed by an Authorized Signatory for contractor

XI. Section 410: Prevailing Wage Rates

A. Wayne State University requires all project contractors, including subcontractors, to compensate at a rate no less than prevailing wage rates

B. Prevailing Wage Schedules are posted on the website and must be posted at the job site.

C. 1099 Workers are NOT acceptable

D. Certified Payroll must be provided with each of the contractor's pay applications

E. Sworn Statement must be provided for all materials and labor contracted in excess of $10,000.00

F. Signed waivers from all Subcontractors and suppliers must accompany Pay Applications

G. Note: Contractor invoices WILL NOT be processed until all listed certified payroll documents are received

H. https://procurement.wayne.edu/vendors/wage-rates.php

XII. Sections 420, 430, and 440

A. Section 420: Key Performance Indicator Tracking Forms

B. Section 430: Pay Application Requirements

C. Section 440: Contractor Evaluation Criteria

XIII. Section 500: Sample Contract

A. Contractors must review the contract in its entirety

B. Questions or Concerns must be submitted in advance to Buyer by question deadline

XIV. Section 700: General Conditions

A. Revised by the University 7-2018

B. Includes the following:

i. Responsibilities of the Parties

ii. Responsibility to Secure and Pay for Permits

iii. Interpretation of and Adherence to Contract Requirements

iv. Claims and Disputes.

XV. Section 700: General Conditions (*continued*)

A. Permit requirements are the responsibility of the awarded contractor and are not reimbursable (4.02.18)

B. City of Detroit: Elevators, and Sidewalks

C. State of Michigan: Fire Inspection, Electrical, Mechanical, and Plumbing

D. State Permits not required for non-classroom or residential housing buildings

XVI. Section 800: Supplementary General Conditions

A. Certificates of Liability Insurance must be provided matching amounts listed on page 800-6

B. Contractor is responsible to ensure all subcontractors also obtain insurance at these amounts

C. Also see Section 700, article 4.05.1

D. Sample ACORD form can be found at https://procurement.wayne.edu/forms/rfp_insurance_requirements.pdf

XVII. Section 1000: General Requirements

A. All work must comply with both University Construction Design Standards and the Standards for Communications Infrastructure

B. This may be an occupied area, awarded Contractor must be considerate of environment (noise, cleanliness, etc.)

C. Interaction with students and/or staff not connected to the project is prohibited

D. Project hours of operation are 7:00am – 5:00 pm.

E. Parking on WSU campus lots and structures are $8.50/access. There is no complimentary parking for Contractor's employee vehicles

F. Wayne State has a smoke- and tobacco-free policy for indoor and outdoor spaces

XVIII. Intramural Field

A. Located at Trumbull and Edsel Ford Freeway, Detroit Michigan 48202, Detroit, MI 48202

B. Regrade the existing field, rework the existing utilities, and install a new synthetic turf field. Remove existing trees and landscaping to expand the boundaries of the fence. Install new fence and landscaping.

XIX. Reminders

A. The UNIVERSITY reserves the right to accept, reject, modify, and/or negotiate any and all proposals

B. All information related to this RFP will be posted to the Project site at http://go.wayne.edu/bids

C. If a List Serve has been established, those wishing notifications must register as listed in the RFP

D. All questions concerning this Request for Proposal are to be directed to Robert Kuhn, Sr. Buyer, Email; ac6243@*wayne.edu*

E. A copy should be submitted to Valerie Kreher, Sr. Buyer, Email; ab4889@wayne.edu

F. Do not contact Facilities Planning & Management or other University Units directly, as this may result in disqualification of your proposal

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. In the event of conflict between this specification section **ONLY** and the WSU Division 0 specifications, the WSU Division 0 specifications shall prevail.

B. The following General Requirements are in addition and supplementary to the terms and conditions stated in the "The Contract Agreement." It is the intent of these General Requirements to work together with the specified requirements of the Contract Agreement to define the terms and conditions agreed to between Wayne State University and the Contractor for the performance of the Work. In the event there are any conflicts or specific contradictions between the Sections, the terms set forth in the Contract Agreement shall take precedence. Unless specifically mentioned otherwise, all costs to meet the conditions and requirements of these General Requirements shall not be paid for separately but shall be incorporated into the Contractor's pay item pricing.

C. Work covered by Contract Documents is as stipulated within this project manual and as accompanied by drawings.

D. Interpretation of drawings and order of precedence

E. Specifications shall have precedence over all drawings

F. Larger scale drawings shall have precedence over smaller scale drawings

G. Schedules and Tables shall have precedence over detail drawings and sections

H. Detail drawings and sections, shall have precedence over smaller scale drawing

I. Definitions. The following terms are used throughout the Contract Documents. The work will be governed in accord with the definitions.

1. Owner: Shall mean Wayne State University
2. Owner's Representative: Wayne State University, Design and Construction Services Project Manager.”
3. Professional Service Consultant: Shall mean SmithGroup. Note that any reference to Inspection or Inspector in Division 01 through Division 35 shall not be defined as SmithGroup, but shall mean the testing agent, inspector, permit reviewer, compliance officer or other as defined within each section. Coordinate with Owner's Representative.
4. Fabricated: Fabricated pertains to items specifically assembled or made of selected materials or components to meet individual design requirements.
5. Manufactured: Manufactured means standard units, usually mass-produced by an established manufacturer of the respective item.
6. Provide: Provide means furnish and install.
7. Shop fabricated or shop made: Shop fabricated or shop made refers to items made by a Contractor or Subcontractor in their own Shop.

1.2 SUBMITTAL OF SHOP DRAWINGS

A. The Contractor shall submit the requisite shop drawings and catalog documents for any material or equipment proposed to be utilized in the performance of the Work to the Owner's Construction Engineering Inspection Consultant, which shall distribute the Submittals to the Landscape Architect/Civil Engineer with a copy to the Owner. The Contractor shall transmit said submittals to the Landscape Architect/Civil Engineer in a form and manner that would allow the Landscape Architect/Civil Engineer to review the submittals in an efficient and timely manner. The Design Engineer will review each submittal for compliance with the Contract Documents. If a submittal is found to be non-compliant, then the submittal will be returned to the Contractor to be corrected. Finally, after the Landscape Architect/Civil Engineer have reviewed and approved the submittals, the Contractor shall distribute the final submittal copies to the Owner as part of the close out documents.

1.3 AS-BUILT RECORDS

A. A set of Construction Documents shall be marked as As-Built Drawings and be maintained at the Project site by the Contractor for the purposes of making all changes, revisions, relocations, reroutes, or variances in the Work that differ from the Construction Documents. The As-Built Drawings shall be made accessible to all of the Contractor's subcontractors for recording any changes, field sketches, revisions, relocations, reroutes, or variances in the Work. The completed set of As-Built Drawings shall be transmitted to the Owner upon completion of the Work provided in a timely manner and in AutoCADD 2010 version or later, to the County. Field sketches and installation records, other than shop, fabrication, or field installation drawings, shall not be submitted separately but shall be recorded on the As-Built Drawing set only.

1.4 PROJECT MEETINGS

A. The Contractor shall arrange and conduct scheduled progress meetings determined by the Owner’s Representative and prepare and distribute meeting minutes. Special meetings for the purposes of coordinating and monitoring the work progress, identifying problems, informing subcontractor and Project participants of project status, stressing safety, coordinating construction details and inspecting quality conformance shall be conducted as required to assure the smooth and uninterrupted progression of the Work.

1.5 FIELD OFFICE BUILDINGS, SHEDS, AND TEMPORARY STORAGE AREAS

A. The Contractor shall provide all temporary field offices and storage area enclosures to conduct the Work and properly administrate the Work. The Contractor may locate field offices and storage areas on site at Contractor’s discretion, and subject to Owner Representative’s location approval, but Contractor will have full responsibility to maintain access to the Work and the work of the Owner. Any relocation of the Contractor’s temporary facilities required to provide access for installation of utilities or the Owner shall be done to maintain the schedule at no cost to the County. The appearance of field offices is subject to the reasonable approval of the County.

1.6 TEMPORARY PROJECT SIGN

A. The Contractor, may at its own expense design, fabricate and construct one (1) Project Identification Sign for the purpose of advertising the Project. Contractor to coordinate with Landscape Architect/Civil Engineer for rendered graphics of proposed site. The sign shall be constructed of exterior grade wood, with weather resistant graphics and hardware and shall be a maximum of 16 square feet. The design and content of the sign shall be subject to the approval of the County.

1.7 CONSTRUCTION SEQUENCING AND NOTIFICATION PLAN

A. The Contractor must submit to the Owner's Representative, Landscape Architect and Owner a detailed plan, which shall delineate the sequence of the various construction activities that will occur on the Project Site, all road closure requirements (including closure time duration on a per block basis) and proposed measures to maintain reasonable and safe access for the stakeholders and business owners which may be affected by construction activities. The Construction Sequence and Lane closure plan shall be provided to the Owner's representative at the time of the Contractor's first proposed Schedule submittal to the County, due within 7 days of the County providing the Contractor with a Notice to Proceed. The County at its sole discretion will determine the reasonableness of the Contractor's plan to provide and maintain pedestrian and vehicular access. The Plan has to be approved by the Owner's Representative, Landscape Architect and Owner before the Contractor will be allowed to commence work on the Project Site. Owner's Representative to provide dates and limitations to site for Fairground events during the time of construction.

B. The Contractor shall designate only one (1) individual who will be assigned to the work throughout its entirety to be responsible for all communications with the stakeholders in the project area. The Contractor shall notify the stakeholders in writing at least thirty (30) days prior to the anticipated start of construction activities and again not less than seven (7) days prior to the actual start of construction activities. The Contractor may be required to fabricate and post signage in various locations on the project site advising the stakeholders in the project area of the forthcoming construction activity.

1.8 CONSTRUCTION PARKING

A. The Contractor shall be responsible for its employees' and subcontractors' vehicles while parked on or off the construction site. Any vehicle found to be owned by the Contractor's employee or an employee of the Contractor's subcontractor parked illegally may be towed away by the County and charged to the Contractor by Change Order. The County reserves the right to deny parking privileges on the Project site to any individual who parks a vehicle improperly or operates any vehicle in an unsafe manner.

1.9 WATER SERVICE

A. If required for construction purposes, the Contractor will arrange for, or otherwise furnish, and pay for water required for the Work. The Contractor shall be responsible to provide and maintain connections, backwater valves, valves, and pipe that may be required to supply water at a point convenient to the work area. The locations of the connections shall be acceptable to Water Department.

1.10 TEMPORARY POWER, LIGHTING AND PHONE SERVICE

The Contractor will furnish and pay for electrical power and telephone service necessary for the Work including labor, equipment and materials required to make connections to power sources and to provide and pay for any required temporary electrical power and light at location of work. Temporary equipment and wiring for power, lighting and distribution requirements shall be in accordance with applicable provisions of governing laws, codes and ordinances. The Contractor shall maintain temporary wiring and related equipment so as not to constitute a hazard to persons or property. County may possibly provide electric to site. Temporary electrical power may be needed for portion of work.

1.11 TOILET FACILITIES

A. The Contractor shall arrange for, provide (per OSHA guidelines) and maintain temporary on-site sanitary toilet facilities for use by the Contractor and County for the duration of the Work.

1.12 WEATHER PROTECTION

A. The Contractor shall provide weather protection, including pumping water and temporary heat and ventilation as required during construction to protect the Work from damage due from freezing, frost, rain, dampness, excessive heat or other adverse elements and as required to maintain the continuous progression of the Work without stoppage due to the weather. This shall include hot and cold weather concrete placement protections recommended by the American Concrete Institute.

1.13 EXISTING SITE CONDITIONS

A. The information in this Bid Package is intended to orient the Contractor to the site. The Contractor will be responsible to thoroughly evaluate the site conditions for construction requirements. It is the responsibility of the Contractor in conjunction with the utility companies to verify the exact types and locations of existing utilities. All damage to existing utilities, caused by the Contractor, shall be repaired at Contractor's expense, in accordance with the standards of the applicable City department or private utility company.

1.14 UTILITY SHUT-OFF REQUIREMENTS

A. The Contactor shall coordinate all utility shut-offs with the Utility Companies and departments to permit the proper and safe performance of the Work as scheduled. The Contractor shall have the full responsibility for contacting MISSDIG at least 72-hours prior to any subsurface excavation.

1.15 FIRE HYDRANT RELOCATION

A. Contractor to coordinate with University Project Management, Fire Marshal and any other required University or City Department to relocate any fire hydrant. The Fire hydrant to be relocated shall move directly east, using the same water line. Relocation of the hydrant requires all University standard equipment that meets all necessary life safety codes. Adjacent structures and Athletic Facilities along pedestrian corridor do not have sprinklers. Fire hydrant relocation shall be coordinated to have the water service shut off for a minimum period of time. Max 1 day. Contractor to coordinate.

1.16 OVERHEAD ELECTRICAL WIRES

A. Contractor shall coordinate with WSU electrical group (and DTE if needed) to determine the best route to relocate the existing overhead wires connecting the current football locker room facility to the maintenance building located in the northwest corner of the site. The current overhead line is routed through 2 existing trees. One of these trees are scheduled to be removed during construction. A schematic layout to route the overhead wires has been added to the enlargement plan. Contractor to abide by current electrical codes and coordinate with Wayne State University on the disconnection, grounding, OHW clearance height, pole material and footing, connections to the pole, and connection to buildings. System to be approved by University and DTE if needed.

1.17 PROTECTION

A. The Contractor shall provide site protection, traffic controls and barricades as required to secure the site from trespassers and the general public. The Contractor shall install, in conformance to the requirements of the governing road/street authority, traffic controls for all work performed in the rights-of-way including curb cuts and utility taps.

1.18 REPLACEMENT OF DAMAGED WORK

A. The Contractor shall be responsible to pay all costs for the timely (within schedule parameters) replacement or restoration of any portion of the Facility damaged by fire or other cause during construction to the extent that such damage is a result of the negligence or a faulty installation made by the Contractor or its subcontractors.

1.19 EMERGENCIES

A. In any emergency affecting the safety of persons or property, the Contractor shall act at its discretion to prevent threatened damage, injury or loss, provided that the Contractor shall have determined that there is not sufficient time to advise and consult with the County prior to taking such action.

1.20 FIRE HAZARDS

A. The Contractor shall take all necessary precautions to eliminate possible fire hazards and to prevent damage to construction work, equipment, temporary field offices, storage sheds, and other property. During construction, the Contractor shall provide fire extinguishers and fire hose in accordance with the appropriate OSHA and construction industry rules and regulations.

1.21 FLAMMABLE HAZARDS

A. Gasoline, benzene, other combustible materials, oils, solvents, or chemicals shall not be poured into sewers, manholes, or traps. All casual spills shall be immediately cleaned up and all contaminated soil removed from the site and legally disposed. Tarpaulins and other materials used for temporary enclosures, coverings and protection shall be flameproofed. The Contractor shall comply with County, State and Federal regulations with respect to barrels and tanks containing flammable or hazardous materials, and shall remove any such materials immediately at the request of the County.

1.22 EXPLOSIVE CHARGES

A. Any fastening device, powder activated stud gun or any other device or system of any kind using an explosive charge for activation may not be used in performing work at the Project site unless it is specifically approved by OSHA or the County Health Department. It shall be the responsibility of the Contractor to secure all permits and permissions without extra cost to the County and to assure the safe use of any such devices by trained individuals.

1.23 FIRST AID

A. A completely equipped first-aid kit shall be provided and maintained by the Contractor at the site in a clean orderly condition and shall be readily accessible at all times to all the Contractor's employees. The Contractor shall designate certain employees who are properly instructed to be in charge of first aid. At least one such employee shall be available at the site whenever work is being carried on.

1.24 HOURS OF WORK

A. The Contractor shall conduct the work during normal working hours in cooperation with the existing property owners and occupants. At the beginning of work on this Contract, the Contractor shall notify the County, in writing, the schedule of the days and work hours proposed for a normal workweek. The Contractor shall be responsible for contacting in advance all involved parties whenever the Contractor intends to depart from the normal workweek schedule and resolve to the satisfaction of the County any reasonable objections made. All costs incurred, due to the failure of the Contractor to properly notify involved parties, shall be paid by the Contractor or deducted from the Contractor’s contract amount.

B. The Contractor shall plan and conduct the Work so as not to create a public nuisance or disturb the peace specifically for any residents near or adjacent to the Project site. Should the Contractor be stopped by order of a public authority from working at such times that are contrary to or in violation of any law, ordinance, permit, or license, the Contractor shall not be entitled to an extension of time or additional compensation due to such stoppage.

C. In an emergency, requiring work to be performed outside the normal work week schedule to save or protect life or property, the requirements for the twenty-four (24) hour notification will be waived. The Contractor shall notify the County as soon as the Contractor determines that an emergency condition exists necessitating the change in or extension of the normal hours of work. However, the Contractor's determination of the existence of the emergency is subject to the review and revision by the County.

D. The normal workweek schedule and/or daily hours of work may be altered as directed by the County, when, in its reasonable judgment, such alteration is necessary to maintain the required progress of the Work.

1.25 SANITARY REQUIREMENT

A. Committing unnecessary acts of nuisance on the Project site is prohibited. Any employee who violates such provisions shall be promptly removed from the Project by the Contractor and not be permitted to work on the project site without the written consent of the County.

1.26 CLEANLINESS OF PROJECT SITE AND STREET

A. The Work and all public or private property used in connection with the Work shall be kept in a neat, clean and orderly condition at all times. Stored materials shall be safely stacked and ordered. Waste materials, rubbish and debris shall removed daily and shall not be allowed to accumulate. No burning of rubbish is permitted.

B. The Contractor shall remove unused construction equipment, temporary buildings and excess materials from the site upon the reasonable request of the EDC. The site shall not be permitted to become a storage yard for the Contractor's equipment and materials not directly involve in the Work. Any stored equipment or unnecessary materials stockpiled shall be removed from the Project site upon the request of the County.

C. During the performance of the Work, the Contractor shall daily inspect and maintain the Project site in a clean condition including control of dust, picking up scattered construction debris, and removal of splattered materials from the surfaces of the new construction. Should the Contractor fail to maintain proper cleanliness or order of the site the County, upon 48 hour notice to the Contractor, shall arrange for the cleaning and removal of extraneous materials accumulated at the site and shall have the right to deduct the costs incurred from the Contract value.

D. Trucks hauling loose material from or to the project site shall be tight and their loads trimmed and tarped to prevent spillage on the public streets. This requirement likewise applies to suppliers making deliveries to the Project site. The Contractor will be held responsible to require compliance by the Contractor's suppliers. The County shall have the right to deny site access to any subcontractor or supplier who refuses to comply with this requirement. The Contractor shall promptly (daily as a minimum) clean streets, sidewalks and alleys dirtied by any cause arising from the Contractor's operations. Should the Contractor fail to maintain proper street cleanliness, the County, upon notice to the Contractor will clean any such public right of ways and shall have the right to deduct the costs incurred from the Contract value.

1.27 DEWATERING

A. The Contractor shall dewater and keep dry all trenches and other excavated areas at the site by evenly grading the surface drainage to eliminate standing water. The Contractor shall be responsible to protect structural bearing subgrades and materials from ponding, standing water or erosion. Dewatering operations shall not be permitted to discharge water to any other private properties. The Contractor shall be responsible for securing Water Department permission prior to discharging any water from the site into public sewers.

1.28 SECURITY

A. The Contractor shall secure and protect from theft, loss or damage all materials and equipment used for or relating to the Work until final completion and acceptance by the County.

1.29 WORKING AREA

A. All the Work under this Contract shall be performed on the Project site. The Contractor shall access the Project site via City streets and rights-of-way. The Contractor shall review the legal loading limit for the access streets and rights-of-way and shall be responsible for coordinating deliveries and shipments that do not exceed the legal load limits.

B. The Contractor shall use Flagmen whenever trucks or equipment enter public roadways from the project site.

C. Should additional working or storage space be desired, the Contractor shall make all arrangements with any property owner and submit to the County written evidence that the Contractor has secured permission to use this property for construction purposes. The Contractor shall pay all expense in connection with its use, and in no way involves or obligates the County by such use.

1.30 SPECIAL SYSTEM INSPECTIONS

A. The Contractor, as part of the Work, shall coordinate all specialty manufacturer inspections and testing required to certify that the installation of the Work meets the manufacturer's conditions for warranty.

1.31 TIME OF STARTING AND COMPLETION OF WORK

A. The Contractor shall, carry on the construction operations continuously without stoppage so that all items of work are totally complete including punchlist in accordance with the agreed upon completion date. This shall not relieve the Contractor from the responsibility to coordinate the Work with County, and to sequence the Work including interrupting the Work as required by the County.

1.32 TESTING & INSPECTION

A. The University's separately contracted Construction Engineering & Inspection Consultant shall arrange and pay for all testing and inspection required to verify conformance of the Work with the Contract Documents. All testing and inspection shall be coordinated with the University.

1.33 SOIL EROSION AND SEDIMENT CONTROL

A. The Contractor shall install and maintain, for the duration of the Project, soil erosion protection measures as required by Wayne County. The Contractor shall provide other temporary soil erosion control as required to eliminate sedimentation from entering sewers and open ditches due to the Contractor's operations. The Contractor shall remove completely all soil erosion control measures from the site at the end of the Project.

B. The Contractor will promptly remove soil, debris, or other materials spilled, dumped, or otherwise deposited on public streets, highways, or other public thoroughfares by the Contractor's equipment and operations.

C. The Contractor shall abide by the requirements of the "Authorized Public Agency" under the provisions of Section 11 of Act 347 of the Public Acts of 1972, "Soil Erosion and Sedimentation Control Act" as modified or superseded.

D. Current Soil Erosion and Sediment Control Plans included in set are approved by the Health Department.

1.34 DISCLAIMER OF SITE INFORMATION

A. By its own examinations, observations, investigations and tests the Contractor shall make its own determination of the existing site conditions. Information contained in this Bid Package is provided solely for the informational use of the Contractor. The County does not guarantee the accuracy or sufficiency of any site information.

1.35 UNIT PRICES

A. Unit prices, if established during the Project, shall include all permits, fees, labor, material, tools, supervision, equipment, taxes, insurance and bonding necessary for or incidental to the proper completion of the Work.

1.36 TRUCK TICKETS

A. Any excavated materials removed from the site shall be controlled for assurance of legal dumping by (3) part "Truck Tickets" for each load of material removed from the site. The Contractor shall note on each truck ticket the bid package number, date, location of excavation, trucking firms, quantity of material and time of departure for each outgoing truck. The Contractor shall record the disposal site and time of disposal on the "Truck Ticket" and shall obtain the signature of the recipient of the material in verification thereof and return the completed "Truck Ticket" to the County.

1.37 ENVIRONMENTAL COORDINATION

A. Owner shall make available to the Contractor any environmental reports or information in the Owner's possession as reference information .to assist in the Contractor's required production of the Health and Safety Plan, as expressed in paragraph 1.3 of Section VII of the Bid Documents. Unless otherwise noted in the plans and specifications the Contractor shall assume that all excavated material in the right of way is contaminated and shall be taken to a licensed Class II landfill. If the Contractor encounters potential hazardous materials, the Contractor shall notify the EDC for inspection of the condition before proceeding with any Work in that area. The contractor shall continue with the orderly progression of work in non impacted areas. Subject to the nature of the hazardous material encountered and the Contractors qualifications, the EDC reserves the right to require the Contractor to perform any removal/remediation work for hazardous materials on a time and material basis, or negotiated basis according to the provisions of the Contract Documents.

1.38 PROTECTION OF THE PRIVATE AND EXISTING UTILITIES

A. The Contractor shall protect and maintain for the duration of the work all existing improvements and utilities that are to remain. The Contractor will immediately undertake and pay for the repair of any damaged existing improvements or utilities.

B. All unattended excavations, voids, pits, manholes or holes shall be barricaded immediately by the Contractor. Barriers shall be removed promptly by the Contractor when no longer required,

C. Precautions against fire, accidental explosion, excessive dust and accident shall be strictly enforced by the Contractor in cooperation with the County and the EDC.

D. The Contractor shall not allow salvaged material, debris, and trash to accumulate on the project site but shall require all such material to be hauled away on a regular, daily basis.

1.39 PROTECTION OUTSIDE THE PROJECT AREA

A. All existing areas outside the limits of the Work shall be protected from damage. All damage caused by the Contractor shall be corrected at the expense of the Contractor and to abide by City or County Standards.

B. During progress of work, the Contractor shall keep adjacent roads free of trash, debris, and salvage material resulting from the work.

C. The Contractor is advised that other construction activities may be performed by others within the Project area during this the performance of the Work under this Contract Agreement. The Contractor shall plan proposed trucking and all other vehicular routes accordingly in coordination with and at the reasonable direction of the County.

D. All construction traffic control signage and barricading shall conform to the standard requirements of the governmental body having jurisdiction over the street right of way.

1.40 TEMPORARY CONTROLS

A. Surface Water Control – The Contractor shall complete the work in such a manner so as not to entrap surface water on the site. Low areas caused by removals, shall be graded in such a manner to allow drainage to existing storm water structures. The Contractor shall be responsible for drying out and repairing any grade surfaces damaged due to the Contractors failure to properly grade the work area.

B. The Contractor shall secure and pay for all erosion control permits and conduct earth changes in a manner, which will effectively eliminate accelerated soil erosion and resulting sedimentation. Measures to be taken shall include but not be limited to:

C. Provide temporary soil erosion control to eliminate sedimentation from entering sewers and open ditches.

D. Remove sediment caused by accelerated soil erosion from runoff water before it leaves the site.

E. Maintain temporary soil erosion silt fences, sediment traps and control measures for the term of this contract.

F. Promptly remove soil, debris, or other material spilled, dumped, or otherwise deposited on public streets, highways, or other public thoroughfares during transit.

G. The Contractor shall utilize applicable soil erosion details, shown on Contract drawings, in implementing his work.

H. The Contractor shall utilize water trucks and other dust inhibiting methods to control fugitive dust emanating from the work activity performed under this scope of work. Truck and equipment wheels shall be cleaned before exiting the project area. Travel routes shall be established with the prior approval of the County to reduce dust in adjacent areas. Existing roads shall be used wherever practical based on street loading capacity.

1.41 SUSPECTED HAZARDOUS MATERIALS

A. In the event the Contractor encounters excavated materials that are suspected as hazardous, the Contractor shall notify the County for review, and through County’s Environmental Consultant the possible characterization and management of the suspect material. If it is determined that the suspect material is hazardous by the County’s environmental Consultant, the Consultant will provide a material handling protocol for the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONTRACTOR USE OF PREMISES

A. Confine operations at site to areas permitted by:

1. Law
2. Permits
3. Contract
4. Owner's Representative
5. Required use of adjacent existing buildings
6. Contract documents

B. Confer with Owner's Representative and obtain full knowledge of all site rules and regulations affecting work.

C. Conform to site rules and regulations while engaged in project construction.

D. Site rules and regulations take precedence over others that may exist outside such jurisdiction.

E. Employees On Site: The Owner's Representative may examine Contractor's list of employees, including those of his subcontractors and their agents for all employees working on site.

F. Vehicle use: Rigidly enforce the following:

1. Keep all vehicles, mechanized or motorized equipment locked at all times when parked and unattended on Owner’s premises.
2. Do not, under any circumstance, leave any vehicle unattended with motor or engine running, or with ignition key in place.
3. All traffic control subject to Owner's Representative approval.
4. Contractor employee parking shall be limited to areas indicated by Owner's Representative.
5. Contractor shall not park any vehicles within the dripline of trees.

G. Do not unreasonably encumber site with materials or equipment.

H. Assume full responsibility for protection safety and safekeeping of products stored on premises.

I. Move all stored products or equipment, which interferes with operations of Owner or other subcontractors.

J. Obtain and pay for use of additional storage or work area needed for operations.

K. Limit use of site for work and storage:

1. To areas indicated on the drawings.
2. To areas approved in advance by Owner's Representative.

L. The Contractor acknowledges that the Owner will use the adjacent sites and the Contractor must maintain staff and appropriate safety requirements. Contractor to work with Owner's Representative to coordinate with scheduled events. Owner's Representative to provide schedule.

3.2 DUTIES OF CONTRACTOR

A. Except as specifically noted, provide and pay for:

1. Labor, materials and equipment.
2. Tools, construction equipment and machinery.
3. Water, heat and utilities required for construction.
4. Other facilities and services necessary for proper execution and completion of work.

B. Secure and pay for as necessary for proper execution and completion of work, and as applicable at time of receipt of bids.

1. Licenses.

C. Give required notices.

D. Promptly submit written notice to Professional Services Consultant of known or observed variances of Contract Documents from legal requirements.

1. Appropriate modifications to Contract Documents will adjust necessary changes.

2. Assume responsibility for Work known to be contrary to such requirements.

E. Enforce strict discipline and good order among employees. Do not employ on Work:

1. Unfit persons.
2. Persons not skilled in assigned task.

F. Purchase and maintain insurance in accordance with the Contract Agreement.

G. Contractor shall protect existing site from damage. Contractor shall clean areas of construction debris, equipment, and material prior to Date of Completion for such area.

3.3 PERMITS

A. See Section 003143 PERMIT APPLICATION

3.4 TIME OF COMPLETION

A. Completion of work shall be in accordance with the schedule as indicated in the Bid Form.

3.5 JOB OPERATIONS

A. Project Security:

1. Take necessary precautions such as barrier to protect Owner's personnel, the public, in the area of construction.
2. Securely close off all areas of construction after working hours to prevent entry by unauthorized persons.
3. Provide barriers to prevent visitors from construction area.

3.6 WORK LIMITATIONS:

A. Owner's personnel may occupy all spaces around where work will be done. Any work done during times of occupancy shall be limited in scope to prevent disturbing it.

B. Give Owner's representative three days notice before starting Construction Work in any area.

C. All work, including material storage, shall be limited to the project area.

3.7 PHOTOGRAPHY

A. Starting on the 01st of the month following Notice to Proceed, and on the 01st of each subsequent month up to and the 01st of the month following the Substantial Completion Date eight color photographs are to be taken of the Site. One image from each following direction facing the improvements of the site: N, S, E, W, NE, NW, SE, SW Pictures are to include the date taken on the photograph

B. By the 15th of each month delivery two sets of 8 x10 color prints of all photographs taken that month; one set to the Landscape Architect and one set to the Owner's Representative. Also deliver digital/electronic copies of the photographs to the Landscape Architect and Owner.

C. All rights, privileges, copyrights, ownership, etc to the pictures shall be transferred to the Architect and Owner so they each may use the images / photographs at their discretion now and in the future. A written release stating such is to be provided each month with each set of photographs.

D. Receipt of the photographs on the 15th of each month is prerequisite to the processing of that month's pay request.

3.8 RELATED DOCUMENTS

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

END OF SECTION

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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. "As Otherwise Direct": Used in relation to items to be determined after Contract by agreement between Owner, Architect, and Contractor, with input from other entities as appropriate.

D. "Certified": Guaranteed in writing over the signature of an authorized representative of the certifying organization.

E. "Directed": An instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

F. "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."

G. "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.

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

I. "Install": Operations including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations at Project site.

J. "N.I.C" or "NIC": Not in Contract.

K. "Necessary": That which is reasonably necessary to the proper completion of the Work.

L. "Per": In accordance with the requirements of.

M. "Products": Materials, equipment, or systems.

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

O. "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.

P. "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.

Q. "Replace": To put something new in place of.

R. "Required": Referring to requirements of the Contract Documents, unless its use clearly implies a different interpretation.

S. "Shown" or "Indicated": Appearing on the Drawings, unless their use clearly implies a different interpretation.

T. "Supply": Same as Furnish.

1.3 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.

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.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall 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."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall 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. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
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; (Formerly: ACI International); www.concrete.org
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.

15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - Canadian Standards Association; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.

72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org .
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. IAS - International Approval Services; (See CSA).
101. ICBO - International Conference of Building Officials; (See ICC).
102. ICC - International Code Council; www.iccsafe.org.
103. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
104. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
105. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
106. IEC - International Electrotechnical Commission; www.iec.ch.
107. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
108. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
109. IESNA - Illuminating Engineering Society of North America; (See IES).
110. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
111. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
112. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
113. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO - International Organization for Standardization; www.iso.org.
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int/home.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; www.lightning.org.
124. MBMA - Metal Building Manufacturers Association; www.mbma.com.
125. MCA - Metal Construction Association; www.metalconstruction.org.
126. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.

127. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA - Material Handling Industry of America; www.mhia.org.
129. MIA - Marble Institute of America; www.marble-institute.com.
130. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI - Master Painters Institute; www.paintinfo.com.
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
133. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
134. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA - National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
137. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
138. NBI - New Buildings Institute; www.newbuildings.org.
139. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
140. NCMA - National Concrete Masonry Association; www.ncma.org.
141. NEBB - National Environmental Balancing Bureau; www.nebb.org.
142. NECA - National Electrical Contractors Association; www.necanet.org.
143. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
144. NEMA - National Electrical Manufacturers Association; www.nema.org.
145. NETA - InterNational Electrical Testing Association; www.netaworld.org.
146. NFHS - National Federation of State High School Associations; www.nfhs.org.
147. NFPA - National Fire Protection Association; www.nfpa.org.
148. NFPA - NFPA International; (See NFPA).
149. NFRC - National Fenestration Rating Council; www.nfrc.org.
150. NHLA - National Hardwood Lumber Association; www.nhla.com.
151. NLGA - National Lumber Grades Authority; www.nlga.org.
152. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
153. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
154. NRCA - National Roofing Contractors Association; www.nrca.net.
155. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
156. NSF - NSF International; www.nsf.org.
157. NSPE - National Society of Professional Engineers; www.nspe.org.
158. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
159. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
160. NWFA - National Wood Flooring Association; www.nwfa.org.
161. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
162. PDI - Plumbing & Drainage Institute; www.pdionline.org.
163. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); http://www.plasa.org.
164. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
165. RFCI - Resilient Floor Covering Institute; www.rfci.com.
166. RIS - Redwood Inspection Service; www.redwoodinspection.com.
167. SAE - SAE International; www.sae.org.
168. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
169. SDI - Steel Deck Institute; www.sdi.org.
170. SDI - Steel Door Institute; www.steeldoor.org.
171. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
172. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
173. SIA - Security Industry Association; www.siaonline.org.
174. SJI - Steel Joist Institute; www.steeljoist.org.
175. SMA - Screen Manufacturers Association; www.smainfo.org.
176. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
177. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
178. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
179. SPIB - Southern Pine Inspection Bureau; www.spib.org.
180. SPRI - Single Ply Roofing Industry; www.spri.org.
181. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
182. SSINA - Specialty Steel Industry of North America; www.ssina.com.
183. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
184. STI - Steel Tank Institute; www.steeltank.com.

185. SWI - Steel Window Institute; www.steelwindows.com.
186. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
187. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
188. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
189. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
190. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
191. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
192. TMS - The Masonry Society; www.masonrysociety.org.
193. TPI - Truss Plate Institute; www.tpinst.org.
194. TPI - Turfgrass Producers International; www.turfgrasssod.org.
195. TRI - Tile Roofing Institute; www.tileroofing.org.
196. UL - Underwriters Laboratories Inc.; http://www.ul.com.
197. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
198. USAV - USA Volleyball; www.usavolleyball.org.
199. USGBC - U.S. Green Building Council; www.usgbc.org.
200. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
201. WASTEC - Waste Equipment Technology Association; www.wastec.org.
202. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
203. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
204. WDMA - Window & Door Manufacturers Association; www.wdma.com.
205. WI - Woodwork Institute; www.wicnet.org.
206. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
207. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall 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.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall 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. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.

19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall 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 Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
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.quicksearch.dla.mil.
    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
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).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall 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. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
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; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 USE CHARGES

A. General: Installation and removal of 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 Representative, Landscape Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer, Water, and Electric Power Service: Use charges are specified in Section 011200 "Multiple Contract Summary."

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.

C. Accessible Temporary Egress: Comply with IBC ADA requirements.

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 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 gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating 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.

C. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of at each return-air grille in system and remove at end of construction.

D. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

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.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

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.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

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. Sanitary Facilities: Provide temporary toilets, wash 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.

1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install land-based telephone line(s) for each field office.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

G. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i5 or i7.
2. Memory: gigabyte.
3. Disk Storage: gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
4. Display: 24-inch LCD monitor with 256-Mb dedicated video RAM.
5. Full-size keyboard and mouse.
6. Network Connectivity: .
7. Operating System: Microsoft Windows 7 Professional.
8. Productivity Software:

a. Microsoft Office Professional, 2010 or higher, including Word, Excel, and Outlook.
b. Adobe Reader 11.0 or higher.

c. WinZip 7.0 or higher.

9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum Mbps upload and Mbps download speeds at each computer.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
12. Backup: External hard drive, minimum terrabyte, with automated backup software providing daily backups.
13. Access to large format scanner.

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 Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. 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 312000 "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 321216 "Asphalt Paving."

D. 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.

E. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

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: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

I. 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 017300 "Execution."

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

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

L. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

M. 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 011000 "Summary."

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and] requirements specified in Section 311000 "Site Clearing."

D. 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, requirements of DEQ Construction General Permit or authorities having jurisdiction, whichever is more stringent.

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.

E. 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.

F. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

G. 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.

H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

I. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

J. 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.

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

L. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

M. 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.

N. 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.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

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 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 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 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. 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.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

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.

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.3 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.

B. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground].

C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain with tape.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Contractor to place construction fence at limits of disturbance/dripline of tree to protect mature tree along Trumbull.

3.3 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

SECTION 033000 - CAST-IN-PLACE CONCRETE

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.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Concrete curb and gutter
2. Concrete sidewalks

B. Related Requirements:

1. Section 3120400 "Earth Moving" for drainage fill under slabs-on-grade.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Curing compounds.
7. Joint-filler strips.

