PROJECT MANUAL

OWNER:

TULSA

PUBLIC SCHOOLS

INDEPENDENT SCHOOL DISTRICT NO. ONE
OF TULSA COUNTY
3027 South New Haven
Tulsa, Oklahoma 74114

TULSA PUBLIC SCHOOLS
INDEPENDENT SCHOOL DISTRICT NO. ONE OF TULSA COUNTY

WEBSTER HIGH SCHOOL - 2021 BOND PROJECTS
BAND ROOM & GREEN HOUSE
ADDITIONS W/ SITE IMPROVEMENTS

1919 WEST 40TH STREET, TULSA OK 74107

ARCHITECT:

GS HELMS + ASSOCIATES

ph: 918.298.7257
wb: gshelms.com

424 e. main st.
jenks, ok 74037

M.E.P. CONSULTANTS:

AEG

ALLIED ENGINEERING GROUP, LLC
MECHANICAL-ELECTRICAL-PLUMBING-CONSULTANTS
1401 SOUTH DENVER STREET SUITE A
TULSA, OK 74119
(918) 384-0593 FAX (918) 384-3186
CA 3479 EXPIRES: 06.30.24

CIVIL ENGINEERING CONSULTANT:

wallace design collective

STRUCTURAL, CIVIL, LANDSCAPE, SURVEY
123 N. MARTIN LUTHER KING JR. BLVD.
TULSA, OKLAHOMA 74103
PH 918.584.5858 FAX 918.584.8689

OKLAHOMA CERTIFICATE OF AUTHORIZATION: #1460
EXPIRATION DATE: 06.30.23

STRUCTURAL ENGINEERING CONSULTANT:

RICHARDS & ASSOCIATES, INC.

424 EAST MAIN STREET JENKS, OK
405.627.9584 FAX 918.355.9309
C.A. #4458 EXP. DATE 06.30.23

CONSTRUCTION MANAGER:

NABHOLZ

10319 EAST 54th STREET
TULSA, OK 74146
918.632.7200

ISSUE:

CONSTRUCTION DOCUMENTS

PROJECT NO.: 21-03000

SET NUMBER:

ISSUE DATE: JUNE 16, 2022

PROJECT MANUAL
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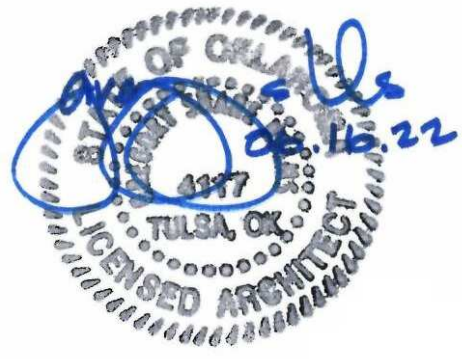

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SECTION 000010
SOLICITATION AND NOTICE FOR BIDS

Sealed Bids in duplicate for **TULSA PUBLIC SCHOOLS – WEBSTER HS BAND ROOM & GREEN HOUSE ADDITIONS W/ SITE IMPROVEMENTS** project will be received and publicly opened and read aloud by INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY, OKLAHOMA, hereinafter referred to as "Owner," in Room 444, the Bond Conference Room, Education Service Center, 3027 S. New Haven Ave, Tulsa, OK, 74114 until **2:00pm, JULY 7, 2022.**

The bidding process will be in compliance with the Public Competitive Bidding Act of 1974. Bids must be accompanied by a bid security in the amount of 5% of the bid. By this notice, all provisions of the act apply to this project and are incorporated into notice by reference.

Upon receipt of an acceptable bid, the contract will be awarded within thirty days after the opening of bids and the written contract executed within sixty days thereafter.

Contractor qualification statement must be submitted **seven (7)** calendar days prior to bid date to the Owner, if not currently on file.

Attention is called to the fact that a designated completion date for this project site will be established based on the number of calendar days, as stated in the accepted bid, required to complete the Project work. There will be a $2500 Liquidated Damages Clause for each day the contract is not completed. The scheduled completion date will be a very significant and material factor to the owner when selecting the Lowest Responsible Bid. Each Bidder must include (in the space provided on the Bid Form) the number of calendar days, which the Bidder will require to complete the specified Project.

Failure to comply with the above bid requirements will result in return of unopened Bid Proposal.

Construction Manager for the project is Nabholz Construction.

Architect for the project is GSHELMS & Associates, LLC

Bid Documents may be obtained from:

http://www.tulsaschools.org/6_Community/bond_bids.asp

Owner reserves the right to reject any or all bids and to waive informalities or minor irregularities in any bid.

INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY OKLAHOMA

By Ms. Stacey Woolley, Board President

ATTEST:

By Cindy Hutchings, Clerk

SECTION 000020

INSURANCE REQUIREMENTS

Contractor shall obtain insurance of the types and in the amounts described below. The insurance shall be written by insurance companies and on forms acceptable to Owner.

1). Commercial General and Excess Liability or Umbrella Liability Insurance:

Contractor shall maintain commercial general liability (CGL) and, if necessary, commercial excess liability or umbrella insurance with a limit of not less than $1,000,000 each occurrence. CGL insurance should contain a general aggregate with a $2,000,000 limit, and should apply separately to the Project.

a) CGL insurance shall be written on an ISO occurrence form and shall cover liability arising from premises, operations, independent contractors, at a minimum, contractual liability equivalent to an intermediate form of contractual liability insurance, products/completed operations and personal injury and advertising injury;
b) Owner shall be included as an injured CGL, using ISO Additional Insured Endorsement CG 20101185 or a substitute providing equivalent coverage, and under the commercial excess liability or umbrella, if any. This insurance, including insurance provided under the commercial excess liability or umbrella, if any, shall apply as primary insurance with respect to any other insurance or self insurance programs afforded to or maintained by Owner;
c) There shall be no endorsement or modification of the CGL limiting the scope of coverage for liability arising from pollution, explosion, collapse or underground property damage;
d) **Waiver of Subrogation**. Contractor waives all rights against Owner and its agents, officers, directors and employees for recovery of damages to the extent these damagers are covered by the commercial general liability, excess liability or umbrella liability insurance maintained pursuant to this agreement.

2). Business Auto and Excess Liability or Umbrella Liability Insurance:

Contractor shall maintain business auto liability and, if necessary, excess liability or umbrella liability insurance with a limit of not less than $1,000,000 each accident.

a) Such insurance shall cover liability arising out of any auto (including owned, hired and non-owned autos);
b) Business auto coverage shall be written on an ISO form. If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01;
c) If the Contract Documents require Contractor to remove and haul hazardous waste from the project site or if the Project involves such similar environmental exposure, pollution liability coverage equivalent to that provided on the ISO Pollution Liability Broadened Coverage for Covered Autos Endorsement (CA 99 48) shall be provided, and the Motor Carrier Act Endorsement (MCS 90) shall be attached;
d) **Waiver of Subrogation**. Contractor waives all rights against the Owner and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the business auto liability, excess liability or umbrella liability insurance obtained by Contractor pursuant to this Agreement or under any applicable auto physical damage coverage.

3). Workers Compensation Insurance

Contractors shall maintain workers compensation and employers liability insurance.

a) The employers liability, and if necessary excess liability or umbrella insurance limits shall not be less than $1,000,000 each accident for bodily injury by accident or $1,000,000 each employee for bodily injury by disease;
b) The alternate employer endorsement (WC 00 03 01 A) shall be attached showing Owner in the schedule as the alternate employer.

4). Property Insurance

a) Owner may choose to purchase and maintain in force property insurance for the entire Work. Such insurance shall be written in an amount at least equal to the initial contract sum as well as subsequent modifications of that sum. The insurance shall apply on a replacement cost basis. If the insurance obtained in compliance with the Paragraph is Builders Risk insurance, coverage shall be written on a completed value form;
b) The insurance as required in subparagraph (a) shall name as insured the Owner, Contractor and all subcontractors and sub-subcontractors on the Project. The insurance policy shall contain a provision that the insurance will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Contractor;
c) The insurance as required in Subparagraph (a) shall cover the entire Work as outlined in the project specifications and shall also cover portions of the Work located away from the site but intended for use at the site and shall also cover portions of the Work in transit. The policy shall include as insured property scaffolding, false work and temporary buildings located at the site. The policy shall cover the cost of removing debris, including demolition, as any is made legally necessary by the operation of any law, ordinance or regulation.
d) Owner shall purchase and maintain boiler and machinery insurance required by the contract documents or by law, covering insured objects during installation and until final acceptance by Owner. This insurance shall name as insured Owner, Contractor and all subcontractors and sub-subcontractors in the Work;
e) The insurance as required by this Paragraph shall be written to cover all risks of physical loss except those specifically excluded in the policy and shall inure at least against the perils of fire, lightning, explosion, windstorm or hail, smoke, aircraft or vehicles, riot or civil commotion, theft, vandalism, malicious mischief and collapse;
f) Any deductible applicable to the insurance purchased in compliance with this Paragraph shall be paid by Owner;
g) Before the commencement of Work, Owner shall provide Contractor a copy the insurance policy obtained in compliance with this Paragraph;
h) Before the commencement of Work, Owner shall declare to Contractor any decision on its part not to obtain any or all of the insurance coverage as required in this Paragraph. Upon such declaration, Contractor shall then have the right to obtain insurance equivalent in coverage to that required in this Paragraph 4 and by appropriate change order, charge the cost of such insurance to Owner. If Contractor is damaged by the failure of Owner to comply with the requirements of this Paragraph, then Owner shall bear all reasonable costs properly attributable to that failure.
i) **Waiver of Subrogation**. Owner and Contractor waive all rights against each other and each of their subcontractors, sub-subcontractors, officer, directors, agents and employees for recovery for damages caused by fire and other perils to the extent covered by builders risk or property insurance purchased pursuant to the requirements of this Paragraph 4 or any other property insurance applicable to the Work.
j) Partial occupancy or use of the Work shall not commence until the insurance company or companies providing insurance as required in this Paragraph have consented to such partial occupancy or use. Owner and Contractor shall take reasonable steps to obtain consent of the insurance company or companies and agree to take no action, other than upon mutual written consent, with respect to occupancy or use of the Work that could lead to cancellation, lapse or reduction of insurance;

5). Evidence of Insurance

Prior to commencing the Work, Contractor shall furnish Owner with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, setting out compliance with the insurance requirements set forth above.

a) All certificates shall provide for 30 days written notice to Owner prior to the cancellation or material change of any insurance referenced to herein;
b) The work "endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives" shall be deleted from the cancellation provision of all certificates provided by the Contractor;
c) Failure of Owner to demand such certificate or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence that is provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance;
d) Owner shall have the right, but not the obligation to prohibit Contractor or any subcontractor from entering the Project site unit such certificates or other evidence that insurance has been placed in the complete compliance with these requirements is received and approved by the Owner;
e) Failure to maintain the insurance in this Insurance Requirement Section shall constitute an event of default pursuant to this Agreement and shall allow Owner to terminate this Agreement to Owner's option. If Contractor fails to maintain the insurance set forth herein, Owner shall have the right, but not the obligation, to purchase said insurance at Contractor's expense;
f) Contractor shall provide certified copies of all insurance policies required above within 10 working days of Owner's written request for said copies.

6). General Insurance Provisions

a) No Representation of Coverage Adequacy. By requiring the insurance as set out in the Insurance Requirement Section, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities provided to Owner in this Agreement or any other provision of the Contract documents;
b) Cross Liability Coverage. If Contractor's liability policies do not contain the standard ISO separation of insureds provision or a substantially similar clause, they shall be endorsed to provide cross liability coverage;
c) The insurance requirements set out in this Insurance Requirement Section are independent from all other obligations of Contractor under this Agreement and apply whether or not required by any other provision of this Agreement;
d) Subcontractor's Insurance. Contractor shall cause each subcontractor employed by Contractor to purchase and maintain insurance of the type specified in the Insurance Requirement Section. When requested by the Owner, Contractor shall furnish to Owner copies of certificates of insurance evidencing coverage for each subcontractor.

END OF SECTION

SECTION 000100

INSTRUCTIONS TO BIDDERS

SCOPE:

1. GENERAL CONDITIONS:

Standard form "General Conditions of the Contract for Construction," The American Institute of Architects, Document A201 - 2017, ("General Conditions") shall apply to the Work, except insofar as the General Conditions are modified, amended, waived, or changed by these Supplementary General Conditions. The following paragraph numbers refer to the paragraphs in the above referenced "General Conditions":

(a) Paragraph 1. 1. 1: The last sentence is amended to read as follows: "The Contract Documents include the advertisement or invitation to bid, notice to bidders, instructions to bidders, sample forms, the Contractor's bid or proposal, any addenda relating to the foregoing and any other documents specifically enumerated in the Owner-Contractor Agreement."

(b) Paragraph 3.7. 1. is amended to read as follows: "When applicable, Contractor shall secure all permits, licenses and inspections necessary for the proper execution and completion of the Work. Owner will not reimburse Contractor for any fees paid by Contractor for permits and inspections."

(c) Paragraph 13.6.1 is amended to read as follows: "Any moneys not paid within thirty (30) days after they become due and payable under the terms of this Contract shall bear interest at the rate of six percent (6%) per annum from and after said thirty (30) day period."

(d) Paragraph 8.3.1 is amended to read as follows: "The Contractor shall not be entitled to compensation for any loss, cost or expense, sustained by reason of delay in completion of the Work from any cause whatever."

(e) Paragraph 11.3.1 is amended to read as follows: "The Contractor shall purchase and maintain, at Contractor's expense, property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of Owner, Contractor, Subcontractor and Sub-subcontractors in the Work and shall insure against perils of fire and extended coverage on a 'broad-form, all risk' basis for physical loss of damage, including theft, vandalism and malicious mischief. Such insurance shall be purchased from a carrier licensed to do business in the State of Oklahoma. Certificates of such insurance shall be delivered to the Department Manager of Building Planning, Maintenance and Plant Operations of Owner prior to commencement of the Work. Said certificates shall provide that the carrier must give Owner at least thirty (30) days prior written notice before cancellation or reduction of the coverage for any reason. If not covered by the above insurance, Contractor shall also purchase and maintain similar coverage on portions of the Work stored off site or in transit when such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2. Until substantial completion of the Work, all risk of loss shall be upon Contractor."

(f) Paragraph 11.3.4 is eliminated.

(g) Paragraph 3.6.1 is amended by adding the following "Contractor assumes full responsibility for the payment of all contributions and payroll taxes (State and Federal) for all employees engaged on the Work and provide proof of worker compensation coverage for all employees.

2. DEFINITIONS:

Wherever the words herein defined, or pronouns used in the stead, occur in this contract and these specifications, they shall have the meanings herein given.

(a) The word "OWNER" shall mean the Independent School District Number One of Tulsa County, Oklahoma, a public corporation.

(b) The word "CONTRACTOR" shall mean the person, persons, Partnership, company, firm or corporation entering into the contract for the performance of the Work, and the legal representative of said party, or agent appointed to act for said party in the performance of the Work.

(c) The word "SURETY" or "SURETIES" shall mean the bondsman or party of parties who have made sure the fulfillment of the requirement of the contract by bonds, including the Payment Bond, and whose signatures are attached to said bonds.

(d) The word "ADVERTISEMENT" shall mean all of the legal publications pertaining to the Work.

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(e) The word "SPECIFICATIONS" shall mean, collectively, all of the terms and stipulations contained in those portions of the contract known as Instructions to Bidders, General, Mechanical and Electrical Specifications.

(f) The word "PLAN" shall mean, collectively, all of the drawings pertaining to the contract and made part thereof, and also such supplementary drawings as may be issued from time to time in order to elucidate the drawings or for the purpose of showing changes in the Work as authorized under the section "Changes and Alterations," or for showing details which are not shown thereon.

(g) The words "CONTRACT PRICE" shall mean either the unit prices or unit price, or lump sum price, named in the contract or the total of all payments according to schedule or prices in the contract, as the case may be.

(h) The word "BID" or "BIDS" shall mean the written statements duly filed with the Clerk of Independent School District Number One of Tulsa County, Oklahoma, for the person or persons, partnership, company, firm or corporation proposing to do the Work and furnish materials called for on plans at the prices named on said statement.

(i) The word "CALENDAR DAYS" shall mean the actual days to complete the contract excluding days due to inclement weather.

3. BONDS:

If the Contract Price is in excess of **$50,000.00**, Contractor will furnish the following bonds: (i) a Payment Bond (the "statutory" bond required by Section I of Title 6 1, Okla. State, as amended) in an amount equal to 100% of the Contract Price; and (ii) a Performance Bond in such form as directed by Owner in an amount equal to 100% of the Contract Price for work on the project(s) as security for the proper and prompt completion of the Work in accordance with the contract and bidding documents; and (iii) a Warranty Bond in an amount equal to 100% of the Contract Price for work on the project(s) to protect Owner against defects in workmanship and materials for a period of one (1) year from Owner's acceptance of the Project(s); or (iv) a Letter of Eligibility notarized by the bonding company verifying the ability of the Contractor to be bonded for the total amount of the project as specified in the project manual. The Surety on all bonds of the successful bidder must be approved in the Treasury Department Circular 570. If the Surety Company is not on the list, those bids shall be rejected.

Where the Contract Price is **$50,000.00** or less, the above bonds will not be required. However, in lieu of the Payment Bond, as to contracts where the Contract Price is $25,000.00 or less, Contractor shall submit an affidavit of the payment of all indebtedness incurred by the Contractor, Subcontractors, and all material men for labor, material, rental of machinery or equipment and repair of and parts for equipment as are used or consumed in the performance of the contract. The execution of the affidavit with knowledge that any of the contents of the affidavit are false, upon conviction, shall constitute perjury, punishable as provided by law. Copies of the affidavit form may be obtained from the Facilities Bond Office Room 201 South, Charles C. Mason Education Service Center, 3027 South New Haven Avenue, Tulsa, Oklahoma, 74147.

4. CORPORATE SURETY BONDS:

To be acceptable, a corporate surety bond (including both a bid bond and the payment/performance/warranty bonds of the successful bidder) must be signed by BOTH the bidder, as principal, and by a properly authorized representative of the bonding company. If the bonding company is a corporation, the bond must have attached a power of attorney from the corporation authorizing the person signing the bond on behalf of the bonding company to sign bonds for the bonding company. Only original executed instruments will be acceptable.

The corporate surety issuing the bond must be licensed by the Oklahoma State Insurance Commissioner to issue corporate surety bonds in the State of Oklahoma. The Owner reserves the right to require the bidder to submit evidence that the corporate Surety Company is so authorized. The Corporate Surety on all bonds of the successful bidder must be approved in the Treasury Departments Circular 570. If the Surety Company is not on the list, those bids shall be rejected. A bond written by an “offshore” (non-United States) surety company will not be acceptable.

5. LETTERS OF CREDIT:

If a bidder submits an irrevocable letter of credit in lieu of a bond (either a bid bond or a payment/performance/warranty bond), the irrevocable letter of credit must be issued by a financial institution having an office in the State of Oklahoma and insured by the Federal Deposit Insurance Corporation or Federal Savings and Loan Insurance Corporation. The letter of credit must be written on a form, which can be obtained from the Owner.

6. SPECIFICATIONS REGARDING EQUALS:

It is not the intent of these documents to have closed specifications and the brand names shown are the desired materials to be used. The name of a certain brand, make or manufacturer does not restrict proposals to the specified brand, make or manufacturer named unless a brand, model or manufacturer is labeled “No Substitution” in the bid. It is not intended to exclude other products, but to convey the type, functional characteristics and quality of the item desired. Any item that the Owner, in its sole discretion, determines and approves to be the equal of that specified considering quality, workmanship, economy of operation and suitability for the purpose intended will be considered. Thus “equal” products of other manufacturers may be considered if the products meet or exceed the stated specifications, and if a detailed explanation of a claim of equivalency is submitted five (5) days prior to the bid opening. It will be the responsibility of the Bidder to provide data on all products so that the Owner can compare.

7. COMPLETION:

Upon completion of the project, the Contractor will notify Owner and Owner’s Representative will make a final inspection of the work. The project shall be completed in good and workmanlike manner and to the satisfaction of the Owner.

8. ETHICS IN PUBLIC CONTRACTING:

By submitting their bid, Bidders certify that their bids are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder, supplier, manufacturer or subcontractor in connection with their proposal, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised unless consideration of substantially equal or greater value was exchanged.

9. NON-DISCRIMINATION:

Contractor agrees Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin. Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, age or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff-, or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting for the provisions of this non-discrimination clause.

10. ERRORS OR OMISSIONS:

The Bidder shall not be allowed to take advantage of any errors or omissions in the specifications. Where they occur, the Bidder shall promptly notify the contact person listed. Inconsistencies in the specifications are to be reported before bids are submitted.

11. BID FORM:

The bid MUST be submitted on the bid form provided in the bid packet. A Xerox copy of this bid form is acceptable. All blanks must be completed.

END OF SECTION

SECTION 000110

SPECIAL CONDITIONS OF THE CONTRACT

The following conditions also apply to this contract:

1. WORK COVERED UNDER THE CONTRACT:

The scope of the work consists of all new materials, tools, equipment, labor and services, to complete the **TULSA PUBLIC SCHOOLS – WEBSTER HS BAND ROOM & GREEN HOUSE ADDITIONS W/ SITE IMPROVEMENTS** project listed in the "Solicitation and Notice for Bids" in accordance with the "Form of Proposal" and as indicated by the Drawings and by the Specifications included in this Project Manual.

2. MATERIALS AND EQUIPMENT:

All material and equipment utilized shall be in conformance with these Specifications and with good Standards of practice and shall meet or exceed the latest applicable industry standards such as A.S.T.M., Standards and Specifications along with all applicable local and national codes and ordinances, including ICC, N.E.C. and N.F.P.A.

Failure to comply with the terms and conditions of this solicitation or to deliver equipment, supplies or services identified in the Solicitation and Contract at the discount quoted will void the contract award. In the case of failure to deliver goods or provide services in accordance with the contract terms and conditions, Owner, after due oral or written notice, may procure them from other sources and hold the contractor responsible for any resulting additional purchase and administrative costs.

3. CONTRACT METHOD:

The method of Contract and Management shall be in accordance with the Owner's requirements and guidelines set forth at the time the Contract is signed and a Work Order issued.

4. CONTRACT ADMINISTRATOR:

This individual shall serve as the monitor of the conditions of the contract and shall work directly with the contractor to schedule and coordinate the performance of services and to provide general direction under the resulting contract. The following individual is identified to use all powers under the contract to enforce its faithful performance for the Owner: **Chris Hudgins**, Project Supervisor, **(918) 746-6684**.

5. PRIORITIES AND WORK SEQUENCE:

The priority will be furnished by the Owner to the successful bidder at the Issuance of the Work Order. Completion of the project(s) in a timely manner is critical. The bidder is required to give the actual number of days to complete each project. Timing will be a consideration in determining the successful bidder.

6. CONTRACTOR'S USE OF PREMISES:

The contractor shall also furnish a schedule of intended workdays to the owner through the Department of Building Planning prior to commencing the work at any site and keep all

parties informed of any adjustments made necessary by changes of shipping schedules or other causes.

Permission must be obtained from the Owner for temporary use of electric power, water, toilet facilities or other utilities. The Owner's approval must also be obtained for the exact on-site location of any storage of materials, tools or equipment. Owner assumes no responsibility for items stored on school property.

Demolition items and/or debris shall be hauled away from the site after each day's activity and the site always maintained in a clean condition free of any build-up of objectionable scraps, waste material or refuse.

7. OWNER OCCUPANCY AND PROTECTION OF PROPERTY:

The owner's Site-based Personnel may occupy the site. Therefore, it may be necessary to erect a system of barricades or markers to direct traffic away from the area of each day's operations. The Contractor shall protect and safeguard against damage to all adjacent or nearby surfaces, materials, hardware, glass, furnishings, signage or other site improvements and/or vehicles if in the area of intended loading and unloading operations.

8. SALES TAX: (None Required)

The Owner will issue such Documents as necessary to exempt the sales tax upon execution of a contract for the Project(s); therefore the Contractors are advised to omit the State Sales Tax when preparing their Bid.

9. PROJECT START-UP:

The contractor is advised to notify the Owner well in advance of commencing the work on the site.

10. KNOWLEDGE OF SITE AND SCOPE OF WORK REOUIREMENTS:

All Contractors shall visit the site on which work is proposed and become thoroughly familiar with the existing conditions and with the Bid Documents and the Scope of the Work included prior to submitting their bid. Sign in at the main office when visiting the site(s).

