KILLEEN ISD

FACILITY DESIGN AND CONSTRUCTION STANDARDS

VERSION 1.3 OCTOBER 11, 2018

LAST REVISED 06/07/2021

200 North W.S. Young Drive
Killeen, Texas 76540-0967
Phone 254.336.0074 • Fax 254.519.5601

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Preface

This purpose of the Facilities Design and Construction Standards (FDCS) is to establish and sustain consistent representation of requirements and standards for all members of the KISD Administration, Faculty, Design Team, Architects, Engineers, and Contractors. It presents design guidelines and criteria for the planning, design and technical development for repurposing, renovating, or constructing new schools. The FDCS includes references to the Texas Education Code, Texas Administrative Code and Texas Education Agency.

00 10 00 - Introduction

The purpose of this section is to communicate KISD's Design and Construction Standards to the consultants who design facilities for the district.

If any standard differs from the consultants' professional opinion or experience as to the proper materials, components, or equipment for the project under contract by the consultant, the consultant is requested to communicate that concern through the KISD Project Manager in writing at the earliest possible phase of the project for review. Nevertheless, no provision herein shall alter the contractual or fiduciary responsibility of the consultant or of Killeen Independent School District, as executed in the Owner-Consultant Agreement. Neither shall the absence of a particular instruction or detail relieve the consultant of the responsibility to deliver a comprehensive professional service or final product in accordance with the most current Building Codes.

KISD encourages innovative quality design of the architectural and engineering components of the work, but the following standards listed *are not* optional. The A/E may propose other materials and systems for KISD consideration and written approval.

KISD encourages and supports sustainable architectural design. Minimal maintenance requirements, long life cycle, and flexible designs are paramount to the design of buildings that will last for the next 50 years. During the pre-design and design stages, discuss with the district possible options for meeting U.S. Green Building Council's "LEED" criteria in every facet, and address recycling of waste materials and use of recycled and regionally manufactured products.

00 20 00 – Purpose and Principals

A. PURPOSE

1. The Killeen Independent School District is committed to creating high-quality educational environments – places that provide well-planned, high-performing, healthy school environments that foster student achievement and well-being, as well as being centers of community.
2. The **"Facilities Design and Construction Standards"** establishes and ensures consistent representation of requirements and quality standards for those environments to all members of the Design Teams for KISD facilities. It is based on the current curricula, teaching methodologies, student groupings, structural functionality, intended use requirements, and site constraints of the District.
3. Architects and engineers shall follow the requirements and standards presented here for the planning and design of renovations, modernization, reconstruction, and new school construction. The intent of the FDCS is to serve as a foundation for all phases from concept to occupation. If a design professional feels that varying from specific requirements, while still meeting the intended design requirement, is desirable for a specific project, it may be possible to incorporate the variations into the design with written approval from KISD.
4. The FDCS incorporates and complements the policies, requirements, and standards of other KISD documents that direct the design of school facilities. Visit the Board Policy Standards webpage for the most current versions of existing standards, as well as the update bulletins.

B. ORGANIZATION OF DESIGN REQUIREMENTS

1. The content of the *"Facilities Design and Construction Standards Manual"* is divided into four Parts:
   a. *Part 1* – general items, purpose and principles
   b. *Part 2* – functional and relational planning and design criteria; including general environmental and sustainability issues; and
   c. *Part 3* – detailed information on material choices, system design criteria, requirements, by Specifications Divisions on each major technical discipline.

C. The Code that governs the educational specifications, capacity, size, and number of functional spaces of each school project is the Texas Administrative Code, Title 10, Part 2 (Texas Education Agency), Chapter 61 (School Districts), Subchapter CC (Commissioner's Rules Concerning School Facilities):

TEA School Facilities Standards

Reference: Title 19 -Education Part II -Texas Education Agency, Chapter 61-School Districts SubChapter CC. -Commissioner's Rules, 61.1036 -School Facilities Standards for Construction on or after January 1, 2004
As of May 24, 2013

		ELEMENTARY SCHOOL (Grades Pre-K through 5th or 6th)				MIDDLE SCHOOL (Grades 6th through 8th or 9th)				HIGH SCHOOL (Grades 9th through 12th)			
ROOM TYPE	**TEA Reference**	**MIN. SQ. FOOT PER PUPIL**	**NO. OF STUDENTS PER CLASS**	**MIN. NET SQ. FOOTAGE**	**Special Notes:**	**MIN. SQ. FOOT PER PUPIL**	**NO. OF STUDENTS PER CLASS**	**MIN. NET SQ. FOOTAGE**	**Special Notes:**	**MIN. SQ. FOOT PER PUPIL**	**NO. OF STUDENTS PER CLASS**	**MIN. NET SQ. FOOTAGE**	**Special Notes:**
Classrooms	[ref: (d)(5)(B)]	32	22	700	See Notes 1 & 5 Below	28	25	700		28	25	700	
Computer Labs (See Note 6 below.)	(d)(5)(C)(i,ii)	36	25	900	If class > 25 students, add 36 sq. ft. for each addtl. comp. station	36	25	900	If class > 25 students, add 36 sq. ft. for each addtl. comp. station	36	25	900	If class > 25 students, add 36 sq.ft. for each addtl. comp. station
Combination Science Laboratory/Classrooms (Ref Note 7 for Hazards)	(d)(5)(C)(iii)	41 SF; if small class size, 700 SF min.	22	900	If class > 22 students, add 41 sq. ft. for each addtl. student.	50 SF; if small class size, 950 SF min.	24	1,200	If class > 24 students, add 50 sq. ft. for each addtl. student.	58 SF; if small class size, 1100 SF min.	24	1,400	If class > 24 students, add 58 sq.ft. for each addtl. student.
Science Laboratory (Ref Note 7 for Hazards)	(d)(5)(C)(iv)	36 SF; if small class size, 600 SF min.	22	800	If class > 22 students, add 36 sq. ft. for each addtl. student.	38 SF; if small class size, 700 SF min.	24	900	If class > 24 students, add 38 sq. ft. for each addtl. student.	42 SF; if small class size, 800 SF min.	24	1,000	If class > 24 students, add 42 sq.ft. for each addtl. student.
Science Classrooms (Ref Note 7 for Hazards)	(d)(5)(C)(iv)	32		700	See Note 4 Below	32		700	See Note 4 Below	32		700	See Note Below
Special Education (Speech, Content Mastery, Self-Contained, etc.)	(d)(5)(C)(vii)	40		400		40		400		40		400	
Gymnasium (Primary Space)	(d)(5)(D)(i)			3,000				4,800				7,500	
Library (Requirements includes all support spaces.)	(d)(5)(D)(ii)				See Table A" Below "				See Table A" Below "				See Table A" Below "
Large Group Lecture Space	(d)(6)(B)				See Note 3 Below				See Note 3 Below				See Note 3 Below
Small Group , Conference or Office Space	(d)(6)(B)			150				150				150	
Cafetorium		15 SF per student				15 SF per student				15 SF per student			

NOTES:

1 - Classrooms for Pre-Kindergarten-Grade 1 shall have min. of 800 SF per room; small classes shall have a min. of 36 SF per pupil.

2 - Table "A"

School Capacity	Required Library Area
</= 100 students	1,400 SF
101 to 500 students	1,400 SF + 4 SF for every student over 100
501 to 2,000 students	3,000 SF + 3 SF for every student over 500
>/= 2001 students	7,500 SF + 2 SF for every student over 2,000

Space Type/Usage In Libraries: 30% for reading/instructional area & reference/independent study 45% for stack area, circulation desk/area & computer /on-line reference area 25% for necessary ancillary spaces

3 - If space does not utilize tables or desks for the students, provide 15 SF per pupil. If space utilizes tables or desk see general classroom requirements.

4 - Science classrooms shall be provided at a ratio not to exceed 2:1 of science classrooms to science laboratories at M.S. and H.S.

5 - Texas law requires that for grades Pre-Kindergarten through 4th, max capacity shall not exceed 22 students per classroom.

6 - If computer labs support other instructional area, provide 25 SF per computer station or 20 SF per portable computer station.

7 - If hazardous or vaporous chemicals are used in science spaces a separate secure-from-students chemical storage room shall be provided. May be accesed through the prep room. Ref [(d)(5)(C) (v)]

00 21 00 – KISD Project Manual Front End Documents

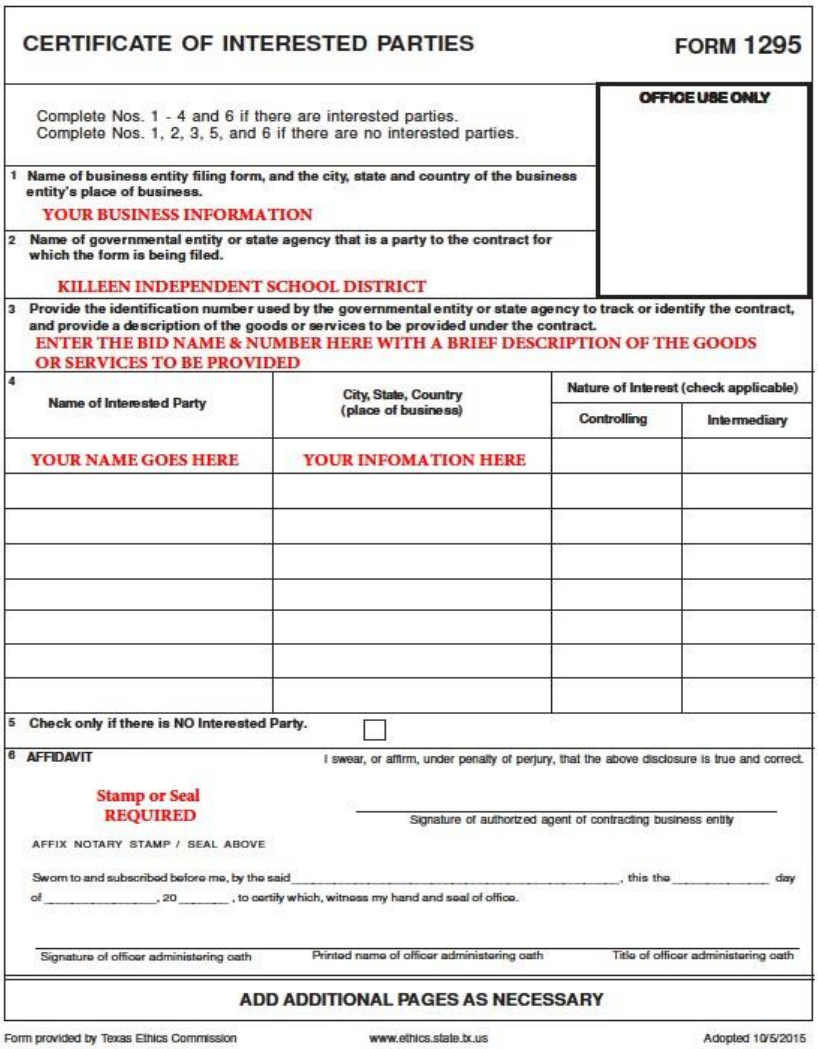
HOUSE BILL 1295 CERTIFICATE OF INTERESTED PARTIES

House Bill 1295 Certificate of Interested Parties is a new requirement that requires the business entity to visit the Texas Ethics Commission's Website. You must visit the link below to create an account and enter the following information. Once completed submit a signed notarized certificate to the Government Entity (School District)

Please visit this link to the Texas Ethics Commission Website:
https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

On Section 2 of the HB 1295 form the Government Entity is: Killeen Independent School District On

Section 3 of the HB 1295 form please annotate: The RFP number associated with proposal.



CERTIFICATE OF INTERESTED PARTIES — **FORM 1295**

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 **Name of business entity filing form, and the city, state and country of the business entity's place of business.**
YOUR BUSINESS INFORMATION

2 **Name of governmental entity or state agency that is a party to the contract for which the form is being filed.**
KILLEEN INDEPENDENT SCHOOL DISTRICT

3 **Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the goods or services to be provided under the contract.**
ENTER THE BID NAME & NUMBER HERE WITH A BRIEF DESCRIPTION OF THE GOODS OR SERVICES TO BE PROVIDED

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary
YOUR NAME GOES HERE	YOUR INFOMATION HERE		

5 **Check only if there is NO Interested Party.** ☐

6 **AFFIDAVIT** — I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

Stamp or Seal REQUIRED

_____
Signature of authorized agent of contracting business entity

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said _____, this the _____ day of _____, 20 _____, to certify which, witness my hand and seal of office.

_____ _____ _____
Signature of officer administering oath | Printed name of officer administering oath | Title of officer administering oath

ADD ADDITIONAL PAGES AS NECESSARY

Form provided by Texas Ethics Commission | www.ethics.state.tx.us | Adopted 10/5/2015

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY
Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____
Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____
Signature of vendor doing business with the governmental entity Date

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 11/30/2015

FELONY CONVICTION NOTIFICATION

State of Texas Legislative Senate Bill No. 1, Section 44.034, Notification of Criminal History, Subsection (a), states "a person or business entity that enters into a contract with a school district must give advance notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony".

Subsection (b) states "a school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract."

THIS NOTICE IS NOT REQUIRED OF A PUBLICLY-HELD CORPORATION

I, the undersigned agent for the firm named below, certify that the information concerning notification of felony convictions has been reviewed by me and the following information furnished is true to the best of my knowledge.

VENDOR'S NAME_____

AUTHORIZED COMPANY OFFICIAL'S NAME (PRINTED):_____

A. **My firm is a publicly-held corporation, therefore, this reporting requirement is not applicable.**

Signature of Company Official:_____

B. **My firm is not owned nor operated by anyone who has been convicted of a felony.**

Signature of Company Official:_____

C. **My firm is owned or operated by the following individual(s) who has/have been convicted of a felony: Name of Felon(s):**_____

Details of Convictions(s):_____

_____

_____

_____

_____

_____

_____

_____

Signature of Company Official:_____

INSURANCE REQUIREMENTS

The successful bidder, or proposer, shall, at his/her own expense provide and maintain insurance in a company rated no less than "A" by A.M. Best and Company, and in a company licensed to sell insurance as an "admitted carrier" in the State of Texas**.** Said insurance shall be evidenced by a Certificate of Insurance, delivered to the District, indicating the limits of coverage, and naming the Killeen Independent School District as an additional named insured on all policies. The District reserves the right to require higher limit is of coverage depending on the size, scope, and nature of a contract.

TYPES OF INSURANCE COVERAGE	LIMITS OF LIABILITY
Worker's Compensation	Statutory
Employer's Liability - B.I. by accident B.I. by disease B.I. by disease	$500,000/accident $500,000/person $500,000/aggregate
General Liability	$2,000,000/ aggregate $2,000,000/products/comp.op $1,000,000/personal injury/adv. lia. $1,000,000/per occurrence $100,000/fire damage $10,000/medical expense
Automobile Liability Bodily Injury Property Damage OR Combined Single Limit Hired & Non-Owned Auto	 $ 1,000,000/per person $ 1,000,000/per accident $ 1,000,000/per accident $ 750,000/per accident Same limit as owned autos

Additional Contractual Requirements:

- Contractual Liability
- Blanket waiver of subrogation – all policies
- Umbrella Policy - $5,000,000

Deletion of explosion, collapse, and underground exclusion.

Successful bidder must furnish a copy of insurance acceptable to KISD before starting work and these Certificates shall contain a provision that coverage afforded under the policies will not be canceled until at least thirty (30) days prior written notice has been given to Killeen ISD and to bidder. Certificates shall also indicate any exclusions or policy limitations, other than standard exclusions, which may substantially affect the terms and conditions of this contract. Killeen Independent School District shall be named as an additional named insured on all policies other than worker's compensation. Insurance must remain in effect for the duration of this contract. Said certificate shall be delivered within 14 days of the date of the award notification if not included with bid.

Contractor Criminal Background SB9 Certification

Introduction: Texas Education Code Chapter 22 requires service contractors to obtain criminal history records on covered employees. Covered employees with disqualifying convictions are prohibited from serving at a school district. Contractors must certify to the district that they have complied and must obtain similar certifications from their subcontractors. For more information or to set up an account, a contractor should contact the Texas Department of Public Safety's Crime Records Service at 512-424-2474. The district has no input to, or control of the DPS process.

Definitions: *Covered Employee*: Employees of a contractor who have or will have *continuing duties* related to the service to be performed at the District, and have or will have *direct contact* with students. The District will be the final arbiter of what constitutes continuing duties or direct contact with students.

Disqualifying criminal history: (1) a conviction or other criminal history information designated by the District; or (2) one of the following offenses, if at the time of the offense, the victim was under 18 or enrolled in a public school: (a) a felony offense under Title 5, Texas Penalty Code; (b) an offense for which the defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; (c) an equivalent offense under federal law or the laws of another state.