C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

D. Field quality-control reports.

E. MDOT Type P-1 concrete design mix for a similar project(s) that has been submitted to and approved by MDOT within the past five years.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency: An independent agency engaged by the Owner qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II gray.

a. Fly Ash: ASTM C 618, Class F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2.5 FIBER REINFORCEMENT

A. Synthetic Micro-Fiber: Monofilament polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

2.6 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete in accordance with ACI 318.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 REMOVING AND REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

B. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

C. Contraction Joints in Slabs in concrete sidewalk and concrete curb and gutter: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in concrete sidewalk and concrete curb and gutter: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating sufficient depth below finished concrete surface to install the backer rod and sealant.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

F. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING SIDEWALKS AND SLABS

A. Medium Broom Finish: Apply a broom finish to exterior concrete sidewalks and slabs elsewhere as indicated.

3.8 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each l 00 cu. yd. or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143Mi one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C I 064/C I 064M; one test hourly when air temperature is 40 deg F and below and when 80 deg r and above, and one test for each composite sample.
6. Compression Test Specimens: ASTM C 31/C 31 M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

9. Strength of each concrete mixture will be satisfactory if every average of any three-consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi,

10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of Concrete batch in Work, design compressive strength al 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION

SECTION 129300 - SITE FURNISHINGS

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.

PART 2 - PRODUCTS

2.1 NET SYSTEM

A. Pole to Pole tension Netting System,

1. 877-789-3245
2. Powder Coated Black Steel Poles with Welded Tabs, Cabling and Hardware
3. Black 336 Nylon Netting 1-3/4” square mesh and rope bound perimeter
4. 6.625x0.28 with 4’-) pole embedment – net starting above chain link fence at 6’-0”. See drawings for lengths.
5. Net system foundations to be structural designed for the State of Michigan loading requirements

B. SportsField Specialties

1. Terra Erickson
2. 312-933-9680
3. terickson@sportsfieldspecialties.com
4. Or Approved Equal
5. Bid to include state of Michigan stamped and sealed Structural Engineering drawings for the net system.

2.2 BOLLARD

1. 7902 Fixed Bollard
2. Reliance Foundary
3. https://www.reliance-foundry.com/bollard/fixed-bollards#gref
4. Or Approved Equal
5. Per manufacture’s install and foundation recommendations

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and positioned at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION

SECTION 311000 - SITE CLEARING

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.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place.
7. Temporary erosion and sedimentation control.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated according to requirements in Section 015639 "Temporary Tree and Plant Protection."

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
3. See site preparation drawings; coordinate with Owner for salvageable items.

B. Utility Locator Service: Notify Miss Dig for area where Project is located before site clearing.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

D. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

B. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #23 (surface-tolerant, anticorrosive metal primer) or SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXISTING UTILITIES

A. Locate, identify, and disconnect utilities indicated to be abandoned in place.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Landscape Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

C. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 24 inches below exposed subgrade.
3. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

SECTION 312000 - 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.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for walks pavements turf and grasses and plants.
3. Excavating and backfilling for structures.
4. Base course for concrete walks.
5. Base course for asphalt paving.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:

1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Section 329200 "Lawns" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
3. Section 329300 "Exterior Plantings" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subgrade, and the concrete walks

C. Field Base Stone (4G MODIFIED): Aggregate layer placed directly below synthetic turf

D. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

E. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

F. Drainage Aggregate: Free draining aggregate used to help infiltrate storm water into the ground water.

G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

H. Fill: Soil materials used to raise existing grades.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.

J. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

K. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage aggregate, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Warning tapes.

1.5 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 1557.
3. Gradation report.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify "Miss Dig" for area where Project is located before beginning earth-moving operations.

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 015000 "Temporary Facilities and Controls" and Section 311000 "Site Clearing" are in place.

D. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

E. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. To be placed under unpaved areas.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Field Base Stone:

1. Base stone shall be a natural, crushed aggregate conforming to 4G Modified Standards.

2. The base stone materials shall provide a percolation rate to meet the turf manufacturer’s requirements.

Sieve Size

1.5” - 100% passing

1" – 95% to 100% passing

½" – 65-90% passing

#8 – 15-40% passing

#30 – 5-25% passing

PAN 3-8

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, meeting MDOT 21AA gradation.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, meeting MDOT Class II gradation except at least 90 percent passing a 1-1/2-inch sieve.

1. To be placed under paved areas.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Aggregate: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel meeting MDOT 6AA gradation.

I. Asphalt and Aggregate Mix: On-site ground asphalt and asphalt base material (aggregate) used for new base material for HMA paving. Asphalt and Aggregate Mix shall be placed by JDOT. All excavation to accommodate the placement of Asphalt and Aggregate Mix provided by earthwork contractor.

J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.

K. Sand: ASTM C 33/C 33M; fine aggregate.

L. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Survivability: As follows:

Property	Test Method	Results
Grab Tensile Strength	ASTM D4632	180 lbs. min.
Grab Elongation	ASTM D4632	50 percent max.
Mullen Burst	ASTM D3786	350 psi min.
Puncture Resistance	ASTM D4833	110 lbs. min.
Trapezoidal Tear	ASTM D4533	75 lbs. min.
Coeff. of Permeability	ASTM D4491	0.25 cm/sec. min

3. Apparent Opening Size:No 60, maximum; ASTM D 4751.
4. Permittivity: [0.5] [0.2] [0.1] per second, minimum; ASTM D 4491.

5. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

A. Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY AND INFILTRATION POD TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate utility trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

C. Utility Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
3. For infiltration pods, hand-excavate trench bottoms and support pipes and drainage aggregate on an undisturbed subgrade.

D. Utility Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

E. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If WSU hired Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

B. Proof-roll subgrade below synthetic turf and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Landscape Architect/Engineer and Testing Agency, and replace with compacted backfill or fill as directed.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

E. Remedial work for unstable subgrade should as a minimum consist of discing, aerating, and recompacting exposed subgrades soils as provided for IDOT Specifications Article 301.03.

1. Unstable soils may require removal and replacement with sub base structural aggregate, stabilization fabric, construction of trench drains or a combination thereof.
2. The application of lime for soil stabilization may be required.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under trenches, pavement, infiltration pods, and utility structures as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation under unpaved areas.
2.
3. Soil Backfill:Place and compact final backfill of granular backfill up to subgrade of paved areas.

4. Retain "Controlled Low-Strength Material" Subparagraph below if controlled low-strength material is permitted or required as final backfill.

F. Detectable Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use engineered fill.
3. Under steps and ramps, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:

1. Under pavements, and walkways, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
3. For utility trenches, compact each layer of initial and final backfill soil material in accordance with 1. and 2. above.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Pavements: Plus or minus 1/2 inch – to meet ADA requirements.

3.16 SUBSURFACE DRAINAGE

A. Specified in Section 334600 "Subdrainage."

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place base course under pavements and walks as follows:

1. Shape base course to required crown elevations and cross-slope grades.
2. Place base course 6 inches or less in compacted thickness in a single layer.
3. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.18 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 4000 sq. ft. (372 sq. m) or less of paved area but in no case fewer than three tests.
2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.19 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.20 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove unsatisfactory soil and waste materials, including trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 312319 - DEWATERING

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.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site:

1. Location to be identified by Owner's Representative.

1.3 FIELD CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering according to the performance requirements.
2. The geotechnical report is included in the appendix in the Project Manual.

PART 2 - EXECUTION

2.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Provide temporary grading to facilitate dewatering and control of surface water.

C. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 311000 "Site Clearing," during dewatering operations.

2.2 INSTALLATION

A. Install dewatering system if necessary utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.

2.3 OPERATION

A. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

B. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

2.4 PROTECTION

A. Protect and maintain dewatering system during dewatering operations.

B. Promptly repair damages to adjacent facilities caused by dewatering.

END OF SECTION

SECTION 321373 – SITE JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Perform all site sealant work as indicated on drawing and as specified herein.
2. Required applications of sealants include, but are not necessarily limited to, the following general locations:

a. Curb and paving

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms with not less than five years of successful experience in production of types of sealants required for this project.

1. Obtain elastomeric sealants from a manufacturer which will, upon request, send a qualified technical representatives to the project site for purpose of advising installer on proper procedures for use of products.

B. Installer: A firm with a minimum of five hears of successful experience in application of type of materials required.

1.3 SUBMITTALS

A. Product Date: Submit manufacturer's specification, recommendations and installation and instructions for each type of sealant and associated miscellaneous material required.

B. Samples: Submit three 12-inch long samples of each color required (except black) for each type of sealant exposed to view. Install sample between two strips of material similar to or representative of typical surfaces where compound will be used, held apart to represent typical joint widths and shape.

1.4 JOB CONDITIONS

A. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended temperature range for installation. Proceed with the work only when the weather conditions are favorable for proper cure and development of high early bond strength. Where joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in lower third of the manufacturer's recommended installation temperature range so that sealant will not be subject to excessive elongations and bond stress at subsequent low temperatures.

1.5 SPECIAL PROJECT WARRANT

A. Sealant Warranty: Provide written warranty, signed by manufacturer and installer agreeing to, within warranty period of six years after date of substantial completion replace/repair defective materials and workmanship defined to include: instances of leakage or water or air; failures in joint adhesion, material cohesion, abrasion resistance, strain resistance, or general durability; failure to perform as required and the general appearance of deterioration in any other manner not clearly specified in manufacturer's published project literature as an inherent characteristic of the sealant material.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Expansion Joints:

1. All expansion joints without exception shall be resin impregnated, premolded fiberboard, conforming to the physical requirements of ASTM D 1752 with a removable poly-plastic top edge that after set in position, and the paving properly cured, the poly-plastic edge can be removed to accommodate joint sealant. Size, width and length as required and shown on drawings.

B. Provide manufacturer's standard, non-modified two or more part, polyurethane-based elastomeric sealant; comply with either ASTM C920 Grade P, Class 50; self-leveling grade/type. Color to match adjacent surface color.

C. Provide product of one of the following manufacturers:

1. Contech/Sonneborn
2. Mameco International
3. W. R. Meadows, Incorporated
4. Pecora Corporation
5. Products Research and Chemical Corporation
6. Sika Chemical Corporation
7. Toch/Carboline
8. Tremco, Incorporated
9. Dow

D. Color: Sika limestone color, or equal.

2.2 MISCELLANEOUS MATERIALS

A. Joint Cleaner: Provide type of joint cleaning compound recommended by sealant manufacturer for joint surfaces to be cleaned.

B. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

D. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer. Provide size and shape or rod which will control joint depth for sealant placement, break bond of sealant at bottom of joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize possibility of sealant extrusion when joint is compressed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The installer must examine joint surfaces, backing, and anchorage of units forming sealant rabbet, and conditions under which sealant work is to be performed, and notify Engineer in writing of conditions detrimental to proper completion of the work and performance by sealants. Do not proceed with sealant work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.2 JOINT SURFACE PREPARATION

A. Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture, and other substances which would interfere with bond of sealant.

B. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicated that alkalinity does not interfere with sealant bond and performance.

C. Etch with 5 percent solution of muriatic acid; neutralize with dilute ammonia solution; rinse thoroughly with water and allow to dry before sealant installation.

D. Roughen joint surfaces in vitreous-coated and similar non-porous materials, where sealant manufacturer's data indicate lower bond strength than for porous surfaces. Rub with fine abrasive to produce a dull sheen.

3.3 INSTALLATION

A. Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown on specified and except where manufacturer's technical representative directs otherwise.

B. Prime or seal joint surfaces where shown or recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

C. Install sealant backer rod for liquid sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.

D. Install bond breaker tape where shown and where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surface equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface an a vertical surface, fill joint to form a slight cove so that joint will not trap moisture and dirt.

F. Install sealants to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section or bead:

1. For sidewalks, pavements, and similar joints sealed with elastomeric sealant and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75 percent of joint width, and neither more than 5/8 inch deep nor less than 3/8 inch deep.
2. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but neither more than ½ inch deep, nor less than ¼ inch deep.

G. Spillage: Do not allow sealants to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces by primer/sealer.

H. Remove excess and spillage of sealants promptly as the work progresses. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes.

3.4 CURE AND PROTECTION

A. Cure sealants in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability. Do not cure in a manner which would significantly alter materials modules of elasticity of other characteristics.

B. Installer shall advise Engineer of procedures required for curing and protection of sealants during construction period so that they will be without deterioration or damage (other than normal wear and weathering) at time of Engineer acceptance.

END OF SECTION

SECTION 321723 - PAVEMENT MARKINGS

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.

1.2 SUMMARY

A. Section includes painted markings and parking stall lines as shown on the drawings, applied to asphalt and concrete pavement.

1.3 REFERENCES

A. Reference Specifications

1. Unless otherwise specified, the materials and application shall comply with the 2003 Michigan Department of Transportation (MDOT) “Standard Specification for Construction” referred to as “MDOT.”
2. Also referenced Manual of Uniform Traffic Control Devices (MUTCD) 2009 Edition, including Revisions 1 & 2 May 2012.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

B. Existing Conditions: Examine work in place on which this work is dependent. Defects which may influence satisfactory completion and performance of this work shall be corrected in accordance with the requirements of the applicable section of work prior to commencement of work. Commencement shall be construed as work in place being acceptable for satisfying the requirements of this section.

C. Protection: Protect the work and adjacent work against damage during progress of the work. Construction equipment which will damage existing or new pavement shall not be used.

PART 2 - PRODUCTS

2.1 PAVEMENT MARKING PAINT

A. Traffic paint shall be from the MDOT Qualified Product List.

B. Glass beads shall comply with MDOT specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.

B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Landscape Architect.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils in lines 4 inches wide.

E. Parking Stall Color: White 4” width

F. Handicap Stall Color: Blue 4:” width with symbol – see drawings and refer to MUTCD

G. Turn Arrows Color: White

H. Lane separation at Entrance/Exits Color: Yellow 4” width

I. Lane separation at Exit Left Turn / Straight and Right Turn Lanes Color: White 4” width

J. Crosswalks Color: White – see details for dimensions

K. Stop bars Color: White

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.4 APPLICATION

A. Lines shall be mechanically painted on bituminous paving with one coat of traffic paint in the locations shown on drawings. Parking stall lines shall be painted only on bituminous surface. Paint on concrete curbs or gutters will not be accepted.

B. Wavy lines or lines with ragged edges will not be accepted.

C. Pavement marker shall be equipped as follows:

1. Provide self-propelled equipment certified by the Department in accordance with Equipment Certification Guidelines for Pavement markings. Certification is effective for 2 years.
2. Sufficient paint storage capacity to enable sustained pavement-marking operations and shall be equipped to assure uniform paint application.
3. Mechanical bead dispensers or pressurized bead dispensers.
4. Be equipped with a pressure regulator airjet capable of removing all debris from pavement in advance of the applicator gun.
   In general, the equipment shall accomplish the marking in a safe efficient and workmanlike manner.
   All vehicles used in the marking operations shall be equipped with rotating or oscillating flashers that are visible from both the front and rear of vehicle.
5. Marking shall be 4-inch minimum width lines. Markings shall be applied so that they adhere adequately to the surface. Glass beads for relectorization shall be applied in accordance with Table 6.29-1 of MDOT.
6. SINGLE LINE – YELLOW OR WHITE
   Single Line shall be applied as one solid 4-inch minimum line width. The paint shall be applied at a rate of 16 gallons per minute.
7. DOUBLE LINE – YELLOW
   Double Line shall be applied as two solid 4-inch minimum line width lanes separated by a discernable space (4”). The paint shall be applied at a rate of 32 gallons per minute.
8. As incidental, protection of wet paint shall be the Contractor’s responsibility.
9. New markings and/or retracted markings shall be placed, with reasonable tolerance, in their proper locations. Incorrect or misplaced markings shall be obliterated by grinding (removal) and remarked in accordance with Landscape Architect’s instructions.
   Applied markings with defects such as, but not limited to, fuzzy edges, non-uniform thickness, improper width, non or non-uniform reto-reflective feature, or an adhesion failure with the pavement surface, shall be considered unacceptable and replaced at Contractor’s expense.

END OF SECTION

SECTION 321813 - SYNTHETIC TURF

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.

1.2 SUMMARY

A. Section includes all materials, labor and equipment for installation of synthetic turf and base as indicated on drawings.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver manufactured materials in original packages with seals unbroken and bearing manufacturer's labels indicating brand name and directions for storing.

B. Store manufactured materials in a clean, dry location, protected from the weather and deterioration, and complying with manufacturer's written instructions for minimum and

C. Maximum temperature requirements for storage.

D. Store units on flat surfaces.

E. Protect UV-light sensitive materials from exposure to sunlight.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply surface system materials or components over wet, frozen, or excessively damp substrates if prohibited by manufacturer's written instructions or warranty requirements.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit playground surface system to be performed according to manufacturer's written dimensions of other construction by field measurements.

1.5 WARRANTY

A. The Contractor shall provide its Manufacturer's Warranty which guarantees the usability and playability of the synthetic turf system for its intended use. The warranty coverage shall not be prorated nor limited to the amount of the usage.

B. The warranty must have the following characteristics:

1. Must provide full coverage for eight (8) years from the date of Substantial Completion
2. Must warranty materials and workmanship.
3. Must warrant that the materials installed meet or exceed the product specifications.
4. Must have a provision to either make a cash refund or repair or replace such portions of the installed materials that are no longer a serviceable as a playable surface.

5. Manufacturer's warranty shall be supported by a third-party insurance policy for the full eight (8) year period. The insurance policy shall be pre-paid, direct with the owner, and non pro-rated. The insurance policy shall cover full labor and material replacement of the entire system including backing, fibers, infill, seams, inlays, adhesives, and nailer boards.
6. Guarantee the availability of replacement material for the synthetic turf system installed for the full warranty period.

1.6 SHOP DRAWINGS

A. Contractor to provide color rendered, computer designed shop drawings show turf colors, line markings and dimensions, roll lengths and seam locations.

PART 2 - PRODUCTS

2.1 SYNTHETIC TURF

A. Contractor shall provide a total of (6) six sperate prices for synthetic turf systems.

1. See Section 00 43 22 UNIT PRICES FORM – Section 1.3. Contract shall enter overall synthetic turf system number on line provided and ender a price per Square Foot cost for each system for evaluation by the University.

B. Contractor shall provide (3) three bids on the following turf systems:

1. Base Bid:

a. 2-1/4” pile
b. Minimum 6 pounds total infill weight (1.5 pounds to 3 pounds sand minimum)
c. Must not exceed 165 GMAX for life of the field, 8 year warranty.
d. FieldTurf: Field Turf XT-57
e. AstroTurf: Rhino 42
f. Shaw: Momentum SD

C. Contractor shall provide (3) three bids on the following turf systems:

1. Alternate Bid:

a. 2” pile height
b. Minimum 5 pounds total infill weight (1.5 pounds to 3 pounds sand minimum)
c. Must not exceed 165 GMAX for life of the field, 8 year warranty.
d. FieldTurf: FieldTurf Vertex-50 2”
e. AstroTurf: Rootzone 3D3 Blend 52 – 2” fiber
f. Shaw: Legion 2” – Duel Fiber

D. Grooming Equipment

1. No grooming equipment to be included as part of the base bid or alternate bid. Wayne State University will use existing grooming equipment.

PART 3 - EXECUTION

3.1 GENERAL

A. The installation shall be performed in full compliance with approved shop drawings.

B. All installation operations shall be performed by personnel directly employed by the manufacturer, full familiar with the materials and their application, under the full-time direction and supervision of a qualified technical supervisor employed by the manufacturer of the synthetic turf. Installation supervisors shall have a minimum of five (5) years experience.

C. The surface to receive the synthetic turf shall be inspected and certified by the manufacturer as ready for the installation of the synthetic turf system. Contact Landscape Architect to schedule on-site meeting.

D. Adhesives for bonding knitted synthetic turf appropriately shall be as recommended by the synthetic turf manufacturer.

E. Cord for sewing seams of the turf shall be as recommended by the synthetic turf manufacturer.

3.2 BASE STONE CONSTRUCTION

A. The base stone slope gradation and direction shall match subgrade slope, unless otherwise noted.

1. The geotextile fabric shall be installed under the stone base.
2. The drain system shall be installed as indicated on the drawings.
3. The base stone shall consist of open graded aggregate. The open graded aggregate material must be free draining consistent with the vertical draining requirements of the turf manufacturer.
4. The finished grade of the base stone shall not vary more than ¼" when compared with a 50' taut string line. Any imperfections, divots, etc in the base stone will be repaired by the contractor and re-evalauted.

3.3 SYNTHETIC TURF INSTALLATION

A. The turf installer shall thoroughly inspect all materials delivered to the site both for quality and quantity to assure that the entire installation shall have sufficient material to maintain proper mixing ratios.

B. Synthetic turf shall be loose-laid across the field, stretched, and attached to the perimeter edge detail. Turf shall be of sufficient length to permit full cross-field installation. No head or cross seams will be allowed except as needed for inlaid fabric striping or to accommodate programmed cut-outs.

C. All seams shall be flat, tight, and permanent with no separation or fraying. Field seams shall be sewn using double-lock stitch with cord recommended by the turf manufacturer. Seaming tape is to be constructed of high tenacity polyurethane coated, woven nylon. Inlaid markings shall be adhered to the seaming tape with a two-part, high strength polyurethane adhesive applied per the turf manufacturer's standard procedures for outdoor applications. All seams shall be transverse to the field direction; i.e., run perpendicularly across the field.

D. Prior to infill installation, Landscape Architect shall conduct a pre-fill inspection for the purpose of verifying striping seaming and other requirements. Infill materials shall be properly applied in numerous lifts using special broadcasting equipment to produce a layered system of the manufacturer's standard infill products composed of a minimum 30% silica sand and maximum of 70% crumb rubber by weight. The turf shall be raked and brushed properly as the mixture is applied. The infill material shall be installed to a depth of 1-3/4 inches. The infill materials can only be applied when the turf fabric is bone dry.

3.4 FIELD MARKINGS

A. Field markings and decorations shall be installed in accordance with approved project shop drawings, and shall be in color as indicated on drawings.

B. All synthetic turf logos as indicated on the drawings shall be manufactured at the factory in (1) piece, with colors as noted on the drawings.

3.5 CLEAN UP

A. Contractor shall provide the labor, supplies and equipment, as necessary, for final cleaning of surfaces and installed items.

B. All usable remnants of new material shall become the property of the Wayne State University.

1. Coordinate with WSU Project Manager, provide a minimum 10’ x 10’ square green attic stock.
2. Dispose of off-site in accordance with waste management and disposal requirements.

C. The Contractor shall keep the area clean throughout the project and clear of debris.

D. Surfaces, recesses, enclosures, etc., shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END OF SECTION

SECTION 329100 - SOIL PREPARATION (TOPSOIL)

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.

1.2 SUMMARY

A. This section specifies all soil materials designated as "Topsoil" on the drawings or in the specifications. Supply topsoil for landscape work seeding, sod, transplant areas, heritage rose area and planting) from both on-site and off-site sources.

1.3 REFERENCES

A. ASTM International, as referenced herein as ASTM.

B. US Department of Agriculture (USDA) Handbook No. 60 – Diagnosis and Improvement of Saline and Alkali Soils.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than 25 mm (one inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 6.0 nor more than 7.0, and should be best suited to the region, climate and plant material specific to the project.

B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil that meet the general requirements as stated above. Amend topsoil not meeting the pH range specified by the addition of pH Adjusters.

C. If sufficient topsoil is not available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. At least 10 days prior to topsoil delivery, notify the Owner’s Representative of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES and Part 1.4.E of this Section. Amend

D. See Planting Specification for planting mixtures.

E. Topsoil Sieve Chart

Sieve Designation	Percent Passing
1 inch screen	100
1/4 inch screen	97 - 100
No. 10 U.S.S. mesh sieve	95 - 100
No. 140 U.S.S.	15 – 35

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Sampling: Each soil test unit shall be a composite of five to seven subsamples taken the full depth of proposed source for each acre of surface area. For on-site stockpiles, discard upper 6 inches of soil before sampling. For large stockpiles, partial excavation will be required for collection of representative samples. Include site plan verifying the locations of all topsoil sampling. Topsoil test reports shall be accompanied with each sample unit for review and approval by the Landscape Architect.

B. Testing methods and written recommendations when not references elsewhere, shall comply with USDA's Handbook No. 60. Nutrient data to be given in parts per million (ppm) dry soil.

C. Topsoil shall be as defined in ASTM D5268.

D. Soil pH shall be tested in accordance with ASTM D4972.

E. Test for organic material by using ASTM D2974.

3.2 FINE GRADING

A. Contractor shall obtain Owner Representative's written approval of previously completed rough grading work prior to commencing organic soil amendment incorporation work.

B. Immediately prior to dumping and spreading the approved organic soil amendment, the subgrade shall be cleaned of all stones greater than one inches (1") and all debris or rubbish. Such material shall be removed from the site. Prior to spreading of the organic soil amendment, subgrades which are too compact to drain water and too compact based upon compaction tests shall be ripped with a claw one foot (1') deep, pulled by a bulldozer two feet (2') on center, both directions. Contractor shall then regrade surface.

C. Organic soil amendment material shall be placed and uniformly spread over approved finish sub-grades to a depth sufficiently greater than the specified depth so that after natural settlement and light rolling, the specified minimum compacted depth will have been provided and the completed work will conform to the lines, grades and elevations indicated with allowance for additional topsoil spreading for turfgrass areas in determining final elevations. Incorporate organic soil amendment by disc harrowing, rototilling or other means in a uniform manner. The depth of incorporation shall be based upon the organic content of the tested and approved organic soil amendment, so as to produce a finished soil with an organic matter content of between four (4) and six percent (6%). Supply additional organic soil amendment material, after in-place testing and approval, as may be needed to give the required organic matter content and finished grades under the Contract without additional cost to the Government.

D. Disturbed areas outside the limit of work shall be spread with four inch (4") minimum depth of organic soil amendment material to the finished grade.

E. No subsoil or organic soil amendment material shall be handled in any way if it is in a wet or frozen condition.

F. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Connect contours and spot elevations with an even slope.

G. After organic soil amendment material has been incorporated into the subsoil, it shall be carefully prepared by scarifying or harrowing and hand raking. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove all stones over one and one half inch (1-1/2") diameter from the amended soil bed. The amended soil shall also be free of smaller stones in excessive quantities as determined by the Resident Engineer.

H. The whole surface shall then be compacted with a roller or other suitable means to achieve a maximum dry density of 88 to 90 percent in accordance with compaction standards of ASTM D1557 Method D. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional organic soil amendment and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.

END OF SECTION

SECTION 3292000 - LAWNS

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.

1.2 SUMMARY

A. Section Includes:

1. Seeding
2. Hydroseeding
3. Sodding
4. Sprigging
5. Mulching
6. Erosion control blanket – slope stabilization
7. Turf renovation
8. Maintenance
9. Warranty

B. Related Requirements:

1. Section 311000 "Site Clearing" for stripping and using on-site topsoil.
2. Section 312000 "Earth Moving" for mass grading of the site.
3. Section 312500 "Soil Erosion and Sedimentation Control" for soil stabilization during construction.
4. Section 329100 “Soil Preparation (Topsoil)” for lawns and plant mixture amendment.
5. Section 329300 "Exterior Plantings" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.
6. Section 334600 "Subdrainage" for below-grade drainage of landscaped areas.

1.3 REFERENCES AND REGULATORY REQUIREMENTS

A. United States Department of Agriculture (USDA), Federal Seed Act - labeling and purity standards and miscellaneous requirements.

B. State Seed Laws – where applicable.

C. Association of Official Seed Analysts (AOSA): “Rules for Testing Seed”.

D. Turfgrass Producers International (TPI): Guidelines for Turfgrass Sod.

1.4 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to grasses, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Pure Live Seed (PLS): (percent germination x percent purity)/100 = Percent PLS

E. Topsoil: Existing, on-site soil that has been modified with soil amendments and fertilizers to produce a soil mixture best for lawn growth. See Section 329110 "Soil Preparation-Topsoil" and drawing designations for topsoil.

F. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before topsoil is placed.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data:

1. Erosion control blanket and anchors.
2. Fertilizers - from manufacturer.
3. Mycorrhizal inoculum.
4. Pesticides and herbicides: Product label, manufacturer's product data sheet, application instructions and application equipment.
5. Seeding and mulching equipment.
6. Straw Mulch tackifier – materials and equipment.
7. Lawn maintenance equipment.
8. Hydroseeding/hydromulching products – equipment and materials.
9. Maintenance edge aggregate gradation analysis.
10. Maintenance edge aggregate separation fabric.

B. Source Quality Control:

1. Samples:

   a. Seed: Quart size sealable plastic bag
   b. Straw Mulch: 1 cubic foot (On-Site).

2. Test Report:

   a. Topsoil: Test reports including soil amendments and fertilization rates for each seed mix. Refer to Section 329100 Soil Preparation (Topsoil).

3. Certifications/Licenses:

   a. Certification of Grass Seed for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity (PLS), germination, weed seed, year of production, and date of packaging. Include identification of source, name and telephone number of supplier.
   b. Certification of sod from proposed sod supplier that identifies quality standard, turf species stating the botanical and common names, proportions of each species in the sod, composition of the root zone soil in which the sod has been grown, and date the sod was planted. Include identification of source, name and telephone number of supplier.

C. Field Quality Control:

1. Project Work Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Landscape Architect indicating dates for delivery, installation, and Substantial Completion for all landscape work. The Schedule shall be comprehensive and address procurement, delivery, and installations of irrigation, lawn areas of the site. For a large site, the schedule shall reflect a phased installation and shall include support graphics required to identify this phased approach. Refer to 1.10 below for a complete list of schedule requirements.
2. Maintenance Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a detailed typewritten approach and schedule for the warranty maintenance of all landscape activities outlined under 3.13 of this section. Coordinate landscape maintenance with other applicable Sections Section 329300 Exterior Plantings and combine all maintenance activities into one plan of action. The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
3. Irrigation Plan: Prior to the issuance of Substantial Completion, submit a detailed typewritten approach and schedule that outlines watering requirements for maintaining the landscape as described herein. The Irrigation Plan shall be submitted in conjunction with the Maintenance Schedule. The plan shall address how the irrigation system will be operated during the warranty period, frequencies and durations that will be established to provide the correct watering rates for plants and lawns, inspection protocols and winterization procedures. If the automatic irrigation system is inoperative or not present, provide an approved temporary irrigation system or hand water from a source approved by the Landscape Architect and Owner's Representative. The system shall have the ability to be operated without moving hoses or sprinklers around the site between seeded/planted areas (i.e. system can be set to water one area for the required maintenance period), and may be automated with a timer. Supply all water and equipment at the Contractor’s expense from a source approved by the Owner's Representative. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within a 2-mile radius of the project site. The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
4. Maintenance Report Forms: Using the approved Maintenance Schedule and Irrigation Plan as the framework for all maintenance activities (plant maintenance, and seed bed maintenance and irrigation operations). The Contractor shall provide detailed maintenance report forms for each site visit. The reports shall be completed by the on-site maintenance superintendent performing the work prior to leaving the site and shall be submitted monthly as back-up to each invoice. Office prepared reports will not be permitted and payment for this work will only be made by the Owner when proof of completed specified maintenance has been provided. Each report shall include the following:

    a. Date of activity.
    b. Length of time on site (start time and finish time).
    c. Name and signature of the maintenance superintendent.
    d. Number of personnel performing the work.
    e. Site climatic conditions (rain, wind, temperature, etc.)
    f. Detailed description of maintenance activities performed by area.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. Include list of at least three similar projects completed in the last 5 years by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
2. Provide resumes of field technician (foreman) responsible for managing the purchase and installation of all materials. Separate resumes shall be provided for the seeding, planting, irrigation and maintenance technicians.
3. License certificates for pesticide applicator.

1.8 QUALITY ASSURANCE

A. Qualifications:

1. The Contractor shall be a company specializing in seeding, sodding, exterior landscape, installations and maintenance, having a minimum 5 years' experience in projects of the scope and scale being specified.
2. Installer's field technician: The installer shall provide a full-time supervisor on site when work is in progress.
3. Maintenance field technician: The maintenance activities for all turf areas shall be performed by skilled employees of the landscape installer. Subcontractors specializing in landscape and turf maintenance will not be permitted unless approved in writing by the Owner's Representative.
4. Pesticide applicator: State licensed, commercial.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding". Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Straw Mulch: Straw mulch shall be stored off the ground under a cover that provides protection from moisture and humidity.

D. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.10 SCHEDULING

A. Work Schedule:

1. Upon authorization to proceed with the work, submit a project work schedule indicating the dates of each of the following items:

a. Submittal schedule.
b. Delivery of materials to the site.
c. Layout of seed bed locations on the site.
d. Installation including; topsoil placement, fine grading, seeding and sodding .
e. Substantial Completion of the work.

2. Update schedule monthly to reflect progress of the work.

B. Seasonal Limitations:

1. Seed mixes shall be installed during planting seasons normally recognized in the job locality.

2. Cool Season Grasses: Install during the spring and fall only when soil temperatures are between 50 and 65 degrees Fahrenheit and air temperatures is 60 to 75 degrees Fahrenheit.

    a. Approximate spring installation: Between April 1 and May 15.
    b. Approximate fall installation: Between August 15 and September 30 but no later than 60 days before the first average annual frost date.

3. Dormant seeding: Due to construction operations and schedules, if contractor cannot install seed/sod between April 1 and May 15, Contractor to seed/sod and provide irrigation to the area with Owner Representative's Approval.

4. If special circumstances warrant installation outside the normal installation season, submit a written request to the Owner's Representative describing conditions and stating the proposed variance. Seeding/Sodding outside the specified seasons may extend warranty obligations and will be dependent upon the extent of the variance.
5. Weather limitations: Proceed with seeding and sodding only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
6. Coordination with Plantings: Plant trees, shrubs, and other plants after finish grades but prior to lawn installation unless otherwise indicated. When planting trees, shrubs, and other plants after lawn installation, protect completed areas, and promptly repair damage caused by planting operations.

1.11 WARRANTY, MAINTENANCE AND ACCEPTANCE

A. Substantial Completion:

1. The Substantial Completion inspection shall occur in Spring 2020. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion or correction.
2. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
3. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs shall occur at no additional cost to the Owner.
4. Substantial Completion will be provided for all lawn areas complying with the following:

    a. Landscape Architect approval of all specified submittals.
    b. The work shall be 100% complete (including all site preparation, earthwork, topsoil, seeding, sodding, mulching, erosion control blanket, planting, irrigation and clean-up), and ready for inspection.

5. After receiving a Notice of Substantial Completion, warrant and maintain all lawn areas in a vigorous, well-kept condition until Final Acceptance.

B. Final Acceptance:

1. Approximately two weeks prior to the expiration of the warranty and maintenance period (or sooner if plantings are included in the inspection), the Owner's Representative will conduct an inspection of all lawn areas, plantings, irrigation system and review all previously submitted maintenance report forms to verify all completed maintenance activities. There shall be thorough documentation previously submitted by the contractor and field observations made by the Owner or Landscape Architect that the specified maintenance has occurred. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
2. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs shall occur at no additional cost to the Owner.
3. Final Acceptance will be based upon Owner approval and the work having:

    a. Uniform finished grades conforming to the drawings and free of erosion.

b. All maintenance items completed and documented by Contractor through maintenance report forms.
c. Satisfactory Seeded Lawn: At end of warranty and maintenance period, a healthy, uniform well-rooted, even-colored, close stand of grass has been established, free of weeds, disease and insect problems, and surface irregularities, with 100% coverage of the specified species.
d. Satisfactory Sodded Lawn: At end of warranty and maintenance period, a healthy, well-rooted, even-colored, viable lawn, free of weeds, disease and insect problems, open joints, bare or dead areas, and surface irregularities.

4. Areas which do not meet the contract requirements shall be regraded as needed and seeded, mulched, sodded. Use specified materials and procedures to reestablish lawn that does not comply with requirements and continue maintenance at no cost to the Owner until lawn is satisfactory.
5. Final Acceptance and the end of the warranty period for the lawns will occur only after all punch list items have been satisfactorily completed and the site is left in the condition specified under Cleanup and Protection.

C. Warranty and Maintenance Period:

1. The end of the warranty and maintenance period shall be:

a. 1 year following University acceptance of the project

1) When the initial warranty and maintenance period has not elapsed before end of growing season (October 31), or if lawns are not fully established, continue maintenance during next growing season until all maintenance and warranty obligations have been met.

2. The Contractor will not be held responsible for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents beyond landscape installer's control which result from floods, hail storms, winds over 100 miles per hour, fires or vandalism, unless Contractor has not completed specified installation in a manner that could have protected the landscaping from these phenomena.
3. If, in the opinion of the Owner’s Representative it is advisable to extend the warranty and maintenance period for an additional growing season, the contractor will be notified of such requirement by the Owner. Improper execution of the installation and/or failure to perform and document the specified maintenance in accordance with contract requirement shall be the basis for extending the period of establishment for a second growing season. All specified maintenance and warranty requirements will be required during this extended period and all costs shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

B. Other varieties that those specified may be submitted for approval to Landscape Architect, but they must be newer, more improved cultivars than what is listed.

C. Dormant seeding shall only be permitted if approved by Landscape Architect in writing. Apply seed at a rate that is 25 percent higher than the rates specified below.

D. Seed Species:

1. The University prefers to use a Sun and Partial Shade Blend. If contractor would like to suggest a different blend for the restoration around the perimeter of the synthetic turf field, please contact the Landscape Architect.

    2. Quality: Seed of grass species as listed below for solar exposure, with not less than 90 percent germination, not less than 98 percent pure seed, and not more than 0.3 percent weed seed:

    3. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three improved turf type varieties.

        a. Install at a rate of 4 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

    4. Sun and Partial Shade Blend: Proportioned by weight as follows:

        a. 60 percent Kentucky bluegrass (Poa pratensis), a minimum of three improved turf type varieties.
        b. 30 percent fine fescue (Festuca), a minimum two varieties; chewing and creeping red.
        c. 10 percent perennial ryegrass (Lolium perenne).
        d. Install at a rate of 4 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

    5. Shade Blend: Proportioned by weight as follows:

        a. 65 percent fine fescues (Festuca), a minimum of three varieties consisting of chewing, creeping red and hard.
        b. 25 percent Kentucky bluegrass (Poa pratensis), a minimum two turf type varieties.
        c. 10 percent perennial ryegrass (Lolium perenne), use shade tolerant variety.
        d. Install at a rate of 6 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

    6. Shade and Sun Fescue Blend: Proportioned by weight as follows:

        a. 100% turf type tall fescue (Festuca) consisting of a minimum 3 improved varieties.
        b. All varieties shall be labeled endophyte free or contain beneficial endophytes.
        c. Install at a rate of 8 pounds Pure Live Seed (PLS) per 1000 square feet of bed.