11. SUBMITTALS AND CLOSING PROCEDURES:

(Other than Start-up Contract Requirements such as Certificates of Insurance, Bonds, Etc.)

A. Submit Schedules of intended workdays and activity planned for each Site after receiving Owner's Project Priority list prior to commencing work. **Shop drawings and/or product data and samples** shall be submitted to Tulsa Public Schools' Building Planning department covering all Items in the Scope of Work **for approval prior to manufacture** shipment and installation at the project site. Submit the number of copies, which the contractor requires plus one copy, which will be retained by Tulsa Public Schools' Building Planning Department. Furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

B. Unless the contract stipulates "Payment upon Completion" of the project or another method of payment; during Progress of the work, submit a separate "Application

and Certificate for Payment"-AIA Document G702 on or about the 25th day of each month for work performed in that same month. A 5% retainage shall be calculated and withheld from each Pay Application until the project is completed and accepted by Owner.

C. Upon Final Completion and Final Acceptance by Owner, submit the following prepared and properly signed Closing Documents:

1. Certificate of Substantial Completion
(AIA Document G704)

2. Final Application and Certificate for Payment
(AIA Document G702)

3. Contractor's Affidavit of Payment of Debts and Claims
(AIA Document G706)

4. Contractor's Affidavit of Release of Liens
(AIA Document G706A)

5. Consent of Surety Company to Final Payment
(AIA Document G707)

6. Contractor's Affidavit Pursuant to Title 61
O.S.- Optional in lieu of items 3 above.

7. Contractor's Written Warranty for one (1) year against defects in Material or Workmanship.

12. SUBSTITUTIONS AND DEVIATIONS FROM THE SPECIFICATIONS:

Substitutions prior to Bid are covered under Paragraph 6 "Instructions to Bidders". Any substitution or deviation from the specifications must be by Owner's prior approval and accepted by an approved change order stipulating the change in price and change in construction time, if any.

13. OWNER'S RIGHT TO REJECT BIDS:

The Owner reserves the right to reject any or all bids and to waive minor irregularities in any bid. In addition, Bidders should recognize the right of the Owner to reject a bid if said bidder fails to provide any data required in the bid or if the bid is in any way incomplete.

14. FINAL CLEANING:

A. Execute prior to final inspection.

B. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances and polish transparent and glossy surfaces. Clean equipment and fixtures, sweep and vacuum interior areas and rake clean exterior areas. Remove waste and surplus materials, rubbish and construction facilities from the Project and from the site.

15. SPECIAL TERMS AND CONDITIONS:

15.1 Testing and Inspections: Owner reserves the right to conduct any test or inspection it may deem advisable to assure supplies and services conform to specifications.

15.2 Proprietary Indemnity: Bidder warrants that the system, each part of the system, and all other products and services used by or furnished by bidder, do not infringe upon or violate any patent, copyright, trade, secret, trademark, or any other proprietary right of any third party. In the event of claim against Owner, Owner shall promptly notify vendor and vendor shall defend and indemnify Owner against any loss, cost expense, claim, or liability arising out of such claim, whether or not such claim is successful.

15.3 Patent and Copyright Materials: Unless otherwise expressly provided in a contract, bidder shall be solely responsible for clearing the right to use any patented or copyrighted materials in the performance of this contract.

15.4 Audit: Contractor hereby agrees to retain all books, records and other documents relative to this contract for five (5) years after final payment or until audited by the owner, whichever is sooner. Owner, its authorized agents and/or auditors reserve the right to perform or have performed an audit of contractor's records and therefore shall have full access to the right to examine any of said materials within those five years.

15.5 Open Records: Ownership of all data, materials and documentation originated and prepared for the owner pursuant to this bid shall belong exclusively to Owner and be subject to inspections in accordance with the Oklahoma Open Records Act.

15.6 Contractor Compliance: Contractor shall comply with all procedural instructions that may be issued from time to time by Owner; however, the terms and conditions of the contract will not change:

16. Lead based paint, contractors shall be certified and follow work practices established under the EPA Renovations, Repairing, and Painting Program applicable to schools when performing any work which will disturb interior or exterior lead based surface coatings in buildings constructed before 1997/8. All such work shall be performed in compliance with 40 CFR Part 745.

END OF SECTION

SECTION 000120

SUPPLEMENTAL CONDITIONS TO THE CONTRACT

(References are to Articles, Paragraphs, Subparagraphs and Clauses of the General Conditions of the Contract for Construction, AIA Document A201, 2017 Edition)

2.2.5 **Delete** entire Subparagraph, and substitute the following:

"The Owner shall furnish Contractor with five (5) copies of Drawings and Project Manuals. Additional copies needed by the Contractor shall be provided and paid for by the Contractor."

4.3.1 **Delete** entire Subparagraph, and substitute the following:

"Definition"

"A Claim is any demand or assertion by the Contractor that it should be paid more money than the Contract Sum, as adjusted under the Change Order provisions herein, by the Owner because of action or inaction on the part of Owner, Program Manager, Architect, or any party for whom Owner is responsible, or any party with whom Owner has separately contracted for other portions of the Project, including, but not limited to, any demand or assertion that Contractor's performance has been delayed, interrupted or interfered with, that Contractor's performance has been accelerated or suspended, that Contractor's performance has been wrongfully terminated, that the Contract Documents have been misinterpreted, that there has been a failure of payment, that Contractor has encountered concealed or unknown conditions, that Contractor has encountered hazardous materials, that there are problems with the Contract Documents, or the timing of Architectural approvals or decisions, that actions of the Owner have been intentionally wrongful or deceptive, that Owner is directly or indirectly guilty of negligence or an intentional tort related in any way to the Work, that the amount of time or money granted in a Construction Change Directive is inadequate, that an item treated as a minor change in the Work should have been treated as a Change Order, that a time extension grant was inadequate, or that Contractor is entitled to any other relief, on any legal theory, related to the Work and the Contract."

"Notice Requirement"

"Within five (5) days of the first occurrence of an event that Contractor has any reason to believe might result in a Claim, or within five (5) days of Contractor's discovery of the first occurrence of an event that Contractor has any reason to believe might result in a Claim, if the first occurrence of the event was willfully hidden from the Contractor, the Contractor shall file a written document clearly captioned "Notice of Claim" with Tulsa Public Schools, Program Manager and the Architect. The notice shall clearly set out the specific matter of complaint, and the impact or damages which may occur or have occurred as a result thereof, to the extent the impact or damages can be assessed at the time of the notice. If the impact or damages cannot be assessed as of the date of the notice, the notice shall be amended at the earliest date this is reasonably possible."

Add the following Subparagraph:

"Any claim or portion of a Claim that has not been made the specific subject of a notice strictly in accordance with the requirements of this section shall be waived. It is imperative that Owner have timely, specific notice of any subject, the impact of which Owner may be in a position to mitigate."

4.3.3 **Add** the following sentences:

"Claims Handling During Construction. After receipt of a Notice of Claim, the Owner may elect to refer the matter to the Architect, Program Manager or another party for review. Contractor will attend meetings called to review and discuss the Claims and mitigation of the problem, and shall furnish any reasonable factual backup for the Claim requested. The Owner may also elect to defer consideration of the Claim until the Work is completed, in which case the same review options shall be available to the Owner at the completion of the Work. At any stage the Owner is entitled to refer a Claim to mediation under the Construction Industry Mediation Rules of the American Arbitration Association, and if this reference is made Contractor and the Owner will take part in the mediation process. The filing, mediation or rejection of a Claim does not entitle Contractor to stop performance of the Work. The Contractor shall proceed diligently with performance of the Contract."

4.3.6.1 **Add** the following Subparagraph:

"Calculating Claim Amount"

"In calculating the amount of any Claim the following standards will apply:

.1 No indirect or consequential damages will be allowed.

.2 All damages must be directly and specifically shown to be caused by a proven wrong. No recovery shall be based on a comparison of planned expenditures to total actual expenditures, or on estimated losses of labor efficiency, or on a comparison of planned manloading to actual manloading, or any other analysis that is used to shown damages indirectly.

.3 Damages are limited to extra costs specifically shown to have been directly caused by a proven wrong.

.4 The maximum daily limit on any recovery for delay shall be the amount estimated by the Contractor for job overhead costs divided by the total number of calendar days of Contract Time called for in the original Contract."

.5 No monetary costs shall be allowed for delay.

5.2.1 In the first sentence, delete "as soon as practicable" and substitute "within seventy-two (72) hours."

5.2.5 **Add** this new Subparagraph:

"The Contractor shall not sublet the work as a whole. The approval of Subcontractors in no way relieves the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents."

5.3.1 **Delete** the remainder of the second sentence beginning with the words "and shall allow to the Subcontractor."

5.4.2 **Delete** entire Subparagraph and substitute the following:

"Owner shall only be responsible for compensating Subcontractors for work done or materials furnished after the date Owner gives written notice of its acceptance of the subcontract agreement."

5.5 **Add** this new Paragraph:

5.5 "RESPONSIBILITY"

5.5.1 "Contractor shall be fully responsible for the performance of its Subcontractors.

6.1.1 **Delete** the entire Subparagraph, and substitute the following:

"The Owner reserves the right to perform other construction work, maintenance and repair work and school program operations at the site and near the site during the time period of the Work. Owner may perform other work with separate contractors or with its own forces. On renovation/addition projects, the Owner shall have access to the site and all buildings on the site at all times. On new construction, the Owner shall have access to the site and all buildings during normal business hours."

10.1.2 **Add** this new Subparagraph:

"The Contractor shall be responsible for the protection and security of the Work and the Project, until he receives written notification that the Substantial Completion of the work has been accepted by the Tulsa Public Schools."

10.2.8 **Add** this new Subparagraph:

"In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner, Program Manager and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 4.3 and Article 7."

10.3.1 **Delete** entire Subparagraph and substitute the following:

"Contractor is responsible for reviewing all Asbestos Hazard Emergency Act Management Plans on file with Owner and for obtaining sign-off from Tulsa Public Schools Hazardous Materials Bureau prior to commencing the Work. In no event shall the Contractor engage in the disturbance or removal of asbestos or polychlorinated biphenyl (PCB). In the event the Contractor encounters on the site material reasonably believed to be asbestos or PCB which has not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to the Architect in writing. If the portion of the Work that is stopped is critical to overall completion, the Contractor shall reschedule the Work, if possible, to minimize the impact of the stoppage. The work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or PCB and has not been rendered harmless. The work in the affected area shall be resumed when the asbestos or polychlorinated biphenyl (PCB) has been removed, or when it has been rendered harmless. If the Work is stopped due to the presence of such materials, Owner shall arrange for the removal and/or rendering harmless of such materials prior to Contractor being allowed to proceed. The Owner shall have the option of arranging for removal by a qualified, adequately insured third party tendered to Contractor, and mutually agreed to by both parties, as a Subcontractor in which case a Change Order will be issued for the cost of this subcontract. Any tendered Subcontractor must indemnify the Contractor and the Owner with regard to its work. In the case of such a tender, Owner will not hold Contractor responsible for the work or other actions of the tendered Subcontractor, and Contractor's approval of tendered Subcontractor shall not be unreasonably withheld. In those instances in which the presence of such materials was set forth in the Hazardous Materials documents or in which Contractor had other notice of such through information given to Contractor by Owner or its representative prior to the commencement of the Work, Contractor shall not be entitled to a Claim for any delays, disruption or interference it encounters. In those instances of work stoppage due to the existence of such hazardous materials which were not set forth in the

Hazardous Materials Control plans and of which Contractor had no other prior notice, Contractor may be entitled to a Claim for extension of time due to the work stoppage."

11.4 PROPERTY INSURANCE

11.4.1 **Delete** entire Subparagraph, and substitute the following:

"Until the Work is completed and accepted by the Owner, the Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. The property insurance shall also cover portions of the Work stored off site after written approval of the Owner of the value established in the approval, and also portions of the Work in transit. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage including flood and earthquake and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. The insurance shall cover reasonable compensation for Architect's and Program Manager's services and expenses required as a result of an insured loss. This "all risk" policy shall be written incorporating Actual Completed Value Form and General Change Endorsement incorporating the following language:

"Permission is given for the Project insured hereunder to become occupied, the insurance remaining in full force and effect until such time as the Project has been accepted by the Owner, all as currently approved by the Laws for the State of Oklahoma."

"The policy shall include coverage for Explosion, Collapse and Underground (XCU). Such insurance shall be evidenced by the kind of policy which does not have to be adjusted or reported upon periodically but provides constant insurance at full one hundred percent (100%) of all insurable values as they are created during construction by performance of the Contract. The Certificate of Insurance must include the names of the insured Contractor and the Tulsa Public Schools."

11.4.1.2 **Delete** entire Clause, and substitute the following:

"Loss under such All Risk Builder's Risk Insurance shall be made payable jointly to the Tulsa Public Schools and to the Contractor by name (and, if separate mechanical contracts are awarded to each, by name, of the plumbing, heating, ventilating and electric contractors)."

11.4.1.3 **Delete** entire Clause, and substitute the following:
"In the case of loss under the risks covered, and of collection by insured, the Owner shall act as trustee for all parties concerned as their interests may appear."

12.1.3 **Add** this new Clause:

"Where nonconforming work is found, the entire area of work involved shall be corrected unless the contractor can completely define the limits to the Architect's satisfaction. Additional testing, sampling, or inspecting needed to define nonconforming work shall be at the Contractor's expense. He shall employ the Owner's testing laboratory if such services are reasonably required by the Architect. All connected work shall be retested at the contractor's expense. Extra Architectural or Program Manager Services required to analyze nonconforming work shall be paid for by the Contractor."

13.1.1 **Delete** entire Subparagraph, and substitute the following:

"District Court in and for the County of Tulsa, State of Oklahoma shall have sole jurisdiction in any action brought under this contract."

14.2.5 **Add** this new Subparagraph:

"If a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, the Surety shall promptly remedy the default by completing the Contract in accordance with its terms and conditions, or by obtaining a bid or bids in accordance with its terms and conditions. Upon determination by the Owner and the Surety of the lowest responsible bidder, the Surety will arrange for a contract between such bidder and the Owner, and make available as work progresses sufficient funds to pay the cost of completion less the balance of the Contract Sum, but not exceeding the Penal Sum of the bond and other costs and damages for which the Surety may be liable under the bond. The phrase 'balance of the Contract Sum' as used herein shall mean the total amount payable by the Owner to the Contractor under the Contract and amendments thereto less the amount previously paid by the Owner to the Contractor."

END OF SECTION

SECTION 000125

GEOTECHNICAL INFORMATION

See Attached *Geotechnical Engineering Report* performed by
TERRACON CONSULTANTS, INC.

Report Project No. 04225018
Dated March 14, 2022

Geotechnical Engineering Report

Webster High School Classroom Additions
Tulsa, Oklahoma
March 14, 2022
Terracon Project No. 04225018

Prepared for:
GS Helms & Associates, LLC
Jenks, Oklahoma

Prepared by:
Terracon Consultants, Inc.
Tulsa, Oklahoma

March 14, 2022

GS Helms & Associates, LLC
424 East Main Street
Jenks, Oklahoma 74037

Attn: Mr. Greg Helms
P: 918-298-7257
E: greg.helms@gshelms.com

Re: Geotechnical Engineering Report
Webster High School Classroom Additions
1919 West 40th Street
Tulsa, Oklahoma
Terracon Project No. 04225018

Dear Mr. Helms:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. P04225018 dated February 1, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.
Cert. of Auth. #CA-4531 exp. 6/30/23

Bradley M. Watts, P.E.
Oklahoma No. 16526

Michael H. Homan, P.E.
Senior Principal

REPORT TOPICS

Note: This report was originally delivered in a web-based format. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Webster High School Classroom Additions

Tulsa, Oklahoma

Terracon Project No. 04225018

March 14, 2022

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed classroom additions planned at Webster High School located at 1919 West 40th Street in Tulsa, Oklahoma. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

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

The geotechnical engineering Scope of Services for this project included the advancement of eight test borings, designated B-1 to B-8, to depths ranging from approximately 3.5 to 19 feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** section, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section.

SITE CONDITIONS

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

Item	Description
Parcel Information	The project is located at 1919 West 40th Street in Tulsa, Oklahoma. Latitude/Longitude: 36.1060° N/96.0127° W (approximate) See **Site Location**
Existing Improvements	Buildings, pavement, concrete flatwork, maintained grass area, and easterly flowing drainage channel
Current Ground Cover	Grass, asphalt pavement, concrete flatwork, and some trees

Item	Description
Existing Topography	Relatively level to gradually sloping; a maximum elevation difference of about 4 feet was measured between the borings

PROJECT DESCRIPTION

Our understanding of the project conditions is as follows:

Item	Description
Project Description	The project involves constructing the following: ■ One-story building addition named the Band Classroom addition will be built along the east side of the existing building that contains Studio C, Band Rooms, and the Cafeteria. The building addition will be a combination of insulating concrete forming, cast-in-place concrete foundation walls, steel roof framing, and poured in-place concrete roof topping slab to create a FEMA Community Safe Room. The addition will have brick veneer. ■ One-story building addition along the south side of the Classroom D building (a.k.a., Addition on South Side of Classroom D Building) with the east half of the addition consisting of a greenhouse and west half of the addition consisting of a typical steel frame building with metal stud walls. The addition will have brick veneer. ■ Associated paved drive and parking areas.
Maximum Structural Loads **(provided unless otherwise noted as assumed)**	**Band Classroom Addition:** ■ Columns: 180 kips ■ Walls: 15 kips per linear foot ■ Slab-on-Grade: 150 pounds per square foot, uniform (assumed) **Addition On South Side of Classroom D Building:** ■ Columns: 50 kips ■ Walls: 3 kips per linear foot ■ Slab-on-Grade: 150 pounds per square foot, uniform (assumed)

Item	Description
Grading	■ **Band Classroom Addition:** We understand the finished floor elevation will be located about 6 feet above the grade of the adjacent existing pavement. Therefore, we assume maximum fill depths of about 8 feet, relative to existing grades, will be required to reach the final building subgrade elevation. ■ **Addition On South Side of Classroom D Building:** Final grades have not been provided for this addition. We assume maximum cut and fill depths of about 2 feet, relative to the existing grades, will be required to reach the final building subgrade elevation. ■ **Planned Pavements:** We assume maximum cut and fill depths of about 2 feet, relative to the existing grades, will be required to reach the final pavement subgrade elevations.

GEOTECHNICAL CHARACTERIZATION

Subsurface Profile

Subsurface conditions at the boring locations can be generalized as follows:

Stratum	Approximate Depth to Bottom of Stratum	Material Description	Consistency/Density/ Comments
Surface 1	6 inches in B-1, B-2, B-5, and B-6	Surface Vegetation and Topsoil	N/A
Surface 2	4 inches in B-3, B-4, B-7, and B-8	Asphalt	N/A
1	1.5 to 2 feet in B-4, B-5, and B-7	Fill: Silty Lean Clay	Standard penetration resistance blow count values (N-values) ranging from 3 to 6 blows per foot were obtained in the fill
2	8.5 to 14.5 feet; 3.5 to 4.5-foot termination depths in B-7 and B-8	Lean Clay; Silty Lean Clay; Shaley Lean Clay with varying amounts of sand and sandstone fragments	Soft to Very Stiff [1]
3	13.5 to 18 feet in B-3 to B-6	Highly Weathered Shale; Weathered Shale	Soft; Olive-Brown
4	Approx. 19-foot termination depths in B-1 to B-6	Shale	Moderately Hard to Hard; Gray

Stratum	Approximate Depth to Bottom of Stratum	Material Description	Consistency/Density/ Comments

1. The clays were typically medium stiff to very stiff in consistency, except for the clays at borings B-2 to a depth of about 8.5 feet and B-6 from a depth of about 5 to 8.5 feet which were soft or soft to medium stiff.

Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in material types; in situ, the transition between materials may be gradual.

Groundwater Conditions

The boreholes were observed while drilling and immediately after completion for the presence and level of groundwater. The water levels observed in the boreholes can be found on the boring logs in **Exploration Results** and are summarized below.

Boring Number	Approximate Depth to Groundwater while Drilling (feet) [1]	Approximate Depth to Groundwater after Drilling (feet) [1]
B-1, B-3, B-7, and B-8	Not encountered	Not encountered
B-2	13.5	13
B-4	18	17.5
B-5	11	13.5
B-6	11	13.5

1. Below ground surface

Relatively wet soils were encountered in several borings which indicate the potential for shallow perched water in the areas of those borings.

Groundwater observations made during this exploration occurred over the short duration the borings were performed. Due to the relatively low permeability soil and rock encountered in the borings, a relatively long period may be necessary for a groundwater level to develop and stabilize in a borehole. Therefore, the groundwater observations do not necessarily mean the borings terminated above groundwater, or the water levels summarized above are stable groundwater levels. Long term observations in piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Perched water could be present during some periods of the year. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the

boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

Band Classroom Addition

Relatively high moisture content, low strength soils were encountered at boring B-2 to a depth of approximately 8.5 feet below the existing grade. These low strength soils are unstable and subject to excessive settlement under the loads imposed by the new fills. It should be noted that boring B-2 was located near the existing drainage channel. Wet weather conditions occurring prior to and during construction will exacerbate the extent of low strength, unstable conditions. The extent of low strength, unstable near surface soils will not become evident until construction.

The full-depth of the low strength, unstable soils that are subject to excessive settlement will require undercutting and replacement with tested and approved, engineered fill. Considering the results of boring B-2, undercut depths on the order of 8.5 feet below existing grades should be anticipated to remove the unsuitable soils in the area of boring B-2. Based on these undercut depths, we anticipate fill depths up to approximately 15 feet will be required to reach the final building subgrade elevation for the planned Band Classroom addition.

We estimate post-fill construction settlement could be approximately 1 to 2 inches where the 15-foot deep fills are constructed. The settlement will occur due to compression of the fill under its own weight and compression of the on-site soils under the weight of the fill. Because of the variable thickness of fill required across the Band Classroom addition, differential fill settlement could approach the total settlement value. Conventional on-grade building floor slabs will be subject to the estimated magnitude of total and differential fill settlement, if they were constructed immediately after fill construction.

Because of the variable composition and consolidation characteristics of on-site soils, we cannot accurately predict how long it will take for the majority of the fill settlement to occur such that post-fill construction settlements will be within acceptable levels. At the planned Band Classroom addition, we recommend that settlement monitoring be performed after grading is completed to evaluate when post-fill construction settlement will be within acceptable levels and it is acceptable to begin construction of the building. Foundation installation for the building should not begin until the settlement monitoring period is completed. Settlement monitoring is discussed in more detail in the **Settlement Monitoring – Band Classroom Addition** section.

Based on the results of the borings and anticipated foundation loads, we recommend the planned Band Classroom addition be supported on drilled pier foundations bearing in the moderately hard to hard, gray shale bedrock that was encountered in borings B-1 to B-4 at depths of approximately

13.5 to 18 feet (approximate elevation 82.5 to 89 feet). The **Drilled Pier Foundations** section addresses the design and construction of drilled pier foundations.

The on-site soils have relatively low volume change potential with variations in moisture content. However, because variable thicknesses of fill could be placed to grade building pad, we recommend that a minimum 30-inch thick layer of Low Volume Change (LVC) engineered fill be constructed beneath slab-on-grade floors of the Band Classroom addition to help provide more uniform support. The **Floor Slabs** section addresses slab-on-grade support of the building.

Flexible and rigid pavement system options are provided in this report. The **Pavements** section addresses the design of pavement systems.

Addition on South Side of Classroom D Building

Relatively low strength soils were encountered at boring B-6 between depths of approximately 5 to 8.5 feet below the existing grade. These low strength soils, as well as the clay soil encountered in boring B-5 between depths of about 5 to 8.5 feet have relatively high moisture content and are unstable. Wet weather conditions occurring prior to and during construction will exacerbate the extent of low strength, unstable conditions. The extent of low strength, unstable near surface soils will not become evident until construction.

Because of the relatively low strength, near surface soils encountered at boring B-6, we recommend the planned Addition on South Side of Classroom D Building be supported on drilled pier foundations bearing in the moderately hard to hard, gray shale bedrock that was encountered in borings B-5 to B-6 at depths of approximately 13.5 to 17.5 feet (approximate elevation 82.5 to 86 feet). The **Drilled Pier Foundations** section addresses the design and construction of drilled pier foundations.

We have considered footings for support of this building addition. However, to develop support for footings, it would be necessary to perform an undercut and backfill procedure to construct a thickness of engineered fill beneath the footings. We anticipate construction difficulties would be encountered when performing the undercut and backfill procedure due to the high moisture content, unstable soil conditions between the approximate depths of 5 to 8.5 feet. These conditions could require footing undercuts to be extended deeper and below the zone of unstable soils and/or require the use of special backfill construction procedures involving the use of crushed aggregate underlain by a geogrid mat. Because of these potential construction difficulties and also considering groundwater was encountered in borings B-5 and B-6 at a depth as shallow as 11 feet, it appears that footings are not a viable option for support of the planned Addition on South Side of Classroom D Building.