On behalf of_____("Contractor"), I, the undersigned authorized signatory for Contractor certify to Killeen ISD ("District") that [Check one]:

[ ] None of Contractor's employees are *covered employees,* as defined above. I further certify that Contractor has taken precautions or imposed conditions to ensure that its employees will not become *covered employees*. Contractor will maintain these precautions or conditions throughout the time the contracted services are provided.

Or

[ ] Some or all of Contractor's employees are *covered employees. If this box is selected*, I further certify that:

(1) Contractor has obtained all required criminal history record information, through the Texas Department of Public Safety, regarding its covered employees. None of the covered employees has a disqualifying criminal history.

(2) If Contractor receives information that a covered employee subsequently has a reported criminal history, Contractor will immediately remove the covered employee from contract duties and notify the District in writing within three (3) business days.

(3) Upon request, Contractor will provide the District with the name and any other requested information of covered employees so that the District may obtain criminal history record information on the covered employees.

If the District objects to the assignment of a covered employee on the basis of the covered employee's criminal history record information, Contractor agrees to discontinue using that covered employee to provide services at the District.

I also certify to the District on behalf of Contractor that Contractor has obtained certifications from its subcontractors of compliance with Education Code, Chapter 22.

Noncompliance or misrepresentation regarding this certification may be grounds for contract termination.

Submitter's Signature:_____Date: _____

Submitter's Name & Title:_____Company Name: _____

Telephone # ( )_____800-_____Fax No. _____

Email Address: _____

Mailing Address: _____

City, State, & Zip: _____

This form is required to be completed and signed; however, only the successful Proposers will be required to comply with requirement set forth in Act of May 28, 2007, 80th Leg., R.S., S.B. 9, § 30. All related costs including background checks/fingerprinting shall be at the contractor's expense.

This sheet must be completed, signed, and returned with Prime Contractor's submittal

Killeen
Independent School District

To Whom It May Concern:

We request that both the attached W-9 form and the information at the bottom of this page be completed before we issue a check to you. The information provided by you will be used to determine if we are required to file an information return to the Internal Revenue Service at year end.

We are not required to file an annual information return, Form 1099 Misc., for you if you are a non-medical corporation, a tax-exempt organization, a governmental agency or other exempt payee (including payments made as refunds or reimbursements). However, the law requires that you provide your Taxpayer Identification Number (TIN) in addition to telling us what kind of payee you are. If you do business as an individual or sole proprietor, your social security number serves as your TIN number.

You are required to provide this information under Federal Regulation Section 6109. If you fail to furnish this information, a $50.00 penalty may be imposed by the IRS under section 6723; in addition, all payments we make to you could be subject to 31% backup withholding.

Thank you for your prompt attention to this request. Please contact Purchasing Services at 254-336-0104, if you have any questions.

Sincerely,

George E. Ybarra

George E. Ybarra

Director for Purchasing Services

Please complete the following information in addition to the attached W-9 Form.

Name:_____ **Signature:**_____

Phone number:_____ **Fax Number:**_____

Do you supply primarily services or materials? (Please circle one)

PRIMARILY SERVICES **PRIMARILY MATERIALS** **NEITHER SERVICES OR MATERIALS**

If you are not a vendor, are you a (circle one, if applicable)

KISD EMPLOYEE **KISD SUBSTITUTE** **RECEIVING A REFUND OR REIMBURSEMENT**

Are you an IRS recognized non-profit organization? (please circle on) **YES** **NO**

Please return both forms to:

Killeen Independent School District
Purchasing Services
2301 Atkinson Ave
PO Box 967
Killeen, Tx 76540-0967
Fax: (254) 336-0111

Form **W-9**
(Rev. December 2014)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See **Specific Instructions** on page 2.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification; check only **one** of the following seven boxes:
☐ Individual/sole proprietor or single-member LLC ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate
☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶
Note. For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner.
☐ Other (see instructions) ▶

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):
Exempt payee code (if any)
Exemption from FATCA reporting code (if any)
(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

6 City, state, and ZIP code

7 List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

Social security number
___ – ___ – ____

or

Employer identification number
__ – _____

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

Sign Here | **Signature of U.S. person ▶** | **Date ▶**

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at *www.irs.gov/fw9*.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See *What is backup withholding?* on page 2.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

Cat. No. 10231X — Form **W-9** (Rev. 12-2014)

Note. If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note. ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

Limited Liability Company (LLC). If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)

2—The United States or any of its agencies or instrumentalities

3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

4—A foreign government or any of its political subdivisions, agencies, or instrumentalities

5—A corporation

6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession

7—A futures commission merchant registered with the Commodity Futures Trading Commission

8—A real estate investment trust

9—An entity registered at all times during the tax year under the Investment Company Act of 1940

10—A common trust fund operated by a bank under section 584(a)

11—A financial institution

12—A middleman known in the investment community as a nominee or custodian

13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 5[2]
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note. You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting IRS.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account[1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor[2]
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee[1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner[1]
5. Sole proprietorship or disregarded entity owned by an individual	The owner[3]
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	**Give name and EIN of:**
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity[4]
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

*Note. Grantor also must provide a Form W-9 to trustee of trust.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.ftc.gov/idtheft* or 1-877-IDTHEFT (1-877-438-4338).

Visit IRS.gov to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

00 30 00 – Design Principals

A. **Learning Environment:** The integrated design of district educational facilities will provide instructional spaces that best facilitate student-teacher interaction in the educational process. As methods of instruction change or become increasingly interactive and collaborative so, too, must the space in which the learning is to take place.

B. **Architectural Quality:** The central Texas region is rich in history, fauna, and its geological formations. Bringing these qualities and elements into the site plan and design of the facility will tie the appearance and character of each school to our surrounding culture. The structural aesthetics should be pleasing and stimulating to students, teachers, parents, and the surrounding community while providing a welcoming and attractive place to visit or to spend the day. In the planning and design for the reconstruction or renovation of existing facilities and grounds, the new materials and design of the structures will be architecturally compatible with the existing buildings and site.

C. **Innovation in the Learning Environment:** The core functionality of the KISD educational space focuses entirely on student learning through user-centered planning and design for all schools. Input from the faculty, administration, and local community are integral parts in the design process and center around collaborative learning spaces; ease of accessibility; integration of faculty and students into the day-to-day learning; and flexible environments to support a range of learning activities. Enabling criteria include, but are not limited to cheerful and imaginative spaces that are open and inviting to occupants; variety in materials, colors, and structure that excites the senses; inclusion of small learning communities; select site placement; and quality and enduring building materials.

D. **Flexibility:** The design of schools and facilities must anticipate future growth across the district. Planning efficient multi-use spaces (studios/activity-based learning vs. classrooms/lecture-based learning), structural/mechanical/electrical/plumbing/safety/security "tie-ins" for additional buildings, and creating small learning communities and options for unforeseen changes are imperative for future design considerations – built in flexibility.

E. **Accessibility:** District facilities must accommodate all students, staff and community members including the physically disabled and wheelchair-bound, deaf, visually or emotionally impaired – inclusive rather than exclusive in design. Design shall allow for construction and material tolerances to accommodate dimensional requirements set by ADA and other codes.

F. **Safety and Security:** Schools must be safe and secure without appearing prison-like. Structures, fences and site amenities shall be designed to maintain safety, prevent unauthorized access and deter vandalism. Opportunities to climb to gain access to other floors, roofs, etc. shall be eliminated.

G. **Community Focus:** The school, as the center of the neighborhood, must be accessible on evenings and weekends for joint use of facilities by the community and provision for securing the rest of the site shall be implemented.

H. **Sustainability:** The District must assertively address the design, renovation, and construction of existing and facilities for their long-term requirements and environmental impacts, recycling, water conservation and energy efficiencies. The efficiency of every facility should improve upon the previous design and make every effort to highlight to the students and community that the District will do what is taught in being stewards of our future resources.

I. **Maintainability:** From the concept design through the construction phases for every facility, the District will strive to continually integrate material solutions that will minimize future maintenance requirements. As a reference, over a 30-year period, the initial building costs account for approximately 2% of the total, while operations and maintenance costs equal 6%, and personnel costs equal 92%. Selecting materials that enable maintenance savings can be

reinvested in educational initiatives or facility improvements.

00 40 00 - Design Team Requirements:

A. The Executive Director for Facilities Services will appoint a design team to assemble and participate in the design charrette for the project. The team will ideally have the following members:
   1. Campus representatives (Principal or designee, plus one representative from each major department: math, social studies, P.E., science, fine arts and special programs as required)
   2. District Representatives may include:
      a. Educational Leadership
      b. Maintenance Technicians
      c. Facilities Planning and Construction
      d. Information Technology
      e. Fine Arts
      f. Environmental and Energy Management
      g. Food Services and Nutrition
      h. School Safety
      i. Transportation
      j. Athletics
      k. Custodial
      l. Grounds

B. Design Team Tasks and Responsibilities: The owner's representative and Architect for this project shall be the team co-leaders for the design of the project. The team shall meet regularly to review the program and designs of the new facility. This should occur at intervals that reflect the owner and Architect's planned review with the administration and board. A clear and concise schedule for the design of the school shall be established. The schedule shall include review of preliminary, design/development, and construction document reviews shall be scheduled and executed with the committee. The A/E consultant shall conduct a review of the written program with the committee to establish a clear understanding of the proposed facilities. As the work progresses the architect shall conduct the following:

C. Preliminary plan work session with schematic plan review(s). These reviews shall provide the committee an opportunity for input into the planning process within the framework of the program. A discussion of the general style and character of the school shall occur. A cursory review of the site information shall be done with the committee. The commissioning agent shall provide input to the architect and engineers to assure building systems are appropriate and inclusive. The site analysis shall be discussed and the A/E's rationale for the siting of the building(s) shall be discussed. Final preliminary plan shall be reviewed with the committee prior to board review.

D. Design Development review. As the floor plans, elevations and building sections are executed by the architect, appropriate reviews shall be conducted with the committee. These reviews shall be informative and help committee members understand the spaces within the structure, the vocabulary of materials and the building systems to be included in the project. Cost estimates shall also be reviewed and understood by the committee. Final design development drawings shall be reviewed with the committee prior to board review.

E. Final Contract Documents shall include a series of reviews that include mechanical, electrical, structural, plumbing, communications, and other technical area reviews to assure compliance with the district guidelines and standards. At least one of these reviews will afford the opportunity for the design committee to examine the plans and specifications as they are

completed and before the board reviews them.

F. The design committee is to provide input into the design but as the plans progress the role of the committee becomes more to review and not design the building. This is the job of the architect.

00 50 00 – Life Cycle Schedule

It is critical to include the Total Cost of Ownership (TCO) when specifying materials, systems, and equipment for educational facilities. Materials and systems installed in facilities typically do not have the same 50-year designed life cycle as the structures in which they are placed. The schedule below codifies the industry average life cycles for materials and systems typically found in educational and administrative facilities.

KISD Facility Component Useful Life Cycles (years)*

** Reference: https://www.fanniemae.com/content/guide_form/4099f.pdf; March 26, 2015*

ROOF SYSTEMS	
Asphalt shingle (3-tab)	20
Built-up roof - Ethylene Propylene Diene Monomer (EPDM) / Thermoplastic Polyolefin (TPO)	20
Metal	40
Parapet wall	50+
Caps, copings (aluminum/ terra-cotta) - Parapet	25
Roof drainage exterior (gutter/ downspout)	10
Roof drainage interior (drain covers)	30
Roof railing	25
Roof structure	50+
Roof hatch	30
Roof skylight	30
Slab	50+
Slate, clay, concrete tile	40
Soffits (wood/ stucco)	20
Soffits (aluminum or vinyl)	25
Wood shingles (cedar shake)	25
DOORS AND WINDOWS	
Exterior common door, aluminum and glass	30
Exterior common door, solid core wood or metal clad	25
Exterior unit door, solid wood/ metal clad	20
Residential Sliding Glass Doors	20
Residential French Glass Doors	20
Ceilings, open or exterior	30
Service door (roof)	20
Storm/ screen doors	5
Storm/ screen windows	7
Windows (frames and glazing), vinyl or aluminum	30

FIRE SAFETY AND FIRE PROTECTION SYSTEMS	
Call station	10
Emergency Generator	25
Emergency Lights	5
Fire Extinguisher	5
Fire Pumps	20
Fire Suppression	50+
Smoke and Fire Detection System, central panel	15
INTERIOR / COMMON AREA FINISHES	
Common area doors, interior (solid wood/ metal clad)	20
Common area floors, ceramic / quarry tile, terrazzo	50+
Common area floors, wood (strip or parquet)	30
Common area floors, resilient tile or sheet	15
Common area floors, carpet	5
Common area floors, concrete	50+
Common area railing	20
Common area ceiling, concrete	50+
Common area ceiling, acoustic tile (drop ceiling), drywall / plaster	10
Common area countertop and sink	20
Common area, refrigerator	10
Common area dishwasher	10
Common area disposal	3
Common area kitchen cabinets, wood	10
Common area walls	10
Interior railings	15
Interior lighting	10
Public bathroom accessories	5
Public bathroom fixtures	10

KISD Facility Component Useful Life Cycles (years)*

* Reference: https://www.fanniemae.com/content/guide_form/4099f.pdf; March 26, 2015

FLATWORK, PARKING AREAS AND WALKWAYS	
Asphalt pavement	25
Asphalt seal coat	5
Concrete pavement	50
Curbing, asphalt	25
Curbing, concrete	50
Parking, stall striping	5
Parking, gravel surfaced	15
Security gate (site ingress/egress) - rolling gate / lift arm	10
Sidewalk, asphalt	25
Sidewalk, brick paver	30
Sidewalk, concrete	50
SITE LIGHTING	
Building mounted exterior lighting	10
Building mounted High Intensity Discharge (HID) lighting	10
Lighting (pole mounted)	25
SITE FENCING AND RETAINING WALLS	
Bulkhead (barrier) / partition wall /embankment	10
Fencing, chain-link (4' height)	40
Fencing, concrete masonry unit (CMU)	30
Fencing, dumpster enclosure (wood)	10
Fencing, PVC (6' height)	25
Fencing, Tennis Court (10' height)-Chain link	40
Fencing, wood privacy (6' height)	10
Fencing, wrought iron (4-6' height and decorative)	50
Retaining walls, 80 lb block type	50
Retaining walls, concrete masonry unit (CMU) with brick face	40
Retaining walls, timber (railroad tie)	25
BUILDING STRUCTURES	
Carports	40
Canopy, concrete	50
Canopy, wood / metal	40
Garages	50
Storage Sheds	30
Penthouse (mechanical room)	50
FOUNDATIONS	
Foundations	50+
Waterproofing (foundations)	50+
FRAMING	
Brick or block	40
Precast concrete panel (tilt-up)	40
Wood floor frame	50+
BUILDING ENVELOPE / CLADDING / EXTERIOR WALL FINISHES	
Aluminum Siding	40
Brownstone	40
Brick or Stone Veneer	50+
Cement-board siding (Hardi-plank)/ Cementitious (mfgr) siding	45
Exterior Insulation Finishing Systems (EIFS)	20
Glass block	40
Granite block	40
Insulation, wall	50+
Metal/ glass curtain wall	30
Painting, Exterior	5-8
Pre-cast concrete panel	45
Stucco systems	50+
Vinyl siding	25
Wood shingle/ clapboard/ plywood, stucco, composite wood	20

BUILDING HEATING WATER TEMPERATURE CONTROLS	
Chilled Water Distribution	50+
Chilling Plant	15
Cooling Tower	25
Fuel Oil Storage	25
Fuel Transfer System	25
Gas Distribution	50+
Heat Sensors	15
Heat Exchanger	35
Heating Risers and Distribution	50+
VENTILATION SYSTEMS	
Combustion Air, Duct with fixed louvers	30
Combustion Air, Motor louver and duct	25
Flue Exhaust	w/boiler
Free Standing Chimney	50+
ELECTRICAL SYSTEMS	
Common area	15
Buzzer/Intercom, central panel	20
Central Unit Exhaust, roof mounted	15
Compactors	15
Dumpsters	10
Electrical distribution center	40
Electric main	40
Emergency Generator	25
Gas lines	40
Gas main	40
Heating supply/ return	40
Power distribution	40
Transformer	30
BOILER ROOM EQUIPMENT	
Blowdown and Water Treatment	25
Boiler Room Pipe Insulation	Included in boiler
Boiler Room Piping	Included in boiler
Boiler Room Valves	15
Boiler Temperature Controls	Included in boiler
VERTICAL TRANSPORTATION - ELEVATORS	
Electrical Switchgear	50+
Electrical Wiring	30
Elevator, Controller, dispatcher	10
Elevator, Cab	10
Elevator, Machinery	30
Elevator, Shaft-way Doors	20
Elevator, Shaft-way Hoist rails, cables, traveling	25
Elevator, Shaft-way Hydraulic piston and leveling	25
BOILER ROOM EQUIPMENT	
Blowdown and Water Treatment	25
Boiler Room Pipe Insulation	Included in boiler
Boiler Room Piping	Included in boiler
Boiler Room Valves	15
Boiler Temperature Controls	Included in boiler
BOILERS	
Oil-fired, sectional	22
Gas/ dual fuel, sectional	25
Oil/ gas/ dual fired, low MBH	30
Oil/ gas/ dual fired, high MBH	40
Gas fired atmospheric	25
Electric	20