2.2 TURFGRASS SOD

A. Provide an approved nursery grown, Number 1 Quality/Premium sod, complying with “Specifications for Turfgrass Sod Materials” in TPI’s “Guideline Specifications to Turfgrass Sodding”. Furnish sod comprised of the specified species and of uniform density, color, and texture, strongly rooted, weed free and capable of vigorous growth and development once installed. Sod shall be 2 years old and shall have been grown at a sod nursery in a mineral-based root zone. Sod grown on peat (organic soil) will not be approved. Sod shall be free of objectionable grassy and broad leaf weeds.

B. Thickness and width of sod shall be kept to strict dimensions, with width being 24” and containing 90-degree angle cut edges. Netting associated with harvest must be removed before installation.

C. Turfgrass Sod Species: Sod of grass species as follows, with not more than 0.5 percent weed seed:

    1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three improved turf type varieties.
    2. Sun and Partial Shade: Proportioned by weight as follows:

        a. 60 percent Kentucky bluegrass (Poa pratensis), a minimum of two improved turf type varieties.
        b. 40 percent chewing red fescue (Festuca rubra variety) a minimum of two varieties.

    3. Shade: Proportioned by weight as follows:

        a. 60 percent fine fescues (Festuca), a minimum of two varieties; chewing, creeping red and

hard.
b. 40 percent Kentucky bluegrass (Poa pratensis), a minimum of two turf type varieties.

D. Turfgrass-Sod Species: Proprietary blend as follows: <insert sod product name and supplier>.

E. Sod Stakes: Sod Stakes shall be natural based plastic that is 100% biodegradable from microbial activity in accordance with ASTM D5338 or D6400, formed in a T-shaped with barbed heads and shoulders, minimum six inches long, color green and installed per manufacturer spacing and installation instructions.

2.3 STRAW MULCH

A. Straw Mulch: Provide stalks from oats, wheat, rye, barley or rice that are free of weeds, air-dry, clean, mildew- and seed-free, threshed straw of wheat, rye, oats, or barley.

1. Straw shall be in an air dry condition and suitable for placing with commercial mulch blowing equipment.

B. Tackifier

1. Hydraulically applied tackifier shall be an organic based or polymeric emulsion blend designed for use over long-fibered mulch (straw). Tackifier shall:

a. Be powder or liquid based
b. Achieve a drying time between 12 and 18 hours
c. Minimum 4 month longevity after application

2. Asphalt Emulsion tackifier is not permitted.

2.4 HYDRAULIC MULCH

A. Hydraulic mulch is not permitted.

B. Hydraulic Mulch: Provide biodegradable, cellulose fiber mulch made from 100% post-consumer recycled paper, or a combination of 70% recycled wood fiber and 30% post-consumer recycled paper cellulose fiber. Mulch should be processed to contain no growth or germination-inhibiting factors, nontoxic and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, provide hydroseeding mulch containing not more than 12 percent moisture, plus or minus three percent at the time of manufacture, with a pH range from 3.5 to 5.0 for wood/cellulose fiber blends and from 5.0 to 9.0 for 100% cellulose fiber mulch. Provide hydraulic mulch manufactured so that:

1. After addition and agitation in slurry tanks with the fibers, tackifier and water, the material will become uniformly suspended to form an homogeneous slurry. Mixing the lawn seed, fertilizers and soil amendments is prohibited.
2. When hydraulically sprayed on the ground, the material will form a blotter-like cover.
3. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlying soil.

C. Hydraulic Mulch Tackifier

1. Binding agent shall clear and non-staining and result in a stabilized fiber matrix consisting of wood and/or paper fibers and a stabilizing emulsion that includes a hydro-colloidal tackifier and polycarbonate flocculant specific to hydraulic mulch applications.
2. Use products as recommended by fiber-mulch manufacturer for slurry application.
3. Asphalt Emulsion tackifier is not permitted.

2.5 EROSION CONTROL BLANKET

A. Erosion Control Blanket - [Type 1]: Intended for use on flat surfaces or slopes 4:1 (H:V) or greater where only sheet flow will be encountered.

1. Straw/jute blanket shall be constructed with a 100% agricultural straw matrix (0.5 lbs per square yard), with jute or cotton netting on top and bottom, sewn together with biodegradable cloth thread. The blanket shall be 100% biodegradable, and have a typical functional longevity of 12 months after installation. Plastic netting will not be permitted.

B. Erosion Control Blanket - [Type 2]: Intended for use on slopes 4:1 (H:V) or greater or in drainage swales with velocities up to 8 feet per second (fps).

1. Straw/coconut fiber blanket shall be constructed with 70% agricultural straw (0.35 lbs per square yard), and 30% coconut (coir) fiber matrix (0.15 lbs per square yard), with 100% woven jute netting on the top and bottom, sewn together with biodegradable cloth thread. The Blanket shall be 100% biodegradable, and have a typical functional longevity of 18 months after installation. Plastic netting will not be permitted.

C. Erosion Control Blanket - Type 3: Intended for use on slopes 4:1 (H:V) or greater or in drainage swales with velocities up to 10 feet per second (fps).

1. Coconut fiber blanket shall be constructed with 100% coconut (coir) fiber matrix (0.50 lbs per square yard), with 100 % woven coir fiber netting on top and 100% woven jute netting on the bottom, sewn together with biodegradable cloth thread. The Blanket shall be 100% biodegradable, and have a typical functional longevity of 24 months after installation. Plastic netting will not be permitted.

D. Fasteners: Fasteners shall be natural based plastic that is 100% biodegradable from microbial activity in accordance with ASTM D5338 or D6400, formed in a T-shaped with barbed heads and shoulders, minimum six inches long, color green and installed per manufacturer’s spacing and installation instructions.

2.6 EQUIPMENT

A. Tiller:

1. Equipment used for subsoiling or ripping compacted subsoils on slopes up to 2:1 (H:V): A minimum D-7 size tractor with a mounted ripper consisting of 3 to 5 tines spaced a maximum 24 inches apart. Tines shall be equipped with 12 inch wide winged ripper points and shall be capable of penetrating subsoils up to 24 inches deep in one pass.
2. Equipment used for subsoiling or ripping compacted subsoils on slopes up to 4:1 (H:V): A tractor mounted disk harrow consisting of 6 – 12 offset disks weighing a minimum 1,800 pounds each. The harrow shall be capable of penetrating subsoils up to 18 inches deep in one pass.

B. Fine Grading: Hand rake, tractor mounted york rake or other similar equipment.

C. Hydroseeder: Hydroseeding will not be permitted.

D. Hydroseeder: A truck-mounted, hydraulically driven variable speed agitation seeder that effectively shoots an aqueous mixture of seed, fertilizer, and mulch over broad areas through a discharge boom and hydraulic hose. Minimum tank capacity shall be 1,000 gallons.

E. Drop Spreader with Cultipacker, as manufactured by Brillion or John Deere or equivalent.

F. Broadcast Seeding: A spinning-disc type broadcaster with a calibration gauge (hand held and tractor mounted) shall be used to broadcast the seed over the designated areas.

G. Seed Imprinting Equipment: Used with spinning-disc type broadcaster to lightly cover or press seed into the soil. A tractor or all-terrain vehicle mounted dragging devise consisting of anchor chains, disk chains, cables, chain harrow or other similar equipment.

H. Straw Mulcher: A power mulcher that thrashes and separates, then evenly distributes the straw at a capacity between 2 and 20 tons per hour, with a discharge distance between 35 and 100 feet in still air.

I. Crimping Device: A mulch disc or other mechanical anchoring/crimping device for use in anchoring straw mulch into place, such as a Reinco Model MD-96 or equivalent, having flat discs with notched edges spaced 8” apart to impress mulch 1-3” down into soil.

2.7 WATER

A. Water for lawns shall be available from on-site sources.

B. Water shall be free of wastewater effluent or other hazardous chemicals

2.8 TOPSOIL

A. Refer to Section 329100

2.9 SOIL AMENDMENTS

A. Peat shall be a product having at least 95% organic content consisting of sphagnum peat moss with a pH range of 3.0 – 4.0 and Von Post decomposition value of H1 – H3, or low-lime reed-sedge peat with a pH range of 4.0 to 5.0 and Von Post decomposition value of H4 – H6. Product shall be free of sticks, wood or other debris.

B. Compost shall be a heavily decomposed mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. Manure is not suitable for use. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species). Composting facility shall be tested in accordance with the United States Composting Council, Seal of Testing Assurance (STA) following procedures as outlined in the Test Methods for the Examination of Composting and Compost protocols (TMECC).

1. pH: 5.5 to 8.
2. Moisture content: 35 to 55 percent by weight. No visible free water or dust is produced when handling it.
3. Sieve analysis: 100 percent passing ¾ inch screen.
4. Soluble salt content: Less than 5 percent.
5. Organic matter content: Minimum 60 percent.

C. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.

D. pH Adjusters:

1. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85% calcium and magnesium carbonates conforming to ASTM C602, Class T or O.
2. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90% sulfur, with a minimum of 99% passing through No. 6 sieve and a maximum of 10% passing

through No. 40 sieve.

E. Mycorrhizal Inoculum:

1. Mycorrhizal fungi in the inoculant shall be available as propagules, i.e., spores, root fragments and hyphae. The inoculant shall contain highly selected strains of low host specificity endo- and ectomycorrhizal fungi combined with other beneficial fungi (Trichoderma), humic acids, biostimulants, beneficial bacteria, soluble sea kelp, and yucca plant extracts, as manufactured by Horticultural Alliance or approved equal. The selection of inoculants shall be based upon fungal partners that are compatible with the specified turf grasses.

2.10 FERTILIZER

A. Fertilizer shall be a complete fertilizer of neutral character, consisting of fast and slow-release nitrogen and shall be applied at the rates and formulations that release nutrients when new plants can effectively draw them from the soil.

1. The percentages of slow release and fast release nitrogen shall be adjusted based on the time of year fertilizers are being applied.
2. For fall seeding, the percentage of slow-release nitrogen shall be higher that spring seeding since a high percentage of fast-release nitrogen will be mostly lost by runoff or infiltration before plant uptake.

B. Composition: The percentages by weight shall be determined per recommendations of the soil testing reports for lawns.

2.11 PESTICIDES

A. General: Pesticide and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within seeded areas at the soil level.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General:

1. The Contractor shall establish a quantifiable system to be employed in the field for measuring areas, weighing products and calibrating equipment on a daily basis to ensure all products are installed at the specified rates of application.
2. Prior to beginning work, examine and verify the acceptability of the project site and notify the Owner’s Representative of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved.
3. Identify areas of subsoil compaction prior to placement of topsoil.
4. Verify that no foreign or deleterious material has been deposited in soil within a planting area.

5. Where lawn installation occurs in close proximity to other site improvements, provide adequate protection to all features prior to commencing work. Promptly repair any items damaged during installation operations to their original condition.
6. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
7. Suspend spoil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
8. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
9. If lawn areas die or are rejected due to non-conformity to contract requirements, they must be removed from the site immediately and replaced before Substantial Completion.

B. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.

C. Coordination with Other Work:

1. The Contractor shall coordinate work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
2. Completed work installed out of construction sequence which is subsequently disturbed by the completion of work by other trades shall be repaired by the landscape installer at no cost to the Owner.
3. Maintain grade stakes and layout controls set by others until removal is mutually agreed upon by all parties concerned.

3.2 SUBGRADE PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by lawn installation operations.

B. Install erosion control measures, if necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water run-off or airborne dust to adjacent properties, natural resources and walkways.

C. Vegetation Removal: Strip and dispose of organic debris and root mat.

D. Topsoil stripping, stockpiling: Refer to Section 311000 - Site Clearing.

E. Maintain subgrade in areas to be topsoiled in a uniform condition so as to prevent future depressions. Prior to placing topsoil;

1. Till all subsoils to a minimum depth of 18-inches with approved equipment to remove all compacted subsoils. Tilling shall be complete breaking thoroughly fracturing. Perform tilling in two directions, one perpendicular to the other.
2. Upon completion of tilling, the subsoils will require light compaction and leveling to prevent ponding of water and settlement after topsoil placement. As a final operation, a light-weight tracked dozer shall be employed that will remove surface irregularities and prevent excessive settlement. During this procedure, the surface of the subsoil on slopes greater that 4:1 (H:V) shall be imprinted with tracks from the dozer. Imprinting shall be perpendicular to the slope and shall be approximately one-inch deep.
3. Do not proceed with topsoil placement until subgrade tilling and imprinting is completed to the satisfaction of the Landscape Architect.
4. Repair disturbances to previously graded areas and remove surplus subgrade material associated with any landscape construction.

F. If the prepared subgrade is eroded or compacted by rainfall prior to topsoil placement, rework the surface as specified.

G. In locations where existing topsoil has not been removed, till entire area in accordance with paragraph E above. Do not till within dripline of existing trees.

3.3 PLACING TOPSOIL, SOIL AMENDMENTS AND FERTILIZER

A. Provide, fertilize and amend topsoil in accordance with testing laboratory recommendations specified under Section 329113 "Soil Preparation (Topsoil)".

B. Uniformly distribute topsoil on lawn areas so that after light compaction and finish grading, a uniform depth of 4-inches is achieved. Reduce elevation of planting soil to allow for thickness of sod. Placement shall include spreading, cultivating, lightly compacting, dragging and grading to the conditions specified below.

C. Topsoil, when placed, shall be dry enough so as not to puddle or bond. Do not place topsoil when the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or lawn operation.

D. Following topsoil placement but prior to finish grading, broadcast all soil amendments and fertilizer and rototill into the topsoil. The coverage areas for soil amendments and fertilizer shall be carefully calculated by the installer and fully blended into the entire topsoil profile. Do not incorporate soil amendments and fertilizer more than 5 days in advance of seeding.

E. Mycorrhizal Inoculum:

1. Rototill two granular pounds per 1,000 square feet of seed bed into the top four to six inches of topsoil or as recommended by supplier.

3.4 PRE-INSTALLATION PREPARATION

A. Finish Grading:

1. Immediately before lawn installation scarify, loosen, float, and drag topsoil as necessary to bring it to the proper condition. Remove all foreign matter larger than 1” in diameter. There shall be no visible plants, roots, debris or any foreign material present prior to installation.
2. Finished grades shall slope to drain, be free of depressions or other irregularities, lightly compacted to prevent settlement, and shall be uniform in slope between grading controls and the elevations indicated.
3. Finished grade for seeded lawn areas shall meet existing grades at contract limits and be ½” below top of curbs, walk paving, and metal edging if used.
4. Finished grade for sodded areas shall meet existing grades at contract limits and be 1” below top of curbs, walk paving, and metal edging if used.

B. Before lawn installation obtain Landscape Architect's acceptance of finish grading. Restore seedbed areas if eroded or otherwise disturbed after finish grading.

3.5 SEEDING AND MULCHING

A. Moisten prepared area before seeding if soil is dry. Water thoroughly and allow surface to partially dry before seeding. Do not create muddy soil.

B. Pay close attention to weather conditions. Ensure each area being seeded is fully completed in advance of weather conditions such as heavy rains and strong winds that will result in damage to the unfinished work. Fully completed shall mean seeding, dragging, mulching, crimping and tackifier.

C. Seeding Procedures:

1. Do not sow seed when weather conditions are unfavorable, such as during drought or high winds.
2. Perform seeding with only approved equipment. Do not broadcast or drop seed when wind velocity exceeds 10 mph.

3. Sow the seed uniformly at a rates specified under 2.1 of this section. For dormant seeding, increase seeding rates by 25% 9 (if accepted by Owner's Repreentative).
4. Do not use wet seed or seed that is moldy or otherwise damaged.
5. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucers, plant beds and other seed beds.
6. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
7. Immediately following seeding, rake, drag or float all seed beds to provide a light covering of topsoil approximately 1/8 inch deep. When using equipment that lightly injects the seed into the soil, include equipment that lightly rolls the seed bed to provide good moisture contact between the seed and soil.
8. Maintain soil moisture in accordance with 3.11 below.

D. Mulching Procedures:

1. Do not use any straw that contains weeds and other plants that will contaminate the seed beds with unspecified plants. Carefully inspect each bale of straw prior to spreading and any bales observed to be contaminated with weeds shall be removed from the site on a daily basis.
2. Do not mechanically blow straw when wind speeds exceed 10 mph.
3. Remove all straw that has been deposited outside the limits of seeding and on adjacent pavement, plant beds and tree saucers.
4. Spread straw mulch evenly at the rate of approximately 2 tons dry straw per acre. Place all mulch over all seeded areas within 24 hours after seeding. A mechanical blower or hand spreading shall be used to apply mulch material, provided the machine has been specifically designed and approved for this purpose. Mulch shall be uniform in thickness and cover resulting in a blanket of straw approximately 1 ½ inches loose thickness with little to no visible soil.
5. Slopes 4:1 or steeper and drainage swales shall be stabilized with erosion control blanket in accordance with 3.12 below.
6. For dormant seeding, mulching shall be replaced with erosion control blanket in accordance with 3.12 below at no additional cost to the Owner.

E. Anchoring Mulch Procedures:

1. Anchor the mulch by using both an approved crimping device and applying tackifier on the mulched surface immediately following mulching operation.
2. Mulch shall be crimped in all seed beds where slopes are less than 4:1 (H:V) and of sufficient width to allow equipment to perform crimping without damaging the finish seed bed. Crimp all locations in two directions. When finished, straw shall be anchored one to two inches into the seed bed in rows no more than eight inches apart.
3. Tackifier shall be applied at the rate recommended by the manufacturer and shall be applied uniformly to all mulch either simultaneously with mulching operation or in a separate application. Take precautionary measures to prevent materials from marking or defacing structures, pavements, utilities, or plantings. Immediately clean all stains and damaged areas.
4. Any seed and mulch displaced due to improper crimping and bonding with tackifier shall be immediately replaced to the specified condition at no addition cost to the Owner.

3.6 HYDROSEEDING AND HYDROMULCHING

A. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.

B. Moisten prepared area before seeding if soil is dry. Water thoroughly and allow surface to partially dry before seeding. Do not create muddy soil.

C. Pay close attention to weather conditions. Ensure each area being seeded is fully completed in advance of weather conditions such as heavy rains and strong winds that will result in damage to the unfinished work. Fully completed shall mean, seeding, mulching, crimping and tackifier.

D. Hydroseeding and mulching shall be installed as a two-step process.

1. Step One: Apply the seed and water slurry at the specified seed-sowing rate, with a light application of an approved hydraulic fiber mulch tracer.
2. Step Two: Apply the specified straw mulch and tackifier at specified rate, see 3.5 D and E above. Combining both steps into one will not be permitted.

E. Hydroseeding – Step One Procedures:

1. Fertilizer and soil amendments shall be applied as specified under 3.3 above and shall not be included within the step one slurry.
2. Apply seed on the previously prepared bed at the rates specified under 2.1 of this section. For dormant seeding, increase seeding rates by 25%.
3. Water used shall be obtained from fresh water source, and shall be free from injurious chemicals and other toxic substances at all times. Identify to the Owner all sources of water at least two weeks prior to use. The Owner, at his/her discretion, may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content.
4. Mixtures shall be constantly agitated from the time they are combined until they are finally applied to the seed bed. Once combined, mixtures shall be used within 8 hours.
5. Apply slurry uniformity and at the prescribed rate, avoiding misses and overlapping areas, gauging quantities of mixtures to measured application areas. Checks on the rate and uniformity of application may be made by the Landscape Architect observing the degree of wetting, or by distributing test sheets and observing the quantity of seed deposited thereon.
6. Direct application nozzle sufficiently upward so that the mixture falls to the ground in a uniform shower. Never direct spray toward the ground in a manner that produces erosion or runoff. Discontinue application during periods of high wind that affect the ability to properly apply the seed at a uniform cover.
7. Maintain soil moisture in accordance with 3.11 below.

F. Mulching – Step Two Procedures:

1. Hydromulching is not permitted. Apply straw mulch and erosion control blanket and anchor to soil as specified under 3.5 above.
2. Mulch all seeded areas with specified hydraulic mulch following the same requirements outlined under 3.6 E above.
3. Hydraulic mulch shall be applied at the following rates:

    a. 100% cellulose fibers: 2,000 lb/acre on slopes flatter than 4:1 (H:V).
    b. 70% wood fiber / 30% cellulose fiber: 2,500 lb/acre of slopes flatter than 4:1. (H:V).

4. Slopes 4:1 or steeper shall be stabilized with erosion control blanket in accordance with 3.12 below.
5. For dormant seeding, mulching shall be replaced with erosion control blanket in accordance with 3.12 below at no additional cost to the Owner.

G. Anchoring Mulch Procedures:

1. Spray hydraulic mulch tackifier concurrent with or immediately after mulching following the same requirements outlined under 3.6 E above.
2. Use only an approved tackifier applied at the rate recommended by the manufacturer.
3. Tackifier shall be applied at the rate recommended by the manufacturer and shall be applied uniformly to all mulch either simultaneously with mulching operation or in a separate application. Take precautionary measures to prevent materials from marking or defacing structures, pavements, utilities, or plantings. Immediately clean all stains and damaged areas.
4. Any seed and mulch displaced due to improper installation of tackifier shall be immediately replaced to the specified condition at no addition cost to the Owner.

3.7 TURF RENOVATION

A. All preparation work shall be conducted in accordance with 3.1 through 3.4 above. Following surface preparation, lawn installation shall be completed in accordance with the applicable lawn installation methods specified above. Blend newly seeded areas into adjacent existing lawns.

B. Renovate existing lawns where indicated. In areas where diseased or contaminated lawns are identified, remove existing topsoil and dispose off site.

C. Renovate lawns damaged by Contractor's operations, such as storage of materials, haul roads or other areas outside the limits of work.

D. Renovate lawns where topsoil containing foreign materials, such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations has occurred. Remove existing topsoil and dispose off-site.

E. Mow, dethatch, core aerate, and rake existing turf where identified.

F. Maintain soil moisture in accordance with 3.11 below.

3.8 WATERING

A. Watering Procedures:

1. Immediately following lawn installation water all bed areas thoroughly and immediately with a fine mist until soil is soaked to a depth of at least 2-inches or as indicated above. Puddling of water or allowing the seedbed to dry is unacceptable.
2. For seeded areas, maintain soil in a moist condition (in hot dry weather irrigation may be required 2-4 times per day) until seeds have sprouted and reached a height of 1-inch. Water thereafter a minimum of once every 2-3 days unless natural rainfall has provided equivalent watering. Provide irrigation to moisten soil to a depth of 4” to encourage deeper rooting.
3. For sodded areas, begin watering the entire area within 24 hours of installation and water daily for the first two weeks; twice a day in hot dry weather. Keep soil in all areas moist but not soaked to 2-inches below the bottoms of the plants. Water thereafter a minimum of once every 2-3 days unless natural rainfall has provided equivalent watering until Final Acceptance. During this period, moisten soil to a minimum depth of 4” to encourage deeper rooting.
4. Watering at accelerated rates that dislodge seed and mulch materials or cause erosion shall be immediately repaired at no cost to the Owner.

3.9 EROSION CONTROL BLANKET

A. Erosion Control Blanket Procedures:

1. Install erosion control blanket as indicated in on the Plans and all seed beds with slopes 4:1 (H:V) or steeper.
2. Immediately following seeding, erosion control blanket shall be rolled out in place in the direction of the slope fall line. The material shall be applied without stretching and shall lie smoothly but loosely on the soil surface. Installers shall minimize walking directly on the seed or topsoil bed either before or after the blanket is applied.
3. All ends shall be buried a minimum of 4 inches deep and the trench shall be firmly tamped after closing.
4. In cases where roll ends join, the up-slope piece shall overlap the down-slope piece by at least 18 inches.
5. Anchor edges prior to backfilling trench, all overlaps at 12-inch intervals, and the center of each panel on 3-foot intervals.
6. The upslope ends of the blanket shall be buried a minimum of 6 inches deep and anchored at 12-inch intervals prior to backfilling trench.

7. Reseed all disturbed edges immediately following straw blanket installation and work seed into blanket.

3.10 MAINTENANCE

A. General: Maintain and establish lawn areas by watering, fertilizing, pest and weed control, litter removal, mowing, trimming, repairs, and performing other operations as required to establish healthy, viable lawn. Maintenance shall also include grade repair, seeding, sodding all associated soil amendments and fertilizers.

B. Provide all maintenance under the supervision of a skilled employee of the lawn installer. The skilled maintenance supervisor shall be: capable of operating the automatic irrigation system controller, conducting turf diagnostics to identify the presence of disease, insect and fertility problems, and directing a maintenance crew in the performance of horticultural maintenance practices identified below. Maintenance requirements identified below shall be the basis for information to be included in the Maintenance Schedule and Irrigation Plan identified under 1.5.C of this section and thoroughly documented under the required Maintenance Report Forms to verify the work has been properly performed.

1. Failure to perform and submit factual Maintenance Report Forms could result in non-payment for said services and require the extension of the warranty and maintenance period an additional year at the Contractor’s expense.

C. Provide all equipment, materials, labor and services to maintain the landscape beginning immediately after each area is installed and continuing until Final Acceptance and the end of the warranty period. During this period, perform the following:

1. Inspect the entire landscape at least once per week during the growing season and perform needed maintenance promptly.
2. Prior to each mowing, collect all debris, litter and miscellaneous materials accumulating on the site and remove from the site.
3. Irrigation: Irrigate all turf areas to maintain optimum moisture within the root zone as specified under 3.11 above. When using an automatic sprinkler system, the lawn installer responsible for maintenance shall bear full responsibility to set each zone to the correct frequency and duration.
4. Mow all lawns weekly during the growing season and as described below. Mowing frequencies shall be adjusted based on cutting requirements and may require more frequent visits during high growth periods. Use mulching mower only with sharpened blades and alternate direction of each mowing session to prevent rutting.
5. Fertilize as described below.
6. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Apply herbicides and pesticides as described below.
7. Remove leaves bi-weekly during the fall as they accumulate on the lawns. Bag and dispose off-site. Do not mow in advance of leaf removal.
8. Repair bare, eroded or settled areas and restore to provide a uniformly smooth lawn with the specified grasses. Provide same materials and installation procedures as those used in the original installation.
9. Reclaim/replace soil materials and turf damaged or lost in areas of subsidence. Roll, regrade, and replant bare or eroded areas to produce a uniformly smooth lawn.
10. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

D. Mowings: Mow turf as soon as top growth is tall enough to cut. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. At the time of each mowing, adjust mowing equipment to meet this requirement. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow Kentucky bluegrass, fescue to a height of 2-1/2 to 3-inches.

2. For sodded lawns wait at least 2 weeks after installation for first mowing.
3. Mowing heights may increase during the hot summer months based on regional conditions.
4. Collect all grass clippings if mowings are not sufficiently timed to allow for composting into the existing lawn and accumulations of clippings can be observed on the surface of the grass. Collection and off-site disposal shall be performed at no additional cost to the Owner.

3.11 POST-INSTALLATION FERTILIZATION

A. Apply fertilizers at the time of season, rate of application and grade of N-P-K that maximizes the health of the lawn and minimizes the potential run-off of fertilizers to adjacent waterways and groundwater. Avoid the use of phosphorus unless site soils are deficient of this nutrient.

B. During the warranty and maintenance period, fertilize warm season grasses three times and cool season grasses two times during the growing season.

C. Test site topsoil in early-spring and base actual rates on testing recommendations.

D. Apply fertilizer during the following dates;

1. Spring (April / May): Cool season grasses: After the second spring mowing apply fertilizer at a rate of 1 lb. actual nitrogen per 1,000 square feet of lawn. Nitrogen shall be 70% slow-release. Avoid the use of phosphorous and apply at 4-0-1 ratio of N-P-K.
2. Fall (September/October): Warm and cool season grasses: 8 weeks following application of spring apply fertilizer at a rate of 1.5 lbs. actual nitrogen per 1,000 square feet of lawn. Nitrogen shall be water soluble, quick release. Avoid the use of phosphorous and apply at 3-0-1 ratio of N-P-K.

3.12 PESTICIDE APPLICATION

A. Apply pesticides, and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.13 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Protect newly seeded areas from stormwater flows discharging from paved surfaces until grass establishment. Additional water diversion and erosion control measures such as wattles and check dams may be utilized at Contractor's discretion and expense.

E. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION

SECTION 329300 - EXTERIOR PLANTINGS

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.

1.2 SUMMARY

A. Section Includes:

1. Tree and shrub plantings.
2. Herbaceous perennials, ornamental grasses.
3. Annual plantings.
4. Plant procurement.
5. Planting mixtures.
6. Plant mulch.
7. Staking and guying.
8. Maintenance.
9. Warranty replacements.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Section 311000 “Site Clearing” for stripping on-site topsoil.
3. Section 312000 “Earth Moving” for mass grading of the site.
4. Section 329100 “Soil Preparation (Topsoil)” for lawns and plant mixture amendment.
5. Section 329200 “Lawns” for lawn seeding and sodding.
6. Section 334600 “Subdrainage” for plant bed and tree pit underdrainage system.

1.3 REFERENCES AND REGULATORY REQUIREMENTS

A. Hortus Third, The Staff of the L.H. Bailey Hortorium. 1976. MacMillan Publishing Co., New York.

B. ASTM International, as referenced herein as ASTM.

C. American Standard for Nursery Stock, as referenced herein as ANSI Z60.1-2004.

D. United State Department of Agriculture (USDA), Plant disease and insect control Phytosanitary and Export Certifications.

E. United States Composting Council, Seal of Testing Assurance (STA), Procedures for sampling and testing as outlined in the Test Methods for the Examination of Composting and Compost (TMECC) protocols.

1.4 DEFINITIONS

A. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

B. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.

C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

D. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

E. Finish Grade: Elevation of finished surface of planting soil.

F. Mycorrhizal Inoculum: Fungi either introduced or naturally occurring in the soil that greatly increased plant roots growth and ability to absorb nutrients and water.

G. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

H. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

I. Planting Area: Areas to be planted.

J. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

K. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, annuals, perennials, bulbs, corms, tubers, or herbaceous vegetation.

L. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

M. Root Production Method (RPM): A trademark technology referred to as root production method for a variety of tree and shrub species resulting is a dense fibrous root system for small sized plants.

N. Single Central Leader: A single central dominant leader branch, free of secondary co-dominant stems that would compete with the central leader, either naturally occurring or professionally trained in the nursery with no stem deformities or residual woody stubs from original leader.

O. Specimen Plant: Exceptionally heavy, symmetrical, and tightly knit, growth, superior in form, with properly spaced branching.

P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

Q. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

R. Sheared Evergreen: Any evergreen tree or shrub that has been heavily trimmed or pruned to remove the natural shape of the plant. An evergreen tree grown at a “Christmas “tree farm is typically sheared.

S. Young Plants: Lining out stock, seedlings generally sold within the wholesale trade for continued cultivation.

T. ‘Detention POD’: Stormwater area within linear planting islands with varying depth of aggregate wrapping a percolating detention system.

1.5 SUBMITTALS

A. The Landscape Architect will not be traveling to tag trees and plant material. The Contractor will submit photographs of plant material to be installed prior to delivery to the site. The Owner’s Representative and Landscape Architect reserve the right to reject any plant material delivered to the site due to condition and appearance at no cost to the University.

B. The Contractor will provide photographs of each plant or groups of plants for approval. Images can be jpeg, pdf etc.

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General:

1. Packaged Materials: Deliver packaged materials in original unopened containers showing weight, analysis and name of manufacturer. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.
2. Store materials only in locations approved by the Owner.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Plant Materials:

1. During shipment, do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Do not bend, stack or bind plants in a manner that damages bark, breaks branches or root systems, deforms root balls or destroys natural shape.
2. Transport plants in closed vehicles or with the entire load properly covered to protect from drying winds, heat, freezing or other exposure that may be harmful. Schedule shipping to minimize on-site storage of plants. Closed vehicles shall be adequately ventilated/refrigerated.
3. Stock shall not be shipped until the planting preparations have been completed. If planting is delayed more than 24 hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

a. Heel-in bare-root stock. Pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Soak roots that are in less than moist condition in water for two hours. Plants with dry roots will be rejected. Any bare-root plants requiring sweating to break dormancy must have this procedure carried out before plants arrive onsite.
b. Set balled stock on ground and cover ball with soil, or bark mulch.
c. Do not remove container-grown stock from containers before time of planting.
d. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

4. Schedule shipping aquatic tubers and plugs to result in on-site storage time of less than one day prior to installation. If delays beyond the contractor's control occur after delivery, store plants to ensure viability. All aquatic plants that are in a state of decay at the time of planting shall be rejected regardless of its condition at the time of delivery to the site.
5. Labels: Prior to shipping, each plant or bundle of like variety and size shall be labeled with legible weatherproof tags indicating the correct name and size of plant. Label aquatic plants (tubers, plugs, and/or bare-root) individually or in bundles of like variety.
6. Handle plants at all times in accordance with the best horticultural practices. Lift B&B materials from the bottom of the ball only; do not roll the plants. Plants handled otherwise will be subject to rejection. Balled and burlapped plants which have cracked or broken balls are not acceptable and shall not be planted. Plants with mechanical damage, deformation or breakage will not be accepted and are to be replaced at the Contractor's expense.

1.8 SCHEDULING

A. Work Schedule:

1. Upon authorization to proceed with the work, submit a project work schedule indicating the dates of each of the following items:

a. Submittal schedule.
b. Tagging of plants in nurseries.
c. Delivery of other materials to the site.
d. Staking of plant locations on the site.
e. Delivery of plant material to the site.
f. Planting.
g. Substantial Completion of the work.
h. Maintenance period.

2. Update schedule monthly to reflect progress of the work.

B. Planting Season:
1. Materials shall be installed during planting seasons normally recognized in the job locality.

2. USDA Hardiness Zone 5:

a. B&B and container grown plants, planting season shall be from April 1 through June 1 and from October 1 until the prepared soil becomes frozen.
b. Evergreen plants from April 1 through June 1 and from September 15 through October 15.
c. Bare root woody plants and aquatic tuber and root stock only in spring from April 1 through approximately June 1 but no later than full leaf-out of existing woody and aquatic plants.
d. Bulbs, corms and tubers from September 15 through November 1 and from April 1 through June 1. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.

3. USDA Hardiness Zone 6:

a. B&B and container grown plants, planting season shall be from March 15 through May 15 and from October 1 until the prepared soil becomes frozen.
b. Evergreen plants from March 15 through May 15 and from October 1 through November 1.
c. Bare root woody plants and aquatic tuber and root stock only in spring from March 15 through approximately May 15 but no later than full leaf-out of existing woody and aquatic plants.
d. Bulbs, corms and tubers from October 1 through November 15 and from March 15 through May 15. Spring vs. fall planting is species dependent and Contractor shall comply with seasonal limitations identified on the plant list included on the drawings.

4. If special circumstances warrant installation outside the normal planting season, submit a written request to the Landscape Architect describing conditions and stating the proposed variance. Planting outside the planting season could extend warranty obligations and will be dependent upon the extent of the variance.
5. Weather limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
6. Coordination with lawn installation: Plant trees, shrubs, and other plants after finish grades are established but before seeding/sodding unless otherwise indicated. When planting trees, shrubs, and other plants after seeding/sodding, protect completed areas, and promptly repair damage caused by planting operations.

1.9 WARRANTY, MAINTENANCE and acceptance

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the phase of work. Two Notices of Substantial Completion will be issued. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion or correction.
2. The Substantial Completion inspection for the landscape shall occur in phases based upon the phasing plan approved at the beginning of the work by the Landscape Architect. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
3. The Contractor shall complete all punch list items within 2 weeks of its issuance. All repairs and plant replacements shall occur at no additional cost to the Owner.
4. Substantial Completion will be provided for all planting areas complying with the following:
5. Landscape Architect approval of all specified submittals.
6. The work shall be 100% complete including all site preparation, earthwork, plant mixture installation, plantings, lawns, irrigation and clean-up), and ready for inspection.
7. After receiving a Notice of Substantial Completion warrant and maintain all plantings in accordance with 3.13 of this Section in a vigorous, well-kept condition until Final Acceptance.

B. Final Acceptance:

1. Prior to plant dormancy and the expiration of the warranty and maintenance period, the Landscape Architect will conduct an inspection of all plantings. There shall be clear evidence through factual reporting by the contractor and field observations made by the Owner or Landscape Architect that the specified maintenance has occurred. Following the inspection, the Landscape Architect will issue a punch list identifying all work requiring completion, replacement or correction.
2. The contractor shall complete all punch list items within 2 weeks of its issuance. All repairs and plant replacements shall occur at no additional cost to the Owner.
3. Final Acceptance will be based upon Owner approval and the work having:

a. Been well maintained with all landscape plantings in a healthy growing condition free of disease and insect problems.
b. All maintenance items completed and documented by Contractor through maintenance report forms.

4. Final Acceptance and the end of the warranty period for the landscape will occur only after all punch list items have been satisfactorily completed and the site is left in the condition specified under Cleanup and Protection.

C. Warranty and Maintenance Period:

1. The end of the warranty and maintenance period shall be:

   a. One year following Substantial Completion date.

2. Prior to and during the warranty and maintenance period, replace any plants that are damaged, dead, or, in the opinion of the Landscape Architect, are unhealthy, or have lost more than 25% of their natural shape due to dead branches, excessive pruning or improper maintenance. Rejected plant materials shall be removed from the site immediately after being rejected and legally disposed off-site. Replacement plants shall be installed within 2 weeks following the inspection unless otherwise agreed to in writing by the Owner.
3. Only one replacement of any plant is required after Substantial Completion, except for losses due to failure to comply with specified installation and/or maintenance requirements.
4. Make replacements in accordance with the original specifications, plant list, and notes. Fully restore areas damaged by replacement operations to their original and specified condition.
5. The Contractor will not be held responsible for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents beyond landscape installer's control which result from, hail storms, winds over 100 miles per hour, fires or vandalism, unless Contractor has not completed specified installation in a manner that could have protected the landscaping from these phenomena.
6. If, in the opinion of the Landscape Architect, it is advisable to extend the warranty and maintenance period for an additional growing season, the contractor will be notified of such requirement by the Owner. Improper planting and/or failure to perform and document the specified maintenance in accordance with contract requirement shall be the basis for extending the period of establishment for a second growing season. All specified maintenance and warranty requirements will be required during this extended period and all costs shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 WATER

A. Water for lawns shall be available from on-site sources.

B. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.