The on-site soils have relatively low volume change potential with variations in moisture content. However, because of the potential for a variable subgrade conditions, we recommend that a minimum 12-inch thick layer of Low Volume Change (LVC) engineered fill be constructed beneath

slab-on-grade floors of the building addition to help provide more uniform support. The **Floor Slabs** section addresses slab-on-grade support of the building.

General

Constructing floor slabs and pavements over existing fill is discussed in this report. Because of the potential for variation in the composition and quality of existing fill away from the borings and unsuitable materials to be buried in existing fills, there is an inherent risk of unpredictable settlement of slabs and pavements constructed over existing fills. This risk cannot be eliminated unless the full-depth of the existing fill is removed and replaced with tested and approved, new engineered fill. However, the risk can be reduced with thorough observation and testing by a representative of the Geotechnical Engineer during construction.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

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

Site Preparation

Areas within the limits of construction should be stripped and cleared of all surface vegetation, topsoil, trees, and any debris. Tree stumps and major root systems should be removed full-depth. Any existing surface and subsurface features from past site use should be removed full-depth from the limits of construction. Excavations required for tree stump and root removal, and demolition should be cleaned of loose material, water, and debris and properly backfilled with tested and approved, engineered fill.

After stripping and completing the required cuts and overexcavations, and prior to placing any new fill, the subgrade should be proofrolled to aid in locating soft, unstable areas. Proofrolling should be performed with a loaded tandem axle dump truck weighing at least 25 tons. Areas too small to proofroll should be evaluated by the Geotechnical Engineer. Low strength, unstable soils should be overexcavated full-depth and replaced with suitable engineered fill.

Based on the results of the borings, low strength, unstable subgrade conditions should be anticipated. Low strength, unstable soils were encountered to a depth of about 8.5 feet at boring B-2. Low strength, unstable soil conditions could be encountered at other locations in the vicinity of the existing drainage channel. Perched water seepage could be encountered in undercuts made in the area of the drainage channel. High moisture content, unstable near surface soils

could also be encountered in the area of borings B-5 and B-6, and within the proposed pavement areas (area of B-7 and B-8).

After completing the proofrolling, and before placing any fill, the exposed subgrade should be scarified to a minimum depth of 9 inches, moisture conditioned, and compacted as recommended in **Fill Compaction Requirements** within **Earthwork**.

Where relatively deep undercuts are required, fills should be benched into the sides of the undercut periodically as fill placement progresses vertically.

Fill Material Types

Soils used as engineered fill materials should meet the following requirements:

Fill Type [1]	Acceptable Location For Placement
Imported Low Volume Change (LVC) Material [2] (8 ≤ PI ≤ 18)	■ All locations and elevations ■ Required for top 30 inches of the floor slab subgrade at the Band Classroom addition ■ Required for top 12 inches of the floor slab subgrade at the Addition at South Side of Classroom D Building ■ Required as fill beneath Band Classroom addition and Addition on South Side of Classroom D Building (i.e., only Imported LVC Material should be used as fill beneath these building areas) ■ Required for 12-inch select fill layer below pavements
On-Site Clay Soils [3, 4]	■ Not allowed as fill beneath the Band Classroom addition ■ Not allowed as fill beneath the Addition on South Side of Classroom D Building ■ Depths greater than 12 inches below the final pavement subgrade
ODOT Type A Aggregate Base [5]	■ Aggregate base course in pavement sections

1. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris and contain maximum rock size of 3 inches. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation prior to its use.
2. Approved, imported, low plasticity cohesive soil having a plasticity index (PI) of 8 to 18 and containing at least 15% fines (material passing the No. 200 sieve, based on dry weight).
3. Undocumented existing fills may contain unsuitable materials and debris that render the existing fill materials unsuitable for reuse as engineered fill. The presence of unsuitable materials and debris may not be identified until construction is underway.
4. The on-site soils could have elevated moisture levels and require drying to allow for placement as engineered fill.

Fill Type [1]	Acceptable Location For Placement

5. Subsection 703.01 of the Oklahoma Department of Transportation, Standard Specifications for Highway Construction

Fill Compaction Requirements

The compacted subgrade and engineered fill should be moisture conditioned and compacted in accordance with the following recommendations:

Item		Description
Subgrade Scarification Depth		9 inches
Maximum Lift Thickness [1]		9 inches or less in loose thickness
Minimum Compaction Requirements [2]		■ **Depths Within 4 feet of the Final Subgrade:** At least 95% of the material's standard Proctor maximum dry density (ASTM D 698) ■ **Depths Greater than 4 feet below the Final Subgrade:** At least 98% of the material's standard Proctor maximum dry density (ASTM D 698)
Moisture Content	**Imported LVC Material and On-Site Clay**	-2 to +2% of the material's optimum moisture content (ASTM D-698)
	Aggregate Base	Workable moisture content [3]

1. Thinner lifts are recommended in confined areas or when hand-operated compaction equipment is used.
2. We recommend that engineered fill (including scarified compacted subgrade) be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.
3. Workable moisture content is the moisture content sufficient to achieve the specified compaction without causing pumping when proofrolled.

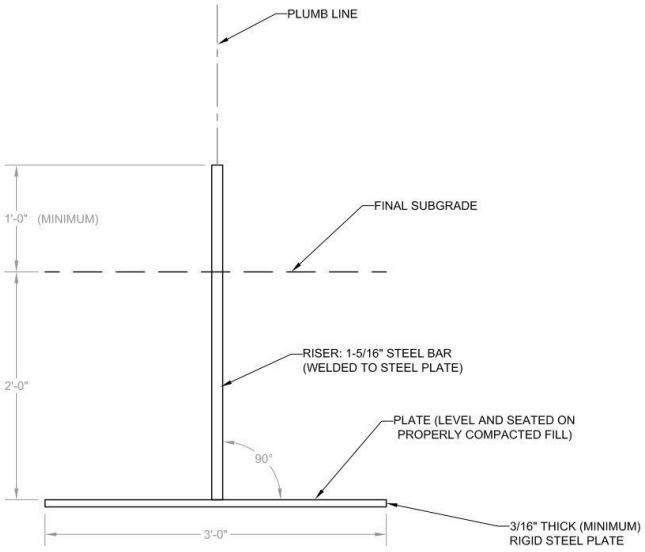
Settlement Monitoring – Band Classroom Addition

Fills up to approximately 15 feet in depth are anticipated at the Band Classroom addition site. To verify that post-construction settlement of on-grade building floor slabs will be within accepted levels, the fill should be allowed to settle prior to constructing the building. Foundation installation for the building should not begin until the settlement monitoring period is completed. Settlement plates should be installed in the compacted fill and the plates should be monitored to determine when the majority of the fill settlement has occurred. A settlement plate detail is shown in Figure 1 below. Terracon should be consulted when the final grading plans are available to provide recommended settlement plate locations.

Building construction, including foundation installation, should not begin until settlement has stabilized and future settlement will be within acceptable levels. We estimate it could take approximately 8 to 12 weeks after fill construction for the settlement to stabilize. However, the actual length of time needed for settlement to stabilize should be evaluated through the recommended monitoring. The quality of subgrade preparation prior to placing fills could have a significant impact on the length of the settlement monitoring period.

Following construction of the fill and settlement plate installation, a licensed surveyor should shoot the elevation of the top of each settlement plate riser at least two times per week. Elevations should be shot to the nearest 0.01 foot. Elevation shots should be made by the same surveyor at approximately the same time of day with similar ambient temperatures. Terracon should be retained to review the monitoring/elevation data and advise the client and design team as to when settlement has sufficiently stabilized. Monitoring should continue until the settlement has adequately stabilized.

A settlement plate detail is provided below. Once the settlement monitoring is completed and the plates are no longer needed, the plates should be removed and the excavation backfilled with engineered fill.



Notes:

1) Firmly seat and level plate to ensure installation of a riser in a plumb line

2) Use a carpenters level to check plumb of the riser when installing

3) Protect settlement plate against disturbance

4) Disturbed settlement plates shall be replaced

Figure 1

Utility Trench Backfill

Utility trenches are a common source of water infiltration and migration. All utility trenches that penetrate beneath the buildings should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the buildings. We recommend constructing an effective clay "trench plug" that extends at least 5 feet out from the face of the structure exterior. The plug material should consist of clay compacted at a water content at or above the soil's optimum water content. The clay fill should be placed to completely surround the utility line and be compacted in accordance with recommendations in this report.

Grading and Drainage

All grades must provide effective drainage away from the buildings during and after construction and should be maintained throughout the life of the structure.

Exposed ground should be sloped and maintained at a minimum 5 percent away from the buildings for at least 10 feet beyond the perimeter of the structure. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After structure construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structures should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structures, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Planters located within 10 feet of the buildings should be self-contained to prevent water accessing the building subgrade soils. Sprinkler mains and spray heads should be located a minimum of 5 feet away from the building lines. Low-volume, drip style landscaped irrigation should not be used near the buildings. Roof runoff should be collected in drains or gutters. Roof drains and downspouts should be discharged onto pavements which slope away from the buildings or extend down spouts at least 10 feet away from the building.

Earthwork Construction Considerations

The on-site clay soils are moisture sensitive and subject to disturbance and instability with moisture increases. If wet conditions exist during construction, construction equipment mobility could be hindered and it could be necessary to overexcavate and replace or stabilize unstable subgrade soils to develop suitable support for new fills, slabs, and pavements, and to allow construction to proceed.

Relatively high moisture content, low strength soils that were unstable were encountered at boring B-2 to a depth of approximately 8.5 feet. Boring B-2 was located near the existing drainage channel. The relatively wet soil conditions indicate the perched water seepage could be encountered within the zone of low strength soils at boring B-2. Wet weather conditions around

the time of construction and during construction will exacerbate the extent of soft, high moisture content near surface soils and perched water conditions.

The low strength, unstable soils encountered to a depth of about 8.5 feet at boring B-2 are subject to excessive settlement under the loads imposed by the new fills and require full-depth removal and replacement with tested and approved engineered fill. Special construction procedures could be required to stabilize the subgrade across the bottom of the overexcavations, after removal of the low strength soils. The need for special construction procedures and selection of the appropriate procedure should be evaluated during construction.

It should be expected that temporary dewatering could be required during construction to perform the overexcavation and backfill procedures "in the dry."

Near surface soils with relatively high moisture content that were unstable were also encountered in the borings for the proposed Addition on South Side of Classroom D Building and in planned pavement areas.

It is our experience that high moisture content, unstable soils can be found beneath existing slabs and pavement after demolition.

It is not possible to accurately predict until construction is underway the actual quantity of unsuitable soils that will need to be removed. We encourage the owner to secure a base bid for removing a specified quantity of the unsuitable soils. The owner should also secure unit rates for adding or deducting quantities from the base bid that includes costs for exporting unsuitable materials and importing approved replacement materials, if required.

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of foundations, slabs, and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to construction of overlying elements.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. Temporary excavations will probably be required during grading operations. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of existing surface and subsurface site features, vegetation and topsoil, proofrolling and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas, with at least two tests per lift. One density and water content test should be performed for each lift for every 100 linear feet of compacted utility trench backfill, with at least two tests per lift.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

DRILLED PIER FOUNDATIONS

We recommend the proposed Band Classroom addition and Addition on South Side of Classroom D Building be supported on drilled pier foundations bearing in the moderately hard to hard, gray shale bedrock. It will be necessary for pier excavations to fully penetrate any overlying highly weathered shale and weathered shale to encounter the recommended bearing material. Close observation by the Geotechnical Engineer should be performed during construction to evaluate that suitable bedrock is encountered and sufficiently penetrated.

Design and construction recommendations for pier foundations are presented in the following paragraphs.

Drilled Pier Design Parameters

Description		Design
Foundation type		Straight shaft drilled piers
Bearing material		Moderately hard to hard, gray, shale
Depth bearing material encountered [1] (approx. relative elevation)	**Band Classroom Addition**	13.5 to 18 feet (82.5 to 89 feet)
	Addition on South Side of Classroom D Building	13.5 to 17.5 feet (82.5 to 86 feet)

Description	Design
Net allowable end bearing pressure [2]	50,000 psf
Allowable skin friction [3]	3,500 psf
Minimum pier diameter	18 inches
Minimum pier spacing [4]	3 pier diameters center-to-center
Minimum grade beam depth [5]	24 inches
Estimated total settlement	1/2 inch or less

1. Depth to recommended bearing material below the ground surface at our borings. Approximate elevation of bearing material is relative to Terracon's arbitrary benchmark elevation of 100.0 feet.
2. Piers should extend at least 2 feet into the gray, moderately hard to hard, shale bedrock to use the recommended net allowable end bearing pressure. The net allowable bearing pressure is the pressure at the base of the piers in excess of the adjacent overburden pressure.
3. The recommended skin friction is for that length of drilled pier extending more than 2 feet into the recommended bearing material. Skin friction can be used to provide additional capacity in compression and resistance to uplift loads.
4. Minimum pier spacing to reduce overlapping bearing stresses and for constructability.
5. Minimum depth applies to grade beams along the perimeter and in unheated areas for frost protection.

Drilled Pier Construction Considerations

A heavy-duty pier drilling rig equipped with a rock auger will be needed to penetrate the shale bedrock.

Zones of highly weathered shale and weathered shale ranging from about 3 to 5 feet thick were encountered above the shale bearing stratum at some of the boring locations. Drilled piers will need to extend completely through the highly weathered shale and weathered shale to encounter the moderately hard to hard shale bearing material. Terracon should observe all pier installations to verify that the recommend bearing materials are encountered and sufficiently penetrated.

Based on the results of the borings, it should be anticipated that temporary casing will be required to complete pier excavations. A sufficient head of plastic concrete having a minimum slump of about 6 inches should be maintained inside the casing during withdrawal to reduce the potential for concrete arching and the influx of soil and water into the pier excavation. Placement of loose soil backfill should not be permitted around the casing prior to removal.

All loose or disturbed material and water should be removed from pier excavations prior to concrete placement. Concrete should be on-hand and ready for placement immediately after the pier excavation is completed.

FLOOR SLABS

Design parameters for building floor slabs are presented in this section and consider that the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure.

Floor Slab Design Recommendations

Item		Description
Floor slab support	**Band Classroom Addition**	30-inch Low Volume Change (LVC) fill zone [1]
	Addition on South Side of Classroom D Building	12-inch Low Volume Change (LVC) fill zone [1]

1. To help provide more uniform slab support, we recommend a Low Volume Change (LVC) fill layer be constructed below building floor slabs. LVC fill material should consist of approved materials conforming to the recommendations presented **Fill Material Types** within **Earthwork**. The thickness of the LVC fill zone does not include the thickness of any granular leveling material below the floor slab. The on-site soils should be undercut sufficiently to allow for construction of the LVC fill zone.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

LATERAL EARTH PRESSURES

We anticipate the building could contain stem walls (i.e., below-grade building walls) along the sides of the building where the retained materials will be under the building floor slab. Earth pressures exerted on the walls are dependent on the height and stiffness of the walls, type and density of backfill materials, and imposed surface loads. Recommended design parameters to evaluate lateral earth pressures for design of below-grade walls are presented in the following table.

Description	Design
Design Equivalent Fluid Pressure – At-Rest Pressure Condition [1]	70 pcf
At-Rest Pressure Coefficient [2]	0.6

1. The equivalent fluid pressure value assumes an at-rest pressure condition where the walls are restrained and cannot move sufficiently to mobilize shear strength of the soil. The recommended equivalent fluid

pressure value assumes a level backfill condition, triangular pressure distribution, no surcharge loads, and no hydrostatic pressures behind the walls.

2. At-rest pressure coefficient can be used to compute lateral earth pressures imposed by uniform surcharge loads behind the walls.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the International Building Code (IBC). Based on the soil/bedrock properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is D**. Subsurface explorations at this site were extended to a maximum approximate depth of 19 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.

PAVEMENTS

Pavement Sections

To improve longer-term pavement support, we recommend that a minimum 12-inch thick layer of select fill be constructed beneath the pavement sections. The on-site soils should be undercut sufficiently to construct the select fill layer. The select fill should consist of an Imported Low Volume Change material meeting the criteria stated in section **Fill Material Types** within **Earthwork**.

Typical, minimum alternative pavement sections are outlined in the sections below. The pavement sections assume that automobile parking pavements will be traveled only by automobiles and drive lane pavements will be traveled by no more than 5 trucks per day having a gross weight of 50,000 pounds or equivalent trafficking. If heavier or more frequent truck traffic is expected, Terracon should be contacted to review the pavements sections and, if necessary, to modify the section thickness. Periodic maintenance should be planned to extend the pavement life. Other pavement sections could be considered.

The following table provides options for AC and PCC Sections:

MINIMUM PAVEMENT RECOMMENDATIONS		
	Drive Lanes	**Automobile Parking**
Pavement Section I		
Asphaltic Concrete Over Aggregate Base Over Select Fill	2.0" Type "C" Asphaltic Concrete [1, 2]	3.0" Type "C" Asphaltic Concrete [1, 2]
	2.5" Type "A" Asphaltic Concrete [1, 2]	6.0" Aggregate Base [1]
	6.0" Aggregate Base [1]	12.0" Select Fill
	12.0" Select Fill	
Pavement Section II		
3,500 psi Air Entrained Portland Cement Concrete Over Select Fill	6.0" Concrete	5.0" Concrete
	12.0" Select Fill	12.0" Select Fill

1. Oklahoma Department of Transportation Standard Specifications
2. Type "C" asphaltic concrete is equivalent to Type "S5" PG 64-22 OK and Type "A" asphaltic concrete is equivalent to Type "S3" PG 64-22 OK.

NOTE: We recommend that 7-inch thick reinforced concrete pads be provided in front of and beneath trash receptacles. The dumpster trucks should be parked on the rigid concrete pavement when the trash receptacles are lifted. The concrete pads should be supported on at least 4 inches of ODOT Type "A" aggregate base over 12 inches of select fill.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

INTERACTION BETWEEN NEW AND EXISTING STRUCTURES

Excavations made near existing structures should be made with care so the support of existing foundations, pavements, slabs, etc. is not adversely affected. A sufficient clear distance should be maintained between new and existing foundations to reduce the potential for overlapping bearing stresses and additional settlement of existing foundations. Connections between new and existing buildings should be designed to tolerate the anticipated differential movements.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location

of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Number of Borings	Boring Depth (feet)	Location
4 (B-1 to B-4)	18.7 to 18.8	Band Classroom Addition
2 (B-5 and B-6)	18.7 to 18.8	Addition on South Side of Classroom D Building
2 (B-7 and B-8)	3.5 to 4.5	Pavement Areas

Boring Layout and Elevations: We used a handheld GPS equipment with an estimated horizontal accuracy of +/-25 feet and measured from existing reference features to locate borings in the field. Terracon determined relative ground surface elevations at the boring locations using a surveying level and rod. The floor slab at a doorway along the east side of the existing building located west of boring B-1 was used as benchmark. The benchmark was assigned an arbitrary elevation of 100.0 feet. The ground surface elevations at the borings, rounded to the nearest 0.5 feet, are shown near the top of the boring logs. The locations and elevations of the borings should be considered accurate only to the degree implied by these methods.

Subsurface Exploration Procedures: We advanced the borings with an ATV-mounted rotary drill rigs using continuous flight augers and rotary cutting bits. Split-barrel samples were obtained in the borings. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the geotechnical engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned various laboratory tests to better understand the engineering properties of the various soil and rock strata as necessary for this project. The following tests were performed.

- Water content
- Atterberg limits
- Percent material passing the No. 200 sieve

The laboratory testing program included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Rock classification was conducted using locally accepted practices for engineering purposes; petrographic analysis may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Boring log rock classification was determined using the Description of Rock Properties.

SITE LOCATION AND EXPLORATION PLANS

Contents:

SITE LOCATION

Webster High School Classroom Additions ■ Tulsa, Oklahoma
March 14, 2022 ■ Terracon Project No. 04225018

Terracon GeoReport

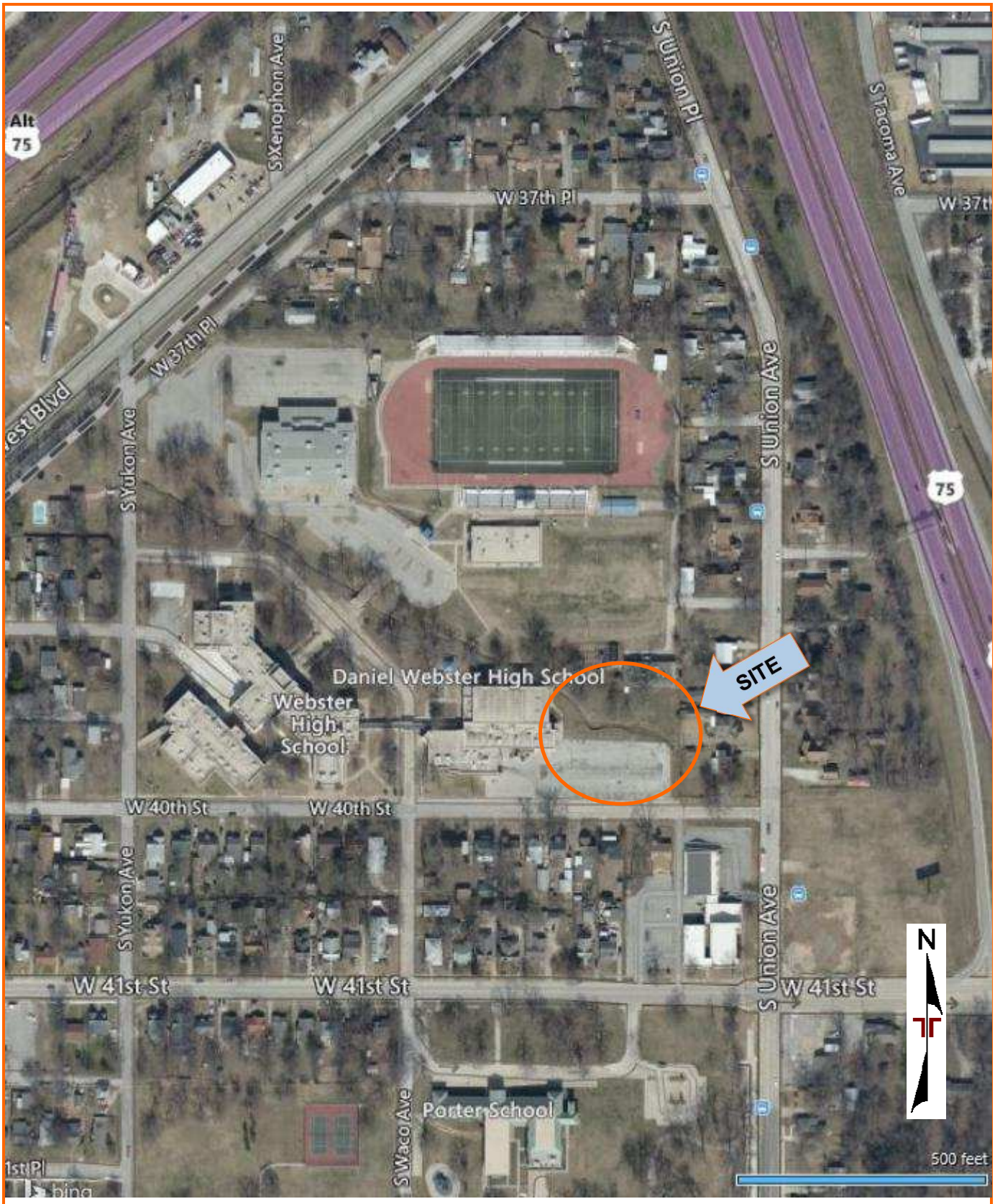


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN 1 – Overall Site
Webster High School Classroom Additions ■ Tulsa, Oklahoma
March 14, 2022 ■ Terracon Project No. 04225018