KISD Facility Component Useful Life Cycles (years)*

** Reference: https://www.fanniemae.com/content/guide_form/4099f.pdf; March 26, 2015*

APPURTENANCES:	
Chimney	40
Exterior stairs, wood	15
Exterior stairs, metal pan- concrete filled	30
Exterior stairs, concrete	50
Fire Escapes	40
Porches, concrete	50
Wood Decks	20
AMENITIES	
Basketball court	25
Mail kiosk	10
Mail facility, interior	20
Pool deck	15
Pool/ spa plaster liner	8
Tennis court / basketball court surface (paint markings)	5
Tennis court Surface (acrylic emulsion)	10
Tot-lot (playground equipment)	10
Tot-lot, uncompressed ground cover	2+
WATER DISTRIBUTION AND DOMESTIC HOT WATER SYSTEMS	
Feedwater only (hydronic)	10
Condensate and feedwater (steam)	Included in boiler
Cooling Tower	25
DHW Circulating Pumps	by size
Domestic Hot Water (DHW) - supply / return	30
Tank only, dedicated fuel	10
Exchanger in storage tank	15
Exchanger in boiler	15
External tankless	15
Instantaneous (tankless type)	10
Domestic Hot Water Storage Tanks, Small (up to 150 gallons)	15
Domestic Hot Water Storage Tanks, Large (over 150 gallons)	15
Domestic Cold Water Pumps	15
Heating Water Circulating Pumps	by size
Heating Water Controller	15
Hot and Cold Water Distribution	50
Solar Hot Water	20
Water Softening and Filtration	15
SANITARY WASTE AND VENT	
Purchased Steam Supply Station	50+
Sanitary Waste and Vent System	50+
Sewage Ejectors	50
SUMP PUMP	
Residential Sump Pump	7
Commercial Sump Pump	15
HEATING/COOLING SYSTEM AND CONTROLS	
Pad/ roof condenser	20
A/C window unit or through wall	10
Evaporative Cooler	15
Fan coil unit, electric	20
Fan coil unit, hydronic	30
Furnace (electric heat with A/C)	20
Furnace (electric heat with A/C)	20
Furnace (gas heat with A/C)	20
Packaged terminal air conditioner (PTAC)	15
Packaged HVAC (roof top units)	20
Heat pump condensing component	20
Heater, electric baseboard	25
Heater, wall mounted electric or gas	20
Hydronic heat/ electric A/C	20
Line Dryers	15
Master TV System	10
Motorized Valves	17
Outdoor Temperature Sensor	10
Pneumatic lines and Controls	30

DWELLING FIRE, SAFETY AND SECURITY	
Unit Smoke/Fire Detectors *	5
Unit Carbon Monoxide Detectors *	5
Unit Buzzer/Intercom	20
DWELLING UNIT CEILINGS	
Concrete	50+
Acoustic Tile / Drywall / Plaster	10
DWELLING UNIT FIXTURES	
Bathroom: Vanity	10
Bathroom: Fixtures / Faucets	15-20
Bathroom: Fiberglass Bath / Shower	18
Bathroom: Toilet	40
Bathroom: Toilet Tank Components	5
Bathroom: Vent / Exhaust	10
Interior Doors	10
Kitchen: Cabinets (wood construction)	15
Kitchen: Cabinets (particle board)	13
Kitchen: Dishwasher	5-8
Kitchen: Microwave	8
Kitchen: Range	15
Kitchen: Range-hood	10
Kitchen: Refrigerator	10
Window covering	1+
DWELLING UNIT FLOORS	
Ceramic / Tile / Terrazzo	20
Wood (strip/ parquet)	20
Resilient Flooring	7
Carpet	3+
Concrete	50+
DWELLING UNIT HVAC AND MECHANICAL EQUIPMENT	
A/C window unit or through wall	10
Evaporative cooler	15
Fan coil unit, electric	20
Fan coil unit, hydronic	30
Furnace (electric heat with A/C)	20
Furnace (gas heat with A/C)	20
Packaged terminal air conditioner (PTAC)	15
Packaged HVAC (roof top unit)	15
Heat pump condensing component	15
Heater, electric baseboard	25
Heater, wall mounted electric or gas	20
Hydronic heat/ electric AC	20
Unit Electric Panel	50+
Unit Level Boiler	25
Unit Level Domestic Hot Water	10
Unit Level Hot Air Furnace	25
Unit Radiation - Steam/ Hydronic (baseboard or freestanding)	30
Unit Wiring	30

Division 01

SPECIFICATIONS

Section 01 05 00 – General Requirements

A. Obtain the KISD Facilities Services approval for the inclusion of any allowance or alternate in the contract documents.

B. Continuity of Building Envelope, Full Height Partitions, and Fire Rated Construction:

1. Continuity of Building Envelope:
   a. All materials such as exterior sheathing, membrane flashings, vapor barriers, insulations, damp proofing, waterproofing, roofing, flashings, etc., and all penetrations, holes, gaps, joints, and openings through such materials shall be sealed to ensure continuity of the building envelope, whether indicated or not. Specifications for life cycle reapplication must be included to effectively plan for future budgeting allocations.
   b. A 3rd party Waterproofing and Roofing design consultant shall be included in the design and construction phases of all projects.
2. Full Height Partitions:
   a. All full height partitions shall be from floor to bottom of deck structure and shall be made to fit around steel joists, beams, etc.
   b. Seal joist at top of partitions, in flutes of steel deck, and around structural elements with a compressible fillers and/or sealant to accommodate movement due to expansion, contraction, and deflection, whether indicated or not.
3. Fire Rated Construction:
   a. All seals in fire rated construction, whether at top, bottom, or penetrations through fire rated construction, shall be made with fire-stopping and fire-safing materials to maintain fire rating integrity of construction and satisfy authorities having jurisdiction, whether indicated or not.

Section 01 91 00 – Commissioning

A. At a minimum, mechanical and electrical systems are to be commissioned to meet IECC 2018 requirements. There may be instances where communications, A/V, security, and other systems may be commissioned as well.

1. The final list of systems to be commissioned will be determined by KISD.

B. Testing:

1. Pre-Functional Testing
   a. The Construction Manager at Risk (CMAR) shall confirm with the trade subcontractors that all equipment has been vetted to assure proper installation and operation. Start-up procedures shall be delivered to the Commissioning Agent (CA).

b. The CA shall determine if any pre-functional tests should be performed on equipment prior to Functional Performance Testing.

2. Functional Performance Testing

a. The CA will develop the Function Performance Testing procedures and will document the actual testing.

C. Reports:

1. Reports of all functional testing shall be provided to KISD.
2. Copies of these reports shall be included in the O&M manuals provided to KISD.

Division

02

EXISTING CONDITIONS

Section 02 41 00 – Demolition

A. KISD shall have first salvage rights on all items from existing buildings prior to demolition. Salvage performed by KISD will be specifically referred to in the construction contract.

B. When specified, the construction contractor will identify the salvage value as a deduct from the contract cost and bid sheet for any and all items intended to be retained following demolition and removal from KISD property to ensure the district is receiving fair market value for salvaged items.

Division 03

CONCRETE

Section 03 30 00 - Concrete

A. The amount of differential settlement (PVM) allowed in new construction will be decided by the district.

Section 03 52 00 – Lightweight Insulating Concrete Deck Systems

A. General
   1. All new and replacement roofing shall require a Professional Roof Consultant to assess, review and/or assist in design, detailing, and inspection of project.
   2. Low sloped roof areas to have minimum of two (2) roof drains per roof area. Whenever possible roof drains shall be located around perimeter edge of building, utilizing roof scuppers as secondary drainage systems to effectively capture and channel overflow drainage.

B. Warranty Requirements
   1. Manufacturer's Requirements: The warranty shall be a NDL "No Dollar Limit" / no penal sum full system type warranty, with total replacement cost. Warranty shall cover the decking and associated Work in conjunction with the roofing manufacturer to guarantee the entire roof assembly against defective material and workmanship of installation, with NO exclusion for ponding water. Refer to roof system specification section for length of warranty period.
   2. Installer/Contractor Requirements: Jointly with any subcontractors, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the lightweight insulating concrete deck will be and remain in good condition for a minimum of a five (5) year warranty period, after the Architect and district accept the work as "substantially complete."
   3. The warranty shall be in approved notarized written form, to obligate the Contractor, and subcontractors, to make good the requirements of the warranty. KISD has notary capability and will notarize documents if coordinated 24-hours in advance.

C. Approved Manufacturers
   1. Manufacturers whose products meet or exceed the specifications, who have manufactured and installed roof materials and systems of the type specified for a minimum of fifteen (15) years, and who maintain a single source responsibility for the total roofing system, as described herein, may apply for approval as a substitution in accordance with Division 1 requirements regarding substitutions. The following are pre-approved manufacturers or distributors.
      a. Siplast, Inc.

b. Elatizell Corp. of America

Division

04

MASONARY

Section 04 20 00 – Unit Masonry

A. Provide graffiti protection on all non-fired CMU. A/E shall recommend other application as appropriate for the project.
B. Building Interior: Bull nose all exposed exterior CMU corners, except where ceramic wall tile is scheduled.
C. To minimize the impact on the environment the district preference is to maximize the use of quarry materials mined or recovered within a 250-mile radius of Killeen, Texas.
D. Confirm all masonry and grout color selections with KISD during design.

Division

05

METALS

Section 05 50 00 – Metal Fabrications

A. Exterior handrails are to be unpainted galvanized steel pipe. Handrails may be powder coated provided they are designed in a manner that will not require field-welding installation. Interior handrails may be brushed aluminum (low maintenance), stainless steel, or powder coated steel (will require removal, sandblasting, and new powder coat every 10 years).

B. Use 12- to 14- gage galvanized steel, powder coated steel, or extruded aluminum for exterior louvers, 16-gage for interior.

C. Use either black vinyl coated or galvanized chain link fencing and gates for all fencing except for main entries, and special public exposures where more decorative fencing would be appropriate (with District approval). Coordinate use and locations of each type with the District.

D. Do not use metal siding in areas less than ten feet above grade where it might be vandalized by graffiti, damaged by impact, or subject to heat gain that could cause injury to students or staff.

Division

06

WOOD, PLASTICS, AND COMPOSITES

Section 06 10 00 – Rough Carpentry Wood Treatment

A. Preservative Treatment (Concealed Conditions): Provide Quality Mark Stamp or end tag identifying third party inspection agency on treated wood for identification.
B. Fire Treatment: As required by Code and AHJ.

Section 06 22 00 – Finish Carpentry and Casework

A. Perform work and cabinet construction in accordance with AWI Classification of Custom Grade, unless noted otherwise.
   1. Classroom Casework – Custom Grade
   2. Balance of Casework – Custom Grade
   3. Counter Tops – Custom Grade
   4. Desks and Display Cases – Premium Grade
B. Where lockable cabinets are specified, provide COMPX National Stock Lock Cam Lock – C8051 – KD 14A – randomly keyed with a Bright Nickel Finish.
C. Casework and millwork bases shall be of solid lumber, 2X material.
D. Any casework featuring built-in plumbing fixtures shall be constructed entirely of water-resistant plywood.
E. All casework shall have European hinges.
F. All interior faces of drawers, cabinets, and doors shall receive a melamine finish.
G. All base cabinets, drawers, and doors shall receive a laminate finish. Countertop finish may vary depending on location but shall be either laminate or solid surface.

Division

07

THERMAL AND MOISTURE PROTECTION

Section 07 30 00 – Steep Sloped Metal Roofing System

A. General:
   1. All new and re-roof construction shall be required to have a Professional Roof Consultant review and/or assist in design and detailing of project.

B. Quality Assurance (Applicator):
   1. Applicator shall have approval by manufacturer of accepted roofing system for application and issuance of specified warranty for a minimum of three (3) years.
   2. Proof of license agreement dated at least three years prior to date of proposal opening.
   3. Applicator shall be an experienced single firm specializing in the type of roofing and sheet metal work specified, with a minimum of five (5) years of previous successful experience on projects similar in size and scope.
   4. No subcontracting of sheet metal fabrication or installation will be accepted. Contractor must have a sheet metal shop on the company premises.
   5. Applicators shall have a competent Superintendent, who is not actually performing roofing work, on site at all time while work is in progress, with full authority to act on behalf of the Contractor as his agent.

C. Quality Assurance (Manufacturer):
   1. An inspection shall be made by a representative of the material manufacturer a minimum of three (3) times monthly during performance of the material installation to ensure that said material is installed in accordance with the manufacturer's specifications and illustrated details. Manufacturer's personnel that are not Certified Quality Control Technicians are not acceptable for performing inspections.
   2. Written reports by the manufacturer shall be turned over to the Owner/Architect/Contractor for each site visit.
   3. All materials shall be asbestos free.
   4. All materials shall be manufactured, specified, and accepted in writing by the manufacturer issuing the warranty. Proposed materials shall ensure full system warranty from said manufacturer.

D. Warranty Requirements:
   1. Manufacturer's Requirements:
      a. Warranty the work specified herein against becoming unserviceable or causing an objectionable appearance resulting from either defective or non-conforming materials or workmanship.
      b. Warranty shall be a "Weather Tightness" NDL "No Dollar Limit"/No Penal Sum type warranty.

c. The warranty shall be issued to the Owner by the manufacturer at the time of substantial completion.

d. The warranty shall guarantee the entire roof system and associated work against defective materials and workmanship of installation.

E. Roof Panels and Finish:

1. Durability of the roof panels due to rupture, structural failure or perforation shall be warranted for a period of 20 years by the manufacturer.
2. The exterior color finish for painted roof panels shall be warranted by the manufacturer for 20 years against chalking, blistering, peeling, flaking, checking, and chipping.

F. Weather Tightness:

1. The entire roof system including all roof panels, flashings, curbs, gutters/downspouts, seams, etc. shall be warranted by the manufacturer against leaks for a period of 20 years.
2. The roof system shall include roof insulation, flashing, metal work, labor, and material shall be guaranteed against failure of workmanship and materials. Repair of the system by the manufacturer, including materials and labor, shall be done at no cost to the Owner.
3. Installer/Contractor Requirements
   a. Jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a five (5) year warranty period, after the Architect accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the Contractor, and subcontractors, to make good the requirements of the warranty. The warranty will be held jointly with the Bonding Company for the first two (2) years and the manufacturer for the remaining three (3) years.
4. System Performance Requirements
   a. Panel Profile: Two (2”) inch high by sixteen (16”) inch wide double lock standing seam panel with striations. (No Exposed Fasteners Allowed.)
   b. Gauge: Minimum 24 gauge.
   c. If the specifications require a colored roofing finish, only premium fluorocarbon coating produced with Kynar 500® or Hylar 5000® resin (20 year warranty) in color selected by Architect from manufacturer's available colors. Approved coating companies include Akzo Nobel, BASF, PPG, and Valspar.
   d. Perimeter edge drainage into gutters at steep sloped roof areas – (refer to sheet metal and trim section for additional gutter information).
5. Approved Manufacturers:
   a. Architectural Building Components
   b. Metal Building Components
   c. Firestone Metal (UNA-Clad)
   d. Peterson Aluminum Corporation

Section 07 40 00 – Roofing and Siding Panels

A. Type:
   1. 2.67" x 7/8" Corrugated profile in continuous lengths.
B. Finish:
   1. Kynar 500 or Hylar 5000 resin (20 year warranty for both) in color selected by Architect from manufacturer's available colors. Approved coating companies include Akzo Nobel, BASF, PPG, and Valspar.
C. Fasteners:
   1. Only long life fasteners shall be used.
D. Cold joint locations require waterproofing to adequately cover and seal.