2.2 TOPSOIL

A. Refer to Section 329100.

2.3 PLANTING MIXTURES

A. General: All planting mixtures shall be well pulverized, blended materials, free of rocks, debris of any type, tree roots, and other extraneous materials that will impede plant growth. When blending off-site amendments (peat, compost, etc.) with topsoil, the topsoil shall be pulverized and screened to remove all non-soil materials greater than ½ inch diameter. On-site sub-soils will not be permitted for use in plant mixtures.

B. Standard planting backfill for individual tree and shrub pits shall be: 1 part existing, well pulverized soil excavated from planting pit or from site topsoil stockpile thoroughly blended with 1 part off-site topsoil and 1 part compost or peat.

C. Plant bed mixture for shrubs beds shall be: 1 part existing, well-pulverized soil excavated from planting bed or site topsoil stockpiles thoroughly blended with 1 part off-site topsoil and 1 part compost or peat.

D. Plant bed mixture for shrubs beds shall be: 2 parts off-site topsoil thoroughly blended with 1 part compost or peat.

E. Plant bed mixture for beds comprising a mix of shrubs, perennials, annuals, ornamental grasses and groundcover shall be 2 parts off-site topsoil thoroughly blended with 1 part compost or peat.

2.4 SOIL AMENDMENTS

A. Peat shall be a product having at least 95% organic content consisting of sphagnum peat moss with a pH range of 3.0 – 4.0 and Von Post decomposition value of H1 – H3, or low-lime reed-sedge peat with a pH range of 4.0 to 5.0 and Von Post decomposition value of H4 – H6. Product shall be free of sticks, wood or other debris.

B. Compost shall be a heavily decomposed mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. Manure is not suitable for use. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species).

1. pH: 5.5 to 8.
2. Moisture content: 35 to 55 percent by weight. No visible free water or dust is produced when handling it.
3. Sieve analysis: 100 percent passing ¾ inch screen.
4. Soluble salt content: Less than 5 percent.
5. Organic matter content: Minimum 60 percent.

C. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.

D. pH Adjusters:

1. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85% calcium and magnesium carbonates conforming to ASTM C602, Class T or O.
2. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90% sulfur, with a minimum of 99% passing through No. 6 sieve and a maximum of 10% passing through No. 40 sieve.

E. Mycorrhizal Inoculum

1. Mycorrhizal fungi in the inoculant shall be available as propagules, i.e., spores, root fragments and hyphae. The inoculant shall contain highly selected strains of low host specificity endo- and ectomycorrhizal fungi combined with other beneficial fungi (Trichoderma), humic acids, biostimulants, beneficial bacteria, soluble sea kelp, and yucca plant extracts, as manufactured by Horticultural Alliance or approved equal.

2.5 FERTILIZER

A. Fertilizers are required at the time of installation and during the warranty/maintenance period. The fertilization program shall be based on soil testing and formulations and rates of application shall be based on test reports provided by the independent testing laboratory.

B. The independent testing laboratory shall also prepare a custom formulation and rate for each category of plants to be installed and maintained; i.e. trees, shrubs, perennials/ornamental grasses, annuals and bulbs.

C. Fertilizers shall include organic and inorganic, slow release and water-soluble nitrogen and the percentages shall be based on soil types and the time of year being applied. Fertilizers shall not be applied during the hot summer months unless specific to blooming plants or in the late summer when plant growth will not harden off prior to the first killing frost.

D. The fertilizer to be used to amend the soil before planting shall be granular fertilizer that conforms to applicable state and federal regulations, and contains no less than 60% slow-release nitrogen.

E. Fertilizer to be used during the year warranty maintenance period shall be a complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, not less than 30% of the nitrogen from a slow release source. Fifty percent of the nitrogen shall be derived from natural organic sources. The formulations shall be as outlined in 3.13B.12 of this Section.

2.6 PESTICIDES AND HERBICIDES

A. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

1. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
2. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.7 ANTIDESICCANTS

A. Water-soluble emulsion specifically manufactured for agricultural use that will provide a protective film over plant surfaces and be permeable enough to permit transpiration. Use according to manufacturer's written instructions.

2.8 DETENTION POD TREE PLANTING

A. The trees placed within the detention pod area shall have a minimum of 12" depth of Plant Bed Mixture measured from the bottom of the rootball to the top of the aggregate stormwater system, this assumes the rootball depth average for a 3" caliper tree is 20". Each tree shall have 10' minimum horizontal length of Plant Bed Mixture. See planting details and Stormwater Profile sheets for locations and design intent. Coordinate with Owner's Representative and Landscape Architect if the above minimum planting requirements are not met. Coordination with excavation team needed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. General:

1. Prior to beginning work, examine and verify the acceptability of the project site and notify the Landscape Architect of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved.
2. Verify that no foreign or deleterious material has been deposited in soil within a planting area.

3. Where planting occurs in close proximity to other site improvements, provide adequate protection to all features prior to commencing work. Promptly repair any items damaged during planting operations to their original condition.
4. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
5. Suspend spoil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
6. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
7. If plants die or are rejected due to non-conformity to contract requirements, they must be removed from the site immediately and replaced before Substantial Completion.

B. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.

C. On-site sources of water will be available for use by the landscape installer.

D. Pesticides and Other Chemicals:

1. General: All plants delivered to the site shall be free of disease, pests, eggs, and larvae. Promptly remove all plants that do not conform to this requirement.

    a. Insecticides should only be used to control pests when present in quantities that will be detrimental to plant vigor.
    b. Applying foliar herbicides to control weeds in plant beds after installation will not be permitted unless approved in advance by the Landscape Architect. Approval will only be granted if plants to be controlled cannot be effectively removed by hand pulling. Foliar herbiciding will only be permitted as part of the weed control program developed by the Contractor in advance of planting.
    c. All chemical shall be stored and mixed off-site. No chemicals of any type shall remain on site at the end of each work day.
    d. Do not apply over water or dispose of used container on-site.
    e. Post all pesticide and herbicide applications.

2. Pre-emergent application:

    a. Apply granular chemicals in accordance with Manufacturer’s instruction.
    b. Apply in early spring just prior to targeted species breaking dormancy. Do not apply too early in the spring.
    c. Do not apply when weather conditions will prevent an effective application or will result in in-effective control of targeted species.
    d. Spread granular chemical only in areas intended to be treated. Promptly remove all granular material spread over pavement and in areas not intended to be treated.

3. Post-emergent application :

    a. Protect all landscape plantings outside of target areas.
    b. Mixing, cleaning or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application.
    c. Do not spray chemicals when wind exceeds 5 MPH.
    d. Repeat procedures until desired effect is achieved.
    e. Mixing, application and clean-up procedures shall be in accordance with manufacturer’s instructions.

E. Coordination with Other Work:

1. The Contractor shall coordinate work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
2. Completed work installed out of construction sequence which is subsequently disturbed by the completion of work by other trades shall be repaired by the landscape installer at no cost to the Owner.

3. Maintain grade stakes and layout controls set by others until removal is mutually agreed upon by all parties concerned.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion control measures, if necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water run-off or airborne dust to adjacent properties, natural resources and walkways.

C. Vegetation Removal: Strip and dispose of organic debris and root mat.

3.3 LAYOUT

A. Accurately lay out each plant location and planting bed edges according to the drawings, using clearly visible painted, labeled stakes or plastic flags. Spray paint continuous lines on bare soil delineating plant bed boundaries. When scaling locations on the drawings, use at least 2 known reference points as layout controls to determine plant locations. Do not proceed with planting operations until locations have been reviewed and approved in writing by the Landscape Architect.

B. Prior to installation, all plant locations and bed edges must be approved by the Landscape Architect, who may field adjust locations at no additional cost to Owner. Plants installed without layout approval are subject to relocation by the Contractor at their expense.

3.4 PLANT INSTALLATION

A. General: Complete all plantings, metal edging and mulching prior to fine grading adjacent seed beds.

1. For plant beds, complete rough grading.

B. Planting Pit Excavation:

1. For individual plant pits in seeded areas, spread seed bed topsoil to the uniform depth and rough grade prior to layout and planting pit excavation.
2. Remove rocks and other unclassified underground obstructions to at least 6 inches below the finished planting depth of the root ball. Trim perimeter of planting pit leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Ensure that root ball will sit on undisturbed base soil to prevent settling. If plant pits are initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
3. If underground utilities or other surface or subsurface obstructions are encountered that cannot be removed, do not proceed with planting operations until alternate planting locations have been selected and approved by the Landscape Architect.
4. Size and configure planting pits in accordance with the planting details. If rotating augers or other mechanical diggers are used, scarify the side walls and bottom of the pit.
5. Where poor soil percolation is probable, test drainage by filling planting pits with 12 inches of water. Record the drainage time for each pit and if, in the opinion of the Landscape Architect, the water does not adequately drain off within 24 hours, install drains or raise plant pits as directed.
6. Keep excavations covered or otherwise protected after working hours and when unattended by Installer's personnel.

C. Planting Bed Excavation:

1. Refer to Section 311000 – Site Clearing for vegetation removal and topsoil salvage for reuse in plant mixture.

2. Refer to Section 312000 – Earth Moving for earthwork requirements.
3. In locations where plant beds are shown on the drawings and earth moving is not required other than achieving the specified plant bed subgrades, excavate plant beds to the depth shown on the planting details. Remove all existing vegetation as described under 3.2C above. Following vegetation removal, strip existing topsoil and stockpile for testing and mixing with specified on/off-site topsoil and peat/compost. Remove surplus excavated subsoil material that is not part of the specified planting soil to an area designated by the University and legally dispose off-site. Following vegetation removal, top dress plant bed with four inches compost plant bed mixture and rototill into upper twelves inches of soil.
4. Grade subgrade smooth and uniform. Slope to perimeter of plant bed when underdrains are required to collect accumulated water within the bed.
5. Transition from plant bed subgrade to adjacent seed bed subgrade outside the limits of the plant bed to ensure full depth plant bed mixture is provided.
6. Where plant beds terminate next to pavement surfaces, subgrade transitions shall be 12 inches wide within the plant bed to protect pavement base material from being undermined.
7. Obtain approval from the Landscape Architect for all subgrades prior to placing plant mixtures. Notify the Landscape Architecture at least 48 hours in advance of placing plant mixture.
8. Keep excavations covered or otherwise protected after working hours and when unattended by Installer's personnel.

D. Mixing and Placing Planting Mixtures:

1. Install planting bed and planting pit mixtures to the specified proportions and depths. On-site mixing of existing topsoil with off-site materials shall result in a homogenous blend of all ingredients. Screen all mixture to remove foreign debris and rocks greater than ½ inch diameter prior to placement.
2. Place planting bed mixture in 6 inch lifts and lightly compact to prevent settlement after planting. Settlement that occurs after planting will require plant removal and the addition of additional plant mixture at the Contractor’s expense. When placing mixture in raised planters, set finish grade elevations 2 inches low for mulch placement.
3. Grade planting areas to a smooth, uniform surface plane. Roll and rake, remove ridges, and fill depressions to meet grade.
4. Before planting, obtain Landscape Architect’s approval of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

E. Fertilizing:

1. Prior to or during planting, amend all planting pit and bed mixes by incorporating fertilizer at rates specified by soil test reports as specified under Section 329100 – Soil Preparation (Topsoil). Do not broadcast fertilize over the surface of the soil or onto any plant root ball.
2. For individual plant pits, incorporate fertilizer into back fill during planting operations. For plant beds, pre-mix fertilizer prior to installation.

F. Planting and Backfill:

1. Do not plant when the ground is frozen or saturated.
2. Balled and burlapped plants: Do not use planting stock if root ball is cracked or broken before or during planting operation. Set the plant in the center of planting pit with the crown set between 1 inch above adjacent soil for shrubs and 2 inches above adjacent soil for trees. Plant root flares shall not be set below adjacent finish grade. Face plant to give the best appearance or relationship to primary views. Cut away burlap, rope, wire or other wrapping materials from the the entire root ball and remove from pit. If plastic wrap or other non-degradable materials are used in lieu of burlap, completely remove them from the root ball before backfilling. Backfill planting pit approximately two-thirds full, add fertilizer, water and allow planting mixture to settle. After the water has been absorbed, complete backfilling and tamp lightly to grade to prevent future settlement, and form a watering basin with plant mixture of the size indicated on Plans.

3. Container-grown plants: Remove containers and make at least five vertical cuts one-half to one inch deep around the root ball and thoroughly loosen the roots on the outside of the ball. Plant as specified above for balled and burlapped plants, and as modified herein. All container-grown stock shall be planted so that top of container soil is level with surrounding grade. Do not plant higher to account for mulch, as mulch should not cover plant crown.

3.5 SPECIAL PLANTING CONSIDERATIONS:

A. Mycorrhizal Inoculum:

1. Rototill 2 granular pounds per 1000 square feet into the top 8 inches of soil for plant beds or as recommended by supplier. Incorporate 1 pound per cubic yard of plant pit backfill as backfill is being placed.

B. Sloped Plantings:

1. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball. Complete planting as specified under 3.4 F above.

C. Mechanized Tree Spade Planting

1. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
2. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
3. Cut exposed roots cleanly during transplanting operations.
4. Use the same tree spade to excavate the planting pit as was used to extract and transport the tree.
5. Fill all voids between the plating pit and root ball with off-site topsoil tamping or watering soil in place until all voids are filled.
6. Deep root water and fertilize immediately following installation.
7. Where possible, orient the tree in the same direction as in its original location.

3.6 MULCHING

A. Uniformly install mulch on all trees and shrub beds to depth shown on Plans within 48 hours of planting.

B. Keep mulch out of the crowns of shrubs and perennials, at least 3 inches from all tree trunks, and off sidewalks and roadways.

3.7 PRUNING

A. After planting, prune trees and shrubs to remove all dead, dying, broken, or crossed limbs flush with the ground or main stem leaving no stubs. Do not prune to shape or to compensate for transplanting shock without prior approval from the Landscape Architect. Retain natural form of the plant type. Prune using standard professional horticultural and arboricultural practices. Remove trimmings from the site.

B. Employ workers experienced in this type of work.

3.8 Delete wrapping if tree wrap is not required.

3.9 WRAPPING

A. The trunks of deciduous trees shall be wrapped immediately after planting, but not before the condition of the trunks has been inspected and approved by the Landscape Architect. Trim the margins of any abrasions or cuts with a sharp, sterile knife prior to applying wrap.

B. Wrap trees beginning at the base and extending to the first branches in a spiral pattern with an overlap of half the width of the paper.

C. Secure the wrapping at the top, bottom and at 18 inch maximum intervals with twine.

3.10 STAKING AND GUYING

A. Install guying and staking as shown on the details immediately after planting.

B. Remove and dispose of stakes and guys at the end of the warranty period.

3.11 CLEANUP AND PROTECTION

A. Remove excess and waste material daily. When planting has been completed, clear the site of all debris, stockpiles and materials.

B. Repair any damage to existing landscape, paving or other such features as a result of work related to this contract to its original condition.

C. Protect landscape work and materials from damage due to landscape operations, operations by other Contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

3.12 MAINTENANCE

A. Provide all maintenance under the supervision of a skilled employee of the landscape installer. The skilled maintenance supervisor shall be: capable of operating the automatic irrigation system controller, conduct plant diagnostics to identify the presence of disease and insect problems, and be capable of directing a maintenance crew in the performance of horticultural maintenance practices identified below. Maintenance requirements identified below shall be the basis for information to be included in the Maintenance Schedule and Irrigation Plan identified under 1.5 C of this section and thoroughly documented under the required Maintenance Report Forms 1.5.D to verify the work has been properly performed.

1. Failure to perform and submit factual Maintenance Report Forms could result in non-payment for said services and require the extension of the warranty and maintenance period an additional year at the Contractor’s expense.

B. Provide all equipment, materials, labor and services to maintain the landscape beginning immediately after each plant is installed and continuing until Final Acceptance and the end of the warranty period. Perform all work under the direct supervision of a technician trained to recognize and treat conditions affecting the establishment and growth of the plants and perform the following:

1. Inspect the entire landscape at least once per week during the growing season and perform needed maintenance promptly.
2. Irrigation:

a. Irrigate all plants to maintain optimum moisture within the root zone. Reoccurring overly dry or wet conditions shall be grounds for rejection of plant material. When using an automatic sprinkler system, the landscape installer responsible for maintenance shall bear full responsibility to set each zone to the correct frequency and duration.
b. If the automatic irrigation system is inoperative or not present, provide an approved temporary irrigation system or hand water from a source approved by the Owner's Representative. The system shall have the ability to be operated without moving hoses or sprinklers around the site between seeded/planted areas (i.e. system can be set to water one area for the required maintenance period), and may be automated with a timer. Supply all water and equipment at the Contractor's expense from a source approved by the Owner's Representative.

3. All pruning shall be performed by or under the supervision of a licensed arborist. Prune dead wood and broken limbs as identified, in accordance with 3.7 - Pruning. Do not shear evergreens or any shrubs unless specifically required to be maintained as a sheared hedge. Maintain the natural shape of trees and shrubs.
4. Maintain stakes and guys taut and in the specified condition. Repair trees wraps if loose, torn or untied.
5. Maintain all plant beds and tree saucers weed free. Edge shrub and perennial beds and tree rings at least monthly during the growing season, keeping all tree rings to a uniform diameter. Hook mulch monthly and add mulch as needed.
6. Deadhead perennials as necessary during maintenance visits to extend blooming periods.
7. In spring – prior to the start of the growing season, cut all ornamental grasses, perennials ,annuals flush with the ground and remove cuttings from the site.
8. Apply treatments as necessary to keep plants and planted areas free of insects, pests, and disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and herbicides. Treatments include utilizing physical and cultural controls.
9. All pesticides shall be applied by a licensed pesticide applicator. Apply pesticides and all other chemical products and biological control agents in accordance with the authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner at least 24 hours before each application is performed. No mixing or disposal of chemicals is allowed onsite.
10. Apply antidesiccant to upright conifers December through February, at least once per month. In locations subject to high wind or salt spray, install burlap windscreens around spreading conifers and broadleaf evergreens but do not allow burlap to touch evergreen plants.
11. Collect all litter and debris from plant beds and dispose off-site.
12. Fertilization:

    a. Trees, shrubs and ornamental grasses: Fertilize once in the fall after the first hard freeze (usually October) but before the ground freezes; 1 pound of 4-1-2 (N-P-K) per 1,000 square feet of ground below the tree canopy or shrub bed.
    b. Perennials: Fertilize twice, once in the early spring and again 8 weeks later with 1 pound of 5-10-5 (N-P-K) per 100 square feet.
    c. Annuals and bulbs: For bed plantings, use high phosphorous granular fertilizer 10-20-10 (N-P-K) monthly during the growing season applied at a rate identify on the package label. For potted annuals, use high phosphorous water-soluble fertilizer 10-20-10 (N-P-K) every 2 weeks applied at a rate identified on the package label.

13. Remove dead and unacceptable plants as their condition becomes apparent.
14. At the end of the warranty period, but prior to Final Inspection, remove all guying, trunk wrap, watering saucers and top dress tree rings and beds 1 inch deep with the specified mulch product.

END OF SECTION

SECTION 321100 - WATER DISTRIBUTION PIPING

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.

1.2 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for water service.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

A. PE: Polyethylene plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

D. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Owner's written permission.

1.8 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L, water tube, annealed temper.

1. Copper, Solder-Joint Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint pressure type. Furnish only wrought-copper fittings if indicated.
2. Copper, Pressure-Seal Fittings:

a. NPS 2 and Smaller: Wrought-copper fitting with EPDM O-ring seal in each end.
b. NPS 2-1/2 to NPS 4: Bronze fitting with stainless-steel grip ring and EPDM O-ring seal in each end.

B. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.

C. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2.2 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Flanges: ASME 16.1, Class 125, cast iron.

2.3 PE PIPE AND FITTINGS

A. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than 200 psig.

1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than 200 psig.

2.4 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping:

1. Standards: ASTM A 674 or AWWA C105.
2. Form: Tube.
3. Material: LLDPE film of 0.008-inch minimum thickness.

2.5 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
b. East Jordan Iron Works, Inc.
c. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
d. McWane, Inc.; Kennedy Valve Div.
e. McWane, Inc.; Tyler Pipe Div.; Utilities Div.
f. U.S. Pipe and Foundry Company.

2. Nonrising-Stem, Resilient-Seated Gate Valves:

a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.

1) Standard: AWWA C509.
2) Minimum Pressure Rating: 200 psig.
3) End Connections: Mechanical joint.
4) Interior Coating: Complying with AWWA C550.

2.6 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Description: Freestanding, with one NPS 4-1/2 and two NPS 2-1/2 outlets, 5-1/4-inch main valve, drain valve, and NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure.

    a. Standard: AWWA C502.
    b. Pressure Rating: 250 psig.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Underground water-service piping NPS 3/4 to NPS 3 shall be the following:

1. Soft copper tube, ASTM B 88, Type K or ASTM B 88, Type L; wrought-copper, solder-joint fittings; and brazed or copper, pressure-seal fittings; and pressure-sealed joints.
2. PE, ASTM pipe; insert fittings for PE pipe; and clamped joints.

E. Underground water-service piping NPS 4 to NPS 8 shall be the following:

1. Ductile-iron, mechanical-joint pipe; ductile-iron, mechanical-joint fittings; and mechanical joints.

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, resilient -seated gate valves with valve box.

3.4 PIPING INSTALLATION

A. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

B. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.

1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.

C. Install PE pipe according to ASTM D 2774 and ASTM F 645.

3.5 JOINT CONSTRUCTION

A. Make pipe joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
3. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.

3.6 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks.
2. Locking mechanical joints.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.7 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

3.8 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

B. AWWA Fire Hydrants: Comply with AWWA M17.

3.9 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

3.10 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

    a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
    b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
    c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION

SECTION 334100 - STORM DRAINAGE PIPING

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.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Manholes.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Catch basins. Include plans, elevations, sections, details, frames, covers, and grates.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle catch basins according to manufacturer's written rigging instructions.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings NPS 3 to NPS 10: AASHTO M 252M, Type S, with smooth waterway for coupling joints.

1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.

B. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints.

1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2.2 PVC PIPE AND FITTINGS

A. PVC Type PSM Sewer Piping:

1. Pipe: ASTM D 3034, SDR 35, PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

2.3 CLEANOUTS

A. Plastic Cleanouts:

1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.4 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
6. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
7. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched down in direction of flow.
2. Install PE corrugated sewer piping according to ASTM D 2321.
3. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.
2. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Install piping so cleanouts open in direction of flow in sewer pipe.

B. Set cleanout frames and covers with tops flush with pavement surface.

3.5 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. Set tops of frames and covers flush with finished surface.

3.6 CONNECTIONS

A. Make connections to existing piping and underground manholes.

1. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.7 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

1. Remove manhole or structure and close open ends of remaining piping.
2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade according to Section 312000 "Earth Moving."

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visible between structures.
b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
d. Infiltration: Water leakage into piping.
e. Exfiltration: Water leakage from or around piping.

2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
3. Reinspect and repeat procedure until results are satisfactory.

3.9 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF SECTION

APPENDIX

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August 6, 2019

Ms. Alycsa Valentine
Construction Project Manager
Design & Construction Services
Wayne State University
5454 Cass Ave.
Detroit, MI 48202

Via Email: a.valentine@wayne.edu (pdf file)

RE: Geotechnical Evaluation Report
WSU Recreation Field
Wayne State University
Detroit, Michigan
SME Project No. 082123.00

Dear Alycsa:

This report presents our geotechnical recommendations for the proposed artificial turf field on the Wayne State University athletic campus. This evaluation was performed per your authorization of our Proposal No. P01984.19, dated June 18, 2019.

In preparation of this report, we reviewed the following information:

- Phase 1 Environmental Site Assessment (ESA) Report prepared by NTH Consultants (dated December 14, 2000).
- Historical aerial imagery of the site available online.

PROJECT DESCRIPTION

The project consists of the redevelopment of an existing grass field at the southeast corner of Trumbull Ave and the I-94 Service Drive. Specifically, the grass field will be converted to an artificial turf field for the intramural sports program. We understand this will include some relatively minor earthwork (e.g. cuts/fills of about 2 feet or less) and installing a below-grade drainage system for the field. Furthermore, we understand that several light poles for the field will be installed around the perimeter.

Based on the Phase 1 ESA report (and aerial images for the site), the existing field previously consisted of a residential area until the 1960s, when it was developed for its current use. The Phase 1 ESA report also indicates that a gas station was formerly located at the northeast corner of the field.

You requested that SME provide geotechnical recommendations related to the light pole installation and turf field construction. We also provided Phase 2 environmental services for this project (findings to be issued under a separate report).

EVALUATION PROCEDURES

FIELD EXPLORATION

The number, locations, and depths of the soil borings for this project were determined by the project architect/engineer. Prior to performing the borings, we subcontracted a private utility locating service to perform ground penetrating radar (GPR) scanning in a radius around each boring location. The GPR was performed during our site visit on July 19, 2019. GPR was also performed during this site visit to assist the project surveyor (Nowak & Fraus) with locating existing/former utilities and exploring other areas of interest.

SME performed the soil borings on July 19 and 26, 2019 using a hydraulic push Geoprobe® device rig. The Geoprobe® obtains soil samples by hydraulically pushing a 2 or 4-foot long steel sampler into the subgrade. The samples are retained in clear plastic liners within the sampler. An SME field engineer also performed dynamic cone penetrometer (DCP) tests (prior to sampling) on portions of the subgrade within the upper 5 feet to evaluate the subgrade condition/consistency. The DCP consists of a 10-pound hammer falling 24 inches and driving a 1-1/8 inch conical tip. The number of blows required to advance the tip into the subgrade is recorded in 6-inch intervals.

The depths of the borings varied from 10 feet (for the turf field) to 20 feet (for the light poles). We experienced difficulty in sampling/penetrating the hard natural clays at about 12 feet below the existing ground surface at boring LP-D1. We offset about 10 feet from this boring (to LP-D2) and again experienced refusal at a depth of 12 feet.

SME measured and recorded groundwater depth (or lack thereof) during and immediately after completion of each boring. Then, we backfilled the boreholes with sand. We took the recovered soil samples to the SME laboratory for further observation and testing.

LABORATORY TESTING

The laboratory testing program consisted of visual soil classification on recovered samples along with moisture content and hand penetrometer shear strength tests on portions of cohesive samples obtained. We also performed two loss-on-ignition (LOI) tests to measure the organics content of select samples. The Laboratory Testing Procedures in Appendix B provide descriptions of the laboratory tests described above.

Upon completion of the laboratory testing, we prepared boring logs including materials encountered, penetration resistances, pertinent field observations made during the drilling operations, and the results of certain laboratory tests. We developed the soil descriptions included on the boring logs from both visual classification and the results of laboratory tests.

Soil samples retained over a long time, even sealed in jars, are subject to moisture loss and are no longer representative of the conditions initially encountered in the field. Therefore, we retain soil samples in our laboratory for 60 days unless instructed otherwise.

SUBSURFACE CONDITIONS

SOIL CONDITIONS

The soil conditions encountered at the borings consisted of surficial topsoil overlying clay and/or sand fill followed by natural clays to the explored depth of the borings. We provide a summary of the materials encountered at the boring locations, beginning at the existing ground surface and proceeding downward, below.

Stratum 1: Surficial Topsoil. We encountered surficial topsoil at each boring location, which ranged in thickness from about 5 to 21 inches.

Stratum 2: Clay Fill. We encountered clay fill below the surficial topsoil at each boring, extending about 3.5 to 6.3 feet below the existing ground surface. Also, a thin stratum of sand fill was located above the clay fill at several of the borings. The clay fill typically contained trace amounts of debris (coal, brick, asphalt, and/or concrete fragments). We also encountered pink crushed limestone at boring LP-D2. The Photo Log attached to this report provides visual examples of the debris present in the Geoprobe® sample liners.

Moisture contents of the clay fill ranged between about 10 to 23 percent. Shear strengths of the clay fill ranged from 1.5 to greater than 4.5 kips per square-foot (ksf), indicating a stiff to hard strength condition.

We also encountered a stratum of buried topsoil below the fill at boring SB-2. A sample of the buried topsoil and a sample of the fill at boring LP-B were submitted for organic content determination using the loss-on-ignition (LOI) method. The LOI test results are presented in the table below:

LOSS-ON-IGNITION TEST RESULTS

BORING NO.	DEPTH (feet)	ORGANICS CONTENT (%)	MOISTURE CONTENT (%)
LP-B	3.5 – 4	4.0	23
SB-2	5.25 – 5.75	7.9	41

Stratum 3: Natural Clays. We encountered natural clays below the surficial topsoil and fill, extending to the explored depths of the borings. Moisture contents of the natural clays ranged between about 11 to 22 percent. Shear strengths of the natural clays ranged from 1.5 to greater than 4.5 kips per square-foot (ksf), indicating a stiff to hard strength condition. Most of the natural clays were in a very stiff or hard condition. Refer to the boring logs for additional information.

The soil profile described in above and depicted on the boring logs are generalized descriptions of the conditions encountered. The stratification depths shown on the boring logs and described above indicate a zone of transition from one soil type to another and are not exact depths of change from one soil type to another. Soil conditions may be different in areas other than at the boring locations. Please refer to the boring logs for the soil conditions at the specific boring locations. We base the soil descriptions on visual classification of the soils encountered.

Thickness measurements of surficial topsoil reported on the boring logs need to be considered approximate since mixing of these materials can occur in small diameter boreholes. Therefore, if accurate thickness measurements are required for inclusion in bid documents or purposes of design, perform additional evaluations such as shallow test pit excavations.

It is sometimes difficult to distinguish between fill and natural soils based on samples and cuttings from small-diameter boreholes, especially when portions of the fill do not contain man-made materials, debris, topsoil or organic layers, and when the fill appears similar in composition to the local natural soils. Therefore, consider the delineation of fill described above and on the appended boring logs approximate only. Review former site topography plans, aerial photographs, and other historic site records and excavate test pits if a more comprehensive evaluation of the extent and composition of the fill is required.

GROUNDWATER CONDITIONS

Groundwater was not encountered during or immediately following sampling at the boring locations. After completing the exploration, we backfilled the boreholes with sand. Therefore, long-term groundwater information was not obtained as part of this evaluation. We expect hydrostatic groundwater levels and the potential rate of infiltration into excavations to fluctuate throughout the year, based on variations in precipitation, evaporation, run-off, and other factors. The groundwater levels indicated by the borings represent conditions at the time we took the readings. The actual groundwater levels at the time of construction may vary. If more information regarding groundwater levels at this site is required, then we recommend additional subsurface assessment(s).

RECOMMENDATIONS

DRILLED SHAFT FOUNDATIONS

We understand that the new light poles will be supported by drilled shaft foundations. The shaft depth/diameter are not known at this time and will depend on the pole height/configuration. Based on our experience with similar projects, we expect that the lateral forces and overturning moments, rather than the allowable vertical bearing pressure or side friction developed along the length of the shaft, will govern the size and depth of the drilled shafts as axial loads will be relatively light.

VERTICAL BEARING PRESSURE

We recommend a net allowable vertical bearing pressure of 5,000 pounds per square-foot (psf) for the drilled shaft foundations. Higher soil bearing pressures are achievable in the hard natural clays; however, we recommend limiting the value to limit over-excavating the drilled piers during construction (and given the relatively light structural loads). We recommend the foundations extend through any existing fill to bear on the very stiff/hard natural clays encountered at the site. The vertical soil bearing pressure is based on a global safety factor of three (3) or more (for bearing capacity) and limited by settlement, which is further discussed in this section. Based on the borings, suitable bearing soils (for axial loading) were encountered at about 5 to 7 feet below the existing ground surface at the light pole borings. However, we recommend designing the drilled piers with a length to diameter ratio of at least three (3). The drilled shafts (and any pier caps) must be situated a minimum of 42 inches below final site grades for protection against frost action during normal winters.

We recommend a minimum nominal 24-inch diameter shaft to facilitate access to the bearing surface for cleaning and observation. We recommend an SME field engineer be on site to observe and test the soil cuttings off the drilled pier auger as a means of verifying that the pier tip reaches competent bearing soil, and to observe proper cleaning of the bearing surface.

Based on the borings, groundwater is not expected to be encountered during foundation construction. However, groundwater from perched sources (trapped within fill materials overlying natural clays, or within sand seams in the natural clays) could be encountered in isolated locations. When encountered, we anticipate the groundwater can be controlled using standard sump pits and pumps on a localized basis. If seepage into the excavation occurs, the underlying subgrade may remain in a wet condition and be sensitive to disturbances, even after dewatering. If the foundation subgrade becomes disturbed, it would be necessary to extend the drilled pier deeper to reach suitable natural soils. If the groundwater seepage is significant, then it may be necessary to fully case the drilled pier with temporary steel casing.

We estimate total settlement for the drilled shafts using the recommended design soil bearing pressure and bearing on suitable soils as described above to be 1 inch or less. We estimate differential settlements to be about one-half the total settlement. We base the settlement estimates on the available boring information, our experience with similar structures and soil conditions and field verification of suitable bearing soils by SME.

LATERAL LOADING

Side friction may be considered in the design of the drilled pier; however, we anticipate the lateral forces and overturning moments generated by wind loads will dictate the size and depth of the drilled pier (rather than the vertical soil bearing pressure). Therefore, we recommend evaluating soil resistance to lateral pressures in the drilled pier design. The following table provides ultimate side friction and horizontal soil modulus values for design, using the generalized subsurface profile encountered at the light pole borings:

DESIGN PARAMETERS FOR LATERAL LOADING CONDITIONS

SOIL TYPE	RANGE OF DEPTH[1] (feet)	TOTAL UNIT WEIGHT (pcf)	LATERAL SUBGRADE MODULUS[2] (kcf)	UNDRAINED SHEAR STRENGTH, S_u (psf)	ULTIMATE SIDE FRICTION ALONG SHAFT[3, 4] (psf)
Very Stiff Clay Fill/Natural Clay	1 to 7	120	140	2,000	1,000
Hard Clay	7 to 15	130	320	4,500	2,200
Very Stiff Clay	15 to 20	125	175	2,500	1,250

NOTES:

(1) All depths measured from the existing ground surface at the light pole boring locations.

(2) Lateral subgrade modulus (K_h) is presented in units of kips per cubic-foot (kcf) with a safety factor of 2 applied.

(3) Neglect side friction beginning from the existing ground surface and extending to a depth of at least 5 feet and extending upward from the bearing surface one shaft diameter (assuming straight shaft drilled piers).

(4) Use a safety factor of 2 to adjust the ultimate side friction to design side friction.

(5) The effective weight of the pier can also be used in evaluating resistance to uplift.

DRILLED SHAFT CONSTRUCTION CONSIDERATIONS

If suitable natural clay is not present at the design bearing level, extend the drilled pier deeper and terminate it in suitable natural clay. Based on the predominantly cohesive profile and anticipated excavation depth, we generally do not anticipate that the excavations will require the use of a temporary casing during construction. However, the existing fill on site will be subject to caving/sloughing and may require the installation of a temporary casing prior to placement of the foundation concrete. Therefore, we recommend that the contractor be prepared to use a partial or full-length casing at any location, as required.

The contractor may encounter some obstructions during drilling based on the glacial nature of the soil deposition, i.e. cobbles or boulders. *As indicated previously, we encountered refusal at about 12 feet below the ground surface at boring LP-D1.* We recommend provisions in the foundation contract for dealing with the removal of these obstructions and reserve contingency funds for potential problems during construction of drilled pier foundation. Base reimbursement for obstructions on time, rather than volume.

The bottom of the drilled pier needs to be free of loose or disturbed soils prior to placement of the concrete. Clean the drilled pier-bearing surface mechanically with the auger and/or a “one-eye” bucket and verify the condition of the surface with an SME field engineer prior to concrete placement.

If the drilled piers are constructed in the “dry” (with dry being less than 2 inches of water at the base of the excavation), the concrete may be placed by the free-fall method. The free-fall method consists of using a short hopper or chute to direct the concrete flow out of the concrete truck into a vertical stream of flowing concrete with a relatively small diameter. Direct the stream to avoid hitting the sides of the drilled pier excavations or any reinforcing cages. For the free-fall method of concrete placement, design the concrete mix with a slump of 5 to 7 inches. If water in the drilled shaft excavation cannot be removed or controlled, then place concrete using tremie methods. For tremie placed concrete, we recommend designing the concrete mix with a slump of 7 to 9 inches.

Maintain a head of concrete within the temporary casing during removal to prevent infiltration of water and soil into the shaft area. We recommend the head of concrete always be higher than the head of water trapped outside the drilled pier, taking into account the differences in unit weights of concrete and water.

To reduce lateral movement of the drilled shafts, it is necessary to place the concrete for the drilled shafts in intimate contact with the surrounding soil. Fill any voids or enlargements in the shafts due to over-excavation or temporary casing installation (if required) with concrete during concrete placement. Do not leave the drilled shaft excavation open overnight prior to placing the concrete.

ARTIFICIAL TURF FIELD CONSTRUCTION

SITE SUBGRADE PREPARATION

We expect minimal grade changes will be required for the turf field construction, as the site is relatively flat (and currently being used as an athletic field). However, some relatively minor earthwork will be required to remove the surficial topsoil, prepare a stable subgrade, and construct the drainage system for the turf field. After removing the surficial topsoil, we expect the earthwork contractor will encounter existing sand and/or clay fill, which extended about 3.5 to 6.3 feet below the existing ground surface at the borings. We consider the fill to be undocumented or uncontrolled since the origin of the existing fill is not known, we are not aware of records documenting fill placement and any compaction operations, and because of the variable composition and density of the fill. Additional information, such as the origin of the existing fill, and records documenting the fill placement and any compaction operations, would be beneficial for review to further assess the condition of the existing fill.