Terracon GeoReport

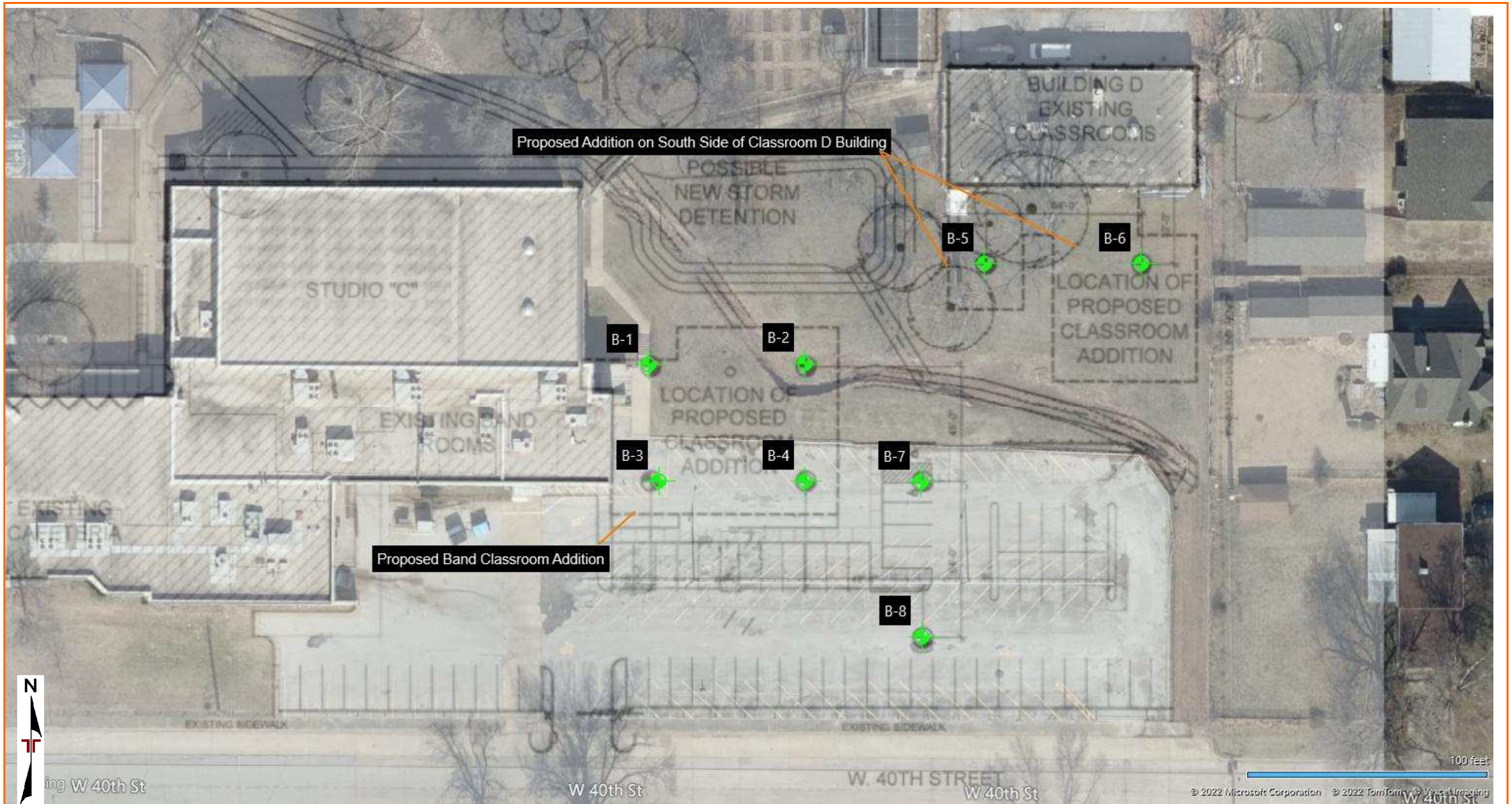


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

Contents:

Boring Logs (B-1 to B-8)

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1059° Longitude: -96.0130°

Approximate Surface Elev.: 100.0 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
		6" Topsoil				
		LEAN CLAY (CL), dark brown, medium stiff	18	2-2-2 N=4	21.8	
2.0	98+/-					
		LEAN CLAY (CL), reddish brown, medium stiff	18	2-3-3 N=6	20.5	33-16-17
5.0	95+/-					
		LEAN CLAY (CL), brown, medium stiff		2-4-4 N=8	20.4	
9.0	91+/-					
		SHALEY LEAN CLAY (CL), with sandstone seams, yellowish brown and gray, very stiff	16	5-12-10 N=22	17.9	
13.5	86.5+/-					
		SHALE+, gray, hard	1	50/2"	5.6	
18.7	81.5+/-					
		Boring Terminated at 18.7 Feet	1	50/1"	6.5	

DEPTH (Ft.): 5, 10, 15

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings and bentonite chips upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

BORING LOG NO. B-2

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1059° Longitude: -96.0128°

Approximate Surface Elev.: 98.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		6" Topsoil					
		LEAN CLAY WITH SILT (CL), dark brown, soft to medium stiff	16	0-2-4 N=6	18.9		
2.0	96.5+/-						
		LEAN CLAY (CL), dark brown, soft, wet	18	0-1-2 N=3	30.2		88
5.0	93.5+/-						
		LEAN CLAY (CL), dark brown with brown, soft, wet	16	0-2-2 N=4	25.8		
8.5	90+/-						
		LEAN CLAY (CL), yellowish brown and gray, medium stiff	18	2-3-3 N=6	23.0		
13.5	85+/-						
		SHALE+, gray, moderately hard	2	50/3"	14.1		
18.8	79.5+/-						
		Boring Terminated at 18.8 Feet	2	50/3"	12.7		

DEPTH (Ft.): 5, 10, 15

WATER LEVEL OBSERVATIONS: ▽ ▽

SAMPLE TYPE: ▨

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings and bentonite chips upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *13.5 feet while drilling*

▽ *13 feet after boring*

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

BORING LOG NO. B-3

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1057° Longitude: -96.0130°

Approximate Surface Elev.: 102.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI
4" Asphalt **SILTY LEAN CLAY (CL-ML)**, dark brown, medium stiff		16	2-2-3 N=5	20.9	26-19-7
2.0	100.5+/-				
LEAN CLAY (CL), reddish brown and brown, medium stiff		18	2-3-3 N=6	21.3	32-17-15
5.0	97.5+/-				
LEAN CLAY (CL), yellowish brown, medium stiff		17	2-2-3 N=5	22.1	
8.5	94+/-				
WEATHERED SHALE+, olive brown, soft		12	16-50/6"	14.3	
13.5	89+/-				
SHALE+, gray, moderately hard		2	50/3"	7.7	
18.7	84+/-				
Boring Terminated at 18.7 Feet		0	50/2"		

DEPTH (Ft.): 5, 10, 15

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings and bentonite chips upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

BORING LOG NO. B-4

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1058° Longitude: -96.0128°

Approximate Surface Elev.: 100.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description
		4" Asphalt
		FILL - SILTY LEAN CLAY, dark brown
2.0	98.5+/-	
		LEAN CLAY (CL), reddish brown and brown, medium stiff
8.5	92+/-	
		SHALEY LEAN CLAY (CL), with sandstone seams, olive brown and yellowish brown, stiff
13.5	87+/-	
		WEATHERED SHALE+, olive brown, soft
18.0	82.5+/-	
18.7	82+/-	**SHALE+**, gray, hard
		Boring Terminated at 18.7 Feet

DEPTH (Ft.)	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		15	2-1-2 N=3	23.6		
		18	2-2-2 N=4	22.1	32-18-14	
5		11	2-3-3 N=6	20.9		
		14	3-4-6 N=10	12.4		
10						
		6	50/6"	16.5		
15						
		1	50/2"	6.7		

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings and bentonite chips upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

18 feet while drilling

17.5 feet after boring

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

BORING LOG NO. B-5

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1060° Longitude: -96.0125°

Approximate Surface Elev.: 99.5 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	Sample	Recovery (In.)	Field Test Results	Water Content (%)	Atterberg Limits LL-PL-PI	Percent Fines
		6" Topsoil						
1.5	98+/-	**FILL - SILTY LEAN CLAY**, dark brown						
				18	2-3-3 N=6	14.6		
		LEAN CLAY (CL), reddish brown and brown, medium stiff						
				13	3-3-4 N=7	21.4	31-19-12	
5.0	94.5+/-							
		LEAN CLAY (CL), yellowish brown, medium stiff, wet						
				13	2-2-3 N=5	21.7		
8.5	91+/-							
9.5	90+/-	**LEAN CLAY (CL)**, with sand seams and trace sandstone fragments, stiff		18	2-5-31 N=36	14.3		
		HIGHLY WEATHERED SHALE+, olive brown, soft						
13.5	86+/-							
		SHALE+, gray, moderately hard to hard		0	50/3"	10.6		
18.7	81+/-							
		Boring Terminated at 18.7 Feet		2	50/2"	23.2		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings and bentonite chips upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

11 feet while drilling

13.5 feet after boring

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

BORING LOG NO. B-6

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1060° Longitude: -96.0123°

Approximate Surface Elev.: 100.0 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	Description	DEPTH (Ft.)	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)
		6" Topsoil				
2.0	98+/-	**SILTY LEAN CLAY (CL)**, dark brown and brown, medium stiff, wet		18	1-2-3 N=5	23.7
				18	3-2-3 N=5	21.9
5.0	95+/-	**LEAN CLAY (CL)**, reddish brown, medium stiff	5			
				16	0-1-2 N=3	
8.5	91.5+/-	**LEAN CLAY (CL)**, yellowish brown, soft, wet				
				16	4-5-6 N=11	19.6
14.5	85.5+/-	**LEAN CLAY WITH SAND (CL)**, trace sandstone fragments, yellowish brown and gray, stiff	10			
				17	7-21-50/5"	18.1
17.5	82.5+/-	**WEATHERED SHALE+**, olive brown, soft	15			
18.8	81+/-	**SHALE+**, gray, moderately hard		2	50/3"	14.1
		Boring Terminated at 18.8 Feet				

ATTERBERG LIMITS: LL-PL-PI

PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings and bentonite chips upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

11 feet while drilling

13.5 feet after boring

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022

Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV

Driller: TS

Project No.: 04225018

BORING LOG NO. B-7

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1058° Longitude: -96.0126°

Approximate Surface Elev.: 99.5 (Ft.) +/-

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		4" Asphalt **FILL - SILTY LEAN CLAY**, dark brown, wet								
	2.0	97.5+/-				16	1-2-2 N=4	24.5		
		LEAN CLAY (CL), reddish brown, medium stiff, wet				18	2-2-3 N=5	23.2		
	3.5	96+/-								
		Boring Terminated at 3.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

BORING LOG NO. B-8

PROJECT: Webster High School Classroom Additions

CLIENT: GSHELMS & Associates, LLC
Jenks, OK

SITE: 1919 West 40th Street
Tulsa, OK

LOCATION See Exploration Plan

Latitude: 36.1056° Longitude: -96.0126°

Approximate Surface Elev.: 100.0 (Ft.) +/-

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		4" Asphalt **SILTY LEAN CLAY (CL)**, dark brown, soft, wet								
	2.0	98+/-			X	18	1-1-2 N=3	22.4		
		LEAN CLAY (CL), reddish brown, stiff								
	4.5	95.5+/-			X	18	3-4-5 N=9	19.9		
		Boring Terminated at 4.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

+Classification estimated from disturbed samples. Core samples and petrographic analysis may reveal other rock types.

Advancement Method:
Power Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

No free water observed

Terracon
9522 E 47th Pl, Ste D
Tulsa, OK

Boring Started: 02-22-2022 | Boring Completed: 02-22-2022

Drill Rig: CME 750 / ATV | Driller: TS

Project No.: 04225018

SUPPORTING INFORMATION

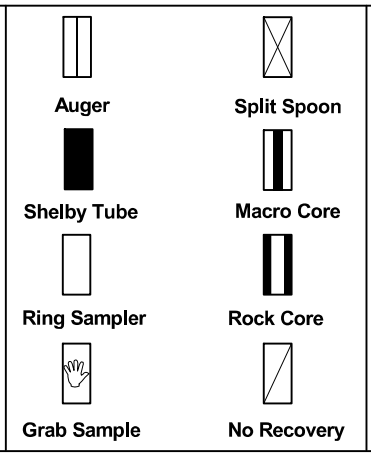
Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

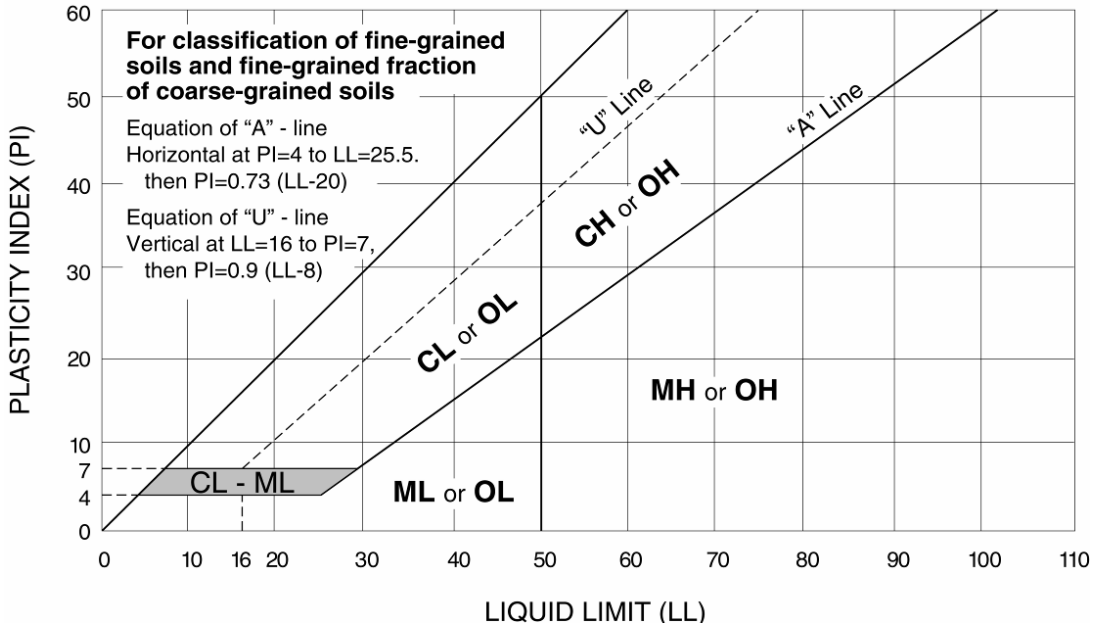
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Terracon

Exhibit C-2

GENERAL NOTES

Sedimentary Rock Classification

DESCRIPTIVE ROCK CLASSIFICATION:

Sedimentary rocks are composed of cemented clay, silt and sand sized particles. The most common minerals are clay, quartz and calcite. Rock composed primarily of calcite is called limestone; rock of sand size grains is called sandstone, and rock of clay and silt size grains is called mudstone or claystone, siltstone, or shale. Modifiers such as shaly, sandy, dolomitic, calcareous, carbonaceous, etc. are used to describe various constituents. Examples: sandy shale; calcareous sandstone.

LIMESTONE	Light to dark colored, crystalline to fine-grained texture, composed of $CaCo_3$, reacts readily with HCl.
DOLOMITE	Light to dark colored, crystalline to fine-grained texture, composed of $CaMg(CO_3)_2$, harder than limestone, reacts with HCl when powdered.
CHERT	Light to dark colored, very fine-grained texture, composed of micro-crystalline quartz ($Si0_2$), brittle, breaks into angular fragments, will scratch glass.
SHALE	Very fine-grained texture, composed of consolidated silt or clay, bedded in thin layers. The unlaminated equivalent is frequently referred to as siltstone, claystone or mudstone.
SANDSTONE	Usually light colored, coarse to fine texture, composed of cemented sand size grains of quartz, feldspar, etc. Cement usually is silica but may be such minerals as calcite, iron-oxide, or some other carbonate.
CONGLOMERATE	Rounded rock fragments of variable mineralogy varying in size from near sand to boulder size but usually pebble to cobble size (½ inch to 6 inches). Cemented together with various cementing agents. Breccia is similar but composed of angular, fractured rock particles cemented together.

PHYSICAL PROPERTIES:

DEGREE OF WEATHERING

Slight	Slight decomposition of parent material on joints. May be color change.
Moderate	Some decomposition and color change throughout.
High	Rock highly decomposed, may be extremely broken.

HARDNESS AND DEGREE OF CEMENTATION

Limestone and Dolomite:

Hard	Difficult to scratch with knife.
Moderately Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Soft	Can be scratched with fingernail.

Shale, Siltstone and Claystone

Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be easily dented but not molded with fingers.

Sandstone and Conglomerate

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

BEDDING AND JOINT CHARACTERISTICS

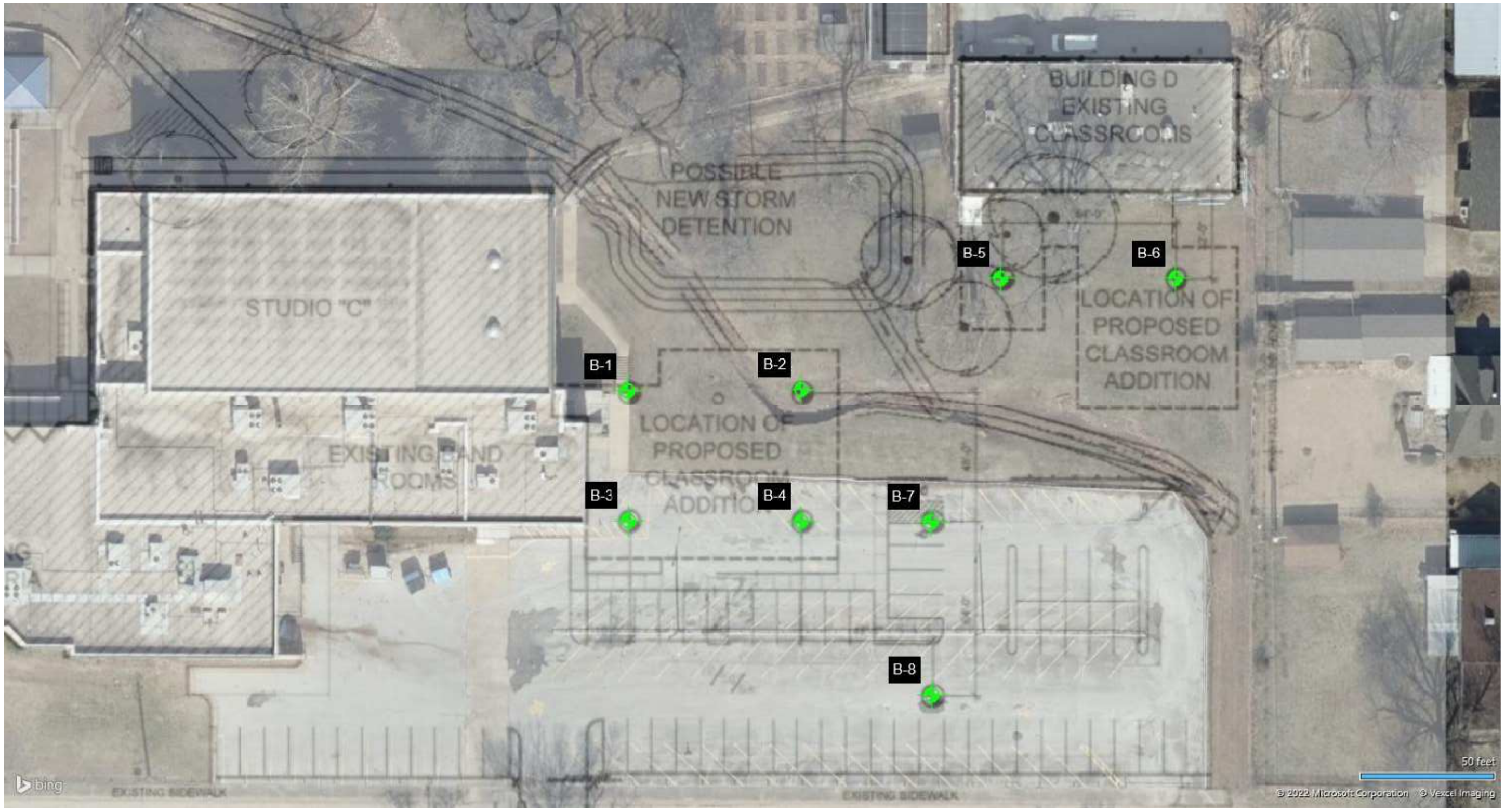
Bed Thickness	Joint Spacing	Dimensions
Very Thick	Very Wide	>10′
Thick	Wide	3′ - 10′
Medium	Moderately Close	1′ - 3′
Thin	Close	2″ - 1′
Very Thin	Very Close	.4″ - 2″
Laminated	—	.1″ - .4″

Bedding Plane	A plane dividing sedimentary rocks of the same or different lithology.
Joint	Fracture in rock, generally more or less vertical or transverse to bedding, along which no appreciable movement has occurred.
Seam	Generally applies to bedding plane with an unspecified degree of weathering.

SOLUTION AND VOID CONDITIONS

Solid	Contains no voids.
Vuggy (Pitted)	Rock having small solution pits or cavities up to ½ inch diameter, frequently with a mineral lining.
Porous	Containing numerous voids, pores, or other openings, which may or may not interconnect.
Cavernous	Containing cavities or caverns, sometimes quite large.

Terracon


BUILDING D
EXISTING
CLASSROOMS
POSSIBLE
NEW STORM
DETENTION
STUDIO "C"
B-1
B-2
B-3
B-4
B-5
B-6
B-7
B-8
LOCATION OF
PROPOSED
CLASSROOM
ADDITION
EXISTING BAND
ROOMS
LOCATION OF
PROPOSED
CLASSROOM
ADDITION
EXISTING SIDEWALK
EXISTING SIDEWALK
50 feet
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SECTION 000140

BID BOND

See Attached AIA Document A310 – Bid Bond

DRAFT

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

BOND AMOUNT: $ « »

PROJECT:
(Name, location or address, and Project number, if any)

«Tusla PS - Webster HS Band Classroom & Green House Additions»
«1919 W. 40th St.
Tulsa, OK 74106»
« »

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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Signed and sealed this « » day of « » , « »

	« »
	(Contractor as Principal) *(Seal)*
	« »
(Witness)	*(Title)*
	« »
	(Surety) *(Seal)*
	« »
(Witness)	*(Title)*

SECTION 000150

NON-COLLUSION AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

_____ , of lawful age, being first duly sworn, on oath says that (she)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any state official or employee as to quantity, quality, or price in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

Subscribed and sworn to before me this _____ day of _____, 2022.

_____
Company Representative

_____
Notary Public

My Commission Expires:

_____

SECTION 000160

BUSINESS RELATIONSHIP AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

_____ , of lawful age, being first duly sworn, on oath says that (she)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the nature of any partnership, joint venture, or other business relationship presently in effect or which existed within one (1) year prior to the date of this statement with the Architect, Engineer, or other party to the project is as follows:

Affiant further states that any such business relationship presently in effect or which existed within one (1) year prior to the date of this statement between any officer or director of the bidding company, any officer or director of the architectural or engineering firm or other party to the project is as follows:

Affiant further states that the names of all persons having any such business relationships and the positions they hold with their respective companies or firms are as follows:

(If none of the business relationships herein above mentioned exist, affiant should so state.)

_____
Company Representative

Subscribed and sworn to before me this _____ day of _____, 2022.

_____
Notary Public

My Commission Expires:

_____

SECTION 000170

NON-DISCRIMINATION AFFIDAVIT

The Contractor affirms and states that he/she complies with the following:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, sex, religion, national origin or age. The Contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, sex, religion, national origin or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the requirements of these nondiscrimination provisions.

2. The Contractor will state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that all qualified applicants will receive consideration for employment without regard to race, color, sex, religion, national origin or age."

_____

Company Representative

Subscribed and sworn to before me this _____ day of _____, 2022.

_____

Notary Public

My Commission Expires:

_____

SECTION 000180

FELONY FREE AFFIDAVIT

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

The undersigned, under the penalties of perjury, certifies to the Tulsa Public Schools ("School District") as follows:

1. The undersigned:

_____ has a contract with the School District; OR

_____ is the duly authorized representative of a business ("entity") having a contract with the School District,

to perform work on School District premises on a full-time or part-time basis.

2. The undersigned hereby certifies that neither the undersigned nor any employee of the undersigned or of the entity, or of any subcontractor of the undersigned or the entity, will perform work on School District premises on a full-time or part-time basis that would otherwise be performed by School District employees if such employee has been convicted in this State, the United States or any other state of any felony offense unless ten (10) years have elapsed since the date of the criminal conviction or the employee has received a pardon for the offense.

3. Neither the undersigned nor any employee of the undersigned, or the entity, or of any subcontractor of the undersigned or the entity, who performs any work on School District property is currently registered under the Oklahoma Sex Offenders Registration Act or the Mary Rippy Violent Crime Offenders Registration Act.