Section 07 52 00 – Low Sloped Roofing Systems

A. General:
   1. All new and re-roof construction shall be required to have a Professional Roof Consultant review and/or assist in design and detailing of project.
   2. Ensure membrane surfacing meets or exceeds the Texas State Energy Conservation Office adopted the 2018 International Energy Conservation Code (IECC) requirements for energy savings based on R and U Values.
B. Inspection/Testing Requirements
   1. The Owner will contract with an independent professional roof consultant or a certified manufacturer's representative to provide part-time quality assurance observation during the course of construction (from the design and pre-bid phase to substantial completion and commissioning).
   2. Project may require tests and inspections as necessary to verify quality of roofing materials and workmanship. If conducted, all laboratory tests shall be in accordance with ASTM standard procedures.
   3. Owner will select testing laboratory and will pay for Work required by testing laboratory.
   4. Re-tests for work, which fail initial tests or inspections, shall be paid by contractor.
C. Quality Assurance – (Applicator):
   1. Applicator shall have approval by manufacturer of accepted roofing system for application and issuance of specified warranty for a minimum of three (3) years. Proof of license agreement dated at least three years prior to date of proposal opening.
   2. Applicator shall be an experienced single firm specializing in the type of roofing work specified, with a minimum of five (5) years of previous successful experience on projects similar in size and scope.
   3. If metal roofing is specified, no subcontracting of sheet metal fabrication or installation will be accepted. Contractor must have a sheet metal shop on the company premises.
   4. Applicator shall have a competent Superintendent (certified by material manufacturer with a minimum of 3 years of experience installing roofing systems greater than 50,000 square feet.), who is not actually performing roofing work, on site at all time while work is in progress, with full authority to answer and act on behalf of the Contractor as his agent.
   5. All workmen shall be covered by Workmen's Compensation insurance, federal income tax withheld (this is a requirement for the bidding process and included as a statement in the contractor's bid submission) and thoroughly experienced in the particular class of work upon which employed. Use of undocumented workers is not an acceptable practice. Contractors desiring to bid on contracts will include a notarized memorandum that they will employ tradesmen in accordance with state and federal laws. Any suspected, perceived, or actual violation of state or federal laws will be reported to the appropriate

authorities. This is in the best interest for the security and safety of the students, faculty, and staff of KISD.

D. Quality Assurance - (Manufacturer):
   1. An inspection shall be made by a representative of the material manufacturer a minimum three (3) times (beginning, mid-point, final) during performance of work to ensure that said project is installed in accordance with the manufacturer's specifications and illustrated details.
   2. Written reports by the manufacturer shall be turned over to the Owner/Architect/Contractor after each site visit.
   3. All materials used on the project shall be asbestos free.
   4. All materials shall be manufactured, specified, or accepted in writing by membrane manufacturer issuing the warranty. Proposed materials shall ensure full system warranty from said manufacturer.

E. Roof Membrane:
   1. Preferred method of membrane attachment will be in accordance to the design specifications to ensure the integrity of the roofing envelope is compliant and meets all warranty requirements.

F. Roof Drains:
   1. Provide minimum 6-inch diameter roof drains. Always provide cast iron, domed strainers at drains.

G. Re-Roofing:
   1. All re-roofing of built-up or gravel layered roofs shall include the complete “tear-off” and “removal” of residual roof materials that may penetrate the single-ply membrane.
   2. Any “overlay” re-roofing scope of work shall be approved by Killeen ISD.

H. Approved Roof Deck Assemblies:
   1. Provide minimum ¼” per foot slope to drains; refer to manufacturer’s requirements for maximum slope. Use structure to slope where possible.

I. Roof Hatches, Vents, and Ladders:
   1. All roof hatches and smoke vents to be aluminum curb and covers.
   2. Provide roof access ladders, roof hatches, and guard-rails to all roof levels in accordance with OSHA Regulations 1910.23 & 1910.27.

J. Warranty Requirements:
   1. Manufacturer’s Requirements
      a. Warrant the roofing and associated work for 20 years from date of Substantial Completion. Warranty shall be a NDL “No Dollar Limit” / No Penal Sum type, with total replacement cost. The warranty shall guarantee the entire roof system and associated work against defective materials and workmanship of installation, with NO exclusion for ponding water. The roof system warranty shall include the roofing, roof deck (to include insulation), flashing, metal work, labor, and material shall be guaranteed against failure of workmanship and materials. Repair of the system, including materials and labor, shall be done at no cost to the Owner and coordinated for completion as quickly as possible minimize any disruption of the district’s educational process.
   2. Installer/Contractor’s Requirements
      a. Jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a minimum of twenty (20) year warranty period, after the Architect accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the Contractor, and subcontractors, to make good the requirements of the warranty. The warranty will be held jointly with the Bonding

Company for the first five (5) years and the manufacturer for the remaining fifteen (15) years.

K. Modified Bitumen System:
   1. This system currently exists across the district and requires standardized maintenance and repair application. A roof membrane assembly consisting of two (2) plies of a prefabricated, reinforced, homogeneous (SBS) polymer modified asphalt membrane.

L. Single-Ply PVC Membrane:
   1. 60 mil thickness (min.); 80 mil thickness (min.) over kitchens. Architect to confirm thickness to be used on the project.
   2. Provide walkway pads and pathways to rooftop equipment as required.
   3. Warranty
      a. 20 year from Manufacturer (min.) for failures in materials or workmanship. 5 year from Installer for workmanship.
   4. Approved Manufacturers
      a. Sika Sarnafil
      b. Carlisle
      c. GAF
      d. Johns Mansville
      e. Others if approved by Owner

M. Single Ply TPO Membrane
   1. 60 mil thickness (min.); 80 mil thickness (min.) over kitchens.
   2. Provide walkway pads and pathways to rooftop equipment as required.
   3. Warranty
      a. 20 year from Manufacturer (min.) for failures in materials or workmanship. 5 year from Installer for workmanship.
   4. Approved Manufacturers
      a. Carlisle
      b. Johns Mansville
      c. Sika Sarnafil
      d. GAF
      e. Others if approved by Owner

Section 07 62 00 – Sheet Metal Flashing and Trim

A. General:
   1. All new and re-roof construction, and flashing details shall be required to have a Professional Roofing and Waterproofing Consultant review and/or assist in design and detailing of project.

B. Single Source Responsibility:
   1. Fabricator and installer of roof-related flashing and accessories shall be the same as the membrane roof installer.

C. Separations:
   1. Provide for separation of metal from dissimilar metal or corrosive substrates by coating concealed surfaces with zinc chromate, bituminous coating, or other permanent separation at locations of contact as recommended by manufacturer or fabricator. Do not use materials that are incompatible with roofing system.

D. Installation:
   1. Install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle.

E. Warranty Requirements:
   1. Manufacturer's Requirements
      a. Durability of the pre-finished metal due to rupture, structural failure or perforation shall be warranted for a period of 20 years. The exterior color finish shall be warranted by the Manufacturer for 20 years against chalking, blistering, peeling, cracking, flaking, checking and chipping.
   2. Installer/Contractor's Requirements
      a. Jointly with any subcontractors employed by him, shall guarantee the work required and performed under this contract will be free from defects in workmanship and materials, and that the building will be and remain waterproof for a five (5) year warranty period, after the Architect accepts the work as substantially complete. The warranty shall be in approved notarized written form, to obligate the Contractor, and subcontractors, to make good the requirements of the warranty. The warranty will be held jointly with the Bonding Company for the first five (5) years and the manufacturer for the remaining fifteen (15) years.

F. Approved Sheet Metal Materials and Accessories:
   1. Architect to specify approved sheet metal materials per application.

G. Approved Manufacturers:
   1. Metal Building Components, Inc.
   2. Vincent Brass and Aluminum Company
   3. Peterson Aluminum Corporation (PAC CLAD)
   4. Others if approved by Owner

H. Pitch Pans/Pitch Pockets:
   1. Not allowed.

Section 07 81 10 – Sprayed Fireproofing

A. Material Composition – As selected by the Architect or Structural Engineer
B. Sprayed Fire Resistive Material (SFRM)
    1. Factory-mixed, dry formulation of gypsum or portland cement binders, additives, and lightweight mineral or synthetic aggregates mixed with water at the Project site to form a slurry or mortar for conveyance and application.
C. Approved Manufacturers
    1. GCP Applied Technologies
    2. Carboline
    3. Isolatek

Division 08

OPENINGS

Section 08 05 00 – Common Work Results for Openings

A. All flashing details shall be required to have a Professional Roofing and Waterproofing Consultant review and/or assist in design and detailing of project.
B. Doors at mechanical and electrical equipment rooms shall be fire-rated, as required by code.
C. Reviews are required by Facilities Services at key project milestones. Drawings and specifications for milestone reviews must include, at a minimum:
    1. Design Development: For each door, Consultant must indicate the function of the room/lock, whether the door is fire-rated, whether the door is alarmed, whether there is a card reader, and must identify security requirements.
    2. Construction Documents 50% Complete: Consultant must indicate specific hardware information for each door, including manufacturer and model number, keyway, finish, etc.
    3. The Door Schedule and the Hardware Schedule must match. Door numbers must be identified for each Hardware Set. Only include Hardware Sets that are used on the current project.
D. Double doors and entryways – Coordinate location of card access reader and associated hardware with entry doors that need to be "dogged" down during school hours.

Section 08 14 16 – Flush Wood Doors

A. Flush Interior Non-Rated, Rated, and Acoustical Wood Doors:
    1. Doors shall have either plastic laminate or wood veneer finish.

Section 08 33 00 – Overhead Coiling Doors

A. Overhead Coiling Doors and Counter Shutters:
   1. Approved Manufacturers
      a. Raynor Door
      b. McKeon Rolling Steel Door Co.
      c. Cookson Company
      d. Overhead Door Corp.
      e. Others if approved by Owner
   2. Locking Mechanism
      a. Match District keying system.
   3. Coordinate means of operation with District.

Section 08 41 00 – Entrances and Storefronts

A. For Insulated Glazing (Exterior) and Monolithic Glazing (Interior) – 2 Inch wide by 4-1/2" Deep Vertical Mullions.
   1. Approved Manufacturers
      a. Kawneer Company
      b. Columbia Commercial Building Products
      c. C.R. Laurence Co., Inc.
      d. EFCO
      e. Manko Window Systems
      f. Oldcastle Building Envelope

B. For Swinging Doors – Thickness: 2 inches
   1. Approved Manufacturers
      a. Kawneer Company
      b. Columbia Commercial Building Products
      c. C.R. Laurence Co., Inc.
      d. EFCO
      e. Manko Window Systems
      f. Oldcastle Building Envelope

Section 08 45 00 – Translucent Roof and Wall Assemblies

A. Skylights are a method to incorporate means to daylighting the interior of structures as a cost saving alternate lighting solution. Designs must include a high ridge or pyramid translucent panel to mitigate residue build up and water collection. If included in the design specifications, skylights must meet OSHA's 29 CFR 1910.23 specification for fall protection and be of 1-piece design and self-flashed waterproof skylight assemblies only.

B. Translucent roof and wall assemblies shall be manufactured by Kalwall, Inc., Skywall, Inc., or Major Industries. Any other manufacturer or product shall be researched, and presented for approval prior to specifying.

C. Windows at ground level are to be non-operable.

D. Breaking of existing insulated glazing units to accommodate unit removal and/or access to glazing sealant/tape systems is not permitted.

E. Shading solutions are preferred for west-facing glazing units in order to mitigate solar heat gain and decrease HVAC cooling requirements.

Section 08 71 00 – Finish Hardware

A. Warranty: Provide Manufacturer's Warranty:
   1. Locks/Locksets: Five Years
   2. Exit Devices Five Years
   3. Closers Five Years
   4. Other Hardware Two Years

B. Finish Hardware:
   1. Doorstop locations: Provide in-wall blocking.
   2. Kick/Mop Plates: Provide on corridor side of all hollow metal and wood doors.
   3. Concealed rods are not to be utilized on any KISD campus.

C. Hinges: Due to safety hazards in the school environment, pivot hinges are not allowed in classrooms, offices, or doorways leading into corridors.
   1. Conventional Hinges
      a. Approved Manufacturers
         i. Ives
         ii. Hagar
         iii. McKinney
         iv. Stanley
      b. Provide extra heavy weight hinges on the following:
         i. Doors over 3'-5" in width.
         ii. Doors with panic hardware or fire exit devices.
         iii. Restroom, locker room, gymnasium, and other high swing frequency doors.
      c. Provide non-ferrous with non-removable pin hinges on out swinging exterior doors.
      d. Provide non-ferrous hinges on doors subject to corrosive atmospheric conditions.
   2. Continuous Hinges
      a. Approved Manufacturers
         i. Ives
         ii. Hagar
         iii. McKinney
         iv. Pemko
         v. Stanley
      b. Use geared-type aluminum at exteriors
      c. Use heavy duty, extra-bearing units for doors over 3'-5" in width.
      d. Use heavy duty, extra-bearing units for doors with panic or fire exit devices.

D. Key Systems: Best or Owner's Standard:
   1. Door Locks: Best 9K3 Bored Lockset, 2-3/4" Back Set. Panic devices require HEX Key dogging. This is the District standard. No substitutes are allowed.
      a. 9K37D15DS3626 – Storeroom function – Used in all classrooms.
      b. 9K37D15DS3626 – Storeroom function – Use on storage rooms, mechanical rooms, electrical rooms.
      c. 9K30L15DS3626 – Privacy (staff bathrooms) function.
      d. 9K37AB15DS3626 – Entrance function (office areas).
      e. 9K30N15DS3626 – Passage (in-classroom bathrooms at Elementary and Middle Schools)
      f. 9K37L15DS3626 – Privacy with key core (high school life skills bathrooms)

2. Cabinet Locks
   a. COMPX National Stock Lock – Cam Lock – C8051-KD-14A. Randomly keyed with bright nickel finish.
3. Deadbolts: Best
   a. 8T37KSTK626 – Regular thumb latch deadbolt – used in non-student areas.
   b. 8T37SSTK626 – Child proof function – must be used in student areas.
4. Cores and Cylinders
   a. Best Interchangeable core, 626 finish. No substitutes.
   b. Rim Cylinder – 12E72S2RP3626
   c. Mortise Cylinder – 1E74C208RP3626

E. Keying:
1. Keying system is Best Access Solutions, 7 pin, interchangeable core, keyed into an existing factory registered Grand Master Key System (BEST) with a standard keyway. Cores are to be provided with locksets, deadbolts, etc. Provide 2 keys with each core. KISD will set up and handle grand master keying.

F. Exit Devices:
1. Precision APEX 2000 – Rim Mount – Wide Stile – 630 Finish with US 32D.
2. Von Duprin 98/99 Series – Rim Mount – Wide Stile – Stainless Steel.
3. Detex Advantex 10xW – For panic hardware mounted outside.
4. No Substitutions

G. Keyed Removable Mullions:
1. Von Duprin KR 4954 Series

H. Closers at Exterior and Interior Doors with Heavy Weight Hinges or Continuous Geared Hinges:
1. Norton 7500 Series
2. Sargent 351 Series
3. LCN 4050 Series
4. Falcon SC71 Series
5. Stanley QDC100 Series

I. Auto Flush Bolts:
1. Ives
2. Hagar
3. McKinney
4. Rockwood

J. Coordinators:
1. Ives
2. Hagar
3. McKinney
4. Rockwood

K. Silencers – For interior hollow metal frames, 3 each for single doors; 4 each for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
1. Ives
2. Hagar
3. McKinney
4. Rockwood

L. Push and Pull Plates:
1. Ives
2. Hagar
3. McKinney
4. Rockwood

M. Stops and Holders

1. Trimco 1201, 1209, 1277
2. Ives FS448, FS18S, 407B
3. Hagar
4. McKinney
5. Rockwood

N. Overhead Stops:
1. Glynn Johnson
2. ABH
3. Sargent

O. Thresholds
1. National Guard
2. Pemko
3. McKinney
4. Reese

P. Seals and Bottoms
1. National Guard
2. Pemko
3. Reese

Q. Key Cabinet
1. TelKee or as specified by Owner

Section 08 80 00 – Glazing

A. Glass:
1. All exterior glazing shall be 1" insulated, low e, glazing systems.
2. Interior glazing shall meet code, i.e. tempered or wire/fire. Architect shall verify code requirements.

B. Window Testing:
1. After sealant is set and a representative amount of wall has been glazed (250 sf or more), spray with a water hose to check installation. If there is a large amount of glass, the hose test shall be repeated during the glazing operation.
2. Testing is to be conducted in accordance with AAMA 501.2 specifications.

Division

09

FINISHES

Section 09 00 00 - General

A. Finish choices must not jeopardize, or be made at the expense of, essential building systems.
B. Coat/seal all items prior to installation as much as able; special consideration(s) required in occupied buildings.
C. Water based finishes only for interior and onsite applications.
D. Low VOC materials are to be used; zero VOC when available.
E. Follow finish manufacturer's recommendations for acceptable moisture ranges prior to application/installation.
F. Moisture testing on concrete, substrate, etc. is required prior to installation of finishes and results shall be submitted to the Owner/Architect/Contractor as a record of compliance.
G. Cutting and Patching:
    1. Patch areas in a manner that eliminates evidence of patching and refinishing.
    2. Refinishing should provide an even surface of uniform finish, color, texture, and appearance of all finish surfaces including as much of the surrounding wall as practical. (I.e. Corner to corner most adjacent to the patch.)
    3. Patch, repair, and/or re-hang ceilings to provide an even-plane surface of uniform appearance.
    4. Restore exterior building enclosures to a weather-tight condition.
    5. Clean all areas and spaces removing debris immediately after work has been completed.