Overall, we anticipate the exposed subgrade will be adequate for support of the new improvements, provided the contractor follows our recommendations for subgrade preparation provided in this section. The recommendations presented in this section assume that the existing fill will remain in-place, given the relatively infrequent and lightly loaded vehicle traffic expected on the turf system. If a mass removal of the fill is planned, please contact us and we can provide additional recommendations. However, we recommend an SME representative be onsite during earthwork activities to further evaluate existing fill that will remain, as there are indications that the fill was placed in an uncontrolled manner. For example, we encountered a stratum of buried topsoil at boring SP-2 with an organics content of 7.9 percent. While leaving the topsoil in-place will likely not affect the performance of the turf field (considered to be a non-structural area), the subgrade in this area should be carefully evaluated during construction. Furthermore, the buried topsoil would need to be completely removed and replaced with engineered fill if this area is used for structural support in the future.

During stripping/site clearing, exercise caution to avoid over-stripping the site based on the color of the existing subgrade. We recommend stripping be based on organic content rather than color. Remove only those near-surface soils with 4.0 percent or greater organic content to reduce the risk of overstripping and the need to import additional granular fill. Refer to the project environmental report(s) for handling/disposal requirements of any subsurface materials that need to be removed from the site.

To reduce the amount of potential subgrade improvements required at this site, we recommend the contractor establish positive site drainage as soon as possible and remove ponded water from exposed and prepared subgrades. Also, protect the subgrade from channelized traffic to reduce the need for undercuts due to subgrade disturbance. Establish designated haul roads and do not allow construction equipment to randomly traffic the site.

We expect some degree of moisture conditioning will be required during earthwork operations. Specifically, some discing/drying of the clayey subgrade may be necessary to facilitate compactive efforts. As is typical for site earthwork projects in southeast Michigan, it will be practical and economical to perform site earthwork activities during the warmer, drier summer months, when it is easier to perform moisture conditioning as needed.

After stripping and removal of unsuitable materials, and making cuts to design subgrade levels, the exposed subgrade needs to be uniformly compacted using large construction equipment to establish a uniform subgrade. Take care during compaction so as not to damage nearby existing structures or utilities. The type of compaction equipment will depend upon specific soil conditions, but we anticipate that both smooth-drum and sheepsfoot rollers will be needed as we encountered both existing sand and

clay fill near the existing ground surface. We recommend at least several passes in mutually perpendicular directions be made with the compaction equipment until the subgrade has been uniformly compacted. In some areas, moisture conditioning and/or undercutting may be necessary to enhance the effectiveness of the compaction operation.

Once the subgrade is compacted, evaluate the subgrade suitability by proofrolling with a fully loaded, rubber-tire tandem axle dump truck (40,000 lbs, min). We recommend an SME representative be onsite during the proofroll for observation and to test the subgrade as necessary. Based on the results of the field tests and observations, the SME representative can provide recommendations in the field regarding the suitability of the subgrade. Areas of unsuitably loose/wet subgrade will need to be either improved in-place (e.g., dried and recompacted) or be removed and replaced with engineered fill.

After making cuts to design grades and after the exposed subgrade has been thoroughly compacted, evaluated (as mentioned above) and improved as necessary, engineered fill may be placed on the exposed subgrade to establish final subgrade levels. Refer to the following section for materials and compaction requirements for engineered fill.

ENGINEERED FILL REQUIREMENTS

Any fill placed within the construction area, including utility trench backfill, must be an approved material, free of frozen soil, organics, or other unsuitable materials. If the proposed fill contains more than 4 percent organics, do not use such materials for engineered fill. Additionally, we do not recommend reusing topsoil and or soils containing significant (greater than 5 percent) debris/rubble, or any undesirable materials (e.g. trash, expansive aggregates, etc.) as engineered fill.

While significant amounts (i.e. less than 5 percent) of debris were not encountered at the borings, we did encounter fragments of brick, concrete, coal, asphalt, etc. in the fill at most of the borings. Furthermore, based on historical aerial imagery it appears the majority of the site formerly consisted of residential areas. Therefore, it is possible that the earthwork contractor will encounter some areas where the debris is more heavily concentrated. Test pit excavations would be required to further explore the buried debris within the fill soils. If/where significant debris/rubble is encountered, it would need to be segregated from the fill before the soils could be reused as engineered fill.

Spread the fill in level layers and compact it to a minimum of 95 percent of the maximum dry density as determined in accordance with the Modified Proctor test. Limit loose lift thickness to the maximum lift size the contractor's equipment can uniformly compact at one time. The successful reuse of the on-site soils for engineered fill will depend on the time of year and the care the earthwork contractor uses during construction. During cold and wet periods of the year, the subgrade soils (in particular, soils containing significant silt and/or clay content) may become saturated and disturbed and the soils can be difficult to dry. If such conditions occur, the contractor may have to use more imported granular fill as engineered fill on the site.

We believe the natural soils and existing fill (as represented by the borings) are suitable for reuse as a general engineered fill where grades need to be raised on the field, provided they meet the requirements described above. However, we recommend using an imported granular fill immediately below the turf system as site drainage will be critical, and the drainage capability of the predominantly clay subgrade at this site is negligible. The specific type of granular fill will depend on the design of the drainage system. The type of fill, layout of underdrains, and other features of the drainage system will be designed by others.

If an open-graded aggregate (such as MDOT 6A crushed stone) is used for the drainage course, we recommend compacting it to the degree where it is stable under the weight of construction equipment using a smooth-drum roller. Density testing of open-graded aggregate is not typically performed due to the lack of fines to occupy the void spaces between the aggregate particles.

CONSTRUCTION CONSIDERATIONS

Based on the borings, we do not anticipate groundwater will be encountered in excavations required for this project (if any). However, localized areas of perched water may still be encountered, and the contractors should be prepared to manage groundwater if encountered using standard sump pit and pump procedures for minor accumulations.

The subgrade soils are prone to disturbance after being exposed due to weather and activity on-site. Disturbed soils will have to be undercut and replaced with engineered fill or improved in place. In heavily trafficked areas and/or under adverse weather conditions, protect areas of exposed subgrade at the site by placing crushed concrete or crushed aggregate on the exposed subgrade.

We recommend the bid documents require prospective contractors to include unit prices for removing unsuitable subgrade such as debris-laden fill, buried organics, overly fine-grained, disturbed soils, etc. and replacing it with suitable engineered fill. Also, we recommend establishing a contingency in the construction budget for this work. Regarding undercuts, we recommend units of cubic yards in-place. Undercut dimensions can be directly measured in the field. Tonnage or loose cubic yards are subject to arbitrary “fluff” factors and are more difficult to quantify.

The contractor must protect existing structures and utilities to remain in place during construction. Exercise care during excavating and compaction operations so excessive vibrations do not cause settlement of existing structures and pavements, and utilities are not damaged or undermined. Where necessary, install temporary shoring/bracing to properly shore/brace existing structures and protect them from distress. Any shoring/bracing will need to be designed by a professional engineer licensed in the State of Michigan. Regarding excavations, properly slope or brace all excavations in accordance with MI-OSHA requirements.

We appreciate the opportunity to serve you on this project. If you have questions regarding this report or the attached information, please contact us.

Sincerely,

SME

Christopher G. Naida, PE
Senior Consultant

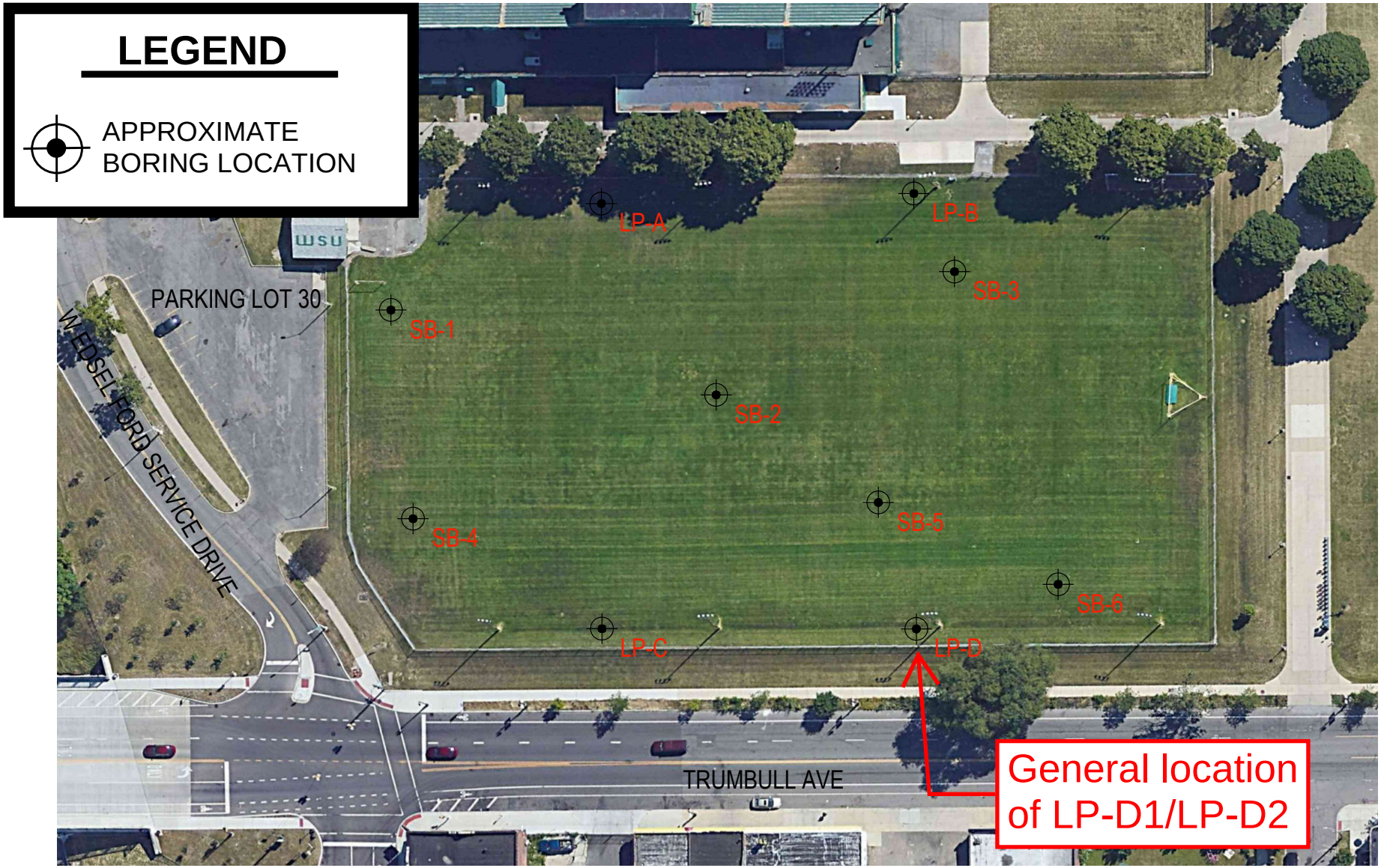
REPORT WRITTEN BY:

Alex Kuisell, PE
Senior Staff Engineer

REPORT REVIEWED BY:

Laurel M. Johnson, PE
Senior Consultant

Attachments:
Boring Location Plan
Boring Log Terminology
Boring Logs (LP-A through LP-D, SB1 through SB6)
Photo Log (select photos – 3 pages)
Important Information about this Geotechnical Engineering Report
Laboratory Testing Procedures



SME	Indiana Michigan Ohio	**DATE:** 07/31/19 **DRAWN BY:** AK **WO #:** NA **JOB:** 082123.00 **SCALE:** NOT TO SCALE	BORING LOCATION PLAN WSU RECREATION FIELD WAYNE STATE UNIVERSITY DETROIT, MICHIGAN

BORING LOG TERMINOLOGY

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOIL (more than 50% of material is larger than No. 200 sieve size.)			
GRAVEL More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravel (Less than 5% fines)	GW	Well-graded gravel; gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravel; gravel-sand mixtures, little or no fines
	Gravel with fines (More than 12% fines)	GM	Silty gravel; gravel-sand-silt mixtures
		GC	Clayey gravel; gravel-sand-clay mixtures
SAND 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sand (Less than 5% fines)	SW	Well-graded sand; sand-gravel mixtures, little or no fines
		SP	Poorly graded sand; sand-gravel mixtures, little or no fines
	Sand with fines (More than 12% fines)	SM	Silty sand; sand-silt-gravel mixtures
		SC	Clayey sand; sand–clay-gravel mixtures
FINE-GRAINED SOIL (50% or more of material is smaller than No. 200 sieve size)			
SILT AND CLAY Liquid limit less than 50%		ML	Inorganic silt; sandy silt or gravelly silt with slight plasticity
		CL	Inorganic clay of low plasticity; lean clay, sandy clay, gravelly clay
		OL	Organic silt and organic clay of low plasticity
SILT AND CLAY Liquid limit 50% or greater		MH	Inorganic silt of high plasticity, elastic silt
		CH	Inorganic clay of high plasticity, fat clay
		OH	Organic silt and organic clay of high plasticity
HIGHLY ORGANIC SOIL		PT	Peat and other highly organic soil

OTHER MATERIAL SYMBOLS

Topsoil, Void, Sandstone, Asphalt, Glacial Till, Siltstone, Base, Coal, Limestone, Concrete, Shale, Fill

LABORATORY CLASSIFICATION CRITERIA

GW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{D_{30}^2}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with PI greater than 7	
SW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{D_{30}^2}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for SW	
SM	Atterberg limits below "A" line or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols
SC	Atterberg limits above "A" line with PI greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent……GW, GP, SW, SP
More than 12 percent……GM, GC, SM, SC
5 to 12 percent……Cases requiring dual symbols

- SP-SM or SW-SM (SAND with Silt or SAND with Silt and Gravel)
- SP-SC or SW-SC (SAND with Clay or SAND with Clay and Gravel)
- GP-GM or GW-GM (GRAVEL with Silt or GRAVEL with Silt and Sand)
- GP-GC or GW-GC (GRAVEL with Clay or GRAVEL with Clay and Sand)

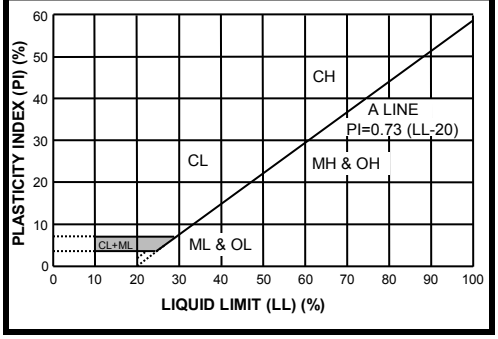
If the fines are CL-ML:

- SC-SM (SILTY CLAYEY SAND or SILTY CLAYEY SAND with Gravel)
- SM-SC (CLAYEY SILTY SAND or CLAYEY SILTY SAND with Gravel)
- GC-GM (SILTY CLAYEY GRAVEL or SILTY CLAYEY GRAVEL with Sand)
- GM-GC (CLAYEY SILTY GRAVEL or CLAYEY SILTY GRAVEL with Sand)

PARTICLE SIZES

Boulders	-	Greater than 12 inches
Cobbles	-	3 inches to 12 inches
Gravel- Coarse	-	3/4 inches to 3 inches
Fine	-	No. 4 to 3/4 inches
Sand- Coarse	-	No. 10 to No. 4
Medium	-	No. 40 to No. 10
Fine	-	No. 200 to No. 40
Silt and Clay	-	Less than (0.0074 mm)

PLASTICITY CHART



VISUAL MANUAL PROCEDURE

When laboratory tests are not performed to confirm the classification of soils exhibiting borderline classifications, the two possible classifications would be separated with a slash, as follows:

For soils where it is difficult to distinguish if it is a coarse or fine-grained soil:

- SC/CL (CLAYEY SAND to Sandy LEAN CLAY)
- SM/ML (SILTY SAND to SANDY SILT)
- GC/CL (CLAYEY GRAVEL to Gravelly LEAN CLAY)
- GM/ML (SILTY GRAVEL to Gravelly SILT)

For soils where it is difficult to distinguish if it is sand or gravel, poorly or well-graded sand or gravel; silt or clay; or plastic or non-plastic silt or clay:

- SP/GP or SW/GW (SAND with Gravel to GRAVEL with Sand)
- SC/GC (CLAYEY SAND with Gravel to CLAYEY GRAVEL with Sand)
- SM/GM (SILTY SAND with Gravel to SILTY GRAVEL with Sand)
- SW/SP (SAND or SAND with Gravel)
- GP/GW (GRAVEL or GRAVEL with Sand)
- SC/SM (CLAYEY to SILTY SAND)
- GM/GC (SILTY to CLAYEY GRAVEL)
- CL/ML (SILTY CLAY)
- ML/CL (CLAYEY SILT)
- CH/MH (FAT CLAY to ELASTIC SILT)
- CL/CH (LEAN to FAT CLAY)
- MH/ML (ELASTIC SILT to SILT)
- OL/OH (ORGANIC SILT or ORGANIC CLAY)

DRILLING AND SAMPLING ABBREVIATIONS

2ST	–	Shelby Tube – 2" O.D.
3ST	–	Shelby Tube – 3" O.D.
AS	–	Auger Sample
GS	–	Grab Sample
LS	–	Liner Sample
NR	–	No Recovery
PM	–	Pressure Meter
RC	–	Rock Core diamond bit. NX size, except where noted
SB	–	Split Barrel Sample 1-3/8" I.D., 2" O.D., except where noted
VS	–	Vane Shear
WS	–	Wash Sample

OTHER ABBREVIATIONS

WOH	–	Weight of Hammer
WOR	–	Weight of Rods
SP	–	Soil Probe
PID	–	Photo Ionization Device
FID	–	Flame Ionization Device

DEPOSITIONAL FEATURES

Parting	–	as much as 1/16 inch thick
Seam	–	1/16 inch to 1/2 inch thick
Layer	–	1/2 inch to 12 inches thick
Stratum	–	greater than 12 inches thick
Pocket	–	deposit of limited lateral extent
Lens	–	lenticular deposit
Hardpan/Till	–	an unstratified, consolidated or cemented mixture of clay, silt, sand and/or gravel, the size/shape of the constituents vary widely
Lacustrine	–	soil deposited by lake water
Mottled	–	soil irregularly marked with spots of different colors that vary in number and size
Varved	–	alternating partings or seams of silt and/or clay
Occasional	–	one or less per foot of thickness
Frequent	–	more than one per foot of thickness
Interbedded	–	strata of soil or beds of rock lying between or alternating with other strata of a different nature

CLASSIFICATION TERMINOLOGY AND CORRELATIONS

Cohesionless Soils

Relative Density	N-Value (Blows per foot)
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	50 to 80
Extremely Dense	Over 80

Cohesive Soils

Consistency	N-Value (Blows per foot)	Undrained Shear Strength (kips/ft^2)
Very Soft	0 - 2	0.25 or less
Soft	2 - 4	0.25 to 0.50
Medium	4 - 8	0.50 to 1.0
Stiff	8 - 15	1.0 to 2.0
Very Stiff	15 - 30	2.0 to 4.0
Hard	> 30	4.0 or greater

Standard Penetration 'N-Value' = Blows per foot of a 140-pound hammer falling 30 inches on a 2-inch O.D. split barrel sampler, except where noted.

BORING LP-A

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/26/19 **COMPLETED:** 7/26/19
BORING METHOD: Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe
LOGGED BY: ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	12 inches of Clayey TOPSOIL- Dark Brown	LS1	27, 40, 56, 50/30"
1.0	FILL- LEAN CLAY with Sand- Trace Brick & Asphalt Fragments- Brown & Dark Brown- Very Stiff to Hard (CL)		
4.0	LEAN CLAY with Sand- Frequent Silt Partings- Brown & Gray- Hard (CL)	LS2	
8.0	LEAN CLAY with Sand- Brown- Hard (CL0	LS3	
		LS4	
16.5	LEAN CLAY with Sand- Occasional Sand Seams- Gray- Very Stiff (CL)	LS5	
		LS6	
20.0	END OF BORING AT 20.0 FEET.		

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10, 20, 30, 40)

DRY DENSITY (pcf) -- ■ (90, 100, 110, 120)

MOISTURE & ATTERBERG LIMITS (%) PL MC LL (10, 20, 30, 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1, 2, 3, 4)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING LP-B

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES	REMARKS
0	12 inches of Sandy Clayey TOPSOIL- Dark Brown			
1.0	FILL- Sandy LEAN CLAY- Trace Brick Fragments- Brown, Dark Brown & Black- Very Stiff (CL)	LS1	13, 22, 28, 40, 31, 19, 28, 34, 30, 42	Organics content: 4.0 percent
4.0	LEAN CLAY with Sand- Brown & Gray- Stiff to Hard (CL)	LS2		
5				
7.0	LEAN CLAY with Sand- Occasional Sand Seams- Brown- Hard (CL)	LS3		
10		LS4		
		LS5		
15.0	LEAN CLAY with Sand- Gray- Hard to Very Stiff (CL)	LS6		
15				
20.0	END OF BORING AT 20.0 FEET.			
20				
25				

DYNAMIC CONE PENETROMETER (DCP) -- ○
10 20 30 40

DRY DENSITY (pcf) -- ■
90 100 110 120

MOISTURE & ATTERBERG LIMITS (%)
PL MC LL
10 20 30 40

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF)
1 2 3 4

GROUNDWATER & BACKFILL INFORMATION

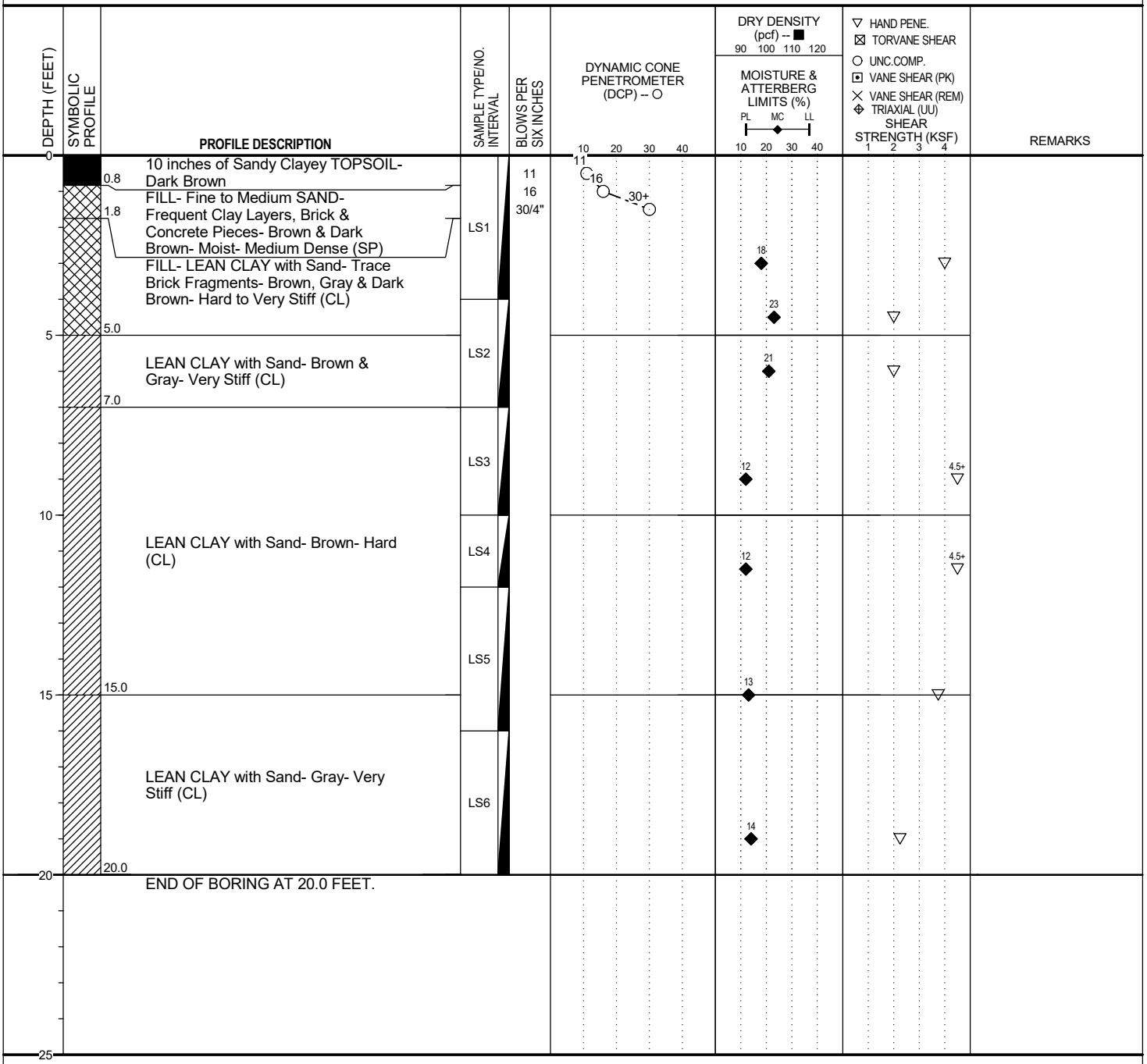
GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.
2.

BORING LP-C

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK



GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING LP-D1

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	10 inches of Clayey TOPSOIL- Dark Brown		9
0.8	FILL- Fine to Medium SAND with Silt- Brown- Moist- Medium Dense (SP-SM)		20
1.3		LS1	26
	FILL- LEAN CLAY with Sand- Trace Brick Fragments- Brown, Dark Brown & Black- Hard to Very Stiff (CL)		29
			37
4.0			26
5	Sandy LEAN CLAY- Brown & Gray- Very Stiff (CL)	LS2	
5.5			
	LEAN CLAY with Sand- Brown & Gray- Hard (CL)	LS3	
9.0			
10	LEAN CLAY with Sand- Brown- Hard (CL)	LS4	
12.0			
	END OF BORING AT 12.0 FEET.		
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10 20 30 40)

DRY DENSITY (pcf) -- ■ (90 100 110 120)

MOISTURE & ATTERBERG LIMITS (%) PL MC LL (10 20 30 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1 2 3 4)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.
2. Refusal encountered at 12 feet.

BORING LP-D2

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/26/19 **COMPLETED:** 7/26/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	14 inches of Clayey TOPSOIL- Dark Brown	LS1	19
1.2	FILL- Fine to Medium SAND- Occasional Clay Seams- Brown- Moist- Medium Dense (SP)		31
1.7	FILL- Crushed LIMESTONE- Pink		45
2.0	FILL- LEAN CLAY with Sand- Brown & Dark Brown- Hard (CL)		64
3.5	Sandy LEAN CLAY- Brown & Gray- Hard (CL)		40
5.0	LEAN CLAY with Sand- Frequent Silt Partings- Brown & Gray- Hard (CL)	LS2	
7.0	LEAN CLAY with Sand- Occasional Sand Seams- Brown- Hard (CL)	LS3	
10		LS4	
12.0	END OF BORING AT 12.0 FEET.		
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10 20 30 40): 19, 31, 45, 64, 40

DRY DENSITY (pcf) -- ■ (90 100 110 120)
MOISTURE & ATTERBERG LIMITS (%) (PL MC LL) (10 20 30 40): 19, 12, 13, 13, 12

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1 2 3 4): 4.5+, 4.5+, 4.5+, 4.5+, 4.5+

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.
2. Boring performed at 10 foot offset from LP-D1. Refusal encountered at 12 feet.

BORING SB-1

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	5 inches of Clayey TOPSOIL- Dark Brown (0.4)		9
	FILL- Fine to Medium SAND with Silt- Frequent Clay Layers- Trace Concrete Fragments- Brown & Dark Brown- Moist- Medium Dense (SP-SM) (1.5)	LS1	16
			31
			32
	FILL- LEAN CLAY with Sand- Brown- Hard (CL)		68
	(4.0)		
5	LEAN CLAY with Sand- Brown & Gray- Very Stiff (CL)	LS2	
	(7.0)		
	LEAN CLAY with Sand- Brown- Hard (CL)	LS3	
10	(10.0)		
	END OF BORING AT 10.0 FEET.		
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10 20 30 40)

DRY DENSITY (pcf) -- ■ (90 100 110 120)

MOISTURE & ATTERBERG LIMITS (%) PL MC LL (10 20 30 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1 2 3 4)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING SB-2

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	15 inches of Clayey TOPSOIL- Dark Brown		13
1.3	FILL- Fine to Medium SAND- Occasional Clay Seams- Brown- Moist- Medium Dense (SP)	LS1	13
2.0			15
			38
			34
			28
	FILL- LEAN CLAY with SAND- Trace Brick, Concrete & Coal Fragments- Brown, Gray & Black- Very Stiff (CL)		36
			43
5			
5.3	Buried TOPSOIL- Dark Brown	LS2	
5.8			
	LEAN CLAY with Sand- Brown & Gray- Very Stiff (CL)	LS3	
10.0			
10	END OF BORING AT 10.0 FEET.		
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10 20 30 40)

DRY DENSITY (pcf) -- ■ (90 100 110 120)

MOISTURE & ATTERBERG LIMITS (%) PL MC LL (10 20 30 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⌖ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1 2 3 4)

REMARKS: Organics content: 7.9 percent

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING SB-3

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	10 inches of Sandy Clayey TOPSOIL- Dark Brown		10
0.8	FILL- Fine to Medium SAND with Silt- Brown & Dark Brown- Moist		12
1.2		LS1	25
	FILL- LEAN CLAY with Sand- Trace Coal, Brick & Concrete Fragments- Brown, Gray & Dark Brown- Very Stiff (CL)		30
			35
4.8			28
5	FILL- Brick, Concrete & Coal Pieces	LS2	
5.5			
	LEAN CLAY with Sand- Brown & Gray- Very Stiff to Hard (CL)		
8.5		LS3	
	LEAN CLAY with Sand- Brown- Hard (CL)		
10.0			
10	END OF BORING AT 10.0 FEET.		
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10 20 30 40)

DRY DENSITY (pcf) -- ■ (90 100 110 120)

MOISTURE & ATTERBERG LIMITS (%) PL MC LL (10 20 30 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⌖ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1 2 3 4)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING SB-4

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	7 inches of Sandy Clayey TOPSOIL- Dark Brown		10
0.6	FILL- Fine to Medium SAND with Silt- Brown & Dark Brown- Moist- Medium Dense (SP-SM)	LS1	17, 38, 74
2.0	FILL- LEAN CLAY with Sand- Trace Brick & Coal Fragments- Brown, Dark Brown & Black- Hard (CL)		
4.0	FILL- LEAN CLAY with Sand- Brown, Gray & Dark Brown- Very Stiff (CL)	LS2	
5			
5.5	FILL- Fine to Coarse SAND with Gravel- Brown- Moist (SP)		
6.3	LEAN CLAY with Sand- Brown & Gray- Hard (CL)	LS3	
8.0	LEAN CLAY with Sand- Occasional Sand Seams- Brown- Hard (CL)		
10.0	END OF BORING AT 10.0 FEET.		
10			
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10, 20, 30, 40)

DRY DENSITY (pcf) -- ■ (90, 100, 110, 120)

MOISTURE & ATTERBERG LIMITS (%) PL MC LL (10, 20, 30, 40)

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⊕ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1, 2, 3, 4)

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING SB-5

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19 **BORING METHOD:** Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe **LOGGED BY:** ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	14 inches of Sandy Clayey TOPSOIL- Dark Brown		
1.2	FILL- Sandy LEAN CLAY- Brown & Dark Brown- Very Stiff to Stiff (CL)	LS1	11, 32, 38, 25, 13, 8
4.5	LEAN CLAY with Sand- Occasional Sand Seams- Brown & Gray- Stiff (CL)	LS2, LS3	
9.0	LEAN CLAY with Sand- Brown- Hard (CL)		
10.0	END OF BORING AT 10.0 FEET.		
5			
10			
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○ (10, 20, 30, 40): 11, 32, 38, 25, 13, 8

DRY DENSITY (pcf) -- ■ (90, 100, 110, 120)
MOISTURE & ATTERBERG LIMITS (%) (PL, MC, LL) (10, 20, 30, 40): 14, 21, 20, 22, 14

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
× VANE SHEAR (REM)
⌖ TRIAXIAL (UU)
SHEAR STRENGTH (KSF) (1, 2, 3, 4): 4.5+

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

BORING SB-6

PROJECT NAME: WSU Recreation Field
PROJECT NUMBER: 082123.00
CLIENT: WSU Recreation Field
PROJECT LOCATION: Detroit, Michigan
DATE STARTED: 7/19/19 **COMPLETED:** 7/19/19
BORING METHOD: Direct Push
FIELD REPRESENTATIVE: ZA **EQUIPMENT:** Geoprobe
LOGGED BY: ARC **CHECKED BY:** AK

DEPTH (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE/NO. INTERVAL	BLOWS PER SIX INCHES
0	21 inches of Sandy Clayey TOPSOIL- Dark Brown		7
1.8			12
2.0	FILL- Fine to Medium SAND with Silt- Brown- Moist (SP)	LS1	14
	FILL- LEAN CLAY with Sand- Trace Coals Fragments- Dark Brown & Black- Hard (CL)		10
4.0			48
5	FILL- LEAN CLAY with Sand- Trace Brick & Concrete Fragments- Brown & Gray- Very Stiff (CL)	LS2	40
5.8			
	LEAN CLAY with Sand- Brown & Gray- Very Stiff (CL)		
8.0		LS3	
	LEAN CLAY with Sand- Brown- Hard (CL)		
10.0			
10	END OF BORING AT 10.0 FEET.		
15			

DYNAMIC CONE PENETROMETER (DCP) -- ○
10 20 30 40

DRY DENSITY (pcf) -- ■
90 100 110 120

MOISTURE & ATTERBERG LIMITS (%)
PL MC LL
10 20 30 40

▽ HAND PENE.
⊠ TORVANE SHEAR
○ UNC.COMP.
⊡ VANE SHEAR (PK)
⨯ VANE SHEAR (REM)
⌖ TRIAXIAL (UU)
SHEAR STRENGTH (KSF)
1 2 3 4

REMARKS

GROUNDWATER & BACKFILL INFORMATION

GROUNDWATER WAS NOT ENCOUNTERED

BACKFILL METHOD: Sand

NOTES: 1. The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.