4. The undersigned, or the entity, has conducted a felony record search of all employees who will be assigned to work on a full-time or part-time basis on School District property.

5. This Affidavit is made and delivered pursuant to the requirements of **OKLA. STAT. tit. 70, § 6-101.48 (Supp. 2000)** and **OKLA. STAT. tit. 57, § 589 (Supp. 2004)** (the "Acts"). The undersigned further certifies to the School District that the undersigned and/or the entity are in full compliance with the requirements of the Acts.

EXECUTED AND DELIVERED this _____ day of _____, 2022.

_____

AFFIANT'S SIGNATURE

_____

(Print Name and Title)

Representing:

_____

(Name of Entity)

Subscribed and sworn to before me this ____ day of _____, 2022.

_____

Notary Public

(S E A L)

Notary Commission Number: _____

My Commission Expires: _____

SECTION 000190
ASBESTOS COMPLIANCE FORM

SHORT-TERM WORKER NOTICE

TO ALL SHORT-TERM WORKERS AT THIS LOCATION, NOT OTHERWISE CONSIDERED EMPLOYEES OF TULSA PUBLIC SCHOOLS

This is to advise you that this site has been inspected for asbestos-containing material. Please refer to the Asbestos Management Plan for the exact location. The Plan is available for your review in the administrative office of this building.

Please acknowledge that you have read this Notice by signing your name, the company you are representing and the date of your visit. Return copy to Tulsa Public Schools contact below.

If you have any questions, the contact person is:

Asbestos Specialist
Tulsa Public Schools.
Maintenance Department
1555 North 77 East Avenue
Tulsa, Oklahoma 74115
Telephone: 831-2400

Signed: _____

Date: _____

Company: _____

CERTIFICATION OF COMPLIANCE
WITH ASBESTOS RESTRICTIONS

STATE OF _____)
) SS.
COUNTY OF _____)

The undersigned Contractor, of lawful age, being first duly sworn, on oath says that:

A. Building materials or products incorporated or installed in the construction of _____ School addition and/or remodel will be free of asbestos containing materials or products of any kind.

B. Certification of Compliance with Asbestos Restrictions will be included in any sub-contract connected with the performance of work for this project.

C. Submit copy in O&M Manuals.

CONTRACTOR

By _____

_____
(Title)

SUBSCRIBED AND SWORN to before me this _____ day of _____ 2022.

_____
Notary Public

My Commission Expires:

_____

SECTION 000191

CONTRACTORS QUALIFICATIONS STATEMENT

This form must be submitted seven (7) days prior to the bid date. All questions must be answered, the data must be clear and comprehensive, and must be signed and notarized. If not previously on file.

1. Name of Bidder: _____

2. Permanent Main Office Address: _____

3. When organized: _____

4. If incorporated, when and where _____

5. How many years have you been engaged in the contracting business under your present firm or trading name? _____

6. List 5 projects of similar size work, references with telephone numbers, cost of project and year completed: _____

(1) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(2) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(3) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(4) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

(5) Project: _____, Year: _____,

Cost: $_____

Reference: _____, Phone: _____

7. Have you ever failed to complete any work awarded to you? Please explain.

8. Please state the size of your business:

   # of employee's (total):_____

9. Are any of your job captains bilingual?

10. Financial Information:

    a. State the name of the bank with whom you do your principal business:

    Name of Bank Address City, State Phone Number

    _____

    b. State 5 trade references with whom you do business:

    1. _____

    2. _____

    3. _____

    4. _____

_____
President of Company

_____, _____
(Notary Public) (Date)

Affix Notary Seal

SECTION 000260

NO KICK-BACK STATEMENT

A duplicate of the following statement is required to be signed, notarized, and submitted with each and every copy of the AIA Document G702, "Application and Certificate for Payment", that is presented to the Owner for payment.

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

The undersigned Contractor, of lawful age, being first duly sworn, an oath says that this invoice is true and correct. Affiant further states that the services as shown by the invoice have been completed in accordance with the contract. Affiant further states that he has made no payment directly or indirectly to any elected official, officer or employee of the State of Oklahoma, any county or local subdivision of the state, of money or any other things of value to obtain payment.

Contractor

_____
(Title)

By_____

Subscribed and sworn to before me this _____ day of _____, 2022.

_____
Notary Public

My Commission Expires:

_____

[SEAL]

END OF SECTION

SECTION 000270

OWNER / CONTRACTOR AGREEMENT

See Attached

Bid Package No.

SAMPLE AGREEMENT BETWEEN

OWNER AND CONTRACTOR

#_____

AGREEMENT made as of the ___ day of _____, 2022;

BETWEEN the Owner: INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY, OKLAHOMA
3027 South New Haven
Tulsa OK 74114

and the Contractor:

The Project is: _____ @ Owner's _____

The Construction Manager: Nabholz Construction Corporation
10319 E. 54th St.
Tulsa, OK 74146

The Architect is: GSHELMS & ASSOCIATES
424 E. Main St.
Jenks OK 74037
(918) 298-7257

The Owner and Contractor agree as set forth below.

ARTICLE 1
THE CONTRACT DOCUMENTS

1.1 The Contract Documents consist of this Agreement, the Conditions of the Contract (General, Supplemental and Other Conditions), Drawings, Specifications, Addenda issued prior to this Agreement, the Project Manual dated_____, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and

integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in ARTICLE 8.

ARTICLE 2
THE WORK OF THIS CONTRACT

2.1 The Contractor shall execute the entire Work described in the Contract Documents for the _____Project, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The date of commencement is the date from which the Contract Time in Paragraph 3.2 is measured, and shall be when Owner's Notice To Proceed (work order) is delivered to Contractor.

3.2 The Contractor shall achieve Substantial Completion of the entire Work in accordance with the time allotted in the Contractor's bid in order for the entire Project to be completed no later than_____ _____, subject to adjustments of this Contract Time as provided in the Contract Documents. Time is of the essence with respect to the Substantial Completion date.

ARTICLE 4
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of _____( ), subject to additions and deductions as provided in the Contract Documents.

4.2 The time of Substantial Completion is critical to Owner. Contractor's bid time for Substantial Completion has been a significant and material consideration in Owner's decision to award the Contract to Contractor.

ARTICLE 5
PROGRESS PAYMENTS

5.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor and the Certificate of Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. Applications for Payment shall be delivered to the Architect promptly thereafter.

5.3 The Owner shall make payment to the Contractor within THIRTY (30) days after Owner's receipt of the Application for Payment approved by the Architect.

5.4 Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor in accordance with the Contract Documents. The Schedule of Values shall allocate the entire Contract Sum, except unauthorized allowances, among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager or Architect may require. This Schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the month covered by the Application for Payment.

5.6 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.6.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the Schedule of Values, less retainage of ten percent (5%). The retainage will be reduced to five percent (5%) when the Work completed, as reflected in the Schedule of Values, equals fifty percent (50%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Subparagraph 7.3.7 of the General Conditions even though the Contract Sum has not yet been adjusted by Change Order;

5.6.2 Add that portion of the Contract sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (5%);

5.6.3 Subtract the aggregate of previous payments made by the Owner;

5.6.4 Subtract amounts, if any, for which the Construction Manager or Architect has not approved payment; and

5.6.5 Subtract liquidated damages, if any.

5.6.7 At any time the Contractor has completed in excess of fifty percent (50%) of the total Contract Sum, retainage shall be reduced to five percent (5%) of the amount earned to date if the Owner or Architect determines that satisfactory progress is being made and upon written approval of Contractor’s surety.

ARTICLE 6
FINAL PAYMENT

6.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph 12.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than THIRTY (30) days after the issuance of the Architect’s final Certificate for Payment.

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate of six percent (6%) per annum.

ARTICLE 8
ENUMERATION OF CONTRACT DOCUMENTS

8.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

8.1.1 The Agreement is this Agreement Between Owner and Contractor.

8.1.2 The "General Conditions" are the General Conditions of the Contract for Construction, AIA Document A201, 2007 Edition, as amended.

8.1.3 The Special and other Conditions of the Contract contained in the Project Manual dated _.

8.1.4 The Contractor's Proposal (Bid).

8.1.5 The Specifications contained in the Project Manual **and the Addenda.**

8.1.6 The Drawings:

8.1.7 The Addenda, as follows:

Number	Date

8.1.8 Other documents, if any, forming part of the Contract Documents are as follows:

8.1.8.1 Owner's Notice to Bidders

8.1.8.2 Owner's Instructions to Bidders

ARTICLE 9
BONDS, INSURANCE, INDEMNITY AND COMPLIANCE WITH LAWS

9.1 Before commencing the performance of its obligations hereunder, Contractor agrees to furnish Owner with the following at Contractor's expense: (i) a performance bond in an amount equal to

the Contract Sum; (ii) a warranty bond in an amount equal to the Contract Sum for a period of one year from the date of completion of the Work; and (iii) the payment bond in an amount equal to the Contract Sum, required by Oklahoma law in connection with contracts for the making of public improvements (tit. 61, (1991) O.S. § 1).

9.2 The surety providing the above bonds shall be listed in the most recent edition of *U.S. TREASURY CIRCULAR 570* and be fully authorized to do business in Oklahoma.

9.3 Contractor agrees to carry worker's compensation insurance at its expense. Before commencing the performance of its services hereunder, Contractor agrees to furnish Owner with certificates of insurance coverage, naming Owner, Construction Manager and Architect as co-insureds as required by Article 11 of the Supplementary Conditions in the Project Manual. Each certificate shall require at least 10 days' notice to Owner, Construction Manager and Architect before cancellation of the coverage for any reason. Contractor agrees to maintain said insurance coverage in force during the entire term of this Agreement. In addition to such insurance, and not in lieu thereof, Contractor agrees to indemnify and hold Owner, Construction Manager, and Architect and their respective agents, employees and officers harmless (including defense costs) against any claim, demand or action arising from or growing out of Contractor's performance of the Work.

9.4 Contractor agrees to comply with all city, county, state and federal laws applicable to the Project.

9.5 Contractor acknowledges that Federal Executive Orders number 11246 as amended; Vietnam Era Veteran Readjustment Assistance Ace, as amended (VEVRAA); and Section 503 of the Rehabilitation Act of 1973, as amended are incorporated herein by reference. Contractor shall not discriminate against any applicant for employment because of race, color, religion, gender, age, national origin, sexual preference, disability, veteran status or any other protected classification, and shall ensure that employees are treated during employment without regard to their race, color, religion, gender, age, national origin, disability, veteran status or any other protected classification. Contractor further agrees to fully comply with any and all laws, statutes, regulations, orders, and directives presently or hereafter imposed by local, state or federal governments, or any agencies thereof, with respect to nondiscrimination in employment, civil rights laws and fair employment practices, and mandated reporting requirements thereof.

9.6 Contractor shall take all safety precautions with respect to its Work as may be required by the U. S. Department of Labor Occupational Safety and Health Administration and shall be responsible for compliances with all safety rules and regulations in connection with all Work to be performed by Contractor on this project. Contractor shall indemnify Owner, Construction Manager, and Architect for any and all expenditures or obligations for expenditures made or imposed upon Owner for fines, penalties, counsel fees, expenses and costs of litigation and costs of corrective measures necessary to comply with rules, regulations or orders which result from acts of commission or omission by Contractor, its agents, employees, suppliers, Contractors, and assigns due to failure upon the part of any one or all of them to comply with such safety rules and regulations.

9.7 Contractor acknowledges that this contract has been or will be assigned to _____, the Projects Construction Manager (“”). Contractor agrees to prosecute the Work, and the several parts thereof at such times and in such order as (Construction Manager) considers necessary to keep the same sufficiently in advance of the other parts of the Project work and to avoid any delay in the completion of the Project as a whole. If Contractor:

a. fails or refuses to proceed with or to properly perform the Work as directed by , or

b. fails or refuses to properly perform or abide by any terms, covenants, conditions, or provisions contained in this Contract, or

c. fails or refuses to obey laws, ordinances, regulations, or other codes of conduct,

shall notify Contractor, in writing, of Contractor's failure to comply. If determines that Contractor has not remedied and cured the event(s) of default in Contractor's performance within three (3) days of the written notification, then (Construction Manager) may, at its option, without releasing or waiving its rights and remedies against Contractor or Contractor's sureties and without prejudice to any other right may be entitle to hereunder or by law, terminate this Contract and take possession of the Work and all materials, tools, equipment and appliances of Contractor and finish Contractor's work by whatever means, method, or agency which may, in its sole discretion, choose. In the alternative, without terminating this Contract, (Construction Manager) may, at its option, without releasing or waiving its rights and remedies against Contractor or Contractor's sureties and without prejudice to any other right (Construction Manager) may be entitled to hereunder or by law, take any steps (Construction Manager) deems advisable to secure any labor, materials, equipment, and services, and shall have a lien on and may take over all of Contractor's equipment, tools, appliances, and materials and may prosecute the Work to completion. In the event that (Construction Manager) deems any of the foregoing remedies necessary, Contractor agrees that Contractor shall not be entitled to receive any further payment until after the Project shall have been completed. Moreover, all monies expended and all of the costs, losses, damages and extra expenses, including all management, administrative, and other overhead and other direct and indirect expenses (including without limitation attorney's fees), incurred by (Construction Manager) incidental to such termination or completion, shall be deducted from the Contract sum herein stated, and if such expenditures, together with said costs, losses, damages, and extra expenses, exceed the unpaid balance of the Contract sum, the Contractor agrees to pay immediately to , on demand, the full amount of such excess, including costs of collection, attorney's fees, and interest thereon at the maximum legal rate of interest per annum until paid. An itemized statement thereof or the checks or other evidence of payments shall be prima facie evidence of the fact and extent of Contractor's liability. Furthermore, (Construction Manager) may reconcile and pay any Contractor debts which should arise out of this Contract with monies due under any other contracts between (Construction Manager) and the Contractor.

ARTICLE 10
EMPLOYEE CRIMINAL CONVICTIONS

10.1 The Contractor will not allow any employee to work on school premises on a full-time or part-time basis, which work would not otherwise be performed by Owner employees, if the employee is convicted in this state, the United States or another state of any felony offense, unless ten (10) years have elapsed since the date of the criminal conviction or the employee has received a Presidential or Gubernatorial pardon for the criminal offense.

10.2 No employee of the Contractor who performs any Work on Owner's property is currently registered under the Oklahoma Sex Offenders Registration Act or the Mary Rippy Violent Crime Offenders Registration Act..

10.3 As a condition to payments, the Contractor will furnish a signed statement declaring that no employee working on Owner's property under the authority of the Contractor is in violation of the provisions of this Article. The signed statement referred to in this Section will be furnished as required from time to time by the Owner/District. Owner's form of the signed statement will be used.

10.4 **The Contractor agrees to obtain similar compliance statements from all Contractors on the Project with reference to employees of the Contractors.**

10.5 If the Contractor is convicted of a violation of tit. 57, O.S. (1998 Supp.) § 589, Owner may terminate this Contract.

□ □ □

This Agreement is entered into as of the date first above written.

CONTRACTOR:

_____

By_____

_____
Printed Name and Title

Contractor's Tax ID #:

_____

_____
Date of signature

OWNER:

INDEPENDENT SCHOOL DISTRICT NUMBER ONE OF TULSA COUNTY, OKLAHOMA

By_____
President

[OK as to Form: _____]

SECTION 011000

SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: Tulsa Public Schools
Webster High School – 2021 Bond Projects
Band Room & Greenhouse Additions w/ Site Improvements
1919 W. 40th St.
Tulsa, OK 74106

B. Owner: Tulsa Public Schools, ISD #1
3027 S. New Haven Ave.
Tulsa, Oklahoma 74114

C. Architect: GSHELMS & Associates, LLC
424 E. Main St.
Jenks, OK 74037
918-298-7257

D. Construction Manager: Nabholz Construction Corporation
10319 E. 54th St.
Tulsa, OK 74146
918-632-7200

E. The Project consists:

1. Interior renovation of existing MS & HS restrooms.
2. Band Classroom addition, including a FEMA Community Safe Room.
3. Teaching Greenhouse Classroom addition.
4. Parking Lot milling, overlay and restriping.

1.02 OWNER OCCUPANCY

A. Owner will occupy the school facility during construction.

B. Project Areas are located within and adjacent to existing Classroom Buildings that shall be protected during construction.

C. This project shall be completed during the District's summer breaks and fall / spring school semesters. Contractors shall coordinate construction schedule / activities with Construction Manager, Architect and Owner.

1.03 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

B. Arrange use of site and premises to allow:
1. Work by Others.
2. Work by Owner.

C. Staging areas shall be coordinated with Owner, Architect and Construction Manager.

END OF SECTION

SECTION 012300
(Revised for Addendum #3 dated 10-05-2022)

ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

A. This section identifies the various Alternates to be bid as part of this project. It describes the general changes to be included in the project if the Alternate is made a part of the Work. The Alternates can only be made part of the Work by specific inclusion in the Owner-Contractor Agreement or by Change Order.

B. Each Alternate will be reviewed by the Owner and the Architect and either accepted or rejected at the Owner's decision.

C. Alternate Bid prices shall remain in effect for 90 days beyond date of execution of the Owner-Contractor Agreement.

D. Alternate Bid prices shall be included in the spaces provided on the Bid Form. All Alternates must be bid by the applicable trades, or the Bid may be rejected.

E. Owner retains all rights to choose any one, combination of, or none of the alternates.

1.02 DESCRIPTION OF ALTERNATES

A. **ALTERNATE #1 – BUILDING "A" MIDDLE HIGH SCHOOL RESTROOM RENOVATION:**

Provide ADDITIVE cost to provide all work required for the Staff Restroom A200 Renovation. Refer to Sheets AA1.1, AA7.1 & A-MEP101 for additional information regarding this Alternate.

B. ALTERNATE #2 – BUILDING "B" MAIN CLASSROOM 1ST FLOOR RESTROOM RENOVATIONS:

Provide ADDITIVE cost to provide all work required for the Restroom Renovations on the 1st floor of Building "B". Refer to Sheets AB0.1, AB0.3, AB0.4, AB1.1, AB2.1, AB2.2, AB2.3, AB7.1, AB9.1, AB9.2 & the "B" MEP Sheets for additional information regarding this Alternate.

C. ALTERNATE #3 – BUILDING "B" MAIN CLASSROOM 2ND FLOOR RESTROOM RENOVATIONS:

Provide ADDITIVE cost to provide all work required for the Restroom Renovations on the 2nd floor of Building "B". Refer to Sheets AB0.2, AB0.3, AB0.4, AB1.2, AB2.1, AB2.2, AB2.3, AB7.1, AB9.1, AB9.2 & the "B" MEP Sheets for additional information regarding this Alternate.

D. ALTERNATE #4 – BUILDING "B" MAIN CLASSROOM 1ST FLOOR SE SECURE ENTRY VESTIBULE RENOVATION:

Provide ADDITIVE cost to provide all work required for the 1st floor S-E Secure Entry Vestibule renovation. Refer to Sheets 7/AB0.4, 5/AB2.1, 5/AB2.2, 5/AB2.3, AB7.1, AB9.1, AB9.3, B-E101, 1/B-E201 & the "B" MEP Sheets for additional information regarding this Alternate.

E. ALTERNATE #5 – BUILDING "B" MAIN CLASSROOM EXTERIOR RE-LAMPING FIXTURES, NORTH CONCRETE SIDEWALK PAVING, STAIR & PLANTER WORK:

Provide ADDITIVE cost to provide all work required for the re-lamping of the Building "B" exterior light fixtures, demolition & replacement of the exterior planters, sidewalks and stairs on the north & east sides of the Building "B" Main Classroom. Refer to Sheets DS0.3, AS0.3, AS0.4, AS0.5, AS0.6, & 1/B-MEP101.

F. ALTERNATE #6 – BUILDING "C" CAFETERIA RENOVATION:

Provide ADDITIVE cost to provide all work required for the Cafeteria Rooms C101 & C102 & Serving C103 Renovation. Refer to Sheets AC0.3, AC0.5, AC1.2, AC1.5, AC1.7, AC9.5 & the "C" MEP sheets for additional information regarding the work required in this Alternate.

G. ALTERNATE #7 – BUILDING "D" GREEN HOUSE POLYCARBONATE PANELS:

Provide DEDUCTIVE cost to provide Polycarbonate Panels at the new Green House structures in lieu of the Acrylic Panels identified for the Base Bid. Refer to Section 131230 – Green House Systems for additional information regarding this Alternate.

H. ALTERNATE #8 – WEST PARKING LOT OVERLAY:

Provide ADDITIVE cost to provide all work required for the "Middle School" Parking Lot Mill Overlay & Restripe. Refer to Sheet 3/C.4.4 for additional information regarding this Alternate. The referenced "gate" is part of Alternate #9.

I. ALTERNATE #9 – DRIVEWAY ENTRY PIPE GATES:

Provide ADDITIVE cost to provide 4 pairs of new steel gates. Refer to Sheets DS0.1, AS0.1, AS0.2, C4.3 & C4.4 for locations & additional information regarding this Alternate.

Note: All FEMA Tornado Safe Room Signage shown on sheets AC1.11, AC1.12 & AC1.13 are part of the project Base Bid regardless of which building they are to be mounted inside.

END OF SECTION

SECTION 012900

PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

1.02 SCHEDULE OF VALUES

A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form or electronic media printout will be considered.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in Agreement Between Owner and Contractor.

B. Present required information in typewritten form.

C. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet using continuation sheets when required. Any other form submitted must be pre-approved by Broken Arrow Public Schools.

D. Execute certification by signature of authorized officer.

E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.

F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

G. Submit three copies of each Application for Payment.

H. Include the following with the application:

1. Transmittal letter as specified for Submittals.
2. Partial release of liens from major Subcontractors and vendors.

I. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of Certificate for Payment submitted. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

A. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA Form G710.

B. Construction Change Directive: Architect may issue a document, signed by Broken Arrow Public Schools, instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time.

2. Promptly execute the change in Work.

C. Proposal Request: Architect may issue a document which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 10 days.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 016000.

E. Computation of Change in Contract Amount:

1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
3. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

F. Substantiation of Costs: Provide full information required for evaluation.

1. On request, provide following data:
   a. Quantities of products, labor, and equipment.
   b. Insurance, and bonds.
   c. Overhead and profit. (max 10% for sub contractor and 5% for general contractor)
   d. Justification for any change in Contract Time.
   e. Credit for deletions from Contract, similarly documented.
2. Support each claim for additional costs with additional information:
   a. Origin and date of claim.
   b. Dates and times work was performed, and by whom.
   c. Time records and wage rates paid.
   d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract on AIA G701.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 017800.
2. Submit Consent of Surety.
3. Submit No Kickback Statement.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Progress meetings.

C. Construction progress schedule.

D. Submittals for review, information, and project closeout.

E. Number of copies of submittals.

F. Submittal procedures.

1.02 RELATED SECTIONS

A. Section 017300 - Execution

B. Section 017800 - Closeout Submittals: Project record documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Architect and Construction Manager will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Tulsa Public Schools' designated Representative.
   2. Architect.
   3. Construction Manager.
   4. Contractor's Project Manager.
   5. Contractor's Jobsite Superintendent for this project.

C. Agenda:
   1. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   2. Designation of personnel representing the parties to Contract, Construction Manager and Architect.
   3. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal requests, Change Orders, and Contract closeout procedures.
   4. Scheduling.

D. Construction Manager shall record minutes and distribute copies to Tulsa Public Schools, Architect, Attendees and affected parties.

3.02 PROGRESS MEETINGS

A. Owner, Construction Manager and Architect shall schedule and administer meetings throughout progress of the Work at weekly intervals.

B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Tulsa Public Schools' Representative, Construction Manager, Architect and Consultants as appropriate to agenda topics for each meeting.

C. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress during the past period.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule. Provide detailed two-week look-ahead schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Maintenance of quality and work standards.
   11. Effect of proposed changes on progress schedule and coordination.
   12. Other business relating to Work.

D. Construction Manager shall record minutes and distribute copies to Tulsa Public Schools, Architect, Attendees and affected parties.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Construction Manager shall prepare a Construction Schedule.

3.04 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Construction Manager and Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies in accordance with NUMBER OF COPIES OF SUBMITTALS article below. Distribute in accordance with SUBMITTAL PROCEDURES article below, and for record documents purposes described in Section 017800 - CLOSEOUT SUBMITTALS.

3.05 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.