Section 09 21 00 – Gypsum Board Assemblies

A. Gypsum Partition Walls
    1. For both elementary and middle schools, classroom walls are to be constructed from floor to deck and insulated for sound proofing.

Section 09 25 00 – Gypsum Board

A. Smooth or sand-finish textures are to be used.
B. Provide abuse/impact resistant drywall at all stud framed staircases.
C. Provide abuse/impact resistant drywall, tile, or brick up to 5-feet at elementary corridors to establish a sustainable surface.
D. Exterior gypsum sheathing shall be from the following manufacturers:
    1. G-P Dens-Glass Gold
E. Provide glass-mat faced drywall at all wet/humid locations.
F. Ceilings:

1. Mechanical and electrical access to equipment above hard lid ceilings require a minimum of 24" x 24" access panels with a clear path to the equipment.
2. Restroom ceiling must be gypsum board with appropriate access panels.

Section 09 30 00 – Tiling

A. Tile must be non-porous and sealed.
B. In kitchen areas provide 6" x 6" x 1/2", non-slip, rustproof aggregate surface quarry tile.
C. Grout:
   1. Use epoxy type grout at all restroom or wet floor locations
   2. Use sanded grout on all other tile locations
   3. At all tile locations except for kitchen areas, grout color shall match the tile color as closely as possible. All color selections are to be approved by KISD.
D. Slope finished floors to drain over entire room to floor drain points.
E. Attic Stock Materials: 10% of each type of tile installed.

Section 09 51 00 – Acoustical Ceiling Panels

A. Acceptable Manufacturers:
   1. Acoustical Tile
      a. USG Interiors
         i. Standard Ceiling, Sag Resistant: Radar ClimaPlus
         ii. Abuse resistant: Rock Face ClimaPlus
         iii. High Humidity Mineral Board: Radar Ceramic ClimaPlus
         iv. Vinyl Faced Gyp Board: Sheetrock Lay-in Ceiling Tile ClimaPlus
         v. Acoustical "Reflective" Ceiling: Radar
         vi. Acoustical "Absorptive" Ceiling, Vinyl-Covered Fiberglass: Halcyon ClimaPlus
   2. Grid Suspension System
      a. USG Interiors
         i. Donn Brand - DX/DXL, DXLA/DXACE
B. Installation:
   1. Only 2' x 2' tiles are allowed.
   2. T-Bar grid to be standard 1" in width.
   3. Coordinate ceiling grid layout with above ceiling mechanical, electrical, and plumbing (MEP) equipment so as not to block access to the equipment.
   4. Provide a minimum of 6" clearance between ceiling tile and bottom of above ceiling MEP equipment to allow for tile removal.
   5. Light fixtures installed in the ACT ceiling system shall be supported by a minimum of three wire hangers. Square or rectangular fixtures shall have wire hangers at each corner of the fixture.
   6. No tegular ceiling tiles are allowed.
   7. No concealed spline supports are allowed.
C. Attic Stock Materials: 10% of each type installed.

Section 09 60 00 – Flooring

A. Public Area Flooring:
   1. Elevator floors: Match corridor flooring.

2. Wet laboratories: use chemical resistant flooring.
3. Masonry flooring: not permitted if it has significant fill and/or requires routine sealing or significant specialized maintenance.
4. In Elementary Schools, under drinking fountains in corridors: Provide removable, recessed walk-off mats. Coordinate exact size and locations with KISD.

B. Stage Flooring:
1. Cafetoriums
a. Furnish and Install Solid Color Luxury Vinyl Tile.

C. Flooring Materials not Permitted by KISD:
1. Specialty flooring: Bamboo, Cork, and Laminate
2. Wood flooring, except at gymnasiums, stages, or as specified in the design.
3. Medium density fiberboard (MDF) as a wall base.

Section 09 64 29 – Stage Flooring

A. High Schools
1. Install hardwood floor from front of stage to the curtain line.
2. Remainder of stage to be Marley Stage Flooring.

B. Middle and Elementary Schools
1. Install Solid Color Luxury Vinyl Tile

Section 09 64 66 – Wood Athletic Flooring

A. Flooring Contractor shall be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Wood Flooring: High Schools
1. Approved Manufacturers
a. Aacer Flooring LLC, (“AacerFlex” with BioPower resilient pads)
b. Action Floor Systems, LLC., (“ProAction Thrust” with ProAction resilient pads)
c. Connor Sports Flooring Corporation, (“NeoShok” with Neoshok pads)
d. Horner Flooring Co., (“SAFE” panel system with SAFE pads)
e. Robbins Sports Surfaces, (Bio-Cushion with Bio Star resilient pads)

C. Wood Flooring: Middle Schools
1. Approved Manufacturers
a. Aacer Flooring LLC, (“AacerCush II” with AacerCush resilient pads)
b. Action Floor Systems, LLC, (“ActionCush” with Airtech resilient pads)
c. Connor Sports Flooring Corporation, (“Rezill Panel” with Rezill pads)
d. Horner Flooring Co., (“Thrust-A-Cushion” panel system with Thrust-A-Cushion pads)
e. Robbins Sports Surfaces, (Bio-Cushion with Bio-Cushion Classic resilient pads)

D. Vapor Barrier
1. Provide 6 mil polyethylene, to cover entire concrete floor under wood flooring, extending up wall at perimeter.
2. Seams lapped and sealed with tape.

Section 09 65 00 – Resilient Flooring

A. Sheet Vinyl Flooring – Used in Restroom
1. Slip Resistant Vinyl Safety Flooring:

a. Acceptable Manufacturers
   i. Alto USA, Inc.
   ii. Others with approval of KISD
b. Provide integral coved base.

Section 09 65 19 – Resilient Tile Flooring

A. Installation Locations:
   1. Classrooms
   2. Hallways
   3. Common Areas
   4. Elementary Activity Rooms
B. Material:
   1. Luxury Vinyl Tile
      a. No wax recommended by manufacturer
      b. 20 mil wear layer
      c. Minimum tile size: 12" x 12"
      d. Approved Manufacturers
         i. Mohawk – Matuto Plus, Living Local, Morikato Stone, Select Step
         ii. Mannington – Spacia Locksolid, Abstract Stone, Natures Path
         iii. Armstrong – Natural Creations
         iv. Karndean Art – Select Line including Van Gogh, Michelangelo and Da Vinci
   2. Resilient Base
      a. Material is to be rubber. Vinyl base is not allowed.
      b. Approved Manufacturers:
         i. Roppe
         ii. Johnsonite
         iii. Burke Mercer
         iv. Others with approval by KISD
C. Attic Stock Material:
   1. Extra Flooring Material: 2% of each type and color.
   2. Extra Base Material: 2% of each type and color.
   3. Extra Stair Material: 2% of each type and color.

Section 09 68 00 – Carpeting

A. Any existing carpeting removed for renovation must be recycled.
B. Installation Locations:
   1. Library
   2. Conference Rooms
   3. Entry Vestibules
   4. Offices (Optional)
C. Installation:
   1. Glue down installation
D. Approved Manufacturer:
   1. Interface – Cubic and Cubic Colours – Library, Conference Rooms, Offices
   2. Interface – Quickship Entry Level Black – Entry Vestibules
   3. No other options
E. Attic Stock Materials:

1. Extra carpet tiles: 5% of total installed for each color and pattern.

Section 09 90 00 – Painting

A. General: Staining & Transparent Finishing; Decorative Finishing; High-Performance Coatings; Special Coatings
   1. Graffiti sealing is required on all building envelopes to top of second-level at a minimum. Application method of sealant must not come into contact with the ground or waste water systems.
   2. No application of varnish within occupied buildings.

B. Attic Stock Material:
   1. High Schools: 20 gallons of each field color/type. 5 gallons for each trim and accent of each color/type
   2. Middle Schools: 15 gallons of each field color/type. 4 gallons for each trim and accent of each color/type.
   3. Elementary Schools: 10 gallons of each field color/type. 3 gallons for each trim and accent of each color/type.
   4. Additions and Renovations: 10 gallons for each field color/type. 3 gallons for each trim and accent of each color/type.
   5. Draw-downs and final list/matrix of all finish paint are required at project completion within O&M Manuals.

C. Finishes:
   1. Public spaces and trim: use semi-gloss finish that may be cleaned with soap and water.
   2. Private spaces: use eggshell or semi-gloss finish.
   3. Flat finishes are prohibited.

D. Approved Manufacturers:
   1. Sherwin Williams
   2. Kelley-Moore
   3. PPG Paints
   4. Others with approval of KISD

Division 10

SPECIALTIES

Section 10 00 00 - General

A. General:
   1. Avoid custom material(s) or material(s) that require significant specialized maintenance.
   2. Construction documents must clearly identify and note specialty items, including their locations and mounting information.
   3. All signage must comply with the Americans with Disabilities Act accessibility guidelines and the Texas Accessibility Standards (TAS).

Section 10 11 00 – Visual Display Surfaces

A. Architect shall verify specific products required as dictated by the grade level(s) to be included in the program. Specify only factory assembled units. Units shall be mechanically fastened. No gluing of boards to substrate.

B. For "White Boards" used to display content from short or long throw projectors, display board must be designed for projector use and not just a standard board.

C. Approved Manufacturers:
   1. MooreCo., Inc.
   2. Claridge Products and Equipment, Inc.
   3. Polyvision Corporation
   4. American Visual Display Products
   5. Others with approval from KISD.

D. Products:
   1. Markerboards
      a. Claridge, Series 1, Type A
      b. 8 Ft. Maximum length
   2. Tackboards
      a. Claridge, Claridge Cork
      b. 8 Ft. Maximum length
   3. Bulletin Boards
      a. Claridge, Contemporary Series, Model 2044
      b. 8 Ft. Maximum length
   4. Exhibit Rails
      a. Claridge, Model EDR with Claridge Cork
   5. Writing Surface
      a. MooreCo., Inc., Sharewall Full Wall Magnetic Whiteboard
   6. Accessories
      a. Map rail

b. Map supports
c. Flag holders – 2 ea.
d. Display hooks – 4 ea.

Section 10 14 00 - Signage

A. Approved Manufacturers:
1. Room and Door Signs
a. Best Sign Systems, Inc.
b. Bayuk Graphics Systems, Inc.
c. Fast Signs
d. Kroy Sign Systems
e. Mowhawk Sign Systems, Inc.
f. ASI Signage
g. Others with approval of KISD
2. Building Title Signs
a. A.R.K. Ramos Signage Systems
b. ASI Signage
c. Best Sign Systems, Inc.
d. The Southwell Company
e. Others with approval of KISD
3. Post Mounted Marquee Signs – Non-Illuminated Only
a. Atlas Sign Company
b. Coppin Sign Company
c. Others with approval of KISD
4. Plaques
a. The Southwell Company
b. Others with approval of KISD
B. Installation:
1. Marquee Signs
a. Install so that bottom of sign is no less than 10 feet above finish grade.

Section 10 21 13 – Plastic Toilet Partitions

A. Toilet partitions shall be solid plastic (HDPE), floor mounted, and overhead braced.
B. All toilet partition hardware shall be as follows:
1. Pilaster Shoes – Stainless Steel
2. Pilaster Brackets – Stainless Steel
3. Head Rails – Anodized Aluminum
4. Wall Brackets – Continuous Stainless Steel
5. Attachments, Screws, and Bolts – Stainless Steel
6. Door Strike and Latch – Heavy Duty Extruded Aluminum
C. Hinges:
1. Door hinges to be continuous type, gravity close, stainless steel.

Section 10 26 00 – Wall Protection (Corner Guards)

A. Approved Manufacturers:
   1. Inpro
   2. Musson
   3. Koroseal
B. Provide in all public spaces, service areas and at specialty finishes.
C. Protect outside corners of gypsum board partitions in public corridors to minimum 48" height.

Section 10 28 13 – Toilet Accessories

A. Contractor Furnished-Contractor Installed Toilet Accessories:
   1. Mirrors
   2. Grab Bars
   3. Robe/Towel Hooks
   4. Soap Dishes
   5. Shower Seats – Solid Plastic
   6. Shower Curtain Rods – Stainless Steel
   7. Shower Curtain Hooks – Stainless Steel
   8. Shower Curtains – Nylon Reinforces, Anti-Bacteria Fabric
   9. Fold Down Accessible Dressing Bench
   10. Electric Hand Dryers
   11. Approved Manufacturers
      a. Toilet Aceesories
         i. Bradley Corporation
         ii. Bobrick Washroom Equipment
         iii. GAMCO
         iv. American Specialties
         v. Kimberly Clarke Professional
         vi. Others with approval by KISD
      b. Electric Hand Dryers – Specify only hand dryers that dry in less than 20 sec.
         i. Bradley Corporation
         ii. Bobrick Washroom Equipment
         iii. America Dryer
         iv. Others with approval by KISD
B. Owner Provided – Contractor Installed Toilet Accessories:
   1. Contractor is to give KISD counts for each item below
      a. Roll Paper Towel Dispenser – Merfin 51080
      b. Toilet Tissue Dispensers – Tork 66TR Jumbo Roll 9"
      c. Soap Dispensers – DEB ADA9134
      d. Sanitary Napkin Dispensers – Tough Guy 1ECK9A

Section 10 40 00 – Electronic Marquee Signs

A. Features:
   1. Shall include shading, additional text effects and increased memory capacity.
B. Technical Specifications:
   1. Cabinet Configuration: Front access, ventilated single cabinet.

2. Graphic Capability: Text, graphics, logos, basic animation, multiple font styles and sizes.
3. Power: 120/240 VAC single phase.
4. Cabinet Size: 3'-10" high x 7'-10" wide x 8" deep.
5. Minimum viewing distance: 45' or 76' depending on speed and size of thoroughfare from which the sign will be seen.
6. Number: One (1) double-sided marquee signs.
7. Locations: As shown on drawings.
8. Approved Product/Manufacturer:
   a. Daktronics, Inc.
   b. Other approved by KISD
9. Minimum Warranty: 5 years (10 years preferred).

Section 10 43 00 – Eyewash and Safety Showers

A. Must be constructed and installed to meet the most current ANSI standard.
B. Install in Science Labs and other areas where hazardous chemicals are used.
C. Equipment should be located as close to the hazard as possible or at the most, within 10 seconds of unobstructed travel to the hazard.
D. Identify location(s) with a highly visible sign.

Section 10 44 13 – Fire Extinguisher Cabinets

A. Type:
   1. Semi-Recessed with 2-1/2" return trim rolled edge.
B. Doors:
   1. In athletic and shop areas – Use solid doors only.
   2. In all other areas – Door to include glass window.
   3. Shall have vertical die cut lettering "Fire Extinguisher" in color selected by Architect.
C. Hardware:
   1. Continuous concealed piano hinge of constructed material which matches door and trim material. Size: Determined by Architect.
D. Finish:
   1. Brushed Aluminum
E. Approved Manufacturers
   1. For both Rated and Non-Rated Locations
      a. Larsen
      b. Others if approved by KISD

Section 10 44 16 – Fire Extinguishers

A. Approved Manufacturers
   1. Buckeye Fire Equipment
   2. Others if approved by KISD

Section 10 75 00 – Flagpoles

A. Approved Manufacturers:
   1. American Flagpole
   2. Concord Industries
   3. Pole-Tech Co., Inc.
   4. Acme Flagpoles Company, Division of Lingo, Inc.
   5. Babcock Davis Associates, Inc.
   6. Morgan-Frances Associates, Inc.

B. One (1) per School.

C. Provide flagpole with external halyard system.

Division

11

EQUIPMENT

Section 11 23 36 – Commercial Appliances

A. Athletics:
   1. Washer and Dryers:
      a. Approved Manufacturer
         i. Unimac
         ii. Washer/Extractor – 65 pound capacity
         iii. Dryer – 120 pound capacity

Section 11 40 00 – Foodservice Equipment

A. Verify foodservice specifications, equipment and sample floor plan requirements with KISD Nutrition Director.
B. Fire suppression equipment and the freezer/cooler condenser shall be free of CFCs.

Section 11 46 83 – Ice Machines

A. "Cube" Ice machines are to be used in:
   1. Kitchens – Manitowoc NXT IFO 600 unless Kitchen Consultant recommends a different unit.
B. "Nugget" Ice machines are to be used in:
   1. Athletic Trainer's Room – Manitowoc RNF 620 or similar
   2. Field Houses – Manitowoc NXT ITO 750 or similar
   3. Teacher's Lounges or Break Rooms – Manitowoc RNF 320A or similar

Section 11 61 43 – Stage Curtains

A. Fire Rating:
   1. Stage curtain material fabric must be permanently and inherently flame retardant. No other fabric types are allowed.
   2. Require written certification of flame-retardants at project closeout.
B. Fabric: Black at back curtain, color at front.
C. Front Setting: Valance, front curtain, and tormentor legs. "Prestige" synthetic velour finish fabric by Texas Scenic, inherently flame retardant, 26 ounce. Color selected by Owner and Architect from manufacturer's full line of available colors.