PHOTO NO. 1: Pink crushed limestone encountered at boring LP-D2

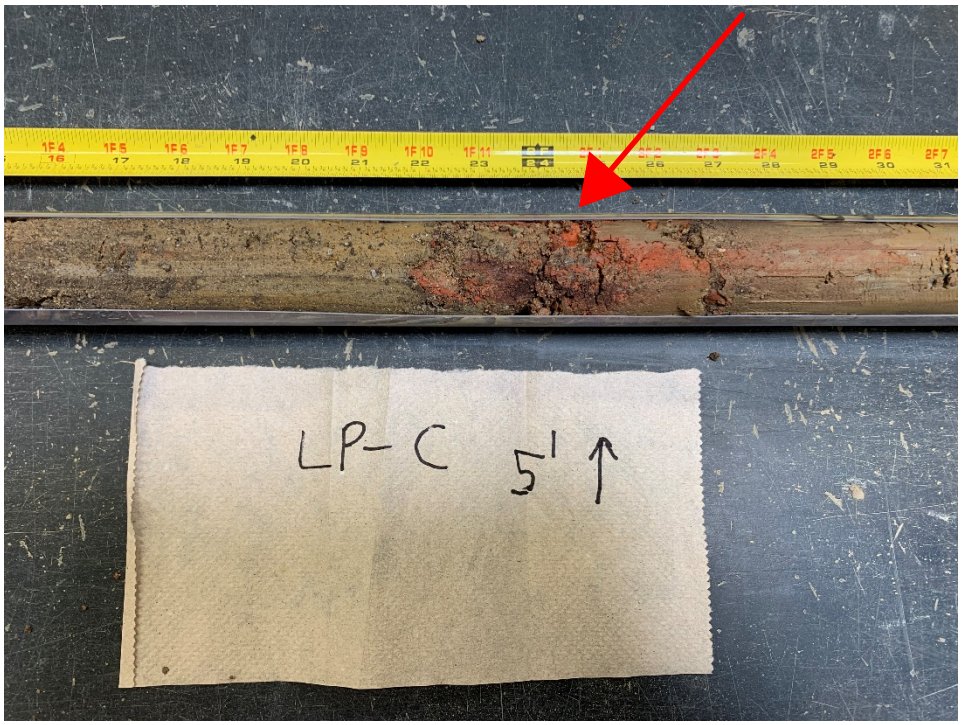


PHOTO NO. 2: Brick fragments in fill at boring LP-C

SME Project No.:	082123.00
Photographs by:	Alex Kuisell, PE
Date:	July 31, 2019
Project:	WSU Recreation Field
Location:	Detroit, Michigan

PHOTO NO. 3: Coal fragments in fill at boring SB-2

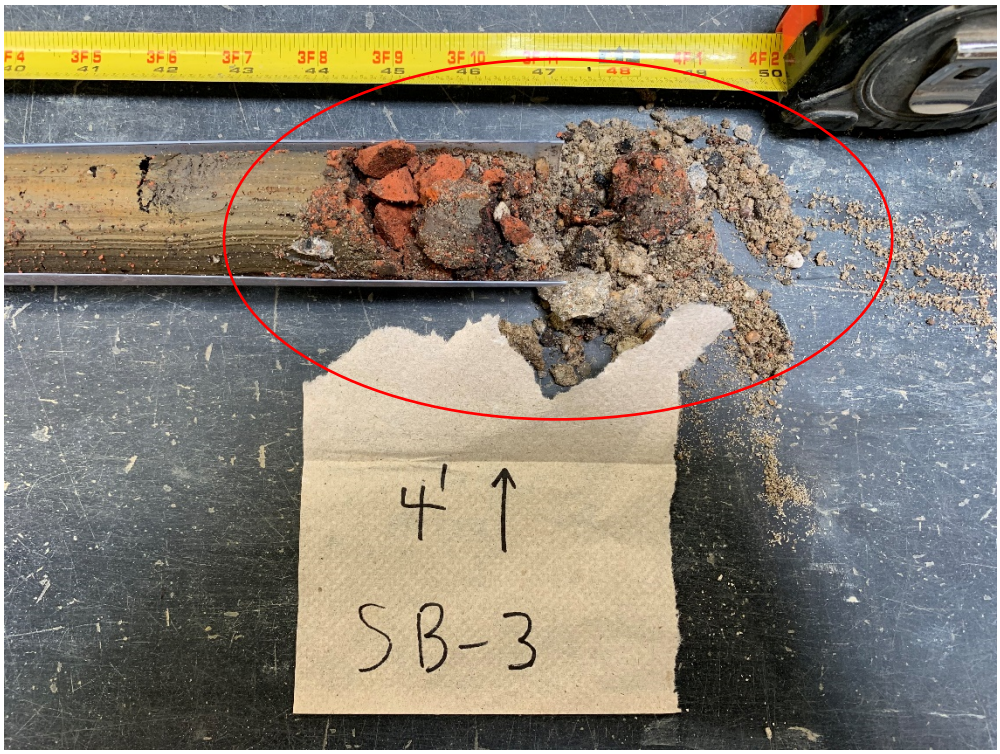


PHOTO NO: 4: Brick, concrete and coal fragments in fill at boring SB-3

SME Project No.:	082123.00
Photographs by:	Alex Kuisell, PE
Date:	July 31, 2019
Project:	WSU Recreation Field
Location:	Detroit, Michigan

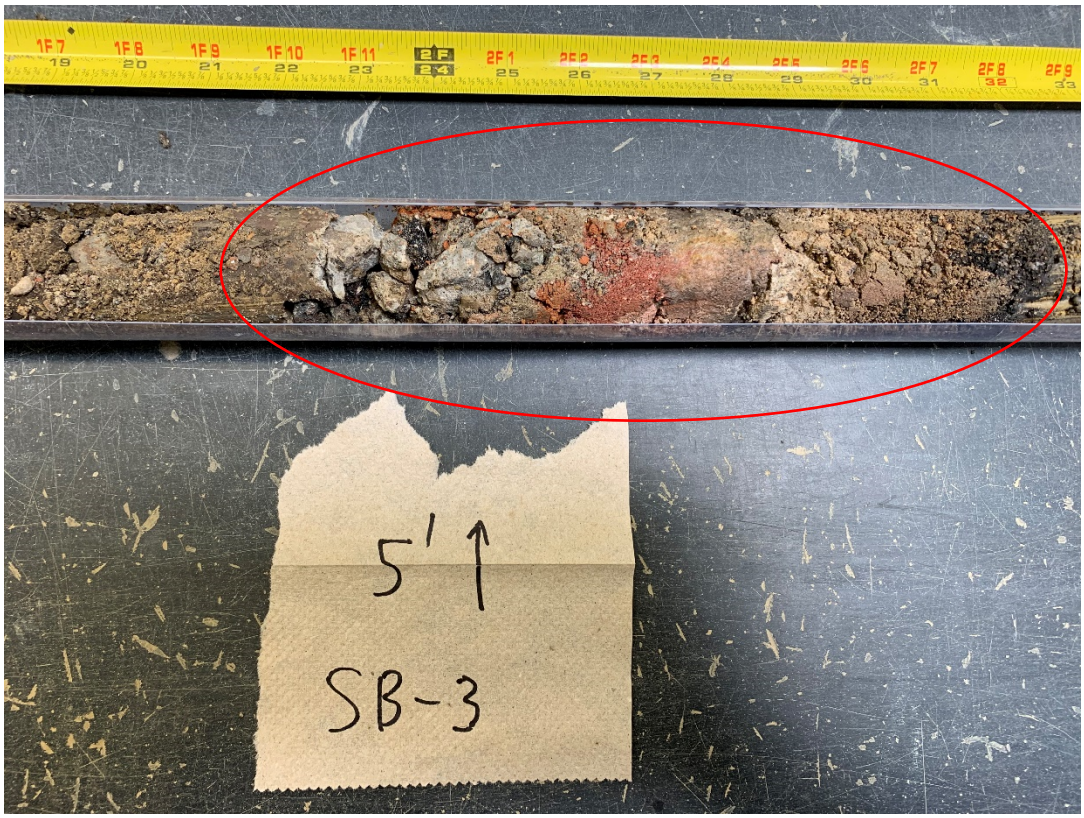


PHOTO NO: 5: Brick, concrete and coal pieces in fill at boring SB-3

SME Project No.:	082123.00
Photographs by:	Alex Kuisell, PE
Date:	July 31, 2019
Project:	WSU Recreation Field
Location:	Detroit, Michigan

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

LABORATORY TESTING PROCEDURES

VISUAL ENGINEERING CLASSIFICATION

Visual classification was performed on recovered samples. The appended General Notes and Unified Soil Classification System (USCS) sheets include a brief summary of the general method used visually classify the soil and assign an appropriate USCS group symbol. The estimated group symbol, according to the USCS, is shown in parentheses following the textural description of the various strata on the boring logs appended to this report. The soil descriptions developed from visual classifications are sometimes modified to reflect the results of laboratory testing.

MOISTURE CONTENT

Moisture content tests were performed by weighing samples from the field at their in-situ moisture condition. These samples were then dried at a constant temperature (approximately 110º C) overnight in an oven. After drying, the samples were weighed to determine the dry weight of the sample and the weight of the water that was expelled during drying. The moisture content of the specimen is expressed as a percent and is the weight of the water compared to the dry weight of the specimen.

HAND PENETROMETER TESTS

In the hand penetrometer test, the unconfined compressive strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small calibrated, spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square-foot (tsf). Theoretically, the undrained shear strength of the cohesive sample is one-half the unconfined compressive strength. The undrained shear strength (based on the hand penetrometer test) presented on the boring logs is reported in units of kips per square-foot (ksf).

TORVANE SHEAR TESTS

In the Torvane test, the shear strength of a low strength, cohesive soil sample is estimated by measuring the resistance of the sample to a torque applied through vanes inserted into the sample. The undrained shear strength of the samples is measured from the maximum torque required to shear the sample and is reported in units of kips per square-foot (ksf).

LOSS-ON-IGNITION (ORGANIC CONTENT) TESTS

Loss-on-ignition (LOI) tests are conducted by first weighing the sample and then heating the sample to dry the moisture from the sample (in the same manner as determining the moisture content of the soil). The sample is then re-weighed to determine the dry weight and then heated for 4 hours in a muffle furnace at a high temperature (approximately 440º C). After cooling, the sample is re-weighed to calculate the amount of ash remaining, which in turn is used to determine the amount of organic matter burned from the original dry sample. The organic matter content of the specimen is expressed as a percent compared to the dry weight of the sample.

ATTERBERG LIMITS TESTS

Atterberg limits tests consist of two components. The plastic limit of a cohesive sample is determined by rolling the sample into a thread and the plastic limit is the moisture content where a 1/8-inch thread begins to crumble. The liquid limit is determined by placing a ½-inch thick soil pat into the liquid limits cup and using a grooving tool to divide the soil pat in half. The cup is then tapped on the base of the liquid limits device using a crank handle. The number of drops of the cup to close the gap formed by the grooving tool ½ inch is recorded along with the corresponding moisture content of the sample. This procedure is repeated several times at different moisture contents and a graph of moisture content and the corresponding number of blows is plotted. The liquid limit is defined as the moisture content at a nominal 25 drops of the cup. From this test, the plasticity index can be determined by subtracting the plastic limit from the liquid limit.

Subsurface Investigation for Underground Storage Tanks

Prepared For: Mike Kapetansky – SME

Prepared By:
Evan M. Soto
Project Manager-Michigan
7/25/2019

GPRS SUBSURFACE SCANNING SOLUTIONS

July 25, 2019

SME
Attn: Mike Kapetansky
Email: mike.kapetansky@sme-usa.com
Site: Wayne State University, Detroit, MI 48202

We appreciate the opportunity to provide this report for our work completed on July 19, 2019 at 1301 Wayne State University, Detroit, MI 48202.

PURPOSE

The purpose of this project was to identify potential orphan underground storage tanks (USTs), UST-related piping, former UST basins, or potential excavation sites in a specific area on the practice football field. The entire field was also requested to be scanned to mark out any potential subsurface anomalies that would indicate any past potential structures or foundations on site.

EQUIPMENT

- **400 MHz Ground Penetrating Radar (GPR) Antenna.** The antenna is mounted in a stroller frame which rolls over the surface. The surface needs to be reasonably smooth and unobstructed in order to obtain readable scans. Obstructions such as curbs, landscaping, and vegetation will limit the feasibility of GPR. The data is displayed on a screen and marked in the field in real time. GPR works by sending pulses of energy into a material and recording the strength and the time required for the return of the reflected signal. Reflections are produced when the energy pulses enter into a material with different electrical properties from the material it left. The strength of the reflection is determined by the contrast in signal speed between the two materials. The total depth achieved can be as much as 8' or more with this antenna but can vary widely depending on the conductivity of the materials. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: Link

- **Electromagnetic Pipe Locator.** The EM locator can detect the electromagnetic fields from live power or radio frequency signals. It can also be used in conjunction with a transmitter to connect directly to accessible, metallic pipes, risers, or tracer wires. A current is sent through the pipe or tracer wire at a specific frequency and the resulting EM field can then be detected by the receiver. The receiver is moved over the surface without coming in contact with the ground so it is not affected by terrain. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. Depths achieved can be as much as 20' depending on the type of signal being traced or methods used. For more information, please visit: Link

- **GPS.** This handheld GPS unit offers accuracy down to 4 inches; however, the accuracy will depend on the satellite environment and obstructions and should not be considered to be survey-grade. Features can be collected as points, lines, or areas and then exported into Google Earth or overlaid on a CAD drawing. For more information, please visit: Link

PROCESS

Initial GPR scans were collected in order to evaluate the data and calibrate the equipment. Based on these findings, a scanning strategy is formed, typically consisting of scanning the entire area in a grid with 3'-5' scan spacing in order to locate any potential UST's that may remain at the site. The GPR data is interpreted in real time and anomalies in the data are located and marked on the surface along with their depths using spray paint, pin flags, etc. Depths are dependent on the dielectric of the materials being scanned so depth accuracy can vary throughout a site. Relevant scan examples were saved and will be provided in this report.

LIMITATIONS

Please keep in mind that there are limitations to any subsurface investigation. The equipment may not achieve maximum effectiveness due to soil conditions, above ground obstructions, reinforced concrete, and a variety of other factors. No subsurface investigation or equipment can provide a complete image of what lies below. Our results should always be used in conjunction with as many methods as possible including consulting existing plans and drawings, exploratory excavation or potholing, visual inspection of above ground features, and utilization of services such as One Call/811. The interiors of buildings were excluded from the scope of this project and the only limitation on site was fencing surrounding the practice field.

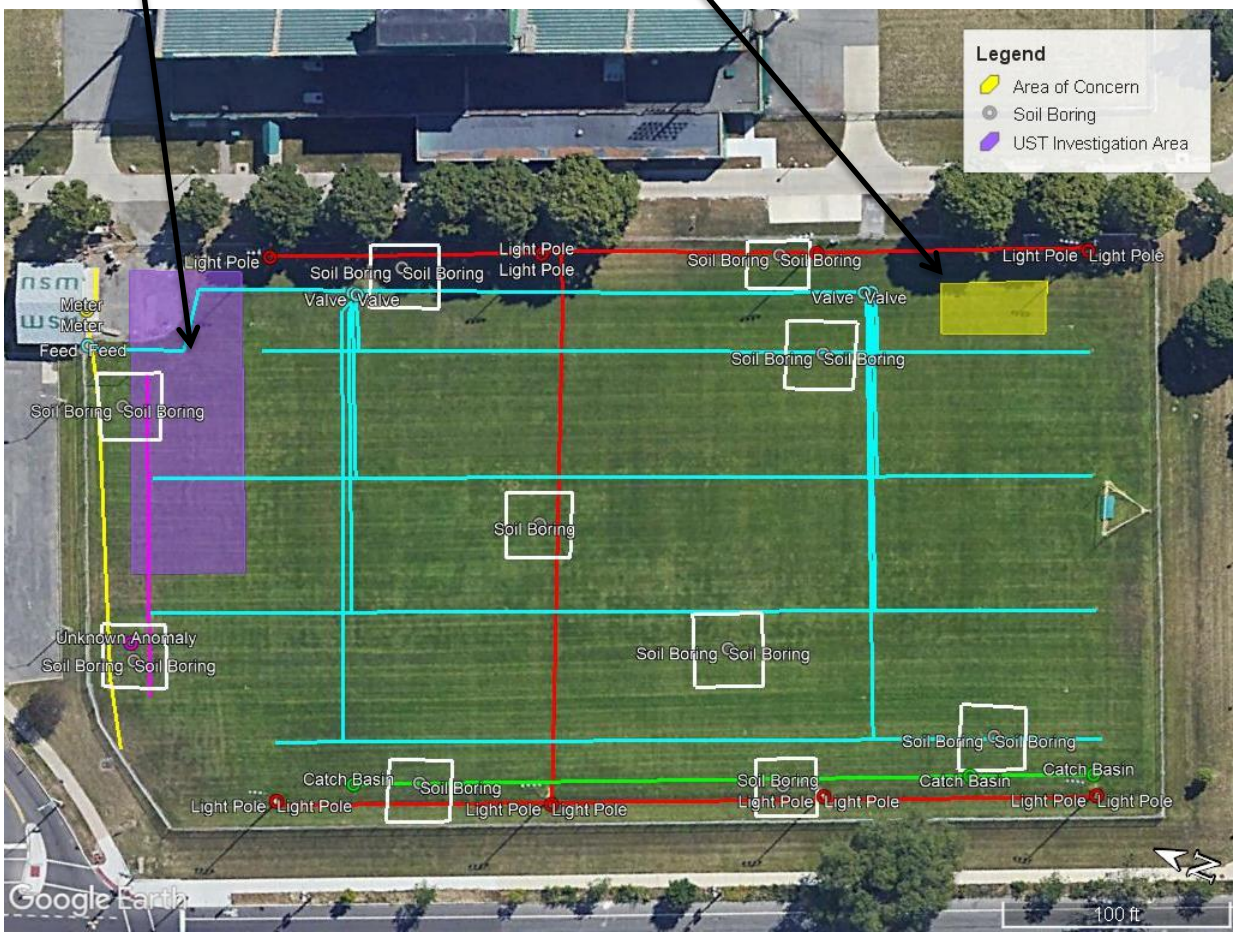
FINDINGS

We found that the soil on-site allowed for maximum GPR depth penetration of approximately 3.0-4.0 feet in most areas. In the area outlined by the client to search for potential USTs, GPRS did not detect any anomalies that would indicate a potential UST in the area. During scanning of the entire practice field GPRS detected one area of concern that was approximately 15.0 feet wide and approximately 30.0 feet long and approximately 1.0-2.0 feet below grade surface (bgs). Multiple utilities were also found on site.

Ten potential soil boring locations were also scanned and cleared at this location. All findings were marked on the ground surface and explained to site contact. The following pages will provide photos, an aerial outlining the survey area, GPR data screenshots, and further explanation of our findings. All findings were collected on GPS to be overlaid onto a map. The map of findings will be included with this report.

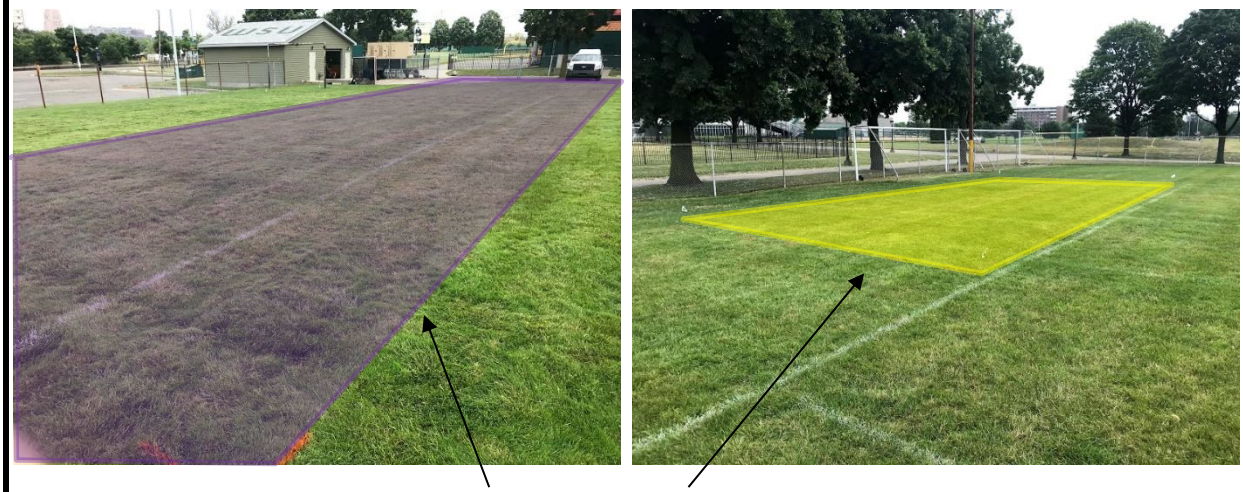
THIS SPACE INTENTIONALLY LEFT BLANK

Yellow area is an area of concern. Purple shaded area is scan area for UST search.



LARGER MAP TO ACCOMPANY REPORT

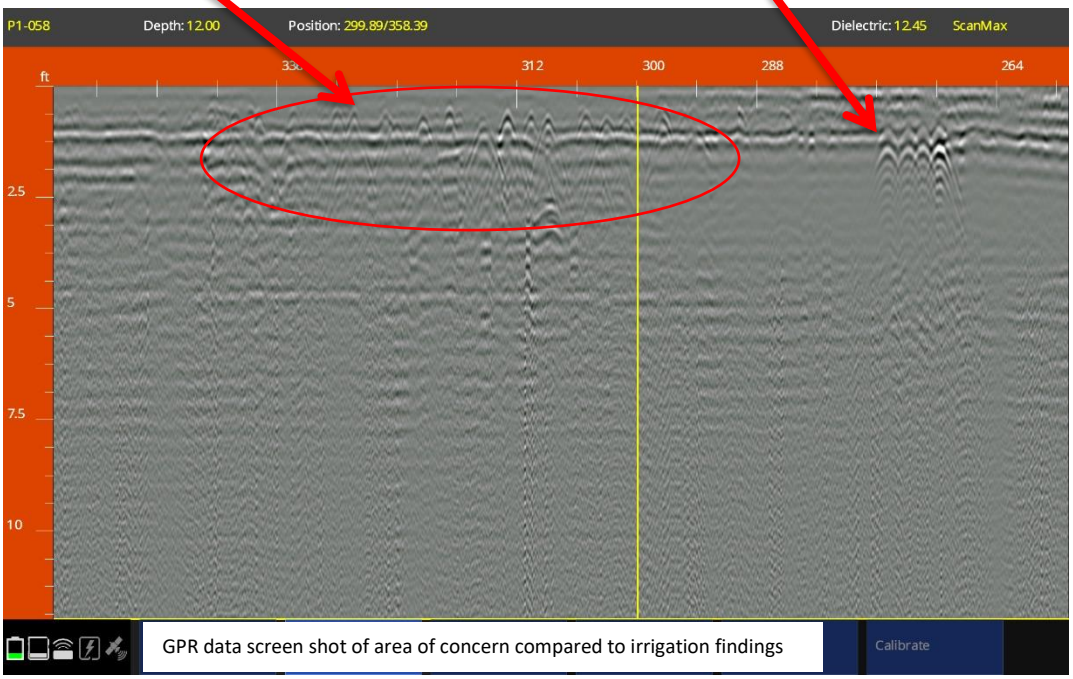
Aerial Map	**Wayne State University** **Detroit, MI 48202**	GPRS



Photos of UST investigation area and area of concern as depicted on aerial map

View of area of concern anomalies.

GPR reaction to irrigation lines detected



GPR data screen shot of area of concern compared to irrigation findings

Photos and GPR Data Screenshots	**Wayne State University** **Detroit, MI 48202**	GPRS

CONCLUSIONS AND RECOMENDATIONS

GPRS detected one area of concern, 15.0 feet wide and 30.0 feet long and approximately 1.0-2.0 feet bgs. Within the scan boundaries as outlined by site contact for UST location, GPRS did not detect any anomalies indicative of a potential UST. The potential exists that other anomalies/USTs could be present and not identified by the GPR survey if the location is outside of the GPR survey area, located directly below a limitation, and/or deeper than 4.0 feet bgs the physical limits of the GPR survey.

GPRS, Inc. has been in business since 2001, specializing in underground storage tank location, concrete scanning, utility locating, and shallow void detection for projects throughout the United States. I encourage you to visit our website (www.gprsinc.com) and contact any of the numerous references listed.

GPRS appreciates the opportunity to offer our services, and we look forward to continuing to work with you on future projects. Please feel free to contact us for additional information or with any questions you may have regarding this report.2

Sincerely,

Evan M. Soto
Project Manager Michigan
Cell: 810-834-8085
evan.soto@gprsinc.com
www.gprsinc.com

Brian Chmielewski
Senior Project Manager-Geologist Michigan
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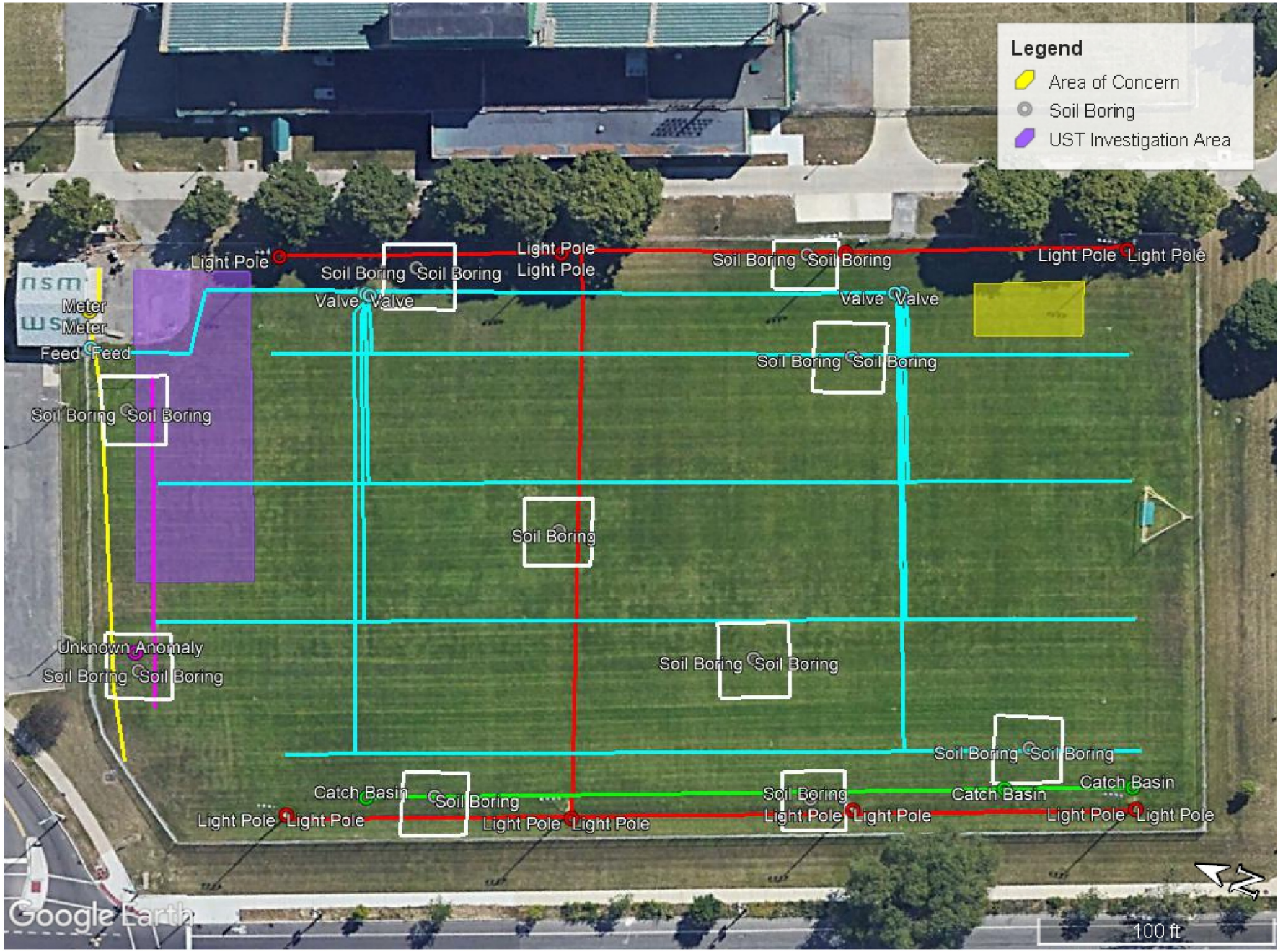
GPRS SUBSURFACE SCANNING SOLUTIONS



GPRS SUBSURFACE SCANNING SOLUTIONS

TERMS AND CONDITIONS

1. THIS DRAWING IS INTENDED TO DOCUMENT MARKINGS AND COMMENTS AS INTERPRETED BY GROUND PENETRATING RADAR SYSTEMS (GPRS). GPRS PROVIDES UTILITY LOCATION SERVICES IN ACCORDANCE WITH ASCE STANDARD 38-02, QUALITY LEVEL "B" THAT INCLUDES GROUND PENETRATING RADAR (GPR) SERVICES. GPR IS A GOOD TOOL FOR UTILITY LOCATING; HOWEVER, IT IS NOT WITHOUT ITS LIMITATIONS. IN GENERAL, THE MAXIMUM DEPTH PENETRATION IS 3-7' DEEP, HOWEVER, THIS DEPTH IS COMPLETELY DEPENDENT ON THE COMPOSITION OF SOILS IN THE AREA BEING SURVEYED. CUSTOMER FULLY UNDERSTANDS THAT FOR EVERY FOOT IN DEPTH PENETRATION WITH THE GPR EQUIPMENT, THE PIPE/UTILITY MUST BE AT LEAST 1" IN DIAMETER TO BE LOCATED. FOR EXAMPLE, AT 4 FEET IN DEPTH, THE PIPE/UTILITY MUST BE 4" OR LARGER TO BE DETECTED. SOME TYPES OF PIPES ARE VERY DIFFICULT TO LOCATE, SUCH AS CLAY OR CONCRETE PIPES, AND EMPTY PVC TYPE PIPES. GIVEN THESE FACTORS, GPRS CANNOT GUARANTEE IT WILL BE ABLE TO LOCATE ALL UTILITIES ON SITE.
2. GPRS DOES NOT PROVIDE LAND SURVEY, OR CIVIL ENGINEERING DATA COLLECTION OR DOCUMENTATION.
3. COLLECTED INFORMATION IS SUBJECT TO GPS/GIS HAND HELD MAPPING UNIT ACCURACY (SUB-METER).
4. OUR GOAL IS TO PROVIDE YOU WITH THE ANSWERS TO YOUR QUESTIONS REGARDING WHAT LIES BELOW THE SURFACE, AND WHERE IT IS LOCATED. CUSTOMER ACKNOWLEDGES IT UNDERSTANDS THAT OUR ANSWERS ARE BASED UPON THE QUALITY OF THE DATA RETRIEVED AND WHAT GPRS BELIEVES LIES BELOW THE SURFACE. THE DECISION TO PROCEED WITH CUTTING, CORING, DRILLING, BORING, OR EXCAVATION IS LEFT ENTIRELY UP TO THE CUSTOMER.
5. GPRS DOES NOT ACCEPT LIABILITY FOR AN INACCURATE INTERPRETATION OR ANY OTHER REASON, AND CUSTOMER AGREES TO RELEASE AND INDEMNIFY GPRS AND ITS OWNERS AND AGENTS FROM ALL LOSSES AND DAMAGES FROM ALL ALLEGED NEGLIGENCE AND/OR CONTRACT CLAIMS BY CUSTOMER OR ANY THIRD PARTY. THESE TERMS AND CONDITIONS SUPERSEDE ANY/ALL OTHER TERMS AND CONDITIONS EITHER ORAL OR WRITTEN.

LEGEND

- Electric
- Gas
- Water
- Comm
- Sewer
- Storm Drain
- Unknown Lines
- IE, UST
- IE, Project Boundaries
- IE, Chilled Water
- IE

SITE

Wayne State University
Detroit, MI 48202

TECHNICIAN

Evan M. Soto

DATE	07-19-2019

DRAWING NO. | REV.

The Kramer Building
43980 Plymouth Oaks Blvd.
Plymouth, MI 48170-2584

T (734) 454-9900

www.sme-usa.com

August 21, 2019

Ms. Alycsa Valentine
Construction Project Manager
Design & Construction Services
Wayne State University
5454 Cass Ave.
Detroit, MI 48202

Via Email: a.valentine@wayne.edu (pdf file)

RE: Phase II Assessment Summary Letter
WSU Recreation Field
Wayne State University
Detroit, Michigan
SME Project No. 082123.01

Dear Alycsa:

This report presents our environmental recommendations for the proposed artificial turf field on the Wayne State University athletic campus. This evaluation was performed per your authorization of our Proposal No. P01984.19, dated June 18, 2019.

In preparation of this report, we reviewed the following information:

- Phase I Environmental Site Assessment (ESA) Report prepared by NTH Consultants (dated December 14, 2000).
- Historical aerial imagery of the site available online.

PROJECT DESCRIPTION

The project consists of the redevelopment of an existing grass field at the southeast corner of Trumbull Ave and the I-94 Service Drive. Specifically, the grass field will be converted to an artificial turf field for the intramural sports program. We understand this will include some relatively minor earthwork (e.g. cuts/fills of about 2 feet or less) and installing a below-grade drainage system for the field. Furthermore, we understand that several light poles for the field will be installed around the perimeter.

Based on the Phase I ESA report (and aerial images for the site), the existing field previously consisted of a residential area until the 1960s, when it was developed for its current use. The Phase I ESA report also indicates that a gas station was formerly located at the northeast corner of the field.

Our August 6, 2019 Geotechnical Evaluation Report provided geotechnical recommendations related to the light pole installation and turf field construction. This letter summarizes the environmental services you requested to further evaluate the environmental concerns identified in the Phase I ESA, to obtain data to evaluate due care obligations during construction, and to characterize soils for disposal at a licensed landfill.

ENVIRONMENTAL ASSESSMENT

The number, locations, and depths of the soil borings for this project were determined by your project architect/engineer. Prior to advancing the soil borings, we subcontracted a private utility locating service to perform ground penetrating radar (GPR) scanning in a radius around each boring location. The GPR scanning was conducted during our site visit on July 19, 2019. GPR scanning was also conducted to assist the project surveyor (Nowak & Fraus) with locating existing/former utilities, former foundations/structures associated with historical uses, and to identify anomalies consistent with underground storage tanks related to a former gas station on the northwest portion of the site. The GPR scanning did not identify anomalies within the area of the former gas station or the areas adjacent to the soil boring locations.

The Geoprobe® drilling procedures were described in our Geotechnical Evaluation Report, dated August 6, 2019. We collected each soil sample for chemical analysis from the 3.5 feet – 4 feet interval (below grade). A portion of each discrete sample was also collected for a waste characterization composite sample for soil disposal purposes during construction. Prior to collecting the soil sample, SME field representatives screened a portion of the sample for volatile organic compounds (VOCs) using a 10.6 eV photoionization detector (PID). No PID readings greater than 1 ppm were noted.

The subsurface and groundwater conditions were also summarized in our August 6, 2019 Geotechnical Evaluation Report.

LABORATORY ANALYTICAL TESTING

We submitted nine discrete soil samples and one composite soil sample to Fibertec Environmental Services (Fibertec) of Holt, Michigan, for chemical analyses of one or more of the following parameters: volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, zinc (Michigan 10 Metals), and hexavalent chromium. The soil sample with the highest total chromium concentration was selected for additional analysis of hexavalent chromium. Fibertec reported that there was insufficient sample volume to conduct lead analysis on the fine/coarse size fraction of the sample with the highest lead concentration (SB6 3.5'-4'). The specific analytes for each discrete sample are presented in Table 1. We selected the target analytes to be representative of, or indicator parameters for, the contaminants reasonably expected to be present in the soil sampled at each location based on the known historical uses of the Property.

We submitted the composite sample for common waste characterization parameters that include Toxicity Characteristic Leaching Procedure (TCLP) analysis of VOCs, TCLP semi-VOCs, TCLP Michigan 10 Metals, TCLP pesticides, TCLP herbicides, total polychlorinated biphenyls (PCBs), and reactivity, corrosivity, and ignitability.

Fibertec analyzed the samples using the reference methods listed below:

- VOCs – USEPA Method 8260B
- PAHs – USEPA Method 8270C
- Hexavalent chromium – USEPA Method 7196A
- Mercury – USEPA Method 7471B
- Other metals – USEPA Methods 6020A
- TCLP VOCs – USEPA Methods 5030C/8260B
- TCLP SVOCs – USEPA Methods 5310C/8270E
- TCLP Michigan 10 Metals – USEPA Methods 3005A/6020A/7470A

- TCLP Pesticides – USEPA Methods 3510C/8081B
- TCLP Herbicides – USEPA Method 8151A
- PCBs – USEPA Methods 3546/8082A
- Reactivity, Corrosivity, Ignitability – USEPA Methods H2S, HCN, 9045D, 1030

The complete list of specific analytical reference methods, reporting limits, and chain of custody documentation for the samples collected are included in the attached Laboratory Report.

LABORATORY ANALYTICAL RESULTS

Results from the chemical analyses performed on discrete and composite soil samples collected during our assessment are summarized in the following paragraphs.

DISCRETE SOIL SAMPLES

The laboratory results for the discrete soil samples are presented in Table 1. We compared the results to Part 201 generic residential cleanup criteria (GRCC) in order to identify contamination and Part 201 generic nonresidential cleanup criteria (GNCC) in order to evaluate for due care obligation requirements during construction and the future nonresidential use of the Property.

Concentrations of benzo(a)pyrene, fluoranthene, phenathrene, arsenic, lead, mercury, selenium, and zinc were measured in soil at concentrations exceeded Part 201 GRCC. Benzo(a)pyrene and fluoranthene were measured at concentrations exceeding Part 201 criteria at two sample locations (SB-3 and SB-6), phenathrene and lead were measured at concentrations exceeding Part 201 criteria at one sample location (SB-6), arsenic was measured at concentrations exceeding Part 201 criteria at five sample locations (SB-2, SB-3, SB-4, SB-6, and LP-C), mercury and zinc were measured at concentrations exceeding Part 201 criteria at three sample locations (SB-2, SB-3 and SB-6), and selenium was measured at concentrations exceeding Part 201 criteria at four sample locations (SB-2, SB-3, SB-6, and LP-B). No other target analytes were measured at concentrations exceeding Part 201 criteria.

COMPOSITE SOIL SAMPLE

The composite soil sample TCLP and total laboratory results were non-detect and below the most-restrictive MDEQ residential cleanup criteria for the VOC's, SVOC, MI-10 metals, PCBs, pesticides, herbicides, reactivity, corrosivity was within a normal range, and ignitability was negative.

DATA VERIFICATION

We evaluated the field and laboratory quality control results and determined that the data collected during our assessment was representative and of useable quality for the project-specific objectives. The laboratory case narratives are included with the attached Laboratory Report.

CONCLUSIONS

Measured concentrations of the constituents benzo(a)pyrene, fluoranthene, phenanthrene, arsenic, lead, mercury, selenium, and zinc exceeded one or more Part 201 GRCC, including Drinking Water Protection, Groundwater Surface Water Interface Protection, and/or residential Direct Contact Criteria. Measured concentrations of fluoranthene, phenanthrene, arsenic, lead, mercury, and selenium exceeded Drinking Water Protection and/or Groundwater Surface Water Interface Protection GNCC; however, no concentrations exceed the nonresidential Direct Contact criteria. This information should be kept in the

Due Care file for the site for recordkeeping purposes. The composite soil sample laboratory report will need to be provided to the designated landfill for completion of the waste profile.