6. Manufacturer's field reports.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, provide approved copies at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Other types as indicated.
   6. Submit for Tulsa Public Schools' benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
   1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect, plus one copy to be retained by the Construction Manager.
   2. Larger Sheets, Not Larger Than 30 x 42 inches: Submit the number of opaque reproductions which Contractor requires, plus two copies which will be retained by Architect, plus one copy to be retained by the Construction Manager.

B. Documents for Information: Submit two copies.

C. Documents for Project Closeout: Make one reproduction of reviewed submittal. Submit one extra of submittals for information.

D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetical suffix.

C. Identify Project, Contractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Deliver submittals to Construction Manager at business address.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

I. Provide space for Construction Manager and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY

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

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

C. Related Requirements:
   1. Section 011000 – Summary
   2. Section 017300 – Execution

1.03 DEFINITIONS

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

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
   1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

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

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

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

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

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

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

1.04 CONFLICTING REQUIREMENTS

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

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

1.05 SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For testing agencies specified in “Quality Assurance” Article to determine their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
   1. Specification Section number and title.
   2. Entity responsible for performing tests and inspections.

3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.06 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Contractor-performed tests and inspections cannot be performed by the special inspector.
2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."

C. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.07 REPORTS AND DOCUMENTS

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

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

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

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

1.08 QUALITY ASSURANCE

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

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

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

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

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

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

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented

according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

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

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
    a. Provide test specimens representative of proposed products and construction.
    b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Owner, with copy to Contractor and to authorities having jurisdiction. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Special Inspector: Special Inspectors shall meet the more stringent of the qualifications listed in this section and the requirements listed in the Statement of Special Inspections submitted to the Authority Having Jurisdiction on this site or otherwise required by the Authority Having Jurisdiction.

L. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
    a. Allow seven days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

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

1.09 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

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

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

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

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

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

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

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

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

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

1.10 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: It will be the owner’s responsibility to contract for special inspections to conduct special tests and inspections required by authorities having jurisdiction as follows:
1. Verifying manufacturer’s certification by submittal of documentation.
2. Notifying Architect, Owner and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Owner, with copy to Contractor and to authorities having jurisdiction.
4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retesting and reinspecting corrected work.
6. Submitting a final report of special tests and inspections at Substantial Completion, which shall include descriptions of satisfactory resolutions achieved for all previously reported deficiencies.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 TEST AND INSPECTION LOG

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

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

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
   2. Protect construction exposed by or for quality-control service activities.
   3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Spare parts and maintenance materials.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 PRODUCTS

A. Provide interchangeable components of the same manufacture for components being replaced.

B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

C. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions:

Submit a request for substitution for any manufacturer not named at least ten (10) days prior to bid date. Approvals of substitution request are not valid unless noted by Addendum issued prior to bid date.

2.03 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra products of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Tulsa Public Schools.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Tulsa Public Schools, and Architect for review or redesign services associated with re-approval by authorities.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

E. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The Architect will notify all bidders in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.03 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 017300

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Tulsa Public Schools personnel.

H. Closeout procedures, except payment procedures.

1.02 SUBMITTALS

A. Cutting and Patching: Submit written request in advance of cutting or alteration which affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Tulsa Public Schools or separate Contractor.

1.03 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Noise Control: Provide methods, means, and facilities to minimize noise from workers and noise produced by construction operations.

D. Pest Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

E. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.04 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate with Construction Manager work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements, supports, and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean-up of work of separate sections.

F. After Tulsa Public Schools' occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Tulsa Public Schools' activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

B. Verify that demolition is complete in alterations areas and areas are ready for installation of new work.

C. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

D. Examine and verify specific conditions described in individual specification sections.

E. Verify that utility services are available, of the correct characteristics, and in the correct

locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished work.

C. Remove debris and abandoned items from area and from concealed spaces.

D. Close openings in exterior surfaces to protect existing work and salvage items from weather and extremes of temperature and humidity. Insulate ducts and piping to prevent condensation in exposed areas.

E. Prepare surfaces and remove surface finishes to provide for proper installation of new work and finishes.

F. Clean substrate surfaces prior to applying next material or substance.

G. Seal cracks or openings of substrate prior to applying next material or substance.

H. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PRE-INSTALLATION MEETINGS

A. When required in individual specification sections, coordinate with Construction Manager and Architect a pre-installation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Construction Manager and Architect at least four days in advance of meeting date.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Construction Manager, Tulsa Public Schools' Representative, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Promptly notify Construction Manager and Architect of any discrepancies discovered.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. Install Products as specified in individual sections.

B. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new Work abuts or aligns with existing, perform a smooth and even transition.

C. When existing finished surfaces are cut so that a smooth transition with new work is not

possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

D. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

E. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

F. Re-cover and refinish work that exposes mechanical and electrical work exposed accidentally during the work.

3.06 CUTTING AND PATCHING

A. Execute cutting and patching including excavation and fill to complete the work, to uncover work to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit Products together to integrate with other work.

B. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

C. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

E. Restore work with new Products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.

H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

I. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

3.09 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Construction Manager, Architect and Owner's representative seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of Products to Tulsa Public Schools' personnel two weeks prior to date of Substantial Completion. Provide documentation stating Tulsa Public Schools' personnel was properly trained, and signed by the Tulsa Public Schools personnel who was trained.

B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

C. For equipment or systems requiring seasonal operation, perform demonstration for other

season 30 days prior to the start of that season.

D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Tulsa Public Schools' personnel in detail to explain all aspects of operation and maintenance.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.11 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

B. Testing, adjusting, and balancing HVAC systems: See Division 15 and Section 01400.

3.12 FINAL CLEANING

A. The Contractor shall be responsible for damaged or broken glass and at completion of the Work shall replace such damaged or broken glass.

B. Execute final cleaning following completion of the Work and prior to Substantial Completion. Final cleaning shall consist of no less than the following:
   1. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
   2. Remove all temporary protections.
   3. Remove marks, stains, fingerprints and other soil or dirt from all surfaces and other work.
   4. Remove spots, mortar, plaster, soil and paint from ceramic tile, marble and other finish materials from all surfaces and other work.
   5. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
   6. Clean fixtures, cabinets and other casework and equipment by removing any and all stains, paint, dirt, etc., and leave in an undamaged and new condition.
   7. Dust all walls that exhibit dust as was created by performance of this Work.
   8. Replace filters of operating equipment.
   9. Clean debris from roofs, gutters, downspouts, and drainage systems.
   10. Clean site; sweep paved areas, rake clean landscaped surfaces.
   11. Remove waste and surplus materials, rubbish, and construction facilities from the site.
   12. ALL surfaces and other work to be cleaned in accordance with recommendations of the manufacturer of the surface and/or equipment being cleaned.

3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Construction Manager.

B. Notify Construction Manager and Architect when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for General Contractor’s and Architect's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Tulsa Public Schools occupied areas.

E. Notify Construction Manager and Architect when work is considered finally complete.

F. Complete items of work determined by Owner's, Construction Manager's and Architect's final inspection.

END OF SECTION

SECTION 017800

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 SUBMITTALS

A. Project Record Documents: Submit documents to Construction Manager and Architect with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Construction Manager and Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Tulsa Public Schools, submit completed documents within ten days after acceptance.
   3. Submit 1 copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Construction Manager and Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Tulsa Public Schools' permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Tulsa Public Schools.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   2. Field changes of dimension and detail.
   3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Additional information as specified in individual product specification sections.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Provide control diagrams by controls manufacturer as installed.

J. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

L. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

M. Include test and balancing reports.

N. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone

numbers of Subcontractors and suppliers. Identify the following:

a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

J. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

K. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, Construction Manager and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

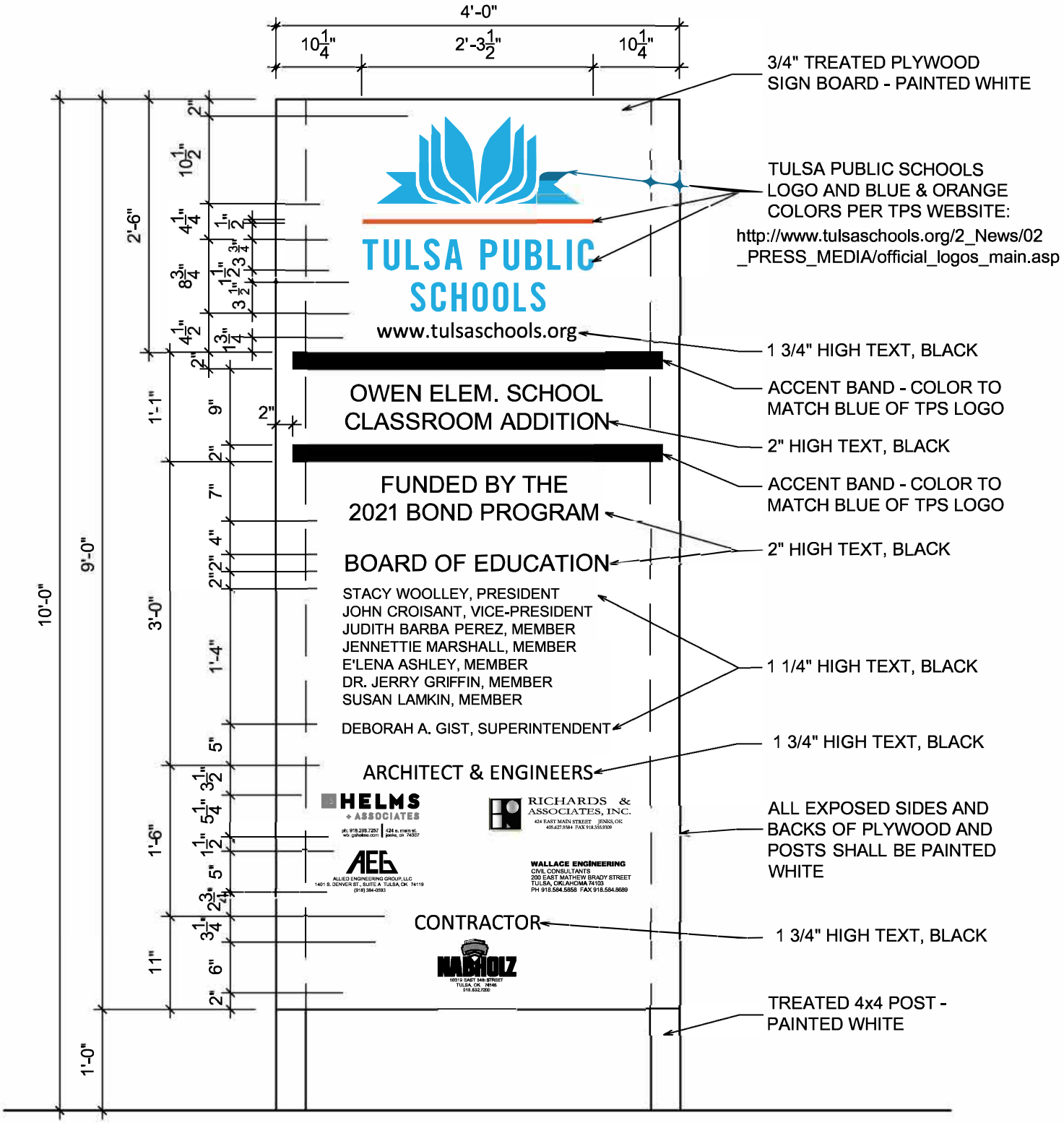
A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Tulsa Public Schools' permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

END OF SECTION



CONTRACTOR SHALL VERIFY WITH OWNER AND ARCHITECT NAMES AND TITLES TO BE PRINTED ON SIGN PRIOR TO FABRIATION

SECTION 081113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work under this section shall include the furnishing of all items shown on the drawings and as specified including, but not limited to, the following.

1. Steel Doors
2. Steel Door Frames
3. Tornado Resistant Doors
4. Tornado Resistant Frames

1.02 REFERENCES

A. Steel Doors and Frames in this section must meet all standards as established by the following listing.

1. Door and Hardware Preparation ANSI 115.
2. Life Safety Codes NFPA-101 (Latest edition).
3. Fire Doors and Windows NFPA-80 (Latest edition).
4. Steel Door Institute ANSI/SDI-100 (Latest edition)
5. UL10C and UBC 7 – 2 Positive Pressure fire testing.

1.03 SUBMITTAL

A. Coordinate approved shop drawings with all other trades and manufacturers whose products are used in conjunction with the Steel Doors and Frames under section 08100.

B. Finish hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Each floor of the building is to be detailed separately.

D. The steel door and frame supplier will furnish to the architect (6) complete copies of the proposed steel door and frames schedule and/or shop drawings. **Using the same reference number for details and openings as those on the contract drawings**. After receipt of the approved door schedule the steel door and frame supplier will make any corrections and submit to the architect (6) sets of corrected schedules.

E. Upon request of the architect or for any substitution to this specification, (4) copies of the steel door & frame manufacturers catalog cut sheets are to be submitted to the architect before any material is placed on the job site.

1.04 QUALITY ASSURANCE

A. Provide Steel Doors and Frames complying with the Steel Door Institute recommended specifications for Standard Steel Doors and Frames ANSI/SDI 100 (Latest edition).

1.05 DELIVERY, STORAGE & HANDLING

A. Doors and frames must be properly marked with door opening mark number to correspond with the schedule.

B. Deliver all steel doors in cartons and palletized to provide protection during transit and job storage.

C. Inspect doors and frames upon delivery for damage. Minor damage is to be repaired, provided the repair is equal to new work and acceptable to the architect.

D. Store doors and frames at the job site under cover. Place units on wood sills on the floor in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters, which could create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a ¼ inch space between stacked doors to promote air circulation.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provided their products meet the requirements of the specifications.

1. Ceco Door Products
2. Curries Company
3. Other SDI or NAAMM members that conform to the specific requirements of this specification.

2.02 HARDWARE LOCATIONS & GENERAL REINFORCEMENTS

A. Locate hardware on doors and frames in accordance with the manufacturer's standard location.

B. When steel frames are used with wood doors, the hardware preparation in the door is governed by the location on the frame. If the doors are factory mortised, the door supplier is responsible for coordinating hardware locations.

C. Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.

D. Doors shall be mortised, reinforced and function holes provided at the factory in accordance with the hardware schedule and templates provided by the hardware supplier. Through bolt holes, attachment holes, or drilling and tapping for surface hardware, shall be done by others in the field.

2.03 STEEL DOORS

A. Material - Exterior and as indicated on the schedule

1. Sheets are to be made of commercial quality hot dipped zinc coated steel that complies with ASTM A924 A60.
2. Vertical edges will join the face sheets by a continuous weld extending the full height of the door. Welds are to be ground, filled to make them invisible and provide a smooth flush surface.
3. Hinge reinforcement to be not less than 7 gauge (3/16") plate 1-1/4" X 9". Approved equal is a 12 gauge continuous channel with formed holes drilled and tapped. The manufacture is to provide test information with submittal that this type reinforcement is equal to a 3/16" or 7 gauge plate reinforcement.
4. Reinforce tops and bottoms of all doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel shall be flush with the top of the face sheets of the door. Plastic fillers are NOT acceptable.
5. Door Cores
   a. Insulated doors are to be completely filled with a rigid polyurethane core chemically bonded to all interior surfaces with a minimum insulation value of R10.

b. Insulated doors to have 20 gauge vertical steel stiffeners spanning the full thickness of the interior space between door faces. Stiffeners are spaced not more than 6" on centers, and attached by spot welds spaced not more than 5" on centers. Spaces between stiffeners are to be filled with fiberglass insulation (Min. density 0.8#/cubic ft.)

6. Door face sheets shall be 16 gage.

B. Materials - Other doors as indicated on the schedule.

1. Face sheets are to be made of commercial quality cold rolled steel that complies with ASTM A366 or A620.
2. Vertical edges to have a hairline edge seam.
3. Hinge reinforcement shall be not less than 7 gauge (3/16") plate 1-1/4" X 9". Approved as equal is a 12 gauge continuous channel with formed holes drilled and tapped. The manufacture is to provide test information with submittal that this type reinforcement is equal to a 3/16" or 7 gauge plate reinforcement.
4. Reinforce tops and bottoms of all doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to have a steel closure channel screwed in place so that the web of the channel is flush with the top of the face sheets of the door. Plastic filler is NOT acceptable.
5. Door Cores
   a. Doors are to be fully filled with a one piece resin-impregnated honeycomb bonded to both faces.
   b. Or doors are to be fully filled with a one piece polystyrene core, securely bonded to both faces.
6. Door face sheets shall be 16 gage.

C. Tornado Resistant Doors
1. Tornado Door Systems: Comply with Federal Emergency Management Agency (FEMA) 320/361 Guidelines and and ANSI ICC500-2014 standards for tornado shelters.
   a. Acceptable Product: Steelcraft Paladin PW14 Series Tornado Door and Frame Systems or other manufacturers meeting or exceeding these specifications.
   b. Face sheets: 14 gage (1.7 mm) galvannealed steel having an A60 zinc-iron alloy coating conforming to ASTM designations A653 and A924.
   c. Hinge and lock edges:
      i. Continuous vertical mechanical joints with edge seams welded, filled and ground smooth.
      ii. Bevel edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges are not acceptable.
   d. Hinge reinforcements: Minimum 7 gage (4.2 mm) galvannealed steel, projection welded to the edge of the door.
   e. Top and bottom steel reinforcement channels, galvannealed 14 gage (1.7 mm), projection welded to both face sheets on 4 inches (102 mm) centers.
   f. Reinforce door faces with 18 gage (1.0 mm) vertical stiffeners manufactured from Galvannealed steel conforming to ASTM A 653 and ASTM A 924 and welded to each face sheet.
   g. Reinforced lock stiles with full-height 12 gage (2.3 mm) lock reinforcing channels.
   h. Fire Rating: Supply door units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.

2.04 STEEL FRAMES

A. Materials - Exterior

1. To be hot dipped zinc coated steel that complies with ASTM designations A924 A60.
2. Weld the face seam and the full web of the frame corner or intersection. Grind and dress the weld area smooth. Apply a zinc rich primer over the grinding area, and finish with a matching prime paint.
3. All exterior door frames shall be 14 gage.

B. Materials - Interior

1. Cold rolled steel that complies to ASTM A366 or A620.
2. Weld the face miter seam. Grind and dress the weld smooth. Finish with a matching prime paint.
3. All interior door frames shall be 14 gage.

C. Fabrication

1. Provide steel frames for doors, transoms, sidelights, borrowed lites, and other openings to the size and design as shown on the architectural drawings.
2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects.
3. Jamb depths, trim, profile and backbends to be as scheduled and shown on approved shop drawings.
4. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field.
5. Hardware reinforcements are to be in accordance with the minimum standard gages as listed in SDI-100.
6. Frames shall be mortised, reinforced, drilled and tapped at the factory for template mortised hardware only, in accordance with approved hardware schedule and template provided by the hardware contractor. Where surface mounted hardware is to be applied, frames shall have reinforcing plates only; all drilling and tapping to be done in the field by others.
7. Hinge reinforcements to be 7 gauge steel.
8. All frames shall be fully welded. **Knock-down type frames shall not be acceptable**.

D. Anchors

1. Floor anchors to be provided at each jamb.
2. Anchors for masonry walls to be of the wire type.
3. Anchors for stud partitions to be steel of a suitable design, not less than 18 gauge thickness,
4. Dust boxes/mortar guards to be no less than 26 gauge.
5. All frames that are to be welded are to have a steel spreader during shipping and handling. Spreader bars are for bracing only and are not be used to size the frame opening.
6. Loose glazing stops are to be of 16 gauge galvanized steel, butted at corner joints and secured to the frame with countersunk cadmium or zinc-plated screws.
7. Except on weather-stripped frames, punch the stop for 3 silencers on single door and 2 on double door frames.

E. Tornado Resistant Frames

1. Steel Frames for Tornado Door Systems: Comply with Federal Emergency Management Agency (FEMA) 320/361 Guidelines and and ANSI ICC500-2014 standards for tornado shelters.
    a. Acceptable Product: Steelcraft Paladin FP Series Tornado Door and Frame Systems or other manufacturers meeting or exceeding these specifications.
    b. Construction:

i. Face welded: Weld miter joints between head and jamb faces completely along their length either internally or externally. The remaining elements of the frame profile (soffit, stop and rabbets) are not welded. Grind and finish face joints smooth.

ii. Full profile welded:
1) Weld miter joints between head and jamb faces completely along their length either internally or externally.
2) Internally weld perimeter profile joints full length of soffit and rabbets with hairline seams on external meeting surfaces. Grind and finish face joints smooth.

c. Profile:
i. 2 inch (51 mm) face dimension with 5/8 inch (16 mm) high stop, and types and throat dimensions indicated on the Door Schedule.

d. Provide following reinforcement and accessories:

i. Hinge Preparation for 4-1/2 inches (114 mm) high, standard weight, or heavy weight, full mortise hinges; with plaster guard.
ii. Hinge Preparation for 5 inch (127 mm) high, universal standard weight, or heavy weight, full mortise hinges; with plaster guard.
iii. Strike preparation (single doors) for 4-7/8 inch (123 mm) universal strike; with plaster guard.
iv. Silencers. Prepare frames to receive inserted type door silencers, 3 per strike jamb on single doors, and 2 per head for pair of doors. Stick-on silencers are not permitted.

e. Fire Rating: Supply frame units bearing Labels for fire ratings indicated in Door Schedule for the locations indicated.

f. Finish: Factory prime finish

2.05 LABELED DOORS & FRAMES

A. Construct and install doors and frames to comply with current issue of National Fire Protection Association (NFPA) Standard Number 80, as herein specified.

B. Doors and/or frames for labeled openings shall bear either a stamped or applied label from a nationally recognized testing agency.

C. All doors and frames shall have been tested in accordance with UL10C and UBC 7–2 Positive Pressure.

2.06 PRIME FINISH

A. Doors and frames are to be cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer. The finish to meet the requirements for acceptance stated in ANSI A224.1 “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.” The prime finish is not intended to be the final layer of protection from the elements. Field painting using a good grade of paint to be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

PART 3 EXECUTION

3.01 INSPECTION

A. It is the responsibility of the General Contractor to assure that scratches or disfigurements caused in shipping or handling are properly cleaned and touched up with a rust inhibitive primer.

3.02 INSTALLATION

A. Frames

1. Prior to installation, all frames must be checked for rack, twist and out of square conditions.
2. Place frames prior to enclosing walls and ceilings. Set frames accurately in position, plumbed and braced securely until permanent anchors are set. Remove shipping bar spreader and insert a wood spreader cut to the opening width, notched to clear the stops.
3. Fill frames in masonry walls with mortar.
4. When temperature conditions necessitate an additive to be used in the plaster or mortar to prevent freezing, the contractor installing the frames shall coat the inside of the frames, in the field, with a corrosion inhibiting bituminous material.
5. SDI-105, "Recommended Erection Instructions for Steel Frames" and SDI-110 "Standard Steel Doors and Frames for Modular Masonry Construction" shall indicate the proper installation procedures.

B. Doors

1. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.
2. Proper door clearance must be maintained in accordance with SDI-110.
3. Where necessary, only metal hinge shims are acceptable to maintain clearances.
4. "Installation Guide for Doors and Hardware" published by DHI is recommended for further details.

C. Hardware must be applied in accordance with hardware manufacturer's templates and instructions.

3.03 ADJUST & CLEAN

A. Check and re-adjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper condition.

B. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply to touch-up or compatible air-drying primer.

END OF SECTION

SECTION 081416

FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Solid core veneer-faced doors.
2. High Pressure Decorative Laminate faced doors.
3. Fire-resistant composite core doors.
4. Factory finishing.
5. Sizing by manufacturer.

1.3 SUBMITTALS

A. Doors shall be numbered to correspond to numbering system used on Construction Drawings.

B. Product Data: For each type of door, include details of core and edge construction and trim for openings.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
2. Provide construction samples of doors, approximately 5 by 5 inches, with door faces and vertical edges representing actual construction to be used.

1.03 INFORMATIONAL SUBMITTALS

A. Sample Warranty.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. A qualified manufacturer that is a member in good standing of the Window and Door Manufacturers Association.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body when FSC Certified wood is specified

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package factory-finished doors individually in manufacturer's standard plastic bags, stretch wrap, or cardboard cartons.

C. Mark each door on top rail with opening number used on Shop Drawings. Include manufacturer's order number and date of manufacture.

1.06 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.07 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Marshfield DoorSystems, Inc. flush wood doors or a comparable product by one of the following:

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Marshfield DoorSystems

B. Source Limitations: Obtain flush wood doors from single manufacturer.

2.02 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A-11, "Architectural Wood Flush Doors."

B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain added urea formaldehyde.