D. Side Cyclorama Legs, Rear Cyclorama, and Borders: synthetic velour finish seamless fabric, inherently flame retardant, 16 oz. Color selected by Owner and Architect from manufacturer's full line of available colors.

E. Black box Curtains: (Floor to Pipe Batten): synthetic velour finish fabric, inherently flame retardant, 16 oz. Color selected by Owner and Architect from manufacturer's full line of available colors.

Section 11 68 00 – Outdoor Athletic Equipment

A. Acceptable Manufacturers:
   1. MLCO Manufacturing Company
   2. Draper, Inc.
   3. Porter Athletic Equipment Company
   4. Others if approved by KISD

B. Elementary and Middle Schools:
   1. Verify current specifications with KISD Athletic Director

C. High School:
   1. Football Goal Posts
      a. Single padded support post (twin cantilever) 6 foot offset pipe supports of 4-1/2 inch O. D. pipe welded together.
      b. Top uprights 2-3/8 inch O. D. capped tops. Galvanized steel support.
   2. Basketball Backstops
      a. Fan shaped aluminum or fiberglass backboard.
      b. 3-1/2 inch O.D. galvanized steel upright with 3-foot extension (adjustable to 7', 8' 6", or 10' heights) with official size hoop and chain net.
   3. Tennis Nets
      a. 1-3/4 inch square, 4.0 mm double braided black polyethylene netting.
      b. Net tie cables and center tie-down.
      c. Double grommets on top binding.
      d. 47 inch by 7/32 inch vinyl coated steel cable.
   4. Tennis Posts
      a. 4-1/2 inch O. D. galvanized pipe 6'-6" long for official 3'-6" above and 3 foot below ground level.
      b. Steel ratchet reel gear and pawl.
   5. Soccer Goals
      a. 4-1/2 inch O. D. galvanized pipe - 8'-0" high by 18'-0" long for girls and 24"-0" long for boys.
      b. One net for each goal.

Section 11 68 13 – Playground Equipment

A. General
   1. Provide location, drainage and accessible ADA-compliant concrete sidewalk.
   2. Play equipment should comply with the most recent Americans with Disabilities Act requirements and with Consumer Products Safety Commission guidelines (CPSC), ASTM and IPEMA.
   3. For schools with pre-kindergarten classes, provide play components set "A" described below. For preliminary site planning purposes, allow approximately 34'x37' area (includes area of protective surface.) For schools with kindergarten and any combination of grades 1-5, provide play components set "B" described below. For preliminary site

planning purposes, allow approximately 59'x42' area (includes area of protective surface.)

4. For schools with pre-kindergarten, kindergarten, and any combination of grades 1-5, play component set "A" may be located near the Pre-kindergarten and kindergarten. For safety of all the children, it is preferred that the play components set "B" be located in a different area of the play yard.
5. For both "A" and "B" play components, provide woof fiber chip fall surfaces. Additional information is provided below.
6. All play structures shall have 5" OD posts and should be heavy-duty equipment suitable for schools.
7. Fall Surface shall be a mix of random-sized, IPEMA certified, engineered wood fiber system over a 100% polyester, non-woven geotextile fabric. Provide sloped subgrade and voids through the perimeter edging for positive drainage. Edging materials shall be 4' long by 12" high and 4" wide made of high-density polyethylene. Provide area drains in general vicinity if needed.

B. Manufacturer Quality Level:

1. Miracle Recreation Equipment Co. / "Kid's Choice"
2. Little Tykes / "Kid Builders"
3. Game Time / "Powerscape"
4. Lone Star Recreation Inc. "PlaySense"
5. Others with approval of KISD.

C. Play Equipment Component Sets:

1. Grade: Pre-K

a. Play Equipment Component Set "A"

Qty	Description
1	Hexagonal Deck
1	Hexagonal Roof
1	ADA transfer point
1	Tube slide
1	Spider climber
1	Side-by-side slide
1	Curved loop climber
1	Mirror panel
1 pair	Fun Fones
3	"C" spring riders (various designs)

2. Grades: K-5

a. Play Equipment Component Set "B"

Qty	Description
5	Square decks
2	Square roofs
1	Horizontal ladder with end climber
1	Twister slide, 3 foot tall
1	Bumper climber
1	Suspension bridge
1	ADA transfer point
1	Climbing point
1	Cargo climber
1	Mongul slide, 4 foot tall
1	Typhoon slide, 6 foot-2 inches tall
1	Kids perch with wheel
1	Alphabet panel

1	Chinning bar
1	Balance beam
4	Free-standing bongos

Section 11 68 43 – Scoreboards

A. Approved Vendors
   1. Daktronics
   2. The Spectrum Corporation
   3. Nevco Scoreboard Company
   4. Trans-Lux/Fair-Play

B. Middle School
   1. Football
      a. Basis of Design: Daktronics FB-2020
      b. Wireless Control: Daktronics All Sport 5000
      c. Semi-Automatic track timing: OmniSport 2000 Console
   2. Timing Display
      a. Basis of Design: Daktronics TI-2003
      b. Wireless Control: Daktronics All Sport 1600
   3. Indoor Sports
      a. Basis of Design: Daktronics BB-2105
      b. Wireless Control: Daktronics All Sport 5000

C. High School - TBD

Division 12

FURNISHINGS

Section 12 30 00 – Educational Casework

A. Materials:
   1. Solid wood (Owner to select type of wood via samples provided by Vendor).
   2. Plastic laminate clad.

B. General:
   1. All exposed surfaces (interior and outside) of all casework are required to be finished.
   2. Cabinet doors and drawers that are indicated under the casework description to have locks shall utilize COMPX National Stock Lock – Cam Lock – C8051-KD-14A. Randomly keyed with bright nickel finish. All cabinet locks within a single room shall be keyed alike unless noted otherwise by KISD.
   3. Eliminate sharp edges by easing corners with curved transitions. At work stations, angle vertical supports back away from the front of the unit to minimize potential damage from chairs and floor maintenance equipment. The selection of edge trim and edge details should be based on endurance under high use.
   4. All plastic laminate casework specifications, standards and construction shall be based on Environments L44 Series manufactured by LSI Corporation of America.
   5. Standard Elementary Books Shelving units are nominal 44" high, 36" wide and 12" deep, anchored to the floor, with each unit having a ¼" plywood back; base shelf and 2 adjustable shelves. All exposed surfaces shall be stained and sealed. Units are constructed of solid wood (red oak) glued in strips no less than 1½" wide. The wood strips shall be matched in wood tone for a consistent uniform appearance. Units shall have 1" thick end panels. Bases shall be solid hardwood 3½" in height.
   6. Shelves shall be 3/4" thick with a 3mm solid edge band on outside edge. Shelves are adjustable and are supported with metal shelf pins in pinholes. The underside of the shelves shall be routed to receive pins.
   7. 2" deep tops shall be continuous over adjacent units and have inset plastic laminate at top and bottom surfaces and solid oak edge band.
   8. All upper cabinets shall have 14" clear depth on the inside of the casework.
   9. Provide graphics holders at end panels.

C. Plastic Laminate Clad Casework:
   1. Materials
      a. Use of particle board is limited to side or divider vertical components only.
      b. All other components should be specified as plywood, including cabinet doors, shelves, and all lower cabinet backs and dividers.
      c. At areas around sinks, specify moisture resistant plywood.

Section 12 35 00 – Laboratory Casework

A. General:
   1. All methods used in construction shall conform to the best practices of the Scientific Laboratory Equipment Industry, including any specialized materials required.
   2. All exposed surfaces (interior and outside) of all casework are required to be finished.
   3. Cabinet doors and drawers that are indicated under the casework description to have locks shall utilize COMPX National Stock Lock – Cam Lock – C8051-KD-14A. Randomly keyed with bright nickel finish. All cabinet locks within a single room shall be keyed alike unless noted otherwise by KISD.
   4. All laboratory casework and equipment specifications, standards and construction shall be based on LSI Science and Technology Systems by LSI Corporation of America.
   5. Table tops and counter tops in science classrooms to be solid epoxy.

B. Finish:
   1. Highly chemical resistant modified acrylic urethane finish with built-in U.V. blocker or equal finish applied over stain of selected color.
   2. Table Tops and Work Surfaces
      a. Factory molded tops of modified epoxy resin formulation, uniform mixture throughout full one (1) inch thickness.
      b. Color shall be non-glare black
      c. Provide integral epoxy resin sinks where sinks are shown in the classroom.

C. Laboratory Equipment – Contractor Furnished – Contractor Installed:
   1. Fume Hoods
      a. ADA Accessible, 48” wide
      b. Double sided, 60” wide
   2. Emergency Shower/Eyewash
      a. ADA compliant, floor mount with extended eye/face wash and pull rod for wheelchair use.
      b. ADA compliant, deck mounted eye/face wash, 90° swivel type, with dual heads and flag handle operation LSI model # 60625 or 60626 (at Preparation rooms only).
      c. See Section 10 43 00 for additional information.
   3. Safety Goggles Compartment Case
      a. Provide 15 minute timer.
      b. Furnish with 70-75 pairs of fog free, non-vented goggles.

D. Laboratory Equipment – Owner Furnished – Owner Installed:
   1. Acid/Corrosive Storage Cabinet (Verify if purchased as FFE)
      a. Capacity – 45 Gallons
      b. Finish: Corrosive-resistant blue epoxy enamel paint.
      c. Label: Cabinet doors shall be labeled “Caution CORROSIVES.”
      d. Dimensions: 65 inches high x 43 inches wide x 18 inches deep.
   2. Flammable Storage Cabinet (Verify if purchased as FFE)
      a. Capacity: 45 gallons.
      b. Finish: Two (2) coats of yellow epoxy enamel paint.
      c. Label: Cabinet doors shall be labeled “FLAMMABLE Keep Fire Away.”
      d. Dimensions: 65 inches high x 43 inches wide x 18 inches deep.
   3. Fire Blanket (Verify if purchased as FFE)
      a. Type: Fire retardant treated woolen blanket in vinyl-coated nylon, quick release tote.
   4. Laboratory Pegboard (Verify if purchased as FFE)

a. Type: 1.25 inch epoxy board, 30 inches x 30” inches with (46) 5 inch long polypropylene legs.

Division 13

SPECIAL CONSTRUCTION

Section 13 47 13: Cathodic Protection

A. Installation shall not begin until KISD and Engineer of Record approve shop drawings.

Section 13 91 00 – Laboratory Safety Device System

A. General:
   1. Provide for utility controllers in the following locations.
      a. High School: Science and Prep Rooms.
      b. Junior High School: Science and Prep Rooms.
   2. Provide control for: Electricity, Water, and Gas Systems.

B. Acceptable Manufacturer:
   1. ISIMET Utility Controllers and Companion Enclosures

Division 14

CONVEYING SYSTEMS

Section 14 42 00 – Elevators

A. General:
   1. Elevators installed in KISD schools shall be Electric, Machine-Room-Less.
B. Acceptable Manufacturers
   1. Schindler
   2. Thyssen Krupp
C. Basis of Design:
   1. Schindler 3300
      a. Capacity – 3,500 lbs.
      b. Components and Finish
         i. Stainless Steel (satin finish) doorways, walls, and panels. Wall colored or printed plastic-laminate panels may be an alternate to match or compliment the color scheme of the structure.
         ii. Brushed Aluminum tubular metal handrails (11/2" rounded tubular or ½"x1½" rectangular are acceptable)
         iii. Floor material type and color shall match the floor space outside the elevator doors.
         iv. All surfaces and fixtures shall be designed to be vandal resistant.
         v. LED lighting and fan controls shall be in-use or occupancy dependent to conserve energy use.

Division 22

PLUMBING

Section 22 05 00 – Common Work Results for Plumbing

A. For construction performed within the City of Killeen's Jurisdiction, all condensate is required to be conveyed out of a building via a storm drain system, not by means of the sanitary system.

B. Plumbing System Criteria for New Work:

1. The design shall include a freeze proof wall hydrant (cold water only) with vacuum breaker in the following areas: Central Plant Mechanical rooms and in the service yard near the kitchen service door.
2. Lift stations shall not be used unless express written consent by KISD is received.
3. Domestic hot water temperature shall be supplied at the temperatures indicated in the chart below.

Space	Use	Water Temp
Kitchen	Dishwasher	180º
Kitchen	3-compartment sink	140º
Faculty/Staff Restroom	Hand Lavatory	105º
Student Restroom	Hand Lavatory	Cold or Tempered to 85º -90º
Special Ed, Pre-K, K	Hand Lavatory	Cold or Tempered to 85º -90º
Can Wash	Hose Bibb	105º
Janitor Closet	Janitor Sink	105º
Space	**Use**	**Water Temp**
Athletic Facility Laundry	Washing Machine	140º
Art/Science	Sinks	Cold Water
Shower	Shower Heads	105º

4. Gas piping on roofs shall be supported by manufactured freestanding pipe supports. See Section 22 10 00, A, 13.a for acceptable manufacturers.
5. Size underground domestic water, sanitary, and storm drainage piping to accommodate future additions of 15%.

6. Water and gas lines under drives and walkways shall be sleeved with schedule 40 PVC, at least two pipe sizes larger than the supply line.
7. All restrooms, clinics, planting areas, custodial rooms, mech. rooms, and emergency shower and eye wash areas shall have a floor drain installed.
8. The design of the roof drainage systems shall incorporate roof drains and overflows. All roof drain covers will be cast iron with a minimum of 6-inch height. The overflow system shall be piped independently and connected vertically to the roof drain down spout. The overflows shall be located in locations readily visible. (Discharge overflow above grade if required by local authority having jurisdiction).
9. The building domestic hot water systems shall consist of central and point of use water heaters, depending on location and usage. The kitchen shall have a stand-alone domestic water heater.
10. Lavatories serving students shall have single, self-closing faucets (cold water only as per table). Classroom sinks shall have single faucets with goose necks with cold water only, except as noted elsewhere.
11. Design such that all sanitary sewer, water lines, and storm drain lines do not pass over MDF, IDF, or Electrical Rooms.
12. The specifications shall state that all drain lines (roof, sanitary, and condensate) shall be flow-tested prior to the contractor obtaining a notice of substantial completion.
13. Stadium/Sports Facilities:
    a. The building domestic hot water systems shall consist of central and point of use water heaters, depending on location and usage.
    b. All shower facilities shall have hot and cold water with standard fixtures. The shower valves shall be anti-scalding type.
    c. Provide a lint trap for facilities with commercial washing machines, sized per governing code.
14. Kitchens
    a. Water heater for kitchen shall be a standalone system.
    b. The hood fire protection system should be included with the hood.
    c. Coordinate installation of an automatic gas shut off valve for gas cooking equipment with food service consultant.
    d. Provide a grease trap, sized per governing code.
    e. Provide softened water to the dishwasher.
    f. Provide reverse osmosis (R/O) processed water to the Combi-Ovens. Do not flow softened water through the R/O system.
15. Required Plumbing Appurtenances
    a. Vent Stack Odor Barrier: The Green Solution 2" SureSeal Vent Guard, Model #SS214VG.
    b. Inline Floor Drain Trap Sealer: The Green Solution 2" SureSeal, Model #SS2009V.

C. Plumbing System Criteria for Renovations or Reconstruction Work:
1. Scope of Inspection:
    a. The intent of the following is to provide minimum levels of required inspection by the designing engineer prior to and in conjunction with the renovation/addition design.
        i. Pre-Inspection Meeting
            (1) Maintenance Staff
                (a) Review existing equipment history.
                (b) Discuss any maintenance issues.
                (c) Review suggested/requested work to be done.
        ii. Engineer's Walk Through

(1) Check fixtures for cracks.
(2) Check piping, faucets, angle stop valves, flush valves and other plumbing brass for leaks. Note signs of water damage.
(3) Inspect drains and any sump pumps.
(4) Inspect concealed (above ceiling) systems: Piping, Insulation.
(5) Submit Engineer's Evaluation including changes in budget and scope.