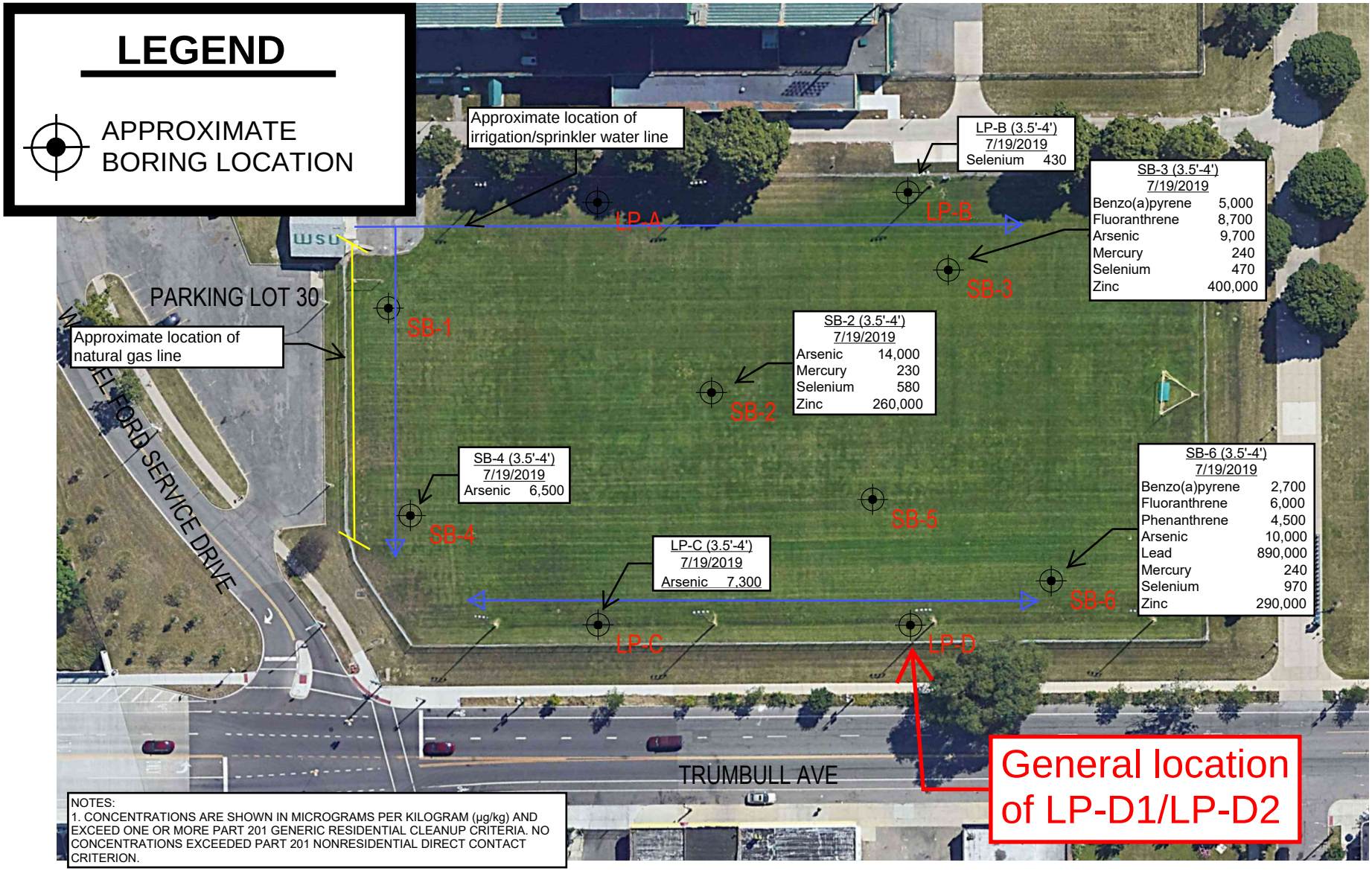
Sincerely,

SME

Paul A. Glasser
Senior Staff Geologist

Troy D. Helmick, CPG
Project Consultant

Attachments: Soil Exceedance Diagram
Summary of Analysis Results - Soil
Laboratory Report



SME

Indiana
Michigan
Ohio

DATE:	08/09/19
DRAWN BY:	CTV
WO #:	NA
JOB:	082123.01
SCALE:	NOT TO SCALE

SOIL EXCEEDANCE DIAGRAM
WSU RECREATION FIELD
WAYNE STATE UNIVERSITY
DETROIT, MICHIGAN

TABLE 1
SUMMARY OF ANALYSIS RESULTS - SOIL
WSU RECREATION FIELD
DETROIT, MICHIGAN
SME PROJECT NO. 082123.01

Constituent	Chemical Abstract Service Number	Statewide Default Background Value	Part 201 Generic Residential Cleanup Criteria		Part 201 Generic Nonresidential Cleanup Criteria		Groundwater Surface Water Interface Protection Criteria	CHEMICAL ANALYSIS RESULTS Sample Identification Depth (feet) Date Collected								
			Drinking Water Protection Criteria	Direct Contact Criteria	Drinking Water Protection Criteria	Direct Contact Criteria		SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	LP-B	LP-C	LP-D
								3.5'-4'	3.5'-4'	3.5'-4'	3.5'-4'	3.5'-4'	3.5'-4'	3.5'-4'	3.5'-4'	3.5'-4'
								7/19/2019	7/19/2019	7/19/2019	7/19/2019	7/19/2019	7/19/2019	7/19/2019	7/19/2019	7/19/2019
VOCs																
All Analyzed VOCs	CS	NA	CS	CS	CS	CS	CS	<RL	<RL	<RL	<RL	<RL	<RL	<RL	<RL	<RL
PAHs																
Acenaphthene	83-32-9	NA	300,000	41,000,000	880,000	130,000,000	8,700	<330	<330	<330	<330	<330	**360**	<330	<330	<330
Acenaphthylene	208-96-8	NA	5,900	1,600,000	17,000	5,200,000	ID	<330	<330	**580**	<330	<330	<330	<330	<330	<330
Anthracene	120-12-7	NA	41,000	230,000,000	41,000	730,000,000	ID	<330	<330	**750**	<330	<330	**1,100**	<330	<330	<330
Benzo(a)anthracene	56-55-3	NA	NLL	20,000	NLL	80,000	NLL	<330	<330	**5,000**	<330	<330	**2,600**	<330	<330	<330
Benzo(a)pyrene	50-32-8	NA	NLL	**2,000**	NLL	8,000	NLL	<330	<330	**5,000**	<330	<330	**2,700**	<330	<330	<330
Benzo(b)fluoranthene	205-99-2	NA	NLL	20,000	NLL	80,000	NLL	<330	**370**	**7,400**	<330	<330	**3,200**	<330	<330	<330
Benzo(g,h,i)perylene	191-24-2	NA	NLL	2,500,000	NLL	7,000,000	NLL	<330	<330	**3,000**	<330	<330	**1,700**	<330	<330	<330
Benzo(k)fluoranthene	207-08-9	NA	NLL	200,000	NLL	800,000	NLL	<330	<330	**2,400**	<330	<330	**1,000**	<330	<330	<330
Chrysene	218-01-9	NA	NLL	2,000,000	NLL	8,000,000	NLL	<330	<330	**4,500**	<330	<330	**2,700**	<330	<330	<330
Dibenzo(a,h)anthracene	53-70-3	NA	NLL	2,000	NLL	8,000	NLL	<330	<330	**790**	<330	<330	**430**	<330	<330	<330
Fluoranthene	206-44-0	NA	730,000	46,000,000	730,000	130,000,000	**5,500**	<330	**540**	**8,700**	<330	<330	**6,000**	<330	<330	<330
Fluorene	86-73-7	NA	390,000	27,000,000	890,000	87,000,000	5,300	<330	<330	<330	<330	<330	**530**	<330	<330	<330
Indeno(1,2,3-cd)pyrene	193-39-5	NA	NLL	20,000	NLL	80,000	NLL	<330	<330	**3,500**	<330	<330	**1,700**	<330	<330	<330
Phenanthrene	85-01-8	NA	56,000	1,600,000	160,000	5,200,000	**2,100**	<330	<330	**1,200**	<330	<330	**4,500**	<330	<330	<330
Pyrene	129-00-0	NA	480,000	29,000,000	480,000	84,000,000	ID	<330	**510**	**7,300**	<330	<330	**5,700**	<330	<330	<330
Metals																
Arsenic	7440-38-2	5,800	***5,800***	**7,600**	***5,800***	37,000	***5,800***	**4,300**	**14,000**	**9,700**	**6,500**	**4,900**	**10,000**	**4,600**	**7,300**	**3,800**
Barium	7440-39-3	75,000	1,300,000	37,000,000	1,300,000	130,000,000	440,000*	**42,000**	**74,000**	**240,000**	**43,000**	**37,000**	**260,000**	**46,000**	**110,000**	**44,000**
Cadmium	7440-43-9	1,200	6,000	550,000	6,000	2,100,000	3,600	**390**	**900**	**1,200**	**160**	**200**	**1,500**	**230**	**130**	**210**
Chromium, Total	7440-47-3	18,000 (total)	30,000	2,500,000	1,000,000,000	1,000,000,000	180,000	**10,000**	**16,000**	**12,000**	**15,000**	**9,400**	**21,000**	**14,000**	**28,000**	**14,000**
Chromium, Hexavalent	18540-29-9	NA	30,000	2,500,000	30,000	9,200,000	3,300	NE	NE	NE	NE	NE	NE	NE	<2,400	NE
Copper	7440-50-8	32,000	5,800,000	20,000,000	5,800,000	73,000,000	75,000*	**14,000**	**58,000**	**41,000**	**14,000**	**14,000**	**44,000**	**12,000**	**15,000**	**11,000**
Lead	7439-92-1	21,000	**700,000**	**400,000**	**700,000**	900,000	2,500,000*	**53,000**	**120,000**	**370,000**	**7,500**	**18,000**	**890,000**	**13,000**	**15,000**	**7,700**
Mercury	7439-97-6	130	1,700	160,000	1,700	580,000	***130***	**60**	**230**	**240**	<50	<50	**240**	**54**	<50	<50
Selenium	7782-49-2	410	4,000	2,600,000	4,000	9,600,000	***410***	**240**	**580**	**470**	**240**	<200	**970**	**430**	**300**	**360**
Silver	7440-22-4	1,000	4,500	2,500,000	13,000	9,000,000	*1,000*	<100	**110**	<100	<100	<100	**350**	<100	<100	<100
Zinc	7440-66-6	47,000	2,400,000	**170,000***	5,000,000	630,000,000	NLV	**44,000**	**260,000**	**400,000**	**43,000**	**42,000**	**290,000**	**40,000**	**58,000**	**48,000**

Notes:

1. Concentrations reported in micrograms per kilogram (µg/kg).
2. Analytical results were compared to December 30, 2013 Promulgated Cleanup Criteria, R 299.46, Table 2 and Table 3. Soil: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels; GSI Protection Criteria Updated June 25, 2018.
3. Results exceeding one or more criteria are shaded, as are the criteria exceeded.
4. VOCs - Volatile Organic Compounds. PAHs - Polynuclear Aromatic Hydrocarbons. Refer to the analytical report for the full list of VOC constituents.
5. CS - Criterion is specific to individual constituent.
6. <RL - Analytical result was below laboratory reporting limit(s).
7. ID - Insufficient data to develop criteria.
8. NA - Not applicable.
9. NE - Not evaluated.
10. NLV - Not likely to volatilize.
11. NLL - Not likely to leach.
12. * = GSI Protection was calculated for the indicated metals using the MDEQ spreadsheet for calculating GSI. A default water hardness value of 150 mg/kg as CaCO3 was used to calculate GSI. Results are presented for surface water receiving bodies not protected as a drinking water source.
13. *Italicized* - the respective criterion was below the Statewide Default Background Level (SDBL) and therefore the value defaulted to the SDBL value.
14. ** - Total chromium results compared to trivalent chromium criteria because hexavalent chromium was analyzed and not measured above the laboratory reporting limit in the soil sample that had the highest concentration.
15. Concentrations were also compared to, and found to be below, the ambient and indoor air criteria and the soil saturation concentration screening levels.
16. Laboratory indicated that there was not sufficient sample to complete the additional fine and coarse lead fraction analysis.

Fibertec
environmental
services

Thursday, August 01, 2019

Fibertec Project Number:	91693
Project Identification:	082123.01 /082123.01
Submittal Date:	07/22/2019

Mr. Troy Helmick
Soil and Materials Engineers, Inc. - Plymouth
43980 Plymouth Oaks Blvd
Plymouth, MI 48170

Dear Mr. Helmick,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

Stephanie Wallace

By Stephannie Wallace at 3:47 PM, Aug 01, 2019

For Daryl P. Strandbergh
Laboratory Director

Enclosures

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-1 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-001** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: SB-1 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
‡	1. Percent Moisture (Water Content)	**11**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-001** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: SB-1 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Arsenic	**4300**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	2. Barium	**42000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	3. Cadmium	**390**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	4. Chromium	**10000**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	5. Copper	**14000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	6. Lead	**53000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	7. Selenium	**240**		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	8. Silver	U		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	9. Zinc	**44000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-001** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: SB-1 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Mercury	**60**		µg/kg	50	8.6	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-001A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-1 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡	2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	7. Bromoform	U		µg/kg	130	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
	9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-1 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-001A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-1 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
14. Carbon Tetrachloride	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
15. Chlorobenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
17. Chloroform	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
34. trans-1,3-Dichloropropene	U		µg/kg	64	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
45. Styrene	U		µg/kg	64	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-1 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-001A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-1 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
49. Toluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
59. Vinyl Chloride	U		µg/kg	45	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-001** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-1 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
11. Fluoranthene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-1 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-001** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-1 (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
17. Pyrene (SIM)	U		µg/kg	330	10	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-2 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-002** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**12**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-002** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**14000**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
2. Barium	**74000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
3. Cadmium	**900**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
4. Chromium	**16000**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
5. Copper	**58000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
6. Lead	**120000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
7. Selenium	**580**		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
8. Silver	**110**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
9. Zinc	**260000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-002** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	**230**		µg/kg	50	8.5	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-002A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
7. Bromoform	U		µg/kg	130	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-2 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-002A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
14. Carbon Tetrachloride	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
15. Chlorobenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
17. Chloroform	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
34. trans-1,3-Dichloropropene	U		µg/kg	63	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
45. Styrene	U		µg/kg	63	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-2 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-002A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
49. Toluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
59. Vinyl Chloride	U		µg/kg	44	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-002** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-2 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	**370**		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
11. Fluoranthene (SIM)	**540**		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-2 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-002** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-2 (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
17. Pyrene (SIM)	**510**		µg/kg	330	1.0	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-3 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-003** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**16**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-003** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**9700**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
2. Barium	**240000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
3. Cadmium	**1200**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
4. Chromium	**12000**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
5. Copper	**41000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
6. Lead	**370000**		µg/kg	1000	50	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
7. Selenium	**470**		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
8. Silver	U		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
9. Zinc	**400000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-003** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	**240**		µg/kg	50	9.2	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-003A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
7. Bromoform	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-3 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-003A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
14. Carbon Tetrachloride	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
15. Chlorobenzene	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
17. Chloroform	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
27. 1,1-Dichloroethane	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
32. 1,2-Dichloropropane	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
33. cis-1,3-Dichloropropene	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
34. trans-1,3-Dichloropropene	U		µg/kg	76	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
45. Styrene	U		µg/kg	76	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-3 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-003A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
49. Toluene	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
50. 1,2,4-Trichlorobenzene	U		µg/kg	290	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
51. 1,1,1-Trichloroethane	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
52. 1,1,2-Trichloroethane	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
59. Vinyl Chloride	U		µg/kg	53	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-003** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-3 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	**580**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
3. Anthracene (SIM)	**750**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	**5000**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	**5000**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	**7400**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	**3000**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	**2400**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
9. Chrysene (SIM)	**4500**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	**790**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
11. Fluoranthene (SIM)	**8700**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	**3500**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-3 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-003** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-3 (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	**1200**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT
17. Pyrene (SIM)	**7300**		µg/kg	330	20	07/26/19	PS19G26F	07/26/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-4 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-004** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**11**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-004** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**6500**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
2. Barium	**43000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
3. Cadmium	**160**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
4. Chromium	**15000**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
5. Copper	**14000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
6. Lead	**7500**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
7. Selenium	**240**		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
8. Silver	U		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
9. Zinc	**43000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-004** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	U		µg/kg	50	8.6	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-004A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
7. Bromoform	U		µg/kg	130	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-4 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-004A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
14. Carbon Tetrachloride	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
15. Chlorobenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
17. Chloroform	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
34. trans-1,3-Dichloropropene	U		µg/kg	64	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
45. Styrene	U		µg/kg	64	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-4 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-004A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
49. Toluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
59. Vinyl Chloride	U		µg/kg	45	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-004** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-4 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-4 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**09:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-004** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-4 (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
17. Pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-5 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-005** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**16**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-005** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**4900**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
2. Barium	**37000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
3. Cadmium	**200**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
4. Chromium	**9400**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
5. Copper	**14000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
6. Lead	**18000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
7. Selenium	U		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
8. Silver	U		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
9. Zinc	**42000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-005** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	U		µg/kg	50	8.5	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-005A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
7. Bromoform	U		µg/kg	140	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-5 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-005A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
14. Carbon Tetrachloride	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
15. Chlorobenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
17. Chloroform	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
34. trans-1,3-Dichloropropene	U		µg/kg	69	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
45. Styrene	U		µg/kg	69	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-5 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-005A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
49. Toluene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
50. 1,2,4-Trichlorobenzene	U		µg/kg	260	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
59. Vinyl Chloride	U		µg/kg	48	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-005** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-5 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-5 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:45**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-005** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-5 (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
17. Pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-6 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-006** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: SB-6 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
‡	1. Percent Moisture (Water Content)	**12**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-006** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: SB-6 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Arsenic	**10000**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	2. Barium	**260000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	3. Cadmium	**1500**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	4. Chromium	**21000**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	5. Copper	**44000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	6. Lead	**890000**		µg/kg	1000	100	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	7. Selenium	**970**		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	8. Silver	**350**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
	9. Zinc	**290000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-006** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: SB-6 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Mercury	**240**		µg/kg	50	8.3	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-006A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-6 (3.5-4)**

							Preparation		Analysis		
	Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
	1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡	2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	7. Bromoform	U		µg/kg	130	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
	9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-6 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-006A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-6 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
14. Carbon Tetrachloride	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
15. Chlorobenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
17. Chloroform	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
34. trans-1,3-Dichloropropene	U		µg/kg	63	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
45. Styrene	U		µg/kg	63	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-6 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-006A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: SB-6 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
49. Toluene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
59. Vinyl Chloride	U		µg/kg	44	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-006** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-6 (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	**360**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
3. Anthracene (SIM)	**1100**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	**2600**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	**2700**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	**3200**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	**1700**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	**1000**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
9. Chrysene (SIM)	**2700**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	**430**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
11. Fluoranthene (SIM)	**6000**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
12. Fluorene (SIM)	**530**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	**1700**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**SB-6 (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**12:30**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-006** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: SB-6 (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	**4500**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
17. Pyrene (SIM)	**5700**		µg/kg	330	20	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-B (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-007** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**15**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-007** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**4600**		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
2. Barium	**46000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
3. Cadmium	**230**		µg/kg	50	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
4. Chromium	**14000**		µg/kg	500	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
5. Copper	**12000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
6. Lead	**13000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
7. Selenium	**430**		µg/kg	200	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
8. Silver	U		µg/kg	100	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM
9. Zinc	**40000**		µg/kg	1000	20	07/26/19	PT19G26A	07/26/19	T419G26A	SEM

Mercury by CVAAS **Aliquot ID: 91693-007** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	**54**		µg/kg	50	9.4	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-007A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
7. Bromoform	U		µg/kg	150	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-B (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-007A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
14. Carbon Tetrachloride	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
15. Chlorobenzene	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
17. Chloroform	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
27. 1,1-Dichloroethane	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
32. 1,2-Dichloropropane	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
33. cis-1,3-Dichloropropene	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
34. trans-1,3-Dichloropropene	U		µg/kg	73	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
45. Styrene	U		µg/kg	73	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-B (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-007A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
49. Toluene	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
50. 1,2,4-Trichlorobenzene	U		µg/kg	280	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
51. 1,1,1-Trichloroethane	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
52. 1,1,2-Trichloroethane	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
59. Vinyl Chloride	U		µg/kg	51	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-007** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-B (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**13:50**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-007** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: LP-B (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
17. Pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-C (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**18**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**7300**		µg/kg	100	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
2. Barium	**110000**		µg/kg	1000	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
3. Cadmium	**130**	LLV+	µg/kg	50	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
4. Chromium	**28000**	F+	µg/kg	500	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
5. Copper	**15000**		µg/kg	1000	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
6. Lead	**15000**		µg/kg	1000	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
7. Selenium	**300**		µg/kg	200	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
8. Silver	U		µg/kg	100	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
9. Zinc	**58000**		µg/kg	1000	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM

Mercury by CVAAS **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	U		µg/kg	50	9.1	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-008A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
7. Bromoform	U		µg/kg	160	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-C (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-008A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
14. Carbon Tetrachloride	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
15. Chlorobenzene	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
17. Chloroform	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
27. 1,1-Dichloroethane	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
32. 1,2-Dichloropropane	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
33. cis-1,3-Dichloropropene	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
34. trans-1,3-Dichloropropene	U		µg/kg	79	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
45. Styrene	U		µg/kg	79	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-C (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-008A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
49. Toluene	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
50. 1,2,4-Trichlorobenzene	U		µg/kg	300	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
51. 1,1,1-Trichloroethane	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
52. 1,1,2-Trichloroethane	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
59. Vinyl Chloride	U		µg/kg	56	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24A	07/24/19	VI19G24A	JLM

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-C (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
17. Pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-D (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-009** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**16**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Michigan 10 Elements by ICP/MS **Aliquot ID: 91693-009** **Matrix: Soil/Solid**
Method: EPA 0200.2/EPA 6020A **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	**3800**		µg/kg	100	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
2. Barium	**44000**		µg/kg	1000	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
3. Cadmium	**210**		µg/kg	50	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
4. Chromium	**14000**		µg/kg	500	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
5. Copper	**11000**		µg/kg	1000	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
6. Lead	**7700**		µg/kg	1000	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
7. Selenium	**360**		µg/kg	200	20	07/29/19	PT19G29B	07/30/19	T419G30A	SEM
8. Silver	U		µg/kg	100	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM
9. Zinc	**48000**		µg/kg	1000	20	07/29/19	PT19G29B	07/29/19	T419G29A	SEM

Mercury by CVAAS **Aliquot ID: 91693-009** **Matrix: Soil/Solid**
Method: EPA 7471B **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	U		µg/kg	50	9.2	07/26/19	PM19G26B	07/26/19	M719G26A	JLH

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-009A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
3. Benzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
4. Bromobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
5. Bromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
6. Bromodichloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
7. Bromoform	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
8. Bromomethane	U		µg/kg	200	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
9. 2-Butanone	U		µg/kg	750	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-D (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-009A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
10. n-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
11. sec-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
12. tert-Butylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
13. Carbon Disulfide	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
14. Carbon Tetrachloride	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
15. Chlorobenzene	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
16. Chloroethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
17. Chloroform	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
18. Chloromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
19. 2-Chlorotoluene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
21. Dibromochloromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
22. Dibromomethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
27. 1,1-Dichloroethane	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
32. 1,2-Dichloropropane	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
33. cis-1,3-Dichloropropene	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
34. trans-1,3-Dichloropropene	U		µg/kg	73	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
35. Ethylbenzene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
36. Ethylene Dibromide	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
37. 2-Hexanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
38. Isopropylbenzene	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
39. 4-Methyl-2-pentanone	U		µg/kg	2500	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
40. Methylene Chloride	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
42. MTBE	U		µg/kg	250	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
43. Naphthalene	U		µg/kg	330	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
44. n-Propylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
45. Styrene	U		µg/kg	73	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
46. 1,1,1,2-Tetrachloroethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-D (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 **Aliquot ID: 91693-009A** **Matrix: Soil/Solid**
Method: EPA 5035A/EPA 8260B **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
48. Tetrachloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
49. Toluene	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
50. 1,2,4-Trichlorobenzene	U		µg/kg	280	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
51. 1,1,1-Trichloroethane	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
52. 1,1,2-Trichloroethane	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
53. Trichloroethene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
54. Trichlorofluoromethane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
59. Vinyl Chloride	U		µg/kg	51	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
60. m&p-Xylene	U		µg/kg	100	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
61. o-Xylene	U		µg/kg	50	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP
‡ 62. Xylenes	U		µg/kg	150	1.0	07/24/19	VI19G24B	07/25/19	VI19G24B	MJP

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-009** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: LP-D (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
3. Anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
9. Chrysene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
12. Fluorene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
15. Naphthalene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-D (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**11:15**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) **Aliquot ID: 91693-009** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8270E **Description: LP-D (3.5-4)**

						Preparation		Analysis		
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	P. Date	P. Batch	A. Date	A. Batch	Init.
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT
17. Pyrene (SIM)	U		µg/kg	330	1.0	07/26/19	PS19G26F	07/27/19	SN19G26B	TKT

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**WC1**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**15**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Ignitability of Solids (Waste Characterization) **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA 1030 **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Ignitability	**negative**		mm/s	0.01	1.0	NA	NA	07/26/19	WX19G26A	AMS

Toxicity Characteristic Leaching Procedure (TCLP) **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA 1311 **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. TCLP Date	**07/24/2019**		NA	NA	1.0	NA	NA	07/24/19	NA	CMB

Toxicity Characteristic Leaching Procedure (TCLP), Zero Headspace **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA 1311 **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. TCLP Date	**7/24/19**		NA	NA	1.0	NA	NA	07/24/19	NA	JLM

Polychlorinated Biphenyls (PCBs) **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA 3546/EPA 8082A **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
2. Aroclor-1221	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
3. Aroclor-1232	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
4. Aroclor-1242	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
5. Aroclor-1248	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
6. Aroclor-1254	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
7. Aroclor-1260	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	07/25/19	PS19G25A	07/25/19	SF19G25B	RDK

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**WC1**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Corrosivity (Waste Characterization); Soil/waste pH measured in water at the reported **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA 9045D **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Corrosivity (pH)	**8.91**	H	pH Units	-1.00	1.0	NA	NA	07/24/19 12:45	WD19G24A	AMS
‡ 2. Temperature	**22**		°C	1.0	1.0	NA	NA	07/24/19 12:45	WD19G24A	AMS

Reactive Sulfide (Waste Characterization) **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA H2S **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Sulfide, Reactive	U		mg/kg	6.6	1.0	07/29/19	WG19G29A	07/29/19	WG19G29A	CMB

Reactive Cyanide (Waste Characterization) **Aliquot ID: 91693-010** **Matrix: Soil/Solid**
Method: EPA HCN **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Cyanide, Reactive	U	L-	mg/kg	8.6	1.0	07/29/19	WG19G29A	07/29/19	WG19G29A	VO

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**WC1**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

TCLP MI-10 Metals by ICP/MS **Aliquot ID: 91693-010B** **Matrix: TCLP Extract**
Method: EPA 3005A (Total Recoverable)/EPA 6020A **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Arsenic	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
2. Barium	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
3. Cadmium	U		mg/L	0.20	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
4. Chromium	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
5. Copper	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
6. Lead	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
7. Selenium	U		mg/L	0.20	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
8. Silver	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM
9. Zinc	U		mg/L	1.0	20	07/29/19	PT19G29E	07/30/19	T419G30A	SEM

TCLP Mercury **Aliquot ID: 91693-010B** **Matrix: TCLP Extract**
Method: EPA 7470A **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Mercury	U		mg/L	0.050	8.0	07/29/19	PM19G29B	07/29/19	M719G29A	JLH

TCLP Pesticides **Aliquot ID: 91693-010A** **Matrix: TCLP Extract**
Method: EPA 3510C/EPA 8081B **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. gamma-BHC	U		mg/L	0.00010	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK
2. Chlordane	U		mg/L	0.00010	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK
3. Endrin	U		mg/L	0.00010	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK
4. Heptachlor	U		mg/L	0.00010	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK
5. Heptachlor Epoxide	U		mg/L	0.00010	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK
6. Methoxychlor	U		mg/L	0.00050	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK
7. Toxaphene	U		mg/L	0.0010	1.6	07/26/19	PS19G26C	07/27/19	SF19G27A	RDK

TCLP Herbicides **Aliquot ID: 91693-010A** **Matrix: TCLP Extract**
Method: EPA 8151A **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. 2,4-D	U		mg/L	0.010	8.2	07/25/19	PS19G25G	07/27/19	SC19G24B	RDK
‡ 2. 2,4,5-TP	U		mg/L	0.0016	8.2	07/25/19	PS19G25G	07/27/19	SC19G24B	RDK

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**WC1**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**15:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

TCLP Volatiles **Aliquot ID: 91693-010C** **Matrix: TCLP Extract**
Method: EPA 5030C/EPA 8260B **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Benzene	U		mg/L	0.10	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
2. 2-Butanone	U		mg/L	40	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
3. Carbon Tetrachloride	U		mg/L	0.10	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
4. Chlorobenzene	U		mg/L	20	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
5. Chloroform	U		mg/L	1.2	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
6. 1,4-Dichlorobenzene	U		mg/L	1.5	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
7. 1,2-Dichloroethane	U		mg/L	0.10	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
8. 1,1-Dichloroethene	U		mg/L	0.14	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
9. Tetrachloroethene	U		mg/L	0.14	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
10. Trichloroethene	U		mg/L	0.10	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK
11. Vinyl Chloride	U		mg/L	0.10	200	07/25/19	VB19G25A	07/25/19	VB19G25A	MAK

TCLP Semivolatiles **Aliquot ID: 91693-010A** **Matrix: TCLP Extract**
Method: EPA 3510C/EPA 8270E **Description: WC1**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. 2,4-Dinitrotoluene	U		mg/L	0.025	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
2. Hexachlorobenzene	U		mg/L	0.025	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
3. Hexachlorobutadiene	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
4. Hexachloroethane	U	L-	mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
5. 2-Methylphenol	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
‡ 6. 3&4-Methylphenol	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
7. Nitrobenzene	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
8. Pentachlorophenol	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
9. Pyridine	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
10. 2,4,5-Trichlorophenol	U	*	mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP
11. 2,4,6-Trichlorophenol	U		mg/L	0.10	1.6	07/25/19	PS19G25D	07/25/19	SJ19G25A	GJP

Definitions/ Qualifiers:

A: Spike recovery or precision unusable due to dilution.
B: The analyte was detected in the associated method blank.
E: The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
J: The concentration is an estimated value.
M: Modified Method
U: The analyte was not detected at or above the reporting limit.
X: Matrix Interference has resulted in a raised reporting limit or distorted result.
W: Results reported on a wet-weight basis.
***:** Value reported is outside QC limits

Exception Summary:

***** : Duplicate analysis not within control limits.
F+ : Recovery from the spiked aliquot exceeds the upper control limit (matrix spike or matrix spike duplicate).
H : Hold time exceeded.
L- : Recovery in the associated laboratory sample (LCS) exceeds the lower control limit. Results may be biased low.
LLV : Recovery in the associated low-level continuing calibration verification sample (LLCCV) exceeds the upper control limit. Results may be biased high.

Analysis Locations:

All analyses performed in Holt.

NELAP ACCREDITED TNI LABORATORY

Accreditation Number(s):

T104704518-19-8 (TX)

Fibertec
environmental
services

Friday, August 09, 2019

Fibertec Project Number:	91693 Supplemental
Project Identification:	082123.01 /082123.01
Submittal Date:	07/22/2019

Mr. Troy Helmick
Soil and Materials Engineers, Inc. - Plymouth
43980 Plymouth Oaks Blvd
Plymouth, MI 48170

Dear Mr. Helmick,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

Trivalent Chromium was detected at 27580 ug/L in sample -008.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

By Sharon Rakow at 3:35 PM, Aug 09, 2019

For Daryl P. Strandbergh
Laboratory Director

Enclosures

Client Identification:	**Soil and Materials Engineers, Inc. - Plymouth**	Sample Description:	**LP-C (3.5-4)**	Chain of Custody:	**176359**
Client Project Name:	**082123.01**	Sample No:		Collect Date:	**07/19/19**
Client Project No:	**082123.01**	Sample Matrix:	**Soil/Solid**	Collect Time:	**10:00**

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: ASTM D2216-10 **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	**18**		%	1	1.0	07/25/19	MC190725	07/26/19	MC190725	JBA

Chromium, Hexavalent **Aliquot ID: 91693-008** **Matrix: Soil/Solid**
Method: EPA 3060A/EPA 7196A **Description: LP-C (3.5-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Chromium VI	U		µg/kg	2400	5.0	08/05/19	W219H05A	08/07/19	W219H05A	AMS

Definitions/ Qualifiers:

A: Spike recovery or precision unusable due to dilution.
B: The analyte was detected in the associated method blank.
E: The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
J: The concentration is an estimated value.
M: Modified Method
U: The analyte was not detected at or above the reporting limit.
X: Matrix Interference has resulted in a raised reporting limit or distorted result.
W: Results reported on a wet-weight basis.
***:** Value reported is outside QC limits

Exception Summary:

Analysis Locations:

All analyses performed in Holt.

NELAP ACCREDITED TNI LABORATORY

Accreditation Number(s):

T104704518-19-8 (TX)

PM19G26B: Method Blank (MB) — EPA 7471B

Run Time: PM19G26B.MB 07/26/2019 13:22 [M719G26A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Mercury	U		50

PM19G26B: Laboratory Control Sample (LCS) — EPA 7471B

Run Time: PM19G26B.LCS: 07/26/2019 13:23 [M719G26A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/kg	µg/kg	%	%	
Mercury	200	182	91	85-115	

PM19G29B: Method Blank (MB) — EPA 7470A

Run Time: PM19G29B.MB 07/29/2019 12:05 [M719G29A]

Analyte	MB Result	MB Qualifier	MB RDL
	mg/L		mg/L
Mercury	U		0.050

PM19G29B: Laboratory Control Sample (LCS) — EPA 7470A

Run Time: PM19G29B.LCS: 07/29/2019 12:07 [M719G29A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/L	mg/L	%	%	
Mercury	0.000250	0.000254	102	85-115	

PS19G25A: Method Blank (MB)

EPA 8082A

Run Time: PS19G25A.MB 07/25/2019 17:27 [SF19G25B]

Analyte	MB Result µg/kg	MB Qualifier	MB RDL µg/kg
Aroclor-1016	U		100
Aroclor-1260	U		100
Decachlorobiphenyl-PCB(S)	*82*		*40-143*
2,4,5,6-Tetrachloro-m-xylene-PCB(S)	*69*		*42-133*

PS19G25A: Laboratory Control Sample (LCS)

EPA 8082A

Run Time: PS19G25A.LCS: 07/25/2019 17:39 [SF19G25B]

Analyte	LCS Spike Amount µg/kg	LCS Result µg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Aroclor-1016	667	540	81	60-120	
Aroclor-1260	667	519	78	60-120	
Decachlorobiphenyl-PCB(S)			*121*	*40-143*	
2,4,5,6-Tetrachloro-m-xylene-PCB(S			*93*	*42-133*	

PS19G25D: Method Blank (MB)

EPA 8270E

Run Time: PS19G25D.MB 07/25/2019 16:27 [SJ19G25A]

Analyte	MB Result	MB Qualifier	MB RDL
	mg/L		mg/L
2,4-Dinitrotoluene	U		0.025
Hexachlorobenzene	U		0.025
Hexachlorobutadiene	U		0.10
Hexachloroethane	U		0.10
2-Methylphenol	U		0.10
3&4-Methylphenol	U		0.10
Nitrobenzene	U		0.10
Pentachlorophenol	U		0.10
Pyridine	U		0.10
2,4,5-Trichlorophenol	U		0.10
2,4,6-Trichlorophenol	U		0.10
2-Fluorobiphenyl(S)	*67*		*44-109*
1-Fluoronaphthalene(S)	*58*		*44-103*
2-Fluorophenol(S)	*32*		*22-85*
Phenol-d6(S)	*33*		*11-60*
4-Terphenyl-d14(S)	*82*		*44-124*
2,4,6-Tribromophenol(S)	*74*		*38-138*

PS19G25D: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8270E

Run Time: PS19G25D.LCS: 07/25/2019 17:05 [SJ19G25A] PS19G25D.LCSD: 07/25/2019 17:44 [SJ19G25A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	mg/L	mg/L	%	%		mg/L	mg/L	%		%	%	
2,4-Dinitrotoluene	0.0800	0.0722	90	68-119		0.0800	0.0747	93		3	30	
Hexachlorobenzene	0.0800	0.0638	80	60-113		0.0800	0.0652	81		1	30	
Hexachlorobutadiene	0.0800	0.0412	51	38-116		0.0800	0.0427	53		4	30	
Hexachloroethane	0.0800	0.0380	48	55-113	*	0.0800	0.0420	53	*	10	30	
2-Methylphenol	0.0800	0.0558	70	39-103		0.0800	0.0589	74		6	30	
3&4-Methylphenol	0.0800	0.0454	57	30-86		0.0800	0.0474	59		3	30	
Nitrobenzene	0.0800	0.0676	85	56-111		0.0800	0.0793	99		15	30	
Pentachlorophenol	0.0800	0.0629	79	46-115		0.0800	0.0640	80		1	30	
Pyridine	0.0800	0.0243	30	15-68		0.0800	0.0231	29		3	30	
2,4,5-Trichlorophenol	0.0800	0.0523	65	55-112		0.0800	0.0774	97		40	30	*
2,4,6-Trichlorophenol	0.0800	0.0526	66	60-115		0.0800	0.0668	84		24	30	
2-Fluorobiphenyl(S)			*63*	*44-109*				*79*				
1-Fluoronaphthalene(S)			*75*	*44-103*				*78*				
2-Fluorophenol(S)			*58*	*22-85*				*63*				
Phenol-d6(S)			*37*	*11-60*				*39*				
4-Terphenyl-d14(S)			*97*	*44-124*				*101*				
2,4,6-Tribromophenol(S)			*87*	*38-138*				*90*				

PS19G25G: Method Blank (MB) — EPA 8151A

Run Time: PS19G25G.MB 07/27/2019 09:38 [SC19G24B]

Analyte	MB Result	MB Qualifier	MB RDL
	mg/L		mg/L
2,4-D	U		0.010
2,4,5-TP	U		0.0010
DCAA(S)	*97*		*10-120*

PS19G25G: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8151A

Run Time: PS19G25G.LCS: 07/27/2019 10:27 [SC19G24B] PS19G25G.LCSD: 07/27/2019 11:15 [SC19G24B]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	mg/L	mg/L	%	%		mg/L	mg/L	%		%	%	
2,4-D	0.0100	0.00933	93	62-128		0.0100	0.00964	96		3	20	
2,4,5-TP	0.0100	0.00960	96	56-136		0.0100	0.00983	98		2	20	
DCAA(S)			*110*	*10-120*				*117*				

PS19G26C: Method Blank (MB) — EPA 8081B

Run Time: PS19G26C.MB 07/27/2019 15:28 [SF19G27A]

Analyte	MB Result	MB Qualifier	MB RDL
	mg/L		mg/L
gamma-BHC	U		0.00010
Endrin	U		0.00010
Heptachlor	U		0.00010
Heptachlor Epoxide	U		0.00010
Methoxychlor	U		0.00050
Decachlorobiphenyl-PST(S)	*78*		*54-135*
2,4,5,6-Tetrachloro-m-xylene-PST(S)	*41*		*26-136*

PS19G26C: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8081B

Run Time: PS19G26C.LCS: 07/27/2019 15:42 [SF19G27A] PS19G26C.LCSD: 07/27/2019 15:56 [SF19G27A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	mg/L	mg/L	%	%		mg/L	mg/L	%		%	%	
gamma-BHC	0.000100	0.0000805	80	71-115		0.000100	0.0000853	85		6	20	
Endrin	0.000100	0.000103	103	65-106		0.000100	0.000111	111	*	7	20	
Heptachlor	0.000100	0.0000604	60	55-107		0.000100	0.0000626	63		5	20	
Heptachlor Epoxide	0.000100	0.0000959	96	71-117		0.000100	0.0000990	99		3	20	
Methoxychlor	0.000100	0.000115	115	70-120		0.000100	0.000120	120		4	20	
Decachlorobiphenyl-PST(S)			*84*	*54-135*				*83*				
Decachlorobiphenyl-PST(S)			*82*	*54-135*				*83*				
2,4,5,6-Tetrachloro-m-xylene-PST(S			*48*	*26-136*				*49*				
2,4,5,6-Tetrachloro-m-xylene-PST(S			*46*	*26-136*				*49*				