C. WDMA I.S.1-A Performance Grade:

1. Extra Heavy Duty

D. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Cores: Provide core specified or fire-resistant composite core as needed to provide fire-protection rating indicated.
2. Blocking: Provide composite blocking approved for use in doors of fire-protection ratings indicated as needed to maintain WDMA performance level and eliminate through-bolting hardware.
3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals.

E. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

F. Wood-Based Particleboard-Core Doors:

1. Provide wood-based particleboard core doors with a minimum density per ANSI A208.1, Grade LD-2 as required to meet WDMA Performance Duty level specified without added blocking.

G. Face Veneer: Face veneer shall be custom grade or better, white birch.

2.03 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs. Any deficiencies must be corrected prior to door installation.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Hardware: Refer to Finish Hardware Schedule

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Do not trim factory finished doors for width.

3.03 ADJUSTING

A. Operation: Correct any deficiency that prohibits the door from swinging or operating freely. Do not remove hinge screws after initial insertion. Shims used for alignment purposes must be inserted between hinge and frame. Do not insert shims between hinge and door.

B. To prevent stile failure, insure that door closers are properly adjusted and do not limit the door opening swing. Limit door opening swing only with a properly located stop.

C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 081613

FRP FLUSH DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced polyester (FRP) flush doors with aluminum frames.

1.02 RELATED SECTIONS

A. Section 081113 – Hollow Metal Doors & Frames

B. Section 087100 - Door Hardware

C. Section 087150 – Finish Hardware Schedule

1.03 REFERENCES

A. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

B. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.

C. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.

D. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

F. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

G. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.

H. ASTM D 570 - Water Absorption of Plastics.

I. ASTM D 638 - Tensile Properties of Plastics.

J. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

K. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

L. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.

M. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

N. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.

O. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

P. ASTM D 5420 – Impact Resistance of Flat Rigid Plastic Specimens by Means of a Falling

Weight.

Q. ASTM D 6670-01 - Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products.

R. ASTM E 84 - Surface Burning Characteristics of Building Materials.

S. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

T. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

U. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

V. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

W. ASTM F 476 - Security of Swinging Door Assemblies.

X. ASTM F 1642-04 – Standard Test Method for Glazing Systems Subject to Air blast Loading.

Y. NWWDA T.M. 7-90 – Cycle Slam Test Method

Z. SFBC PA 201 - Impact Test Procedures.

AA. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

AB. SFBC 3603.2 (b)(5) - Forced Entry Resistance Test.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.

B. Air Infiltration: For a single door 3’-0” x 7’-0”, test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.

C. Water Resistance: For a single door 3’-0” x 7’-0”, test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.

D. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.

E. Hurricane Test Standards, Single Door with Single-Point Latching:
1. Uniform Static Load, ASTM E 330: Plus or minus 75 pounds per square foot.
2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.
3. Cyclic Load Test, SFBC PA 203: Plus or minus 53 pounds per square foot.
4. Large Missile Impact Test, SFBC PA 201: Passed.

F. Blast Test, Doors and Frames, ASTM F 1642-04, 6 psi / 41 psi-msec: Minimal Hazard.

G. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 25,000,000

cycles.

H. Cycle Slam Test Method, NWWDA T.M. 7-90: Minimum 5,000,000 Cycles.

I. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.

J. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.

K. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.

L. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.

M. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
1. Flame Spread: Maximum of 200, Class C.
2. Smoke Developed: Maximum of 450, Class C.

N. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
1. Flame Spread: Maximum of 25.
2. Smoke Developed: Maximum of 450.

O. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.

P. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.

Q. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.

R. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.

S. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.

T. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.

U. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.

V. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to crayon and crankcase oil.

W. Chemical Resistance, ASTM D 543. Excellent rating.
1. Acetic acid, Concentrated.
2. Ammonium Hydroxide, Concentrated.
3. Citric Acid, 10%.
4. Formaldehyde.
5. Hydrochloric Acid, 10%
6. Sodium hypochlorite, 4 to 6 percent solution.

X. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.

Y. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.

Z. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.

AA. Thermal and Humid Aging, Foam Core, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days, ASTM D 2126: Minus 5.14 percent volume change.

1.05 SUBMITTALS

A. Comply with Section 013000 for Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.

C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.

D. Samples:
1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
2. Color: Submit manufacturer's samples of standard colors of doors and frames.

E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.

G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

H. Warranty: Submit manufacturer's standard warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.
2. Door and frame components from same manufacturer.
3. Evidence of a compliant documented quality management system.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

1.08 WARRANTY

A. Warrant doors, frames, and factory hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.

B. Warranty Period: Ten years starting on date of shipment. In addition, a limited lifetime

(while the door is in its specified application in its original installation) warranty covering: failure of corner joinery, core deterioration, delamination or bubbling of door skin.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site www.special-lite.com. E-Mail info@special-lite.com.

B. Manko Window Systems

2.02 FRP FLUSH DOORS

A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.

B. Door Opening Size: As indicated on the Drawings.

C. Construction:
1. Door Thickness: 1-3/4 inches.
2. Stiles and Rails: Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes, minimum of 2-5/16-inch depth.
3. Corners: Mitered.
4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom integral to standard tubular shaped stiles and rails reinforced to accept hardware as specified.
5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
10. Bottom of Door: Install bottom weather bar with nylon brush weatherstripping into extruded interlocking edge of bottom rail.
11. Glue: Use of glue to bond sheet to core or extrusions is not acceptable.

D. Face Sheet:
1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout.
2. Protective coating: Abuse-resistant engineered surface. Provide FRP with SpecLite3 protective coating, or equal.
3. Texture: Pebble.
4. Color: To be selected by Architect from manufacturer's standard colors.
5. Adhesion: The use of glue to bond face sheet to foam core is prohibited.

E. Core:
1. Material: Poured-in-place polyurethane foam.
2. Density: Minimum of 5 pounds per cubic foot.
3. R-Value: Minimum of 9.

F. Cutouts:

1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
2. Factory install vision lites, louvers, and panels.

G. Hardware:
1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
2. Factory install hardware.

2.03 MATERIALS

A. Aluminum Members:
1. Aluminum extrusions made from prime-equivalent billet that is produced from 100% reprocessed 6063-T6 alloy recovered from industrial processes: ASTM B 221.
2. Sheet and Plate: ASTM B 209.
3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.

B. Components: Door and frame components from same manufacturer.

C. Fasteners:
1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
2. Compatibility: Compatible with items to be fastened.
3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.04 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:
1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
2. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.05 HARDWARE

A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.

B. Hardware Schedule: As specified in Section 08715.

C. Doors shall be provided with continuous hinges, adjustable bottom brush sweeps and flush pulls by manufacturer.

2.06 VISION LITES

A. Factory Glazing: As indicated on Construction Drawings.

2.07 ALUMINUM FINISHES

A. Anodized Finish: Class I finish, 0.7 mils thick.

1. Clear Anodized.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Ensure openings are plumb, level, square, and in tolerance.

3.03 INSTALLATION

A. Install doors in accordance with manufacturer's instructions.

B. Install doors plumb, level, square, true to line, and without warp or rack.

C. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.

D. Install exterior doors to be weathertight in closed position.

E. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

F. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.04 ADJUSTING

A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.05 CLEANING

A. Clean doors promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that would damage finish.

3.06 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 083110

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fire resistive rated and non-rated access door and frame units.

B. Wall and ceiling locations.

1.2 RELATED SECTIONS

A. Section 092116 – Gypsum Board Assemblies

B. Section 099000 – Paints and Coatings

C. Divisions 22, 23 and 26

1.3 REFERENCES

A. ASTM E119-05a - Standard Test Methods for Fire Tests of Building Construction and Materials.

B. NFPA 251-2006 - Standard Methods of Tests of Fire Resistance of Building Construction and Material.

C. NFPA 252-2003 - Standard Methods of Fire Tests of Door Assemblies.

D. NFPA 288-2001 - Standard Method of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance Rated Floor Systems.

E. UL - Fire Resistance Directory.

F. UL 10B-1997 - Standard for Fire Tests of Door Assemblies.

1.4 SUBMITTALS FOR REVIEW

A. Section 013000 - Administrative Requirements

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of all access door units.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 017800 – Closeout Submittals

B. Record actual locations and sizes of all access units.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with UL Design requirements.

B. Provide fire rated products with labels.

C. Provide all products specified in this Section from one manufacturer.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable codes for fire rated access doors.

1.8 PROJECT CONDITIONS

A. Coordinate the work with other work requiring access doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Maxam Metal Products Limited.

B. Other manufacturers meeting the requirements of these specifications.

2.2 MATERIALS

A. Galvanized Steel: Bonderized, with electrostatically applied rust inhibitor, off-white prime finish.

B. Gasketing: Urethane composition maximum compression set two percent (2%) at 73 degrees F.

C. Insulation: Fiberglass, R-4.2 per inch.

2.3 ACCESS UNITS - WALLS

A. Non-Fire Rated Door and Frame Unit:

1. Exterior Flange Doors:
   a. Standard Doors: Galvanized steel

B. Fire Rated Door and Frame Unit: Galvanized steel.

1. Exterior Flange Doors:
   a. Uninsulated, fire rating meeting the requirements of the wall assembly the access door is installed in.

2.4 ACCESS UNITS - CEILINGS

A. Non-Fire Rated Door and Frame Unit:

1. Exterior Flange Doors:
   a. Standard Doors: Galvanized steel

2.5 FABRICATION

A. Panel: Galvanized steel, 18 gauge

B. Frame: Galvanized steel, minimum 18 gauge

C. Hinge: Continuous hinge, allows door panel to open 175 degrees.

D. Flanges:

1. Exterior: 3/4 inch wide at perimeter.
2. Gypsum: Gypsum bead, galvanized steel.

E. Latching/Locking Devices:

1. Cam Latch: 3/16 inch allen key operator.
2. Handle: Non-locking, two position.

F. Weld, fill, and grind joints to ensure flush and square unit.

2.6 FINISHES

A. Base Metal Protection: Galvanized,[hot dipped finish. Prime coat units with alkyd primer.

B. Finish: Field Painted to match walls.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that rough openings for door and frame are correctly sized and located.

3.2 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in opening. Secure rigidly in place.

C. Position unit to provide convenient access to concealed work requiring access.

END OF SECTION

SECTION 083300
ROLLING FIRE DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: electric operated, automatic closing, overhead rolling fire doors.

B. Related Sections:

1. 055000–Metal Fabrications. Door opening jamb and head members.
2. 061000–Rough Carpentry. Door opening jamb and head members.
4. 087100–Hardware
5. Division 26. Electrical wiring and conduit, fuses, disconnect switches, connection of operator to power supply, installation of control station and wiring, and connection to alarm systems.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Provide doors with Underwriters' Laboratories, Inc. label for the fire rating classification, 1 1/2 hr
2. Provide doors with Underwriters' Laboratories, Inc. label for “Leakage Rated Assembly” or “S” label demonstrating product tested to UL 1784
   a. Comply with NFPA 105 air leakage requirements

1.3 SUBMITTALS

A. Reference Section 013300–Submittal Procedures; submit the following items:

1. Product Data
2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
3. Quality Assurance/Control Submittals:
   a. Provide manufacturer ISO 9001:2015 registration.
   b. Provide manufacturer and installer qualifications - see 1.4 below.
   c. Provide manufacturer's installation instructions.
4. Closeout Submittals:
   a. Operation and Maintenance Manual.
   b. Certificate stating that installed materials comply with this specification.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing fire and smoke control units of the type specified.
2. Installer Qualifications: Manufacturer's approval.

1.5 DELIVERY STORAGE AND HANDLING

A. Reference Section 016000–Product Storage and Handling Requirements.

B. Follow manufacturer's instructions.

1.6 WARRANTY

A. Standard Warranty: Two years from date of substantial completion against defects in material and workmanship.

B. Maintenance: Submit for owner’s consideration and acceptance of a maintenance service agreement for installed products.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Manufacturer:

1. Cookson: 1901 S. Litchfield Road, Good Year, AX 85338. Telephone: (800) 294-4358.
2. Cornell
3. Clopay

2.2 PRODUCT INFO

A. Model: ERD10

2.3 MATERIALS

A. Curtain:
1. Slats: No. 5F
   a. Galvanized Steel with Finish as Described Below: No. 5F, minimum 18 gauge, Grade 40 steel, ASTM A 653 galvanized steel zinc coating
2. Finish:
   a. GalvaNex™ Coating System (Stock Colors):
      1) GalvaNex™ - ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and gray baked-on polyester enamel finish coat

B. Endlocks:
Fabricate interlocking continuous slat sections with high strength steel endlocks secured with two ¼" (6.35 mm) rivets per UL requirements.

C. Bottom Bar:
1. Configuration:
   a. Structural Steel Angles: 2 structural steel angles minimum 2"x2"x1/8" (50x50x3.2 mm)
2. Finish:
   a. Powder Coat (Stock Colors): Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness

D. Guides:
1. Fabrication
   a. Minimum 3/16 inch (4.76 mm) structural steel. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar. Top 16 ½" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.

   Top 16 ½" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.

2. Finish:
   a. Powder Coat (Stock Colors): Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness

E. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width
2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

F. Brackets: Fabricate from minimum 1/4 inch (6.35 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures
1. Finish:
   a. Powder Coat (Stock Colors): Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness

G. Hood:
Minimum 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets
   a. GalvaNex™ Coating System (Stock Colors):

1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and gray baked-on polyester enamel finish coat

2.4 OPERATION

A. Motor Operation:

1. FireGard™ Fire Door Motor Operation: UL listed NEMA 1 enclosure, horsepower as recommended by manufacturer, 115v single phase service. Provide a totally enclosed non ventilated motor, removable without affecting the setting of limit switches; thermal overload protection, planetary gear reduction, adjustable rotary limit switch mechanism and a transformer with 24v secondary output. All internal electrical components are to be prewired to terminal blocks.
   a. Provide an internal solenoid brake mechanism to hold the door at any position during normal door operation.
   b. Equip operator with an emergency manual chain hoist assembly that provides emergency operation during non-alarm power failure.
   c. Activate automatic closure by separation of a fusible link.
   d. Delay automatic closure for no more than ten seconds when electrically notified.
   e. Control automatic closure speed with a variable rate centrifugal governor without the use of electrical pulsation, oscillation type or constant rate viscosity governors.
   f. Maintain automatic closure speed at an average of 12” (304mm) per second.
   g. Ensure that electrical sensing edge and push button control station are inoperable during automatic closure.
   h. Reset door system by reconnecting fusible links or by re-engaging failsafe release device from floor level.
   i. Provide minimum #50 roller chain for drive connection from operator output shaft to the door drive shaft.
   j. Ensure that manual resetting of spring tension or mechanical dropouts will not be required.
   k. Install system only with manufacturer supplied or specified fasteners.
   l. Notify electrical contractor to mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the door system wiring instructions.
   m. Drop test and reset door system twice by all means of activation and comply fully with NFPA 80 Section 5.

B. Control Station:
   1. Surface mounted: "Open/Close" key switch with "Stop" push button; NEMA 1

C. Control Operation:
   1. Constant pressure to close:
      a. 2-wire, electric sensing edge seal extending full width of door bottom bar. Provide a self-coiling cable connection to control circuit.

2.5 ACCESSORIES

A. Battery Back-Up:
   1. Model R-BBU Battery Back-Up System for AlarmGard Motor Operator:
      a. Prevent gravity closure for a minimum of four hours due to power failure.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
C. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

A. General: Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

3.3 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

3.4 FIELD QUALITY CONTROL

A. Site Test: Test doors for normal operation and automatic closing. Coordinate with authorities having jurisdiction to witness test and sign Drop Test Form.

3.5 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.
B. Remove surplus materials and debris from the site.

3.6 DEMONSTRATION

A. Demonstrate proper operation, testing and reset procedures to Owner's Representative.
B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

SECTION 083350

TORNADO RESISTANT COILING DOOR

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Provide all materials, labor, equipment and services necessary to furnish, deliver and install all work under this section as shown on the contract documents, specified herein, and as specified by the job conditions.

1.02 DESCRIPTION

A. Related work specified elsewhere:

1. Metal Fabrication.	Section 055000
2. Rough Carpentry.	Section 061000
4. Paints & Coatings:	Section 099000
5. Electrical	

1.03 SUBMITTALS

A. Procedures: Furnish submittals in accordance with the general requirements specified.

B. Shop Drawing: Furnish shop drawings for architect's approval. Include elevations, sections, and details indicating dimensions, materials, finishes, conditions for anchorage and support of each coiling acoustically rated service door.

C. Certifications:

1. Provide certification from an accredited testing laboratory of product compliance with FEMA 361 Safe Rooms for Tornadoes and Hurricanes.
2. Provide certification from an accredited testing laboratory of product compliance with ICC 500 ICC/NSSA Standard for the Design and Construction of Storm Shelters.
3. Provide certification form accredited testing laboratory of product compliance to sustain a 240 psf wind pressure (1.2 times the design wind pressure of 200 psf) in accordance with ASTM E330.
4. Provide certification form accredited testing laboratory of product compliance in accordance with the requirements of ASTM E1886 Large Missile Impact for FEMA 361 assemblies.

D. Product Literature: Submit manufacturer's technical literature describing the product to be used under this section.

E. Maintenance and Operating Manuals: Furnish complete manuals describing the materials, devices and procedures to be followed in operating and maintaining all tornado and hurricane resistant coiling doors under this section. Include manufacturer's brochures and parts lists describing the actual materials used in the product.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable FEMA requirements as well as laws, codes, ordinances and regulations of federal, state and municipal authorities having jurisdiction.

B. Manufacturer Requirements: Manufacturer shall have been in the business of and have experience in manufacturing wide span opening protective door assemblies as well as

providing dependable credible service for a minimum of ten (10) years.

1.05 DELIVERY, STORAGE AND HANDLING

A. General: Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.06 WARRANTY

A. Tornado and Hurricane Resistant Coiling Door Warranty: Furnish one (1) year written warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the owner.

PART 2 PRODUCTS

2.01 TORNADO RESISTANT COILING DOORS

A. Manufacturer: Tornado resistant coiling doors shall be the model **SafeSpace 500-G** as manufactured by McKeon Door Company. Door assembly shall be tested and certified by an accredited testing laboratory, approved for use in FEMA 361 and ICC 500 safe rooms and storm shelters.

B. Substitutions shall be submitted to Architect a minimum of 10 days prior to bidding. All substitution requests shall include assembly test certificate and testing agency certifications.

2.02 MATERIALS

A. Curtain: Shall be assembled of **interlocking galvanized steel slats**. Curtain shall be formed of ID slat profile sections with a polymeric insulation core of gauge as required to sustain the minimum required design wind pressure. Slat cross section shall not be less than 3” wide by 1-1/2” deep. Paint standard McKeon Sterling Gray finish.

B. Bottom Bar: Shall consist of a **double structural steel angle** assembly formed to fit and engage the curtain assembly, paint Black.

C. Guides: Each guide assembly shall be fabricated of **structural steel support angles** and guide retaining angles of a sufficient depth to retain curtain in in the guides under the design wind pressure and impact forces specified, paint Black.

D. Mounting Brackets: Fabricated of **3/16” minimum steel plates**, brackets shall be provided to house ends of the counterbalance barrel assembly. Paint standard McKeon Sterling Gray finish.

E. Hood: Shall be provided to entirely enclose coiled curtain and counterbalance barrel assembly. Hood shall be fabricated **22 gauge galvanized steel**, designed and formed to match brackets. Top and bottom shall be bent and reinforced to provide for proper stiffness. Paint standard McKeon Sterling Gray finish.

F. Counterbalance Assembly: Coiling door shall be counterbalanced by means of adjustable steel helical torsion springs attached to shaft enclosed in pipe with required mounting blocks or rings for attachment of curtain. Grease sealed bearings or self-lubricating graphite bearings shall be attached to the spring barrel which shall be fabricated of hot formed structural quality carbon steel seamless pipe.

G. Electric Motor Operator: Coiling door shall be provided with a compact power unit designed and built by the coiling door manufacturer. Operator shall be equipped with an adjustable screw-type limit switch to break the circuit at termination of travel. High efficiency gearing running in an oil bath, shall be furnished together with a magnetic operated brake, completely housed to protect against damage, dust and moisture. An efficient overload protection device, which will break the power circuit and protect against damage to the motor windings shall be integral with the unit. Operator is to be housed in a NEMA type 1 enclosure.
   1. Motor: Shall be intermediate duty, thermally protected, ball bearing type with a class A or better insulation. Horsepower of motor is to be 1/3hp minimum or of manufacturer's recommended size, whichever is greater.
   2. Starter: Shall be size "0" magnetic reversing starter, across the line type with mechanical and electrical interlocks, with 10 amp continuous rating and 24 volt control circuit.
   3. Reducer: Spiral gear type, 70% efficiency minimum.
   4. Brake: Magnetically activated, integral within the operator's housing.
   5. Control Station: Provide recessed mount push button control station marked open, close and stop.
   6. Fail Safe Design to include FXN-EP Motor Operator with AR-C Magnetic Release Device to automatically close doors when power has failed or is shut off.

H. Obstruction Sensing Device: The coiling door shall be designed with an obstruction sensing safety edge. In the event that the safety edge meets an obstruction during the normal closing operation, the coiling door shall stop, reverse and return to the open position.

I. Finish: After completion of fabrication, clean all metal surfaces to remove dirt and chemically treat to provide for paint adhesion. All steel components shall receive a prime coat finish of .2 mils epoxy primer and .8 mils of polyester paint color as indicated for each component in this section parts 2.02, A, B, C, D, & E.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces and field conditions to which this work is to be performed and notify architect if conditions of surfaces exist which are detrimental to proper installation and timely completion of work.

B. Verify all dimensions taken at job site affecting the work. Notify the architect in any instance where dimensions vary.

C. Coordinate and schedule work under this section with work of other sections so as not to delay job progress.

3.02 INSTALLATION

A. Perform installation using only factory approved and certified representatives of the coiling door manufacturer.

B. Install coiling door assemblies at locations shown in perfect alignment and elevation, plumb, level, straight and true.

C. Adjust coiling acoustically rated service door installation to provide uniform clearances and smooth non-binding operation.

D. Install wiring in accordance with applicable local codes and the National Electrical Code Standard. Materials shall be UL listed.

3.03 PROTECTION AND CLEANING

A. Protect installed work using adequate and suitable means during and after installation until accepted by owner.

B. Remove, repair or replace materials which have been damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

END OF SECTION

SECTION 084113

ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.

1.02 SYSTEM DESCRIPTION

A. Storefront System Performance Requirements:

1. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft^2 at a static air pressure differential of 6.24 psf.

2. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf as defined in AAMA 501.

3. Uniform Load: A static air design load of 20 psf shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

1.03 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with Section 013000.

B. Submittals shall include component dimensions, anchorage/fastener requirements, glass preparation and manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Installer experienced to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer’s installation instructions, and manufacturer's warranty requirements.

1.05 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront against damage from elements, construction activities, and other hazards before, during and after entrance installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Kawneer Company, Inc.

B. EFCO

C. MANKO Window

2.02 MATERIALS

A. Aluminum (Storefront and Components):

1. Material Standard: Extruded Aluminum, ASTM B 221; 6063-T5 alloy and temper.

2. Member Wall Thickness: Each framing member shall provide structural strength to meet specified performance requirements.

3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

B. Framing: Kawneer, Trifab VG 451T, center glazed.

2.03 ACCESSORIES

A. Fasteners: Where exposed, shall be Stainless Steel.

B. Gaskets: Glazing gaskets shall be extruded EPDM rubber.

C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

D. Brake metal: Aluminum.

E. Provide Pivot Mullions and similar corners where indicated on plans.

2.04 FABRICATION

A. General:

1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.

3. Prepare components to receive anchor devices. Fabricate anchors.

4. Arrange fasteners and attachments to conceal from view.

2.05 FINISHES

A. Factory Finishing:
   1. AA-M12C22A44, AAMA 611, Architectural Class I Color Anodic Coating, Color #28 – Medium Bronze (Field verify color to match existing)

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.

   1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.02 INSTALLATION

A. General: Install storefront systems plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.

   1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.

   2. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.

3.03 PROTECTION AND CLEANING

A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum storefront system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The General Conditions of the Contract, including Supplementary Conditions and Division 1, General Requirements, apply to work of this Section.

B. Hardware for hollow metal doors.

C. Hardware for fire-rated doors.

D. Lock cylinders for doors for which hardware is specified in other sections.

E. Thresholds.

F. Weatherstripping, seals and door gaskets.

1.02 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

B. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 1999.

C. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 1997.

D. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention and adjustment.