D. Plumbing Specialties: Acceptable Manufacturers:
1. Roof and Floor Drains, Interceptors, Cleanouts, Water Hammer Arrestors
   a. MFGR
   b. J.R. Smith
   c. Zurn
   d. Josam
   e. Wade
   f. Precision Plumbing Products
2. Back Flow Preventers
   a. Watts
   b. Febco
   c. Wilkins
3. Thermostatic Mixing Valves
   a. Lawler
   b. Powers
4. Hose Bid Hydrants
   a. Chicago
   b. Josam
   c. Woodford
   d. Zurn
   e. J.R. Smith
   f. Wade

Section 22 10 00 – Plumbing Piping and Pumps

A. General:
1. All buried piping shall be buried a minimum of 30" below finished grade including domestic water, gas, sewer and storm sewer.
2. Provide shut-off valve for each battery of fixtures located above ceiling near each bathroom.
3. Instructional piping (water, gas, air, etc.) in any area used by students, route the supply lines through the storage or prep room and install control valves with remote actuation. A separate set shall be installed for each individual teaching space, accessible only by the teacher.
4. Drainage piping below slab shall be service weight cast iron bell and spigot or schedule 40 PVC.
5. Interior draining piping above grade shall be schedule 40 PVC.
6. Exterior condensate piping shall be copper, Type M, with Pro-Press fittings.
7. Domestic water below grade shall be ductile iron-ASHI/AWWA C151, C900 PVC and copper ASTM B88 Type K. Above grade, copper ASTM B88 Type L, hard drawn.
8. Where buried gas piping and fittings shall be schedule 40 black steel with welded joints, coated with bitumastic and wrapped with asphaltic tape. Buried pipe shall have a minimum depth of 30" and be sloped to prevent pockets. Gas piping with 5 pound working pressure or less may be yellow polyethylene with socket heat fusion joints and fittings. Polyethylene piping shall be SDR 11 or SDR 11.5 per their respective size.
9. Gas piping 2-1/2" and larger shall have welded connections while piping under 2-1/2" shall have screwed connections.
10. Locate gas meter in the service yard closest to the facility/mechanical room and protected by bollards.
11. Valves 2-½" and smaller shall be cast brass with stainless steel ball and stem; 3" and larger shall be gate valves.
12. Butterfly valves are not acceptable for any plumbing applications.
13. Flexible pipe connectors (Steel and Copper), Expansion joints (bellows type), Flexible couplings, and Accessories.
    a. Acceptable Manufacturers
        i. Amber Booth
        ii. Triplex
        iii. Mercer Rubber Company
14. Gas and Condensate Piping Roof Supports
    a. Acceptable Manufacturers
        i. Miro Industries – Model 3 RAH (3" or less)
        ii. Portable Pipe Hangers (PPH) – Model PP 10.
        iii. MAPA – Model MS-5
15. Provide housekeeping pads for all floor mounted equipment.

B. Plumbing Line Protection:
1. Specify that placing or washing materials, including, but not limited to the following, down any plumbing line or fixture is strictly forbidden.
    a. Concrete, cement, sludge, mortar, grout, plaster, or any other cementitious material
    b. Paint, paint thinner, turpentine, kerosene, gasoline, oil, or any other petroleum or hazardous products.
2. Cleaning painting equipment, including brushes in new or existing plumbing fixtures is strictly prohibited.

3. Contractor shall certify that all affected plumbing lines and fixtures are clean, free flowing and running with no apparent leaks or maligned connections. Plumbing lines and fixtures damaged as a result of any of the above shall be repaired or replaced at no expense to Owner (especially during the warranty period). Contractor shall bear responsibility and all costs of fines, penalties, and legal fees attributed to violations as levied by authorities having jurisdiction.
4. Provide at least one (1) hose bib on each side of the school. Confirm total count with KISD.

Section 22 15 00 – General Service Compressed Air

A. Acceptable Manufacturers:
1. Quincy
2. Ingersoll Rand
3. Champion

Section 22 30 00 – Plumbing Equipment

A. Acceptable Manufacturers:
1. Pumps
   a. Weil
   b. Chicago
   c. Taco
2. Hot Water Circulator Pumps
   a. Bell & Gosset
   b. Taco
   c. Grunfos
   d. PACO
   e. Armstrong
3. Pressure Boosters
   a. Bell & Gosset
   b. Armstrong
   c. NAMCO
   d. Syncroflo
4. Grinder Pumps
   a. ABS
   b. Dorr Oliver
   c. Vaughan
   d. Weil
   e. Hydromatic
5. Sewage Pumps
   a. Chicago
   b. Weil
   c. Vaughan
   d. Weinman
   e. PACO
   f. Hydromatic
6. Sump Pumps
   a. Barnes

b. ABS
c. Vaughan
d. Wienman
e. PACO
f. Weil
g. Hydromatic

7. Hot Water Storage Tanks
   a. A.O. Smith
   b. Reco
   c. Lochinvar
   d. Hot Water Storage Tank shall include the following:
      i. Coated interior
      ii. Inspection access opening
      iii. Accessibility for cleaning
      iv. Drain
8. Water Conditioners (Water Softeners):
   a. Specify the use of this equipment only when recommended by the Kitchen Equipment Manufacturer. Zero-grain water softeners shall be installed such that it services the dishwasher in the kitchen only. Locate installation in easily accessible area for maintenance.
   b. Softener shall operate at designed flow rate with a maximum pressure drop of 5 PSI.
9. Water Filtration Devices:
   a. Filters shall remove odor and taste from water.
   b. Acceptable Manufacturers
      i. Cuno
      ii. Aqua Pure
10. Water Heaters
   a. Storage Type
      i. 5 year warranty against leakage
      ii. Acceptable Manufacturers
         (1) A.O. Smith
         (2) Rheem
         (3) State
   b. Non-Storage Type
      i. Acceptable Manufacturers
         (1) Lochinvar
         (2) Ray Pak
         (3) Lars
   c. Provide circulating return, pumped and controlled by an aquastat and scheduled by BAS to run only during the occupied mode on hot water runs in excess of 40 linear feet of pipe length.
   d. Point of Use Type
      i. Acceptable Manufacturers
         (1) E-Max
         (2) Powerstream
         (3) Chronomite
   e. ASME rating is not required for water heaters under 120 gallons and 200,000 BTUH in capacity.
11. Storage Tanks (Surge and Break Tanks)

a. ASME rated
b. Shall be internally coated if used for domestic water.

Section 22 40 00 – Plumbing Fixtures

A. General:
   1. Urinals shall be ½ gallon flush in lieu of 1 gallon with ½ gallon flush valves.
   2. Boys and Girls lavatory faucets shall be metered, push type.
   3. Toilet seats shall be solid white plastic, open front, elongated, with sustaining hinge and without cover.
   4. All elementary science rooms, art rooms, faculty workrooms, and main custodial rooms shall have stainless steel sinks.
   5. Middle and high school science laboratories shall have epoxy sinks and counters.
   6. Flush Valves – manual, no electric automatic flush valves allowed.
   7. Tepid water, as defined by ANSI standard #2-358, shall be provided for all emergency shower and eyewashes.

B. Fixture Acceptable Manufacturers
   1. Water Closets, Urinals, Lavatories, and Showers
      a. American Standard
      b. Kohler
      c. Crane
         i. Basis of design for lavatories: American Standard – Rondalyn Countertop Sink.
   2. Lavatory Faucets – For Classroom Bathrooms and Boys & Girls Restrooms
      a. T&S Brass and Bronze Works, Inc.
      b. Moen
      c. Speakman
         i. Basis of design for lavatory faucets: T&S Brass and Bronze Works, Inc. – Model No. B-0712. A brass cartridge is required.
   3. Stainless Steel Sinks
      a. Elkay
      b. Just
      c. Moen
   4. Mop Sinks
      a. Floor Mounted – Non-Metallic
         i. Sterns Williams
         ii. Fiat
   5. Shower Valves
      a. Symmons
      b. Chicago
      c. Shower Systems
      d. Bradley
      e. Acorn
      f. Wiloughby
   6. Flush Valves
      a. Sloan
      b. Zurn
   7. Drinking Fountains – Refrigerated, Non-Filtered
      a. All Schools
         i. Single Fountain - Halsey Taylor: Model HVR8
         ii. Bi-Level – Halsey Taylor: HVR8BL
   8. Bottle Filling Station - Refrigerated, Non-Filtered
      a. All Schools

i. Single Filler - Halsey Taylor: Model HTHB-HVR8-NF
ii. Bi-Level – Halsey Taylor: Model HTHB-HVRGRN8BL-NF

9. Emergency Fixtures
    a. Bradley
    b. Haws
10. Food Prep Hand Sink
    a. Electronic AC Faucet 116.124.AB.1 by Chicago Faucet with dual beam infrared sensor and hardwire transformer 240.631.00.1 or equal.

Section 22 66 00 – Chemical Waste Systems

A. Laundry Waste System:
    1. Shall have lint trap and sampling well.
B. Acid Waste System:
    1. Acceptable Manufacturers
        a. Park Equipment
        b. Rockford
        c. Green Turtle
        d. Ipex
C. Piping:
    1. Acid resistant piping and fittings shall be schedule 40 PVDF Fusion Joint Polyvinylidene Flouride for above and below grade/slab applications. Above grade applications shall include PVDF piping with UL listing for use in return air plenums; buried, below grade piping or piping in non-return air plenums need not be plenum rated.
    2. A city/county approved neutralization basin of concrete construction, HDPE or CPVC epoxy lining outside the building, shall be provided.
    3. Approved Manufacturers
        a. Orion
        b. George Fisher
        c. Enfield
        d. Zurn
D. Oil Waste System:
    1. Shall have prefabricated oil separator and sampling wells.
    2. Acceptable Manufacturers
        a. J.R. Smith
        b. Josam
E. Grease Waste System:
    1. Shall have grease traps and sampling wells.
    2. Acceptable Manufacturers
        a. Park Equipment
        b. Rockford
        c. J.R. Smith
        d. Zurn
        e. Josam

Division 23

HEATING, VENTILATING, AND AIR CONDITIONING

Section 23 05 00 – Common Work Results for HVAC

A. General:
   1. Substitutions
      a. Product manufacturers are listed to establish a level of quality on the products. Substitutions may be allowed if the product is equal to or better than what is listed in the design guidelines, as determined by the A/E and the District upon submittal of comparison products.
         i. HVAC Equipment Manufacturers (Chillers, RTU's, etc.)
         ii. DDC Controls (Control System) – Use approved vendors only.
         iii. Chemical Treatment

B. Design Criteria:
   1. Outdoor Environmental Design Criteria
      a. Summer 96/77 °F
      b. Winter 20 °F
   2. Indoor Environmental Design Criteria
      a. Summer 72 °F +/- 2 °F
      b. Winter 72 °F +/- 2 °F
   3. Relative Humidity: 55% RH (+/- 5%)

C. Outside Air Systems:
   1. The HVAC system shall comply with the IECC 2018 and ASHRAE 62. The IAQ method of ASHRAE 62 to reduce outside air is preferred, specifically with the use of bipolar ionization.
   2. Minimum 24" curbs required for HVAC installation.
   3. When required, CO2 sensors with modulating damper – placed side-by-side only, sensors will never be installed over/under other sensors. All voids will have insulation backing to ensure sensors do not detect conditions in void spaces. As the District is now utilizing the use of bipolar ionization, coordinate locations of CO2 sensors with KISD.
   4. When possible, Electrical and MDF/IDF rooms will have a dedicated HVAC unit.

D. HVAC System Criteria for new work:
   1. General Requirements
      a. KISD utilizes an Energy Management Control System (EMCS) to control the HVAC systems including air handling equipment, exhaust fans, pumps, chillers, etc., to control temperature and humidity and to allow for remote monitoring. The system shall be programmed to control occupied and unoccupied modes.

Refer to section 23 09 00 for more details. EMCS installation contractor shall provide training as per 23 09 00 Part 3, 3.1 Training.

b. All ductwork shall be inside the building.

c. All ductwork shall be concealed wherever possible unless exposed design is specified for aesthetic purposes (such as auditoriums, gymnasiums, or cafeterias).

d. Monitoring or control devices in classrooms, public spaces, such as temperature sensors, thermostats, CO2 sensors, occupancy sensors, humidistats, etc., shall be tamperproof. Thermostats shall have blank cover plate with push override or proximity sensor override.

e. All new HVAC units shall include drain pan level switch alarms, where applicable.

f. All HVAC units, with the exception of those utilized for space conditioning the MDF and IDF rooms shall:

i. Be able to actively or passively control humidity.

ii. Control CO2. Confirm with KISD if this will be required.

2. All mechanical systems shall be designed to minimize the sound levels in occupied spaces. The maximum acceptable sound levels shall be as shown in the table below:

Type of Space	Maximum Allowable Sound Level Room Criteria Method RC(N)
Auditorium	25
Library	25
Cafeteria	40
Gymnasium	40
Kitchen	40
Elementary Classroom	30
Middle School Classroom	35
High School Classroom	35
All other occupied spaces	35

a. BACnet Interface cards shall only be installed & started up by equipment manufacturer's representative on chillers, OAHU's & Package RTU's if required in order to communicate with KISD BAS.

b. BACnet cards shall be 76.8 KBPS baud rate.

c. They shall be compatible with Delta, Alerton, and Automated Logic controls.

d. They shall be connected as read only.

3. MDF/IDF Rooms

a. Provide 24/7 stand-alone (BCR only) DX HVAC system. Do not locate the Fan/Evaporator section above the network equipment racks.

b. Do not tie control of a/c unit with building EMCS. Monitor only.

4. Ductwork shall be round, double wall construction, stainless steel or galvanized steel with a corrosion protection coating.

5. Kitchens

a. The amount of outside air brought into the kitchen by the air conditioning unit shall be limited to keep the kitchen under negative pressure relative to the main building. The remaining make-up air shall be pulled from the Cafeteria.

b. All kitchen hood exhaust ductwork shall be welded stainless steel.

E. HVAC System criteria for Renovations and Additions:

1. The A/E shall follow criteria for new construction as described in above wherever practical in renovation projects; however, each renovation project is to be evaluated by the A/E to determine its particular needs. The A/E will recommend design solutions that are cost effective and best meet the unique needs of the school being renovated.
2. Scope of Inspection:
   a. The intent of the following is to provide minimum levels of required inspection by the designing engineer prior to and in conjunction with the renovation/addition design.
   b. Pre-Inspection Meeting
      i. Maintenance Staff
         (1) Review consistent hot/cold spots.
         (2) Review existing equipment history.
         (3) Discuss any accessibility issues.
         (4) Discuss any maintenance issues.
         (5) Review suggested/requested work to be done.
   c. Engineer's Walk-Through
      i. Inspect drains and any sump pumps.
      ii. Inspect concealed (above ceiling) systems:
         (1) Ductwork
         (2) Piping
         (3) Insulation
         (4) Cabling (TV, Phone, Data, Communications)
         (5) Submit Engineer's Evaluation
3. All KISD Facilities – Schools, Administration, Athletics, Maintenance
   a. Renovations shall be compatible with the existing system, but shall incorporate changes due to code requirements and advances due to technical development. Where required, code changes shall be incorporated into the new design. Where renovations are so limited that system upgrade to meet current code is not required, the code issues shall still be addressed and will be evaluated case by case by the Engineer. The recommendations will be reviewed by KISD and the final decision will be made by KISD.
   b. Systems for ADDITIONS shall be designed and installed per the requirements of NEW system guidelines to the extent practical. When tying into an existing system, the type system used shall be compatible with the existing.
   c. Survey existing system that shall be modified in order to determine if existing equipment must be upgraded due to code requirements, lack of capacity or equipment no longer working or beyond life expectancy.
   d. Controls shall be the district accepted Energy Management Control System. Use the following chart (next page) to determine if the Controls System "CS" should be tied to the existing system, connected to the centralized monitoring system and/or be installed based on the Section 23 09 00 BACnet specification.
   e. Coordinate with KISD Energy Management Specialist to decide which EMCS design methodology to use.
   f. During construction the contractor shall be in charge of HVAC system and be responsible for keeping the areas outside the scope of work in working condition as per the general design criteria as well as maintaining the humidity level in the area designated as the scope of work. Coordinate with area maintenance.
   g. Mechanical Identification: Provide markers on all piping systems.

Section 23 05 13 – Motors and Motor Controllers

A. Acceptable Motor Manufacturers:
   1. Baldor
   2. General Electric
   3. MagneTec
   4. Marathon
   5. Reliance
   6. Siemens

B. Motor Controller Requirements:
   1. Motors under 1/2 HP shall be 120/1/60.
   2. Motors 3/4 HP and over shall be 480/3/60, provide integral phase failure relay protection for all three-phase motors.
   3. All continuously operating motors shall be of high efficiency design.
   4. All three phase motors located outside shall be TEFC type.
   5. Three phase motors located outside or where they may be subject to physical damage shall have cast iron enclosure.
   6. Motors serving condenser fans shall be totally enclosed (TEFC or TEAO) type. Steel enclosure is acceptable.
   7. Motors serving air-handling units (mounted inside the units) may be open drip proof type.
   8. Motors operating with variable frequency drives shall be specially designed for the application.
   9. Motors shall be selected so they do not operate into the safety factor.

Section 23 05 48 – Sound and Vibration Control

A. Vibration Control:
   1. Acceptable Manufacturers
      a. Amber/Booth Company, Inc.
      b. Mason Industries, Inc.
      c. Noise Control, Inc.