PS19G26F: Method Blank (MB)

EPA 8270E

Run Time: PS19G26F.MB 07/26/2019 17:35 [SN19G26B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Acenaphthene (SIM)	U		330
Acenaphthylene (SIM)	U		330
Anthracene (SIM)	U		330
Benzo(a)anthracene (SIM)	U		330
Benzo(a)pyrene (SIM)	U		330
Benzo(b)fluoranthene (SIM)	U		330
Benzo(ghi)perylene (SIM)	U		330
Benzo(k)fluoranthene (SIM)	U		330
Chrysene (SIM)	U		330
Dibenzo(a,h)anthracene (SIM)	U		330
Fluoranthene (SIM)	U		330
Fluorene (SIM)	U		330
Indeno(1,2,3-cd)pyrene (SIM)	U		330
2-Methylnaphthalene (SIM)	U		330
Naphthalene (SIM)	U		330
Phenanthrene (SIM)	U		330
Pyrene (SIM)	U		330
2-Fluorobiphenyl(S)	*53*		*49-115*
1-Fluoronaphthalene(S)	*54*		*46-114*
4-Terphenyl-d14(S)	*74*		*48-117*

PS19G26F: Laboratory Control Sample (LCS)

EPA 8270E

Run Time: PS19G26F.LCS: 07/29/2019 13:54 [S519G29A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/kg	µg/kg	%	%	
Acenaphthene (SIM)	5330	4050	76	52-105	
Acenaphthylene (SIM)	5330	3930	74	56-112	
Anthracene (SIM)	5330	4050	76	56-102	
Benzo(a)anthracene (SIM)	5330	4410	83	53-110	
Benzo(a)pyrene (SIM)	5330	4960	93	59-125	
Benzo(b)fluoranthene (SIM)	5330	4770	89	57-130	
Benzo(ghi)perylene (SIM)	5330	4820	90	35-124	
Benzo(k)fluoranthene (SIM)	5330	4570	86	53-127	
Chrysene (SIM)	5330	4670	88	50-112	
Dibenzo(a,h)anthracene (SIM)	5330	4920	92	51-122	
Fluoranthene (SIM)	5330	4490	84	47-135	
Fluorene (SIM)	5330	4010	75	51-112	
Indeno(1,2,3-cd)pyrene (SIM)	5330	4840	91	49-130	
2-Methylnaphthalene (SIM)	5330	4410	83	45-94	
Naphthalene (SIM)	5330	3600	68	53-96	
Phenanthrene (SIM)	5330	3940	74	50-103	
Pyrene (SIM)	5330	4230	79	48-129	
2-Fluorobiphenyl(S)			*69*	*49-115*	
1-Fluoronaphthalene(S)			*85*	*46-114*	
4-Terphenyl-d14(S)			*93*	*48-117*	

PT19G26A: Method Blank (MB)

EPA 6020A

Run Time: PT19G26A.MB 07/26/2019 14:03 [T419G26A]

Analyte	MB Result µg/kg	MB Qualifier	MB RDL µg/kg
Arsenic	U		100
Barium	U		1000
Cadmium	U		50
Chromium	U		500
Copper	U		1000
Lead	U		1000
Selenium	U		200
Silver	U		100
Zinc	U		1000

PT19G26A: Laboratory Control Sample (LCS)

EPA 6020A

Run Time: PT19G26A.LCS: 07/26/2019 14:04 [T419G26A]

Analyte	LCS Spike Amount µg/kg	LCS Result µg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	10000	9850	99	85-115	
Barium	50000	54600	109	85-115	
Cadmium	10000	10400	104	85-115	
Chromium	20000	19800	99	85-115	
Copper	20000	20500	103	85-115	
Lead	20000	19500	97	85-115	
Selenium	10000	10200	102	85-115	
Silver	10000	11200	112	85-115	
Zinc	50000	49600	99	85-115	

PT19G29B: Method Blank (MB) — EPA 6020A

Run Time: PT19G29B.MB 07/30/2019 17:57 [T419G30A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Arsenic	U		100
Barium	U		1000
Cadmium	U		50
Chromium	U		500
Copper	U		1000
Lead	U		1000
Selenium	U		200
Silver	U		100
Zinc	U		1000

PT19G29B: Laboratory Control Sample (LCS) — EPA 6020A

Run Time: PT19G29B.LCS: 07/30/2019 13:54 [T419G30A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/kg	µg/kg	%	%	
Arsenic	10000	9640	96	85-115	
Barium	50000	49100	98	85-115	
Cadmium	10000	9530	95	85-115	
Chromium	20000	18500	92	85-115	
Copper	20000	20200	101	85-115	
Lead	20000	17700	89	85-115	
Selenium	10000	9730	97	85-115	
Silver	10000	10500	105	85-115	
Zinc	50000	52400	105	85-115	

PT19G29E: Method Blank (MB)

EPA 6020A

Run Time: PT19G29E.MB 07/30/2019 12:56 [T419G30A]

Analyte	MB Result	MB Qualifier	MB RDL
	mg/L		mg/L
Arsenic	U		1.0
Barium	U		1.0
Cadmium	U		0.20
Chromium	U		1.0
Copper	U		1.0
Lead	U		1.0
Selenium	U		0.20
Silver	U		1.0
Zinc	U		1.0

PT19G29E: Laboratory Control Sample (LCS)

EPA 6020A

Run Time: PT19G29E.LCS: 07/30/2019 12:59 [T419G30A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/L	mg/L	%	%	
Arsenic	2.00	1.86	93	85-115	
Barium	10.0	9.73	97	85-115	
Cadmium	2.00	1.93	96	85-115	
Chromium	4.00	3.68	92	85-115	
Copper	4.00	4.02	100	85-115	
Lead	4.00	3.45	86	85-115	
Selenium	2.00	1.93	96	85-115	
Silver	2.00	2.10	105	85-115	
Zinc	10.0	10.0	100	85-115	

VB19G25A: Method Blank (MB)

EPA 8260B

Run Time: VB19G25A.MB 07/25/2019 12:31 [VB19G25A]

Analyte	MB Result	MB Qualifier	MB RDL
	mg/L		mg/L
Benzene	U		0.10
2-Butanone	U		40
Carbon Tetrachloride	U		0.10
Chlorobenzene	U		20
Chloroform	U		1.2
1,4-Dichlorobenzene	U		1.5
1,2-Dichloroethane	U		0.10
1,1-Dichloroethene	U		0.14
Tetrachloroethene	U		0.14
Trichloroethene	U		0.10
Vinyl Chloride	U		0.040
4-Bromofluorobenzene(S)	*95*		*80-120*
Dibromofluoromethane(S)	*99*		*80-120*
1,2-Dichloroethane-d4(S)	*104*		*80-120*
Toluene-d8(S)	*100*		*80-120*

VB19G25A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260B

Run Time: VB19G25A.LCS: 07/25/2019 11:11 [VB19G25A] VB19G25A.LCSD: 07/25/2019 11:37 [VB19G25A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	mg/L	mg/L	%	%		mg/L	mg/L	%		%	%	
Benzene	0.0500	0.0495	99	80-120		0.0500	0.0465	93		6	20	
2-Butanone	0.0500	0.0453	91	70-148		0.0500	0.0385	77		17	20	
Carbon Tetrachloride	0.0500	0.0550	110	70-130		0.0500	0.0511	102		8	20	
Chlorobenzene	0.0500	0.0497	99	80-120		0.0500	0.0473	95		4	20	
Chloroform	0.0500	0.0514	103	80-120		0.0500	0.0489	98		5	20	
1,4-Dichlorobenzene	0.0500	0.0485	97	75-125		0.0500	0.0456	91		6	20	
1,2-Dichloroethane	0.0500	0.0506	101	70-130		0.0500	0.0486	97		4	20	
1,1-Dichloroethene	0.0500	0.0545	109	78-120		0.0500	0.0502	100		9	20	
Tetrachloroethene	0.0500	0.0531	106	70-130		0.0500	0.0500	100		6	20	
Trichloroethene	0.0500	0.0521	104	71-125		0.0500	0.0492	98		6	20	
Vinyl Chloride	0.0500	0.0458	92	74-125		0.0500	0.0425	85		8	20	
4-Bromofluorobenzene(S)			*99*	*80-120*				*99*				
Dibromofluoromethane(S)			*101*	*80-120*				*99*				
1,2-Dichloroethane-d4(S)			*103*	*80-120*				*102*				
Toluene-d8(S)			*99*	*80-120*				*99*				

VI19G24A: Method Blank (MB) — EPA 8260B

Run Time: VI19G24A.MB 07/24/2019 11:52 [VI19G24A]

Analyte	MB Result µg/kg	MB Qualifier	MB RDL µg/kg
Acetone	U		1000
Acrylonitrile	U		100
Benzene	U		50
Bromobenzene	U		100
Bromochloromethane	U		100
Bromodichloromethane	U		100
Bromoform	U		100
Bromomethane	U		200
2-Butanone	U		750
n-Butylbenzene	U		50
sec-Butylbenzene	U		50
tert-Butylbenzene	U		50
Carbon Disulfide	U		250
Carbon Tetrachloride	U		50
Chlorobenzene	U		50
Chloroethane	U		250
Chloroform	U		50
Chloromethane	U		250
2-Chlorotoluene	U		50
1,2-Dibromo-3-chloropropane (SIM)	U		250
Dibromochloromethane	U		100
Dibromomethane	U		250
1,2-Dichlorobenzene	U		100
1,3-Dichlorobenzene	U		100
1,4-Dichlorobenzene	U		100
Dichlorodifluoromethane	U		250
1,1-Dichloroethane	U		50
1,2-Dichloroethane	U		50
1,1-Dichloroethene	U		50
cis-1,2-Dichloroethene	U		50
trans-1,2-Dichloroethene	U		50
1,2-Dichloropropane	U		50
cis-1,3-Dichloropropene	U		50

VI19G24A: Method Blank (MB)

EPA 8260B

Run Time: VI19G24A.MB 07/24/2019 11:52 [VI19G24A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
trans-1,3-Dichloropropene	U		50
Ethylbenzene	U		50
Ethylene Dibromide	U		50
2-Hexanone	U		2500
Isopropylbenzene	U		250
4-Methyl-2-pentanone	U		2500
Methylene Chloride	U		100
2-Methylnaphthalene	U		330
MTBE	U		250
Naphthalene	U		330
n-Propylbenzene	U		100
Styrene	U		50
1,1,1,2-Tetrachloroethane	U		100
1,1,2,2-Tetrachloroethane	U		50
Tetrachloroethene	U		50
Toluene	U		50
1,2,4-Trichlorobenzene	U		250
1,1,1-Trichloroethane	U		50
1,1,2-Trichloroethane	U		50
Trichloroethene	U		50
Trichlorofluoromethane	U		100
1,2,3-Trichloropropane	U		100
1,2,3-Trimethylbenzene	U		100
1,2,4-Trimethylbenzene	U		100
1,3,5-Trimethylbenzene	U		100
Vinyl Chloride	U		40
m&p-Xylene	U		100
o-Xylene	U		50
4-Bromofluorobenzene(S)	*104*		*76-127*
Dibromofluoromethane(S)	*98*		*76-126*
1,2-Dichloroethane-d4(S)	*95*		*75-120*
Toluene-d8(S)	*101*		*80-120*

VI19G24A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260B

Run Time: VI19G24A.LCS: 07/24/2019 10:33 [VI19G24A] VI19G24A.LCSD: 07/24/2019 10:59 [VI19G24A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/kg	µg/kg	%	%		µg/kg	µg/kg	%		%	%	
Acetone	2500	2580	103	50-149		2500	2660	106		3	20	
Acrylonitrile	2500	2390	96	70-130		2500	2500	100		4	20	
Benzene	2500	2520	101	75-125		2500	2450	98		3	20	
Bromobenzene	2500	2400	96	70-120		2500	2320	93		3	20	
Bromochloromethane	2500	2400	96	70-125		2500	2350	94		2	20	
Bromodichloromethane	2500	2780	111	70-130		2500	2690	107		4	20	
Bromoform	2500	2830	113	70-130		2500	2810	112		1	20	
Bromomethane	2500	2490	100	66-134		2500	2400	96		4	20	
2-Butanone	2500	2370	95	67-131		2500	2410	97		2	20	
n-Butylbenzene	2500	2680	107	70-130		2500	2540	101		6	20	
sec-Butylbenzene	2500	2620	105	70-130		2500	2510	100		5	20	
tert-Butylbenzene	2500	2650	106	70-130		2500	2530	101		5	20	
Carbon Disulfide	2500	2870	115	70-130		2500	2760	110		4	20	
Carbon Tetrachloride	2500	2880	115	70-130		2500	2790	112		3	20	
Chlorobenzene	2500	2560	102	75-125		2500	2460	98		4	20	
Chloroethane	2500	2750	110	70-141		2500	2680	107		3	20	
Chloroform	2500	2620	105	80-120		2500	2560	102		3	20	
Chloromethane	2500	2250	90	63-130		2500	2180	87		3	20	
2-Chlorotoluene	2500	2510	100	70-130		2500	2420	97		3	20	
1,2-Dibromo-3-chloropropane (SIM)	2500	2610	105	70-130		2500	2650	106		1	20	
Dibromochloromethane	2500	2770	111	70-130		2500	2700	108		3	20	
Dibromomethane	2500	2720	109	70-130		2500	2710	108		1	20	
1,2-Dichlorobenzene	2500	2590	103	75-120		2500	2480	99		4	20	
1,3-Dichlorobenzene	2500	2590	104	70-125		2500	2500	100		4	20	
1,4-Dichlorobenzene	2500	2570	103	70-125		2500	2470	99		4	20	
Dichlorodifluoromethane	2500	2360	94	65-135		2500	2270	91		3	20	
1,1-Dichloroethane	2500	2630	105	75-125		2500	2510	100		5	20	
1,2-Dichloroethane	2500	2480	99	70-130		2500	2420	97		2	20	
1,1-Dichloroethene	2500	2730	109	75-120		2500	2640	105		4	20	
cis-1,2-Dichloroethene	2500	2490	100	70-125		2500	2430	97		3	20	
trans-1,2-Dichloroethene	2500	2670	107	70-130		2500	2590	103		4	20	
1,2-Dichloropropane	2500	2700	108	80-120		2500	2620	105		3	20	
cis-1,3-Dichloropropene	2500	2700	108	70-125		2500	2630	105		3	20	

VI19G24A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260B

Run Time: VI19G24A.LCS: 07/24/2019 10:33 [VI19G24A] VI19G24A.LCSD: 07/24/2019 10:59 [VI19G24A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/kg	µg/kg	%	%		µg/kg	µg/kg	%		%	%	
trans-1,3-Dichloropropene	2500	2790	112	70-125		2500	2730	109		3	20	
Ethylbenzene	2500	2570	103	80-120		2500	2480	99		4	20	
Ethylene Dibromide	2500	2640	106	70-125		2500	2590	104		2	20	
2-Hexanone	2500	2350	94	70-130		2500	2460	99		5	20	
Isopropylbenzene	2500	2720	109	75-130		2500	2630	105		4	20	
4-Methyl-2-pentanone	2500	2480	99	70-130		2500	2540	102		3	20	
Methylene Chloride	2500	2510	100	70-130		2500	2450	98		2	20	
2-Methylnaphthalene	2500	2790	112	61-136		2500	2830	113		1	20	
MTBE	2500	2410	97	70-130		2500	2390	95		2	20	
Naphthalene	2500	2650	106	70-125		2500	2650	106		0	20	
n-Propylbenzene	2500	2590	104	70-130		2500	2460	98		6	20	
Styrene	2500	2890	115	75-125		2500	2780	111		4	20	
1,1,1,2-Tetrachloroethane	2500	2800	112	75-125		2500	2700	108		4	20	
1,1,2,2-Tetrachloroethane	2500	2430	97	70-130		2500	2410	96		1	20	
Tetrachloroethene	2500	2750	110	70-130		2500	2630	105		5	20	
Toluene	2500	2650	106	80-120		2500	2550	102		4	20	
1,2,4-Trichlorobenzene	2500	2730	109	70-130		2500	2640	106		3	20	
1,1,1-Trichloroethane	2500	2740	110	70-130		2500	2660	106		4	20	
1,1,2-Trichloroethane	2500	2600	104	70-125		2500	2550	102		2	20	
Trichloroethene	2500	2810	112	75-125		2500	2700	108		4	20	
Trichlorofluoromethane	2500	2770	111	50-150		2500	2700	108		3	20	
1,2,3-Trichloropropane	2500	2430	97	70-130		2500	2440	98		1	20	
1,2,3-Trimethylbenzene	2500	2610	104	70-130		2500	2510	100		4	20	
1,2,4-Trimethylbenzene	2500	2640	106	70-130		2500	2550	102		4	20	
1,3,5-Trimethylbenzene	2500	2600	104	70-130		2500	2500	100		4	20	
Vinyl Chloride	2500	2270	91	69-120		2500	2200	88		3	20	
m&p-Xylene	5000	5260	105	80-125		5000	5070	101		4	20	
o-Xylene	2500	2610	105	75-125		2500	2520	101		4	20	
4-Bromofluorobenzene(S)			*96*	*76-127*				*99*				
Dibromofluoromethane(S)			*100*	*76-126*				*100*				
1,2-Dichloroethane-d4(S)			*92*	*75-120*				*93*				
Toluene-d8(S)			*100*	*80-120*				*100*				

VI19G24B: Method Blank (MB) — EPA 8260B

Run Time: VI19G24B.MB 07/25/2019 00:48 [VI19G24B]

Analyte	MB Result µg/kg	MB Qualifier	MB RDL µg/kg
Acetone	U		1000
Acrylonitrile	U		100
Benzene	U		50
Bromobenzene	U		100
Bromochloromethane	U		100
Bromodichloromethane	U		100
Bromoform	U		100
Bromomethane	U		200
2-Butanone	U		750
n-Butylbenzene	U		50
sec-Butylbenzene	U		50
tert-Butylbenzene	U		50
Carbon Disulfide	U		250
Carbon Tetrachloride	U		50
Chlorobenzene	U		50
Chloroethane	U		250
Chloroform	U		50
Chloromethane	U		250
2-Chlorotoluene	U		50
1,2-Dibromo-3-chloropropane (SIM)	U		250
Dibromochloromethane	U		100
Dibromomethane	U		250
1,2-Dichlorobenzene	U		100
1,3-Dichlorobenzene	U		100
1,4-Dichlorobenzene	U		100
Dichlorodifluoromethane	U		250
1,1-Dichloroethane	U		50
1,2-Dichloroethane	U		50
1,1-Dichloroethene	U		50
cis-1,2-Dichloroethene	U		50
trans-1,2-Dichloroethene	U		50
1,2-Dichloropropane	U		50
cis-1,3-Dichloropropene	U		50

VI19G24B: Method Blank (MB)

EPA 8260B

Run Time: VI19G24B.MB 07/25/2019 00:48 [VI19G24B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
trans-1,3-Dichloropropene	U		50
Ethylbenzene	U		50
Ethylene Dibromide	U		50
2-Hexanone	U		2500
Isopropylbenzene	U		250
4-Methyl-2-pentanone	U		2500
Methylene Chloride	U		100
2-Methylnaphthalene	U		330
MTBE	U		250
Naphthalene	U		330
n-Propylbenzene	U		100
Styrene	U		50
1,1,1,2-Tetrachloroethane	U		100
1,1,2,2-Tetrachloroethane	U		50
Tetrachloroethene	U		50
Toluene	U		50
1,2,4-Trichlorobenzene	U		250
1,1,1-Trichloroethane	U		50
1,1,2-Trichloroethane	U		50
Trichloroethene	U		50
Trichlorofluoromethane	U		100
1,2,3-Trichloropropane	U		100
1,2,3-Trimethylbenzene	U		100
1,2,4-Trimethylbenzene	U		100
1,3,5-Trimethylbenzene	U		100
Vinyl Chloride	U		40
m&p-Xylene	U		100
o-Xylene	U		50
4-Bromofluorobenzene(S)	*104*		*76-127*
Dibromofluoromethane(S)	*97*		*76-126*
1,2-Dichloroethane-d4(S)	*95*		*75-120*
Toluene-d8(S)	*100*		*80-120*

VI19G24B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260B

Run Time: VI19G24B.LCS: 07/24/2019 23:28 [VI19G24B] VI19G24B.LCSD: 07/24/2019 23:55 [VI19G24B]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/kg	µg/kg	%	%		µg/kg	µg/kg	%		%	%	
Acetone	2500	2330	93	50-149		2500	2250	90		3	20	
Acrylonitrile	2500	2310	92	70-130		2500	2280	91		1	20	
Benzene	2500	2500	100	75-125		2500	2410	96		4	20	
Bromobenzene	2500	2320	93	70-120		2500	2360	94		1	20	
Bromochloromethane	2500	2360	94	70-125		2500	2300	92		2	20	
Bromodichloromethane	2500	2720	109	70-130		2500	2640	106		3	20	
Bromoform	2500	2740	109	70-130		2500	2630	105		4	20	
Bromomethane	2500	2370	95	66-134		2500	2280	91		4	20	
2-Butanone	2500	2120	85	67-131		2500	2040	82		4	20	
n-Butylbenzene	2500	2620	105	70-130		2500	2470	99		6	20	
sec-Butylbenzene	2500	2590	104	70-130		2500	2450	98		6	20	
tert-Butylbenzene	2500	2610	104	70-130		2500	2470	99		5	20	
Carbon Disulfide	2500	2770	111	70-130		2500	2640	106		5	20	
Carbon Tetrachloride	2500	2830	113	70-130		2500	2750	110		3	20	
Chlorobenzene	2500	2530	101	75-125		2500	2380	95		6	20	
Chloroethane	2500	2740	110	70-141		2500	2580	103		7	20	
Chloroform	2500	2600	104	80-120		2500	2490	99		5	20	
Chloromethane	2500	2150	86	63-130		2500	2020	81		6	20	
2-Chlorotoluene	2500	2480	99	70-130		2500	2350	94		5	20	
1,2-Dibromo-3-chloropropane (SIM)	2500	2490	99	70-130		2500	2380	95		4	20	
Dibromochloromethane	2500	2730	109	70-130		2500	2590	104		5	20	
Dibromomethane	2500	2650	106	70-130		2500	2590	104		2	20	
1,2-Dichlorobenzene	2500	2570	103	75-120		2500	2450	98		5	20	
1,3-Dichlorobenzene	2500	2580	103	70-125		2500	2450	98		5	20	
1,4-Dichlorobenzene	2500	2550	102	70-125		2500	2410	97		5	20	
Dichlorodifluoromethane	2500	2150	86	65-135		2500	2030	81		6	20	
1,1-Dichloroethane	2500	2580	103	75-125		2500	2480	99		4	20	
1,2-Dichloroethane	2500	2380	95	70-130		2500	2350	94		1	20	
1,1-Dichloroethene	2500	2670	107	75-120		2500	2610	104		3	20	
cis-1,2-Dichloroethene	2500	2450	98	70-125		2500	2350	94		4	20	
trans-1,2-Dichloroethene	2500	2620	105	70-130		2500	2510	100		5	20	
1,2-Dichloropropane	2500	2680	107	80-120		2500	2560	102		5	20	
cis-1,3-Dichloropropene	2500	2610	104	70-125		2500	2500	100		4	20	

VI19G24B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) — EPA 8260B

Run Time: VI19G24B.LCS: 07/24/2019 23:28 [VI19G24B] VI19G24B.LCSD: 07/24/2019 23:55 [VI19G24B]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/kg	µg/kg	%	%		µg/kg	µg/kg	%		%	%	
trans-1,3-Dichloropropene	2500	2670	107	70-125		2500	2580	103		4	20	
Ethylbenzene	2500	2540	102	80-120		2500	2400	96		6	20	
Ethylene Dibromide	2500	2520	101	70-125		2500	2450	98		3	20	
2-Hexanone	2500	2160	86	70-130		2500	2100	84		2	20	
Isopropylbenzene	2500	2700	108	75-130		2500	2540	102		6	20	
4-Methyl-2-pentanone	2500	2310	92	70-130		2500	2260	91		1	20	
Methylene Chloride	2500	2510	100	70-130		2500	2390	96		4	20	
2-Methylnaphthalene	2500	2580	103	61-136		2500	2440	98		5	20	
MTBE	2500	2350	94	70-130		2500	2270	91		3	20	
Naphthalene	2500	2570	103	70-125		2500	2450	98		5	20	
n-Propylbenzene	2500	2530	101	70-130		2500	2390	96		5	20	
Styrene	2500	2860	114	75-125		2500	2700	108		5	20	
1,1,1,2-Tetrachloroethane	2500	2740	110	75-125		2500	2630	105		5	20	
1,1,2,2-Tetrachloroethane	2500	2330	93	70-130		2500	2220	89		4	20	
Tetrachloroethene	2500	2710	108	70-130		2500	2570	103		5	20	
Toluene	2500	2600	104	80-120		2500	2510	100		4	20	
1,2,4-Trichlorobenzene	2500	2680	107	70-130		2500	2570	103		4	20	
1,1,1-Trichloroethane	2500	2730	109	70-130		2500	2630	105		4	20	
1,1,2-Trichloroethane	2500	2520	101	70-125		2500	2420	97		4	20	
Trichloroethene	2500	2750	110	75-125		2500	2660	106		4	20	
Trichlorofluoromethane	2500	2730	109	50-150		2500	2620	105		4	20	
1,2,3-Trichloropropane	2500	2340	94	70-130		2500	2240	89		5	20	
1,2,3-Trimethylbenzene	2500	2610	104	70-130		2500	2450	98		6	20	
1,2,4-Trimethylbenzene	2500	2620	105	70-130		2500	2500	100		5	20	
1,3,5-Trimethylbenzene	2500	2580	103	70-130		2500	2450	98		5	20	
Vinyl Chloride	2500	2190	88	69-120		2500	2080	83		6	20	
m&p-Xylene	5000	5190	104	80-125		5000	4910	98		6	20	
o-Xylene	2500	2590	104	75-125		2500	2450	98		6	20	
4-Bromofluorobenzene(S)			*88*	*76-127*				*97*				
Dibromofluoromethane(S)			*100*	*76-126*				*101*				
1,2-Dichloroethane-d4(S)			*91*	*75-120*				*92*				
Toluene-d8(S)			*100*	*80-120*				*101*				

Definitions/ Qualifiers:

U: The analyte was not detected at or above the Reporting Limit (RL).
***:** Value reported is outside QC limits

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:

By Veronica Hutchins at 9:24 AM, Aug 01, 2019

Fibertec environmental services

Analytical Laboratory
1914 Holloway Drive
Holt, MI 48842
Phone: 517 699 0345
Fax: 517 699 0388
email: lab@fibertec.us

8660 S. Mackinaw Trail
Cadillac, MI 49601
Phone: 231 775 8368
Fax: 231 775 8584

Industrial Hygiene Services, Inc.
1914 Holloway Drive
Holt, MI 48842
Phone: 517 699 0345
Fax: 517 699 0382
email: asbestos@fibertecihs.com

Geoprobe
11766 E. Grand River Rd.
Brighton, MI 48116
Phone: 810 220 3300
Fax: 810 220 3311

Chain of Custody # 176359
PAGE ___ of ___

Client Name: SME
Contact Person: Troy Helmick
Project Name/ Number: 092123.01
Email distribution list: Troy Helmick, Christina Villerot
Quote#
Purchase Order#

Date	Time	Sample #	Client Sample Descriptor	MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	VOCs	PAHs	MI-10 METALS	TCLP VOCs	TCLP SVOCs	TCLP metals	TCLP pesticides	TCLP Herbicides	Total PCBs	Reactivity, Corrosivity, Ignitability	HOLD SAMPLE
7-19	9:00		SB-1 (3.5-4)	S	2	X	X	X								
	13:00		SB-2 (3.5-4)													
	13:30		SB-3 (3.5-4)													
	9:30		SB-4 (3.5-4)													
	12:45		SB-5 (3.5-4)													
	12:30		SB-6 (3.5-4)													
	13:50		LP-B (3.5-4)													
	10:00		LP-C (3.5-4)													
	11:15		LP-D (3.5-4)													
↓	15:00		WC1	S	3				X	X	X	X	X	X	X	

Matrix Code: S Soil; A Air; O Oil; P Wipe; GW Ground Water; SW Surface Water; WW Waste Water; X Other: Specify

Deliverables: Level 2; Level 3; Level 4; EDD

Remarks:

RCVD BY LAB
JUL 22 2019
Initial: JS

Comments:

Sampled/Relinquished By:	Date/ Time 7-19-19 16:00	Received By: SME cold storage
Relinquished By: SME cold storage	Date/ Time 07/22/19 @ 1115	Received By:
Relinquished By:	Date/ Time 7/22/19 1350	Received By Laboratory:

Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY

___1 bus. day ___2 bus. days ___3 bus. days ___4 bus. days

✓ 5-7 bus. days (standard) Other (specify time/date requirement): _____

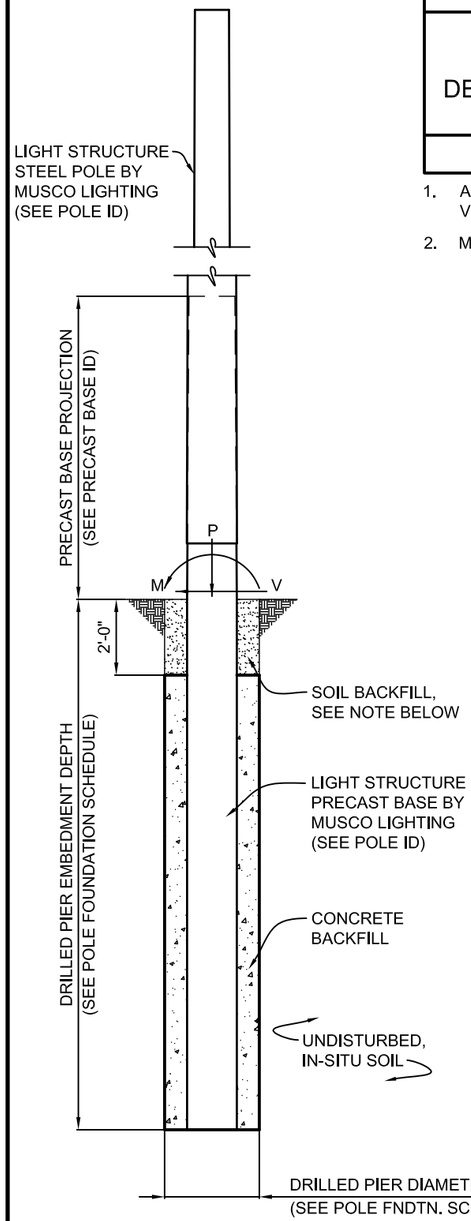
LAB USE ONLY

Fibertec project number: 91693

Temperature upon receipt at Lab: 2.6°C

RCV'D ON ICE

Please see back for terms and conditions



POLE FOUNDATION ELEV.

SCALE: NOT TO SCALE

SOIL BACKFILL NOTE:
THE TOP TWO FEET OF ANNULUS SHALL BE BACKFILLED WITH SOIL, WITH A CLASSIFICATION OF CLASS 5 (TABLE 1806.2) OR BETTER. COMPACTION, 95% FOR COHESIVE SOIL AND 98% FOR A COHESIONLESS SOIL BASED UPON STANDARD PROCTOR TESTING (ASTM D698).

POLE FOUNDATION SCHEDULE

POLE DESIGNATION	FORCES (1.)			DRILLED PIER		
	MOMENT (M) FT-LBS	SHEAR (V) LBS	VERTICAL (P) LBS	DIAMETER INCHES	EMBEDMENT DEPTH	CONCRETE BACKFILL YD^3 (2.)
S1 - S4	93,678	2,018	3,477	30	16'-0"	1.7

1. ASD LOAD COMBINATION D + 0.6W.
   VERTICAL FORCE IS WEIGHT OF DRESSED POLE (DOES NOT INCLUDE PRECAST BASE WEIGHT).
2. MINIMUM CONCRETE BACKFILL VOLUME, SITE CONDITIONS MAY REQUIRE ADDITIONAL BACKFILL.

PRECAST BASE IDENTIFICATION

PRECAST BASE TYPE	PRECAST BASE WEIGHT	PRECAST BASE LENGTH	PROJECTION ABOVE GRADE	STANDARD EMBEDMENT	OUTSIDE DIAMETER
5B	4,580 LBS	23'-11"	7'-11"	16'-0"	18.25"

POLE IDENTIFICATION

POLE DESIGNATION	POLE TYPE	PRECAST BASE TYPE	FIXTURE CONFIGURATION (FIX. PER XARM)	FIXTURE AND ACCESSORIES EPA (FT^2)
S1 - S4	LSS70D	5B	12 (5+4)	31.7

- EACH POLE HAS (1) LED FIXTURE AT 60'-0" AGL, INCLUDED ABOVE.
- EACH POLE HAS (2) LED FIXTURES AT 15'-6" AGL, INCLUDED ABOVE.

DESIGN NOTES

DESIGN PARAMETERS:
WIND: V_{ult} = 115 MPH, V_{asd} = 89 MPH (EXPOSURE C, RISK CATEGORY II) PER INTERNATIONAL BUILDING CODE, 2015 EDITION (ASCE 7-10). DESIGN WIND PARAMETERS ARE AS NOTED, ACTUAL EXPOSURE MUST BE VERIFIED FOR THE SITE BY THE PROPER GOVERNING OFFICIAL.

GEOTECHNICAL PARAMETERS:
ALLOWABLE END BEARING SOIL PRESSURE: 5,000 PSF
ALLOWABLE LATERAL SOIL BEARING PRESSURE: 100 PSF/FT (GRADE TO -2'-0"); 250 PSF/FT (-2'-0" TO -7'-0"); 400 PSF/FT (-7'-0" TO -15'-0"); 300 PSF/FT (BELOW -15'-0") IN ACCORDANCE WITH THE 2015 EDITION OF THE INTERNATIONAL BUILDING CODE, CHAPTER 18.

DESIGN SOIL PARAMETERS ARE AS NOTED. ACTUAL ALLOWABLE SOIL PARAMETERS MUST BE VERIFIED ON SITE. REFERENCE SOILS AND FOUNDATION REPORT, NO. 082123.00, PREPARED BY SME; PLYMOUTH, MI.

A GEOTECHNICAL ENGINEER OR REPRESENTATIVE OF IS RECOMMENDED (NOT REQUIRED) TO BE AVAILABLE AT THE TIME OF THE FOUNDATION INSTALLATION TO VERIFY THE SOIL DESIGN PARAMETERS AND TO PROVIDE ASSISTANCE IF ANY PROBLEMS ARISE IN FOUNDATION INSTALLATION.

ENCOUNTERING SOIL FORMATIONS THAT WILL REQUIRE SPECIAL DESIGN CONSIDERATIONS OR EXCAVATION PROCEDURES MAY OCCUR. POLE FOUNDATIONS WILL NEED TO BE ANALYZED ACCORDING TO THE SOIL CONDITIONS THAT EXIST. IF ANY DISCREPANCIES OR INCONSISTENCIES ARISE, NOTIFY THE ENGINEER OF SUCH DISCREPANCIES. FOUNDATIONS WILL THEN BE REVISED ACCORDINGLY. REVISIONS WILL BE ANALYZED PER RECOMMENDATIONS DIRECTED BY A REGISTERED ENGINEER.

ALL EXCAVATIONS MUST BE FREE OF LOOSE SOIL AND DEBRIS PRIOR TO FOUNDATION INSTALLATION AND CONCRETE BACKFILL PLACEMENT. TEMPORARY CASINGS OR DRILLERS SLURRY MAY BE USED TO STABILIZE THE EXCAVATION DURING INSTALLATION. CASINGS MUST BE REMOVED DURING CONCRETE BACKFILL PLACEMENT. CONCRETE BACKFILL MUST BE PLACED WITH A TREMIE WHEN SLURRY OR WATER IS PRESENT WITHIN THE EXCAVATION OR WHEN THE FREE DROP EXCEEDS 6'-0".

CONTRACTOR MUST BE FAMILIAR WITH THE COMPLETE SOIL INVESTIGATION REPORT AND BORINGS, AND CONTACT THE GEOTECHNICAL FIRM (IF NECESSARY) TO UNDERSTAND THE SOIL CONDITIONS AND THE POSSIBILITY OF GROUND WATER PUMPING AND EXCAVATION STABILIZATION OR BRACING DURING PRECAST BASE INSTALLATION AND PLACEMENT OF CONCRETE BACKFILL.

CONCRETE:
CONCRETE SHALL BE AIR-ENTRAINED AND HAVE A MINIMUM COMPRESSIVE DESIGN STRENGTH AT 28 DAYS OF 3,000 PSI. 3,000 PSI CONCRETE SPECIFIED FOR EARLY POLE ERECTION, ACTUAL REQUIRED MINIMUM ALLOWABLE CONCRETE STRENGTH IS 1,000 PSI. ALL PIERS AND CONCRETE BACKFILL MUST BEAR ON AND AGAINST FIRM UNDISTURBED SOIL.

GENERAL NOTES:
FIXTURES MUST BE LOCATED TO MAINTAIN 10'-0" MINIMUM HORIZONTAL CLEARANCE FROM ANY OBSTRUCTION. ENGINEER MUST BE NOTIFIED IF FOUNDATIONS ARE NEAR ANY RETAINING WALLS OR WITHIN / NEAR ANY SLOPES STEEPER THAN 3H : 1V. POLES, FIXTURES, PRECAST BASES, ELECTRICAL ITEMS AND INSTALLATION PER MUSCO LIGHTING.

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DRAWING TITLE: POLE AND FOUNDATION
SCALE: SEE PLAN
NOTES: SCAN #200226C

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