D. Project Record Documents: Record actual locations of installed cylinders and their master key code.

E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

F. Keys: Coordinate with existing system and deliver with identifying tags to Owner's designated representative ONLY by security shipment direct from hardware supplier.

G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Single-Source: All door hardware is to be furnished by the same vendor.

B. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.05 PRE-INSTALLATION MEETING

A. Convene one week prior to commencing work of this section. The Architect and the Owner's Representative is to be notified of date, time, and location of said meeting at least one (1) week ahead of the meeting and be given the opportunity to attend same.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.07 COORDINATION

A. Coordinate the work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware.

B. Furnish templates for door and frame preparation.

C. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

1.09 MAINTENANCE PRODUCTS

A. Provide special wrenches and tools applicable to each different or special hardware component.

B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. **Keying Instructions – (No Substitution)**
Key All Locks To The Existing Corbin Russwin Restricted Keyway System. Provide Temporary Construction Master Keyed Cores (CT6R) For All Exterior Doors, And Lock-Up Rooms As Required. Provide Disposable Plastic Temporary Cores (CT6D) For All Other Locks. Provide Twenty Construction Keys. Provide Permanent 8000 Series Cores,
Keyed As Required, For Final Installation After Project Completion.
Provide complete bitting schedule.

Hinges – (Or Equal Acceptable)
Pemko Continuous CFM 83 HD1 – Exterior Hollow Metal and all doors on Early Childhood
Pemko Continuous KDFM 83 HD1 – All Aluminum Storefront
Continuous Hinges By Door Supplier – All FRP Doors
PBB 4B81 HD Hinges – Interior Multi Use Restrooms, Cross Corridor, Stairs, Interior Doors Equipped With Exit Devices, Doors Over 3'0" Wide

PBB BB81 Std Hinges – Balance of Interior Doors

Exit Devices – (**No Substitution)**
Von Duprin 99 series US28 finish (313AN @ Storefront) with Corbin Russwin 6 pin restricted keyway interchangeable core cylinders at keyed functions & mullions.
99NL-OP - Keyed Entry (only one keyed per bank of doors)
99EO - Inactive Entry Pairs, Exit Only Doors
99L-F W/ 03 Lever – Fire Rated
99L-F-2 W/03 – Fire Rated Classrooms, Libraries, and Gyms etc.
9947EO-F – Cross Corridor Fire Rated Double Egress
9947L-F W/03 Lever – Cross Corridor Fire Rated Standard Pair
330 Dummy Bar at Full Glass Non Latching Doors

Removable Mullions – (**No Substitution)**
Von Duprin Keyed Removable KR4954 or KR9954. KR4854 with 6111 electric strike
At card access doors. (Card access system by others)

Locks – (**No Substitution)**
Corbin Russwin mortise with 6 pin restricted keyway interchangeable core cylinders, LWA design interior, LWM design exterior, 630 finish.
ML2052 Classrooms, Corridor Office Doors
ML2057 Mech, Elect, Janitor, Non Classroom Storage (M30 Half Trim At Exterior W/ Flush or Vandal Resistant Pull)
ML2055 Offices, Classroom Storage
ML2022 Adjoining Classrooms
ML2030 M19V Single Toilets
ML2065 Early Childhood Classrooms
DL4000 series deadlocks function as required
Double Mechanical Closets have double doors, shall be rated 20 minute. All single closets non rated doors.

Flush Bolts - (Or Equal Acceptable)
Ives FB458B US26D finish manual flush bolt (use top bolt only where security is not an issue) provide long top rod as required
Ives FB51T US32D finish top self latching flush (use at non fire rated wood or hollow metal doors to ensure locking at most applications) provide long top rod as required
Ives FB52T US32D finish top self latching flush (use at fire rated hollow metal doors) provide long top rod as required
Ives FB62T US32D finish top self latching flush (use at fire rated wood doors) provide long top rod as required

Closers – (**No Substitution)**
LCN 4041 series AL finish (DKB finish at Aluminum Storefront)
All closers to be parallel arm application, except regular arm application may be used at inswinging doors to non student areas such as Mech, Elect, Janitor, etc. Where wall stop cannot be used, use “Spring Cush” application. Use “EDA” or “Spring Cush” At exterior doors. At Aluminum Storefront provide drop plates, shoe supports, and spacers as required. Install all closers with “TBSRT” thru bolt application. None required on furnace closets.

Automatic Operators – (**No Substitution)**
LCN 4642 AL finish (DKB finish at Aluminum Storefront) with 8310 series hardwired actuators & bollards as required.

Door Pulls – (Or Equal Acceptable)
Rockwood BF158 W/ Type 1XHD (3/8” thru bolt) mounting US32D finish (US10B finish at Aluminum Storefront) use at entry doors w/ exit devices.
Integral Flush Pulls at FRP Doors (except Elementary & Early Childhood, use BF158)

Rockwood 111 x 70C US32D finish at other push/pull applications – restrooms etc. with 70E (Doors W/ no lite) or 70C (W/ lite) push plates.
Rockwood 94L US32D finish flush pull
Ives VR910NL & VR910DT US32D finish vandal resistant exit device trim (do not use on elementary or early childhood)

Kickplates – (Or Equal Acceptable)
Rockwood K1050 series US32D finish at wood or hollow metal doors, 2" less than door width X 10" high standard or 30" high at kitchen (provide 3" less than door width at doors with finger guards)

Overhead Stops – (Or Equal Acceptable)
Glynn Johnson 90 series W/ Friction Hold Open at doors where standard wall or floor stop cannot be used.

Door Stops – (Or Equal Acceptable)
Rockwood 406 US32D finish wall mount where possible
Rockwood 442 US26D finish floor mount if required
Rockwood 491S US26D finish floor stop & holder at classroom doors

Magnetic Holders - (Or Equal Acceptable)
Rixson 993 with optional release button (300 lb holding force) controlled by fire alarm system (by others) coordinate

Thresholds - (Or Equal Acceptable)
National Guard 425 saddle typical public access doors
National Guard 883S W/bumper Mech, Elec, etc.

Weather Seal - (Or Equal Acceptable)
Pemko S88D gasketing @ exterior & fire doors, and @ sound doors in addition to heavy surface seals
National Guard 200SA sweep @ doors with saddle threshold (use DKB finish at aluminum storefront), not required @ FRP doors
National Guard 5100S mullion seal @ removable mullions at exterior, fire, and sound doors (use 5100N at doors with bronze finish mullions)
National Guard – 16A overhead drip @ doors with no overhead protection (use DKB finish at aluminum storefront) provide 4" longer than door width

Finger Guards – No Substitution
National Guard 2248A (DKB at Aluminum Storefront) custom length full height at all doors on Early Childhood only

Gasketing -
Utilize screw-on mounting. Adhesive type installation shall not be acceptable. Pemko Manufacturing or Zero International.

2.02 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

A. Provide products that comply with the following:
   1. Applicable provisions of Federal, State, and local codes.
   2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
   3. Applicable provisions of NFPA 101, Life Safety Code.
   4. Fire-Rated Doors: NFPA 80.
   5. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
   6. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

B. Finishes: Identified in schedule.

2.03 KEYING

A. Door Locks: Grand master keyed.
   1. For remodel or limited expansion projects, key to existing keying system as directed by Program Manager or Owner.

B. Keying shall be done by manufacturer prior to shipping to job site.

C. ALL KEYS SHALL HAVE THE ROOM NUMBER and MASTER DESIGNATION STAMPED INTO THE KEY.

D. Provide temporary construction master keyed cores (CT6R) for all exterior doors and lock-up rooms as required.

E. Provide temporary cores (CT6D) for all other locks.

F. Provide twenty (20) construction keys.

G. Provide permanent 8000 Series cores.

H. Provide complete bitting schedule.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

A. All door hardware is to be installed by the Vendor.

B. Install wood blocking backup for all wall stops and electro-magnetic hold-opens.

C. All closers to be "through bolted" to the doors, whatever the closer element may be. If the arm attaches to the door, it is to be "through bolted." If the body of the closer attaches to the door, it is to be "through-bolted."

D. Install hardware in accordance with manufacturer's instructions and applicable codes.

E. Use templates provided by hardware item manufacturer.

F. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.

G. Mounting heights for hardware from finished floor to center line of hardware item: As listed in Schedule, unless otherwise noted:

3.03 FIELD QUALITY CONTROL

A. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that

hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified. Installer/AHC is to contact Tulsa Public Schools to be present during installation.

3.04 ADJUSTING

A. Adjust work under provisions of Section 017000.

B. Adjust hardware for smooth operation.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 087150

FINISH HARDWARE SCHEDULE

Keying Instructions

Key All Locks To The Existing Corbin Russwin Restricted Keyway System.
Provide Temporary Construction Master Keyed Cores For All Exterior Doors, And Lock-Up Rooms As Required.
Provide Disposable Plastic Temporary Cores For All Other Locks.
Provide Twenty (20) Construction Keys.
Keying shall be performed by manufacturer.

DOOR HARDWARE SETS ARE DIVIDED BY BUILDING, SOME SETS MAY BE DUPLICATES OF OTHER SETS FOR OTHER BUILDINGS

BUILDING A

SET #A1

Doors: A200

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Privacy Set	ML2030 LWA M19V	630	CR
1	Parallel Arm closer w/stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE

BUILDING B

SET #B1

Doors: B101, B105A

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Privacy Set	ML2030 LWA M19V	630	CR
1	Overhead Door Holder	450F Series	SP28	GL
3	Door Silencers (HM Frame)	SR64		IV

SET #B2

Doors: B104B

1	Continuous Hinge	CFM HD1 DH		PE
1	Exit Device	HD-QEL RX-2 99EO 299	313AN	VO
1	Power Transfer	EPT 10 Field Notch Cont. Hinge for Power Transfer	SP313	VO
1	Power Supply	PS904 900-4RL-FA		VO
1	Corner Pad	54 CP		NA
1	IC Rim Cylinder	3080-178-6 CT6R	613	CR
1	Mortise Cylinder	1080-114-A02-6-CT6R	613	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	613	CR
1	Offset Door Pull	BF158 TYPE 1XHD FASTENING	US10B	RO
1	Parallel Arm Closer w/Stop	4040 XP SCUSH 30 Shoe Support 4040-18PA 61 Stop Spacer TBSRT	DKBRZ	LC
1	1/4" Offset Threshold	653 36"	AL	NA
1	Gasketing	S88 D 17'		PE

OPERATION:

Card reader (by others) releases electric strike for authorized entry. Free egress is provided at all times by manual operation of exit devices.

SET #B3

Doors: B104C, B104D, B104E, B104F

Add TPS standard magnetic lock to existing doors. Tie into new access control system for these doors. Provide all required wiring harnesses, power transfers, etc. for a complete correctly functioning system.

SET #B4

Doors: B105B

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Lockset	ML2072 LWA CT6D M19N	630	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE

SET #B5

Doors: B208B

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Lockset	ML2052 LWA CT6D	630	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Wall Bumper	406	US32D	RO
3	Door Silencers (HM Frame)	SR64		IV

BUILDING C

SET #C1

Doors: C002, C003

1	Continuous Hinge	CFM 83 HD1		PE
1	Exit Device	99EO 299	US28	VO
1	IC Rim Cylinder	3080-178-6 CT6R	626	CR
1	IC Core	8000 MK RESTRICTED KEYWAY VKC1	626	CR
1	Vandal Resist. Exit Dev. Trim	VR910NL	US10	IV
1	HD Parallel Arm Closer	4040 XP EDA TBSRT	AL	LC
1	1/4" Offset Threshold	653 36"	AL	NA
1	Door Sweep	200 SA 36"		NA
1	Gasketing	S88 D 17'		PE
1	Drip Cap	346	AL(C)	PE

SET #C2

Doors: C100

1	Key Removable Mullion	KR4954	SP313	VO
2	Exit Device	99EO	313AN	VO
1	IC Rim Cylinder	3080-178-6 CT6R	613	CR
1	IC Mortise Cylinder	1080-114-6 CT6R	613	CR
2	IC Core	8000 39 RESTRICTED KEYWAY VKC1	613	CR
2	Vandal Resist. Exit Dev. Trim	VR910NL	US10	IV
2	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	DKBRZ	LC
1	1/4" Offset Threshold	653 36"	AL	NA
1	Gasketing	S88 D H&J		PE
1	Mullion Seal	5100N DH		NA

NOTE: Continuous Hinges & Sweeps By Door Supplier

SET #C3

Doors: C105A, C106A — 20 min

1	Key Removable Mullion	KR4954	SP313	VO
2	Exit Device	99EO-252L-F-2SI (Security Indicator)	626	VO
1	IC Rim Cylinder	3080-178-6 CT6R	613	CR
1	IC Mortise Cylinder	1080-114-6 CT6R	613	CR
2	IC Core	8000 39 RESTRICTED KEYWAY VKC1	613	CR

Hinges, Closer, Gasketing, Seals and Sound Control by Door Supplier

SET #C4

Doors: C105B — 90 min

1	Continuous Hinge	CFM HD1		PE
1	FEMA Fire Exit Device	WS 9927L-F x 996L-R&V 03 48"	US26D, US28	VO
		Note: FEMA Exit Devices must be installed on Steelcraft Paladin Doors & Frames		
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR01
1	IC Rim Cylinder	3080-178-6 CT6R	626	CR
1	HD Parallel Arm Closer	4040 XP REG/PA TBSRT	AL	LC
1	Protection Plate	K1050 10" x DW-2"	US32D	RO
1	Gasketing	S88 D H&J		PE
1	1/4" Offset Threshold	653 36"	AL	NA
1	Drip Cap	346	AL(C)	PE
1	Door Sweep	200 SA 36"		NA

SET #C5

Doors: C106B — 20 min

1	Exit Device	99EO-252L-F-2SI (Security Indicator)	626	VO
1	IC Rim Cylinder	3080-178-6 CT6R	613	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	613	CR

Hinges, Closer, Gasketing, Seals and Sound Control by Door Supplier

SET #C6

Doors: C107A, C107B

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Lockset	ML2052 LWA CT6D	630	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Wall Bumper	406	US32D	RO
3	Door Silencers (HM Frame)	SR64		IV

SET #C7

Doors: C108

1	Push Plate	70E 6x16	US32D	RO
1	Pull Plate	111 x 70C Type I Fastening	US32D	RO

Hinges, Closer, Gasketing, Seals and Sound Control by Door Supplier

SET #C8

Doors: C109A — 90 min

2	Continuous Hinge	CFM HD1		PE
2	FEMA Fire Exit Device	WS 9927L-F x 996L-R&V 03 48"	US26D, US28	VO
		Note: FEMA Exit Devices must be installed on Steelcraft Paladin Doors & Frames		
2	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR01
2	IC Rim Cylinder	3080-178-6 CT6R	626	CR
2	HD Parallel Arm Closer	4040 XP REG/PA TBSRT	AL	LC
2	Protection Plate	K1050 10" x DW-2"	US32D	RO
2	Mag Holder With Release Button	993	689	RX

1	Power Supply	PS902 900-FA		LO
2	Gasketing	S88 D H&J		PE
2	Brush Astragal	600 A DH		NA
1	Center Steel Astragal			NA

NOTE: Magnetic Holders are controlled by Fire Alarm System (by others)

SET #C9

Doors: C109B — 90 min

2	Continuous Hinge	CFM HD1		PE
2	FEMA Fire Exit Device	WS 9927L-F x 996L-R&V 03 48"	US26D, US28	VO
		Note: FEMA Exit Devices must be installed on Steelcraft Paladin Doors & Frames		
2	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR01
2	IC Rim Cylinder	3080-178-6 CT6R	626	CR
2	HD Parallel Arm Closer	4040 XP REG/PA TBSRT	AL	LC
2	Protection Plate	K1050 10" x DW-2"	US32D	RO
2	Gasketing	S88 D H&J		PE
2	Brush Astragal	600 A DH		NA
1	Center Steel Astragal			NA
1	1/4" Offset Threshold	653 72"	AL	NA
1	Gasketing	S88 D 20'		PE
		Sweep by Door Supplier		

SET #C10

Door: C110, C111 — 20 min.

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Latchset	ML2010	630	CR
1	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE

SET #C11

Doors: C112, C113 — 20 min

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Lockset	ML2052 LWA CT6D	630	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE

SET #C12

Doors: C114, C115 — 20 min

1	Latchset	ML2010	630	CR

Hinges, Closer, Gasketing, Seals and Sound Control by Door Supplier

BUILDING D

SET #D1

Door: D100A

1	Exit Device	HD-QEL RX-2 99EO 299	313AN	VO
1	Power Transfer	EPT 10	SP313	VO
		Field Notch Cont. Hinge for Power Transfer		
1	Power Supply	PS904 900-4RL-FA		VO
1	IC Rim Cylinder	3080-178-6 CT6R	613	CR
1	Mortise Cylinder	1080-114-A02-6-CT6R	613	CR

1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	613	CR
1	Offset Door Pull	BF158 TYPE 1XHD FASTENING	US10B	RO
1	Parallel Arm Closer w/Stop	4040 XP SCUSH 30 Shoe Support 4040-18PA 61 Stop Spacer TBSRT	DKBRZ	LC
1	1/4" Offset Threshold	653 36"	AL	NA
1	Gasketing	S88 D 17'		PE

NOTE: Continuous Hinge & Sweep By Door Supplier

OPERATION:

Card reader (by others) releases electric strike for authorized entry. Free egress is provided at all times by manual operation of exit devices.

SET #D2

Doors: D100B, D101A, D101B, D101C

1	Exit Device	HD-QEL RX-2 99EO 299	313AN	VO
1	IC Rim Cylinder	3080-178-6 CT6R	613	CR
1	Mortise Cylinder	1080-114-A02-6-CT6R	613	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	613	CR
1	Offset Door Pull	BF158 TYPE 1XHD FASTENING	US10B	RO
1	Parallel Arm Closer w/Stop	4040 XP SCUSH 30 Shoe Support 4040-18PA 61 Stop Spacer TBSRT	DKBRZ	LC
1	1/4" Offset Threshold	653 36"	AL	NA
1	Gasketing	S88 D 17'		PE

NOTE: Continuous Hinge & Sweep By Door Supplier

SET #D3

Doors: D103, D104

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Lockset	ML2072 LWA CT6D M19N	630	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE

SET #D4

Doors: D102 — 60 min

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Lockset	ML2052 LWA CT6D	630	CR
1	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE

SET #D5

Doors: D110, D112

3	Hinges	BB81 4 1/2 X 4 1/2	US26D	PB
1	Latchset	ML2010	630	CR
1	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC

SET #D6

Doors: D105B

Provide (1) Tulsa Schools pad lock

Remainder of Door Hardware by Overhead Door Supplier

SET #D7

Doors: D105A, D114

1	Continuous Hinge	CFM HD1 DH		PE
1	Lockset	ML2068 LWA CT6D M19N (SECURE INDICATOR DISPLAY AND THUMB TURN ON CLASSROOM SIDE)	630	CR

2	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
1	Protection Plate	K1050 10" x DW-2"	US32D	RO
1	Wall Bumper	406	US32D	RO
3	Door Silencers (HM Frame)	SR64		IV

SET #D8

Doors: D108, DD108B, D109A, D109B, D109C, D109D

1	Exit Device	99EO-252L	626	VO

Remainder of Door Hardware by Green House Manufacturer

SET #D9

Doors: D106 — 60 min

1	Key Removable Mullion	KR4954	SP313	VO
2	Continuous Hinge	CFM HD1 DH		PE
2	Lockset	ML2052 LWA CT6D	630	CR
2	IC Core	8000 39 RESTRICTED KEYWAY VKC1	626	CR
2	Parallel Arm Closer W/ Stop	4040 XP SCUSH TBSRT	AL	LC
1	Gasketing	S88 D H&J		PE
1	Mullion Seal	5100N DH		NA

Manufacturer List

Code	Name
AC	Accurate Lock
CR	Corbin Russwin (No Substitution)
GL	Glynn Johnson
IV	Ives
LC	LCN Closers (No Substitution)
LO	Schlage Electronics (No Substitution)
NA	National Guard
PB	PBB, INC
PE	Pemko
RO	Rockwood
RX	Rixson
ST	Stanley
VO	Von Duprin (No Substitution)

END OF SECTION

SECTION 088000

GLASS & GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance glass

1.02 RELATED SECTIONS

A. Section 081113 – Hollow Metal Doors and Frames

B. Section 081416 – Flush Wood Doors

C. Section 081613 – FRP Flush Doors

D. Section 084000 – Aluminum Entrances and Storefronts

1.03 REFERENCES

A. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

B. ASCE 7 - "Minimum Design Loads for Buildings and Other Structures".

C. ASTM International (ASTM):
1. ASTM C 162 - Standard Terminology of Glass and Glass Products.
2. ASTM C 1036 - Standard Specification for Flat Glass.
3. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
4. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
5. ASTM E 2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
6. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

1.04 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in inches.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or other specified gas.

D. Sealed Insulating Glass Unit Surface Designations:
1. Surface 1 - Exterior surface of the outer glass lite.
2. Surface 2 - Interspace surface of the outer glass lite.
3. Surface 3 - Interspace surface of the inner glass lite.
4. Surface 4 - Interior surface of the inner glass lite.

1.05 PERFORMANCE REQUIREMENTS

A. General: Provide glass capable of withstanding thermal movement and wind and

impact loads (where applicable) as specified in paragraph B following.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      a. Design Wind Loads: Determine design wind loads applicable to the Project according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.
         1) Design loads shall be in accordance with IBC, 2015 edition.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
   1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
   2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
      a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. per h per degree F.
      b. Solar Heat Gain Coefficient: NFRC 200.
      c. Solar Optical Properties: NFRC 300.

1.06 SUBMITTALS

A. Submit under provisions of Section 013000.

B. Product Data: For each glass product and glazing material indicated.

C. Verification Samples: For the following products, in the form of 12 inch (305 mm) square samples for insulating glass units.

D. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

E. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

F. Qualification Data: For installers.

G. Product Test Reports: For each type of glazing.

H. Warranties: Special warranties specified in this Section.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has

resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Source Limitations for Glass: Obtain the following through one source from a single manufacturer for each glass type: clear float glass, coated float glass and insulating glass.

C. Glass Product Testing: Obtain glass test results for product test reports in "Submittals" Article from a qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and industry organizations, including but not limited to those below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
   1. Insulating Glass Certification Council.
   2. Associated Laboratories, Inc.

F. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
   1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
   2. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.
   3. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf. or less in area, provide glazing products that comply with Category I or II materials.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.09 WARRANTY

A. Manufacturer's Warranty for Coated-Glass Products: Manufacturer's standard form, made out to the glass fabricator in which the coated glass manufacturer agrees to replace coated glass units that deteriorates during normal use within the specified warranty period. Deterioration of the coated glass is defined as peeling and/or cracking, or discoloration that is not attributed to glass breakage, seal failure,

improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.
1. Warranty Period: Ten years from date of Substantial Completion.

B. Manufacturer's Warranty on Insulating Glass: Manufacturer's standard form in which the insulating glass unit manufacturer agrees to replace insulating-glass units that deteriorate during normal use within the specified warranty period. Deterioration of insulating glass units is defined as an obstruction of vision by dust, moisture, or a film on the interior surfaces of the glass caused by a failure of the hermetic seal that is not attributed to glass breakage, improper installation, or cleaning and maintenance that is contrary to the manufacturer's written instructions.
1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer:

PPG Industries, Inc., Glass Group
Glass Business and Discovery Center 400 Guys Run Rd.
Pittsburgh, PA 15024
Tel: 800-377-5267
www.ppgideascapes.com

B. Other manufacturers meeting or exceeding these specifications.

2.02 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated or required.

C. Pyrolitic-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide coating applied by pyrolitic deposition process during initial manufacture, and complying with other requirements specified.

D. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated or required.
3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
4. Sealing System: Dual seal, with primary and secondary sealants of polyisobutylene and silicone.
5. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
    a. Spacer Material: Aluminum with finish to match window system framing color.
    b. Desiccant: Molecular sieve or silica gel, or blend of both.
    c. Corner Construction: Manufacturer's standard corner construction.

2.03 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.04 GLASS MATERIALS

A. Glass materials shall be as scheduled on drawings.

B. Basis-of-Design cut-sheets are included at the end of this Section

PART 3 EXECUTION

3.01 INSTALLATION

A. Install units in accordance with approved Shop Drawings, plumb, level, square and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding surfaces.

B. Provide glazing compounds and accessories as required.

C. Contractor's beginning of work shall signify acceptance of substrate. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PROTECTION AND CLEANING

A. Mark panes with removable tape after installation.

B. Prior to final acceptance, clean as recommended by manufacturer. Do not use materials or methods which may damage finish or surrounding construction.

END OF SECTION