B. Sound Attenuators
   1. Acceptable Manufacturers
      a. Vibro-Acoustics
      b. Rink

Section 23 07 13 – Duct Insulation

A. Ductwork insulation shall comply with IECC 2018.
B. Externally wrap all ductwork, no internal liner unless approved by KISD.
C. Acceptable Manufacturers
   1. Glass Fiber
      a. Knauf
      b. Johns Manville
      c. Owens Corning
   2. Adhesives
      a. 3M
      b. Arabol
      c. Armstrong

3. Ceramic Fiber
   a. Primer Refractories
   b. A.P. Green Refractories
   c. Others with approval of KISD

Section 23 07 16 – HVAC Equipment Insulation

A. Acceptable Manufacturers:
   1. Owens Corning
   2. Armstrong
   3. Johns Manville
B. Pump insulation shall match piping insulation thickness.
C. Provide metal jacket for outdoor applications.

Section 23 07 19 – HVAC Piping Insulation

A. Acceptable Manufacturers:
   1. Calcium Silicate
      a. Johns Manville
   2. Adhesives
      a. Childers Foster
      b. Armstrong
      c. Pittsburgh Corning
   3. Polyisocyanurate
      a. ITW Trymer 2000XP with Saranex Wrap. Phenolic foam is not approved.
   4. Metal Jacketing
      a. Childers RPR Products
   5. Cellular Glass
      a. Pittsburgh Corning FOAMGLASS
   6. Elastomeric
      a. Armaflex
B. All insulation shall comply with IECC 2018.
C. All chilled water piping insulation shall be cellular glass (FOAMGLAS).
D. Fittings shall be insulated in a manner similar to that for piping.
E. Application shall be in accordance with Pittsburgh Corning Specifications # I-S-83-07-01 and # I-C-82-07-01.
F. All interior chilled water piping insulation shall be 2” thickness minimum.
G. Exterior chilled water pipe insulation shall be a minimum of 2.5” thickness and be a closed cell type with aluminum jacketing where exposed.
H. Provide saddles at all support points.
I. Closed cell insulation shall be applied in two layers with the seams staggered.
J. Fiberglass insulation is acceptable for hot water piping. FIBERGLASS is UNACCEPTABLE FOR CHILLED WATER PIPE. Armaflex is acceptable for condensate drain pipe.
K. Apply insulation according to manufacturer recommendations and when pipe is completely dry.

Section 23 09 00 – Instrumentation and Control for HVAC

A. Environmental Control and Energy Management System:
   1. Provide a fully automated, integrated and programmable Direct Digital Control and Energy Management Control System (EMCS) for HVAC systems (Central and/or Unitary) control and energy management functions.
   2. The EMCS system shall be designed to be monitored and controlled from a remote location.
   3. The specified EMCS shall be open protocol native BACNET system that is capable of interfacing with systems by other manufacturers.
   4. Control system and equipment shall be fully presented in the contract documents. The EMCS manufacturer shall furnish and install the complete system.
   5. An override must be provided to by-pass the system in order to provide continuous service, if service on the system is required during school hours. Override durations shall be fully adjustable through the EMCS front end.
   6. User interface workstation shall be located in the EMCS room and shall be hardwired to the network.
   7. The EMCS shall provide controls and diagnostic tools to create, monitor, and analyze trending points from individual rooms to complete facility.
   8. EMCS Approved System Manufacturers with no exceptions:
      a. Delta (Basis of Design)
      b. Alerton
      c. Automated Logic

B. General:
   1. KISD District-wide temperature standards:
      a. Occupied Mode:
         i. The District setpoint is 72 °F.
         ii. The temperature shall be maintained between 70 °F and 74 °F.
      b. Unoccupied Mode:
         i. Maximum space temperature is 80 °F.
         ii. Minimum space temperature is 65 °F.
   2. Indicate a system that utilizes a screen display for control operations.
   3. The system shall be accessible remotely. Indicate that the system shall be provided with all necessary software and configuration for remote users to open, read, and revise the screen display data.
   4. Digital data shall be stored and saved at 4-hour intervals and analog data at appropriate intervals for an effective operation. Analog power inputs shall be stored at 15 minutes intervals.
   5. The system shall be able to offload historical data onto DVD's yearly. A user alert shall sound at this time. Reset shall be done to standard.
   6. Historical data stored in DVD shall be accessible via a display screen instantaneously by date and time, and in trends and graphs.
   7. Coordinate with Mechanical Engineer to specify AC units or dampers with end limit switches, or analog position feedback for connection to unitary controller.
   8. Design shall provide for continuous network operation.
   9. Design shall indicate but not be limited to pathways and conduit routing, equipment location, component parts, and cables. Provide catalog numbers for all components.
   10. All exterior mounted system components shall be NEMA 3R rated.

C. Control/Monitoring Requirements of EMCS:

1. Air Conditioning Units (2 Tons – 25 Tons)
   a. Supply air temperature
   b. Return air temperature
   c. Space temperature
   d. Outdoor air temperature (one per site)
   e. Filter status
   f. Fan status*
   g. Compressor status*
   h. Economizer damper current position
   i. Any other diagnostic points required by current T-24, automated fault detection and diagnostics (FDD).
   j. CO2 and humidity Levels
2. Fan Coil Units and Condensing Units
   a. Supply air temperature
   b. Return air temperature
   c. Space temperature
   d. Filter status
   e. Fan status*
   f. Compressor status*
   g. Any other diagnostic points required by current T-24, automated fault detection and diagnostics (FDD).
3. Heat Pump and Fan Coil Units
   a. Supply air temperature
   b. Return air temperature
   c. Space temperature
   d. Filter status
   e. Fan status*
   f. Compressor status*
   g. Any other diagnostic points required by current T-24, automated fault detection and diagnostics (FDD).
   h. CO2 and Humidity levels
4. The above listed requirements marked with a (*) need to be proper statuses, validated at the unit, space, and control system. Not just displaying system commands.
5. Lighting:
   a. Provide monitoring for the lighting control system. The EMCS shall communicate with the lighting control system via BACnet protocol. The lighting control system shall include an HOA switch for manual operation and a photocell compatible with the rest of the system.
6. Power System:
   a. Provide for the monitoring of power consumption as follows:
      i. Monitor KWh, KW, KVA, KVAR, Power Factor, Amps at the main electrical service.
      ii. Monitor KWh, KW, KVA, KVAR, and Power Factor at each permanent building, and portables clusters.
      iii. Design shall indicate a unitary controller for connection to the main electrical service power meter.
      iv. The system shall be able to integrate analog signals from power meters. Power meter outputs shall be totalized for each building, designated area(s), or power panels. Each output shall be treated as one item.

7. Water Usage:
   a. Provide for monitoring of total water usage at main water meter.

Section 23 10 00 – Facility Fuel Systems (Natural Gas)

A. Above grade natural gas piping to be black steel – ASTM53.
B. Galvanized steel piping is not acceptable.
C. Natural gas piping below grade shall be yellow polyethylene – ASTM D2513.

Section 23 21 00 – Hydronic Piping and Pumps

A. Acceptable Manufacturers
   1. Gate & Globe Valves
      a. Crane
      b. Mueller
      c. Lunkenheimer
      d. Watts
      e. Nibco
   2. Ball Valves
      a. Apollo
      b. Nibco
      c. Watts
   3. Butterfly Valves
      a. Conbraco
      b. Nibco
      c. Watts
      d. Xomox
   4. Plug Valves
      a. Dezurik
      b. Xomox
   5. Check Valves
      a. Apollo
      b. Crane
      c. Lunkenheimer
      d. Nibco
      e. Val-Matic
      f. Watts

B. General Piping Requirements:
   1. 2” and smaller shall be NPT screwed.
   2. 2-1/2” and larger shall be welded.
   3. Black iron pipe is to be Schedule 40.
   4. Chilled water valves shall have extended stem.
   5. Butterfly valves shall be lug type.
   6. All balancing valves shall have locking indicator handles unless self-regulating cartridge type.
   7. Balancing valves shall be self-regulating, maintaining near constant flow over a wide pressure range. The hydronic system will be self-balancing. If a flow needs to be changed, the cartridge of the unit will be changed.
   8. Provide blanked off taps at central plant to allow for connection of portable chiller.

9. Avoid routing piping on roof as much as possible.

C. Hydronic Specialties

1. Thermometers and Thermo-wells –for chilled water piping. Insulate test well and place so condensate does not drip on pipe insulation. Install on the following locations:
   a. Chiller inlet/outlet
   b. Boiler inlet/outlet
   c. Water cooler condenser inlet/outlet
   d. Thermometer to be 9 inches long, red reading, and ranged for application.
2. Expansion Tanks
   a. Acceptable Manufacturers
      i. Bell & Gossett
      ii. Taco
      iii. Wessels Company
   b. Provide pressure reducer unit.
3. Air Vents
   a. Acceptable Manufacturers
      i. Armstrong
      ii. ITT
      iii. Bell & Gossett
   b. Automatic air vents at high points.
4. Air Separators
   a. Acceptable Manufacturers
      i. Bell & Gossett
      ii. McDonnell Miller
      iii. Taco
5. Pressure Gauges
   a. Acceptable Manufacturers
      i. Terice
      ii. U.S. Gauge
      iii. Taylor
   b. Install on inlet and outlet of all pumps.
   c. Gauges shall be at least 3-1/2” and ranged according to the application.
6. Strainers
   a. Acceptable Manufacturers
      i. Armstrong
      ii. Bell & Gossett
      iii. Mueller
      iv. Hayward
      v. Hoffman
      vi. Process Strainer
7. Flow Controls
   a. Acceptable Manufacturers
      i. Bell & Gossett
      ii. ITT
      iii. Taco
      iv. Griswold
   b. Install flow stations at inlet of chillers, condensers, and boilers.
8. Relief Valves
   a. Acceptable Manufacturers
      i. Bell & Gossett

ii. McDonnel Miller
iii. Taco

b. Block and balance valves at all equipment connections.

9. Taps (Pete's Plugs)
   a. Insulate tap so that condensate does not drip onto insulation.
10. Pumps
   a. Acceptable Manufacturers
      i. PACO
      ii. Taco
      iii. Peerless
      iv. Aurora
      v. Bell & Gossett
   b. Close coupled condenser only.
   c. Base mounted, centrifugal type.
   d. Split case.
   e. Radially split (end suction) up to 500 GPM.
   f. Axially split – 500 GPM and up.
   g. Inline pump 3 HP and smaller may be pipe supported. Larger inline pumps shall be supported by brackets.
   h. Vertical turbine pumps are NOT acceptable.

Section 23 23 00 – Refrigerant Piping

A. Use ACR hard drawn copper.
B. L/R fittings.
C. Use Armaflex insulation with UV protective coating.
D. Insulation shall meet IECC 2018.
E. Supports and hangers shall be same as hydronic piping.

Section 23 23 16 – Refrigerant Specialties

A. Acceptable Manufacturers
   1. Mueller
   2. Alco
   3. Sporlan
   4. Henry
   5. Parker
B. Provide sight glass.
C. Provide removable core drier with pressure tap.
D. Provide isolation valves.

Section 23 25 00 – HVAC Water Treatment

A. General Requirements
   1. The service to be provided requires the Bidder to provide complete water analysis, chemicals, testing equipment, training, consulting and technical service in support of the chemical cleaning and treatment of the following systems:
      a. Condenser Water Systems
      b. Hot Water Systems
      c. Chilled Water Systems
   2. Provide the initial chemical treatment for all systems based on a complete water analysis prior to the equipment installation.
   3. The initial chemical treatment shall be applied after the systems have been cleaned, passivated, and flushed.
   4. The initial treatment supply of chemicals shall be adequate for the start-up and testing period, for the time the system is being operated by the Contractor for temporary cooling and heating, and for a period of (1) year after the systems have been accepted by the Owner. The total time period shall not exceed 1 ½ years unless specified.
   5. Submit a letter of Certification of Substantial Completion; include final report of specific start-up and testing results and include in OEM Manual.
   6. The Contractor shall have a qualified Service Representative on site at the facilities to assist with the initial application of the chemicals and training of the Facility personnel.
   7. Include a 4-hour training session for Owner's designated personnel on all water treatment operations.
   8. All materials and systems shall be new and compatible for use in the Owner's Facility (including compatibility with system pressures, temperatures, etc.).
   9. Acceptable Manufacturer
      a. Nalco Water (Ecolab)

B. Cleaning and Passivation:
   1. Hot & Chilled Water System
      a. Treat each piping system with chemicals to remove and permit flushing of mill scale, oil, grease, and other foreign matter and to promote system passivation. Chemicals shall be equal to Nalco NALPREP 2859 [and shall be compatible with existing water treatment systems, where in use.] Pretreatment shall be accomplished by exposing the system to 500 ppm of NO2 (2700 ppm as Nalco NALPREP 2859), at a pH of 7.0-8.0 for 24-48 hours. Use sulfuric acid if needed to adjust and maintain system pH. Pretreatment and flushing shall be complete before system treatment is added to the system.
   2. Condenser Water System
      a. Treat each piping system with chemicals to remove and permit flushing of mill scale, oil, grease, and other foreign matter and to promote system passivation. Chemicals shall be equal to Nalco NALPREP 2578 [and shall be compatible with existing water treatment systems, where in use.] Pretreatment shall be accomplished by exposing the system to 470 ppm of total inorganic PO4 (2700 ppm as Nalco NALPREP 2578), at a pH of 6.5-7.5 under no load for 24-48 hours. Use sulfuric acid if needed to adjust and maintain system pH. Pretreatment and flushing shall be complete before system treatment is added to the system.

C. Quality Assurance:
   1. Hot & Chilled Water System
      a. The hot water and chilled water treatment system shall be designed to maintain corrosion rates below 0.5 mils per year for mild steel and 0.1 mils per year for copper.

b. Hot and chilled water microbiological growth levels shall be maintained below 10,000 cfu's aerobic bacteria and 10 cfu's anaerobic bacteria.

2. Condenser Water System

a. The condenser water treatment system shall maintain a corrosion rate of less than 2.0 mils per year for mild steel and less than 0.1 mils per year for copper in the cooling water system.

b. Condenser water microbiological growth levels shall be maintained below 500,000 cfu's aerobic bacteria and 10 cfu's anaerobic bacteria. These levels shall be determined with aerobic bacteria dipslides and anaerobic bacteria test provided by the Contractor.

D. Equipment:

1. Conductivity/pH/Biocide Controller

a. A microprocessor based controller manufactured by (Pulsatrol, Lakewood, Walchem) shall be furnished which is capable of controlling conductivity, pH (if needed), and two biocide feeds. The conductivity and pH must have the capability of being transmitted via 4-20 milliamp output to a remote computer or building automation system. The dual biocide feed must include pre-bleed and lock-out capabilities as well as a 28-day schedule. The controller must also sense flow and prevent operation in no-flow conditions. Manual on-off-auto switches must be provided on the controller for conductivity, pH, blowdown, and both biocides. The controller must include visual indications of power, flow, conductivity, pH, alarms, blowdown, and chemical feed. It must also include audible alarm capability.

2. Inhibitor Controller

a. A separate controller must be provided for controlling the inhibitor level in the cooling tower systems. Conductivity controllers are not acceptable. The inhibitor must be fed independent of make-up, blowdown, or timers. A computerized monitoring and control system must be furnished by the Contractor that has the capability of controlling the cooling water chemical inhibitor level +5 PPM at all times. Verification of this capability must be submitted with the bid. The unit must provide direct measurement of the chemical inhibitor or tracer and control the chemical level within the control band noted above. The system must also be capable of converting the chemical value to a 4-20 mA output which can be read by the Energy Management system. The system must be capable of producing graphs of the chemical inhibitor levels with a minimum of 24 data points per day. Also, the system must be able to generate a system report on the exact condenser water volume, holding time index, and cooling tower blowdown rates. The following inhibitor controllers will be accepted: Nalco Trasar 3000 or Hach Phosphate Analyzer Cat. #60001-00.

3. Injectors

a. All condenser water chemicals must be fed neat into the condenser water system header to allow for proper dilution and mixing and to prevent reaction and precipitation that can occur in a multiple chemical dilution line. All chemicals must be injected into the header via corporation stop injectors (equivalent to Neptune CS75316 or CS100316) to allow for removal without system water loss. The injectors must be constructed of 316 stainless steel unless incompatible with the chemical being fed in which case an acceptable material can be substituted. The injectors must be located at least 16 inches apart on the header. (For high pressure systems, the chemical injectors must be capable of handling system pressure – i.e. high pressure retractable injectors.)

4. Pumps

a. Chemical feed pumps, which are compatible with the specified controllers, shall be provided for each liquid condenser water chemical being fed. The pumps shall be sized to deliver adequate dosages in the appropriate time so as not to hinder the performance of the chemical. The pumps shall be manufactured by LMI or Pulsatrol. Liquid bromine pumps shall have automatic degassing heads and be manufactured by Pulsatrol or approved equal for off-gassing chemical. (High pressure systems require pumps manufactured by Milton Roy, Neptune, or approved equal).

5. Solenoid Valve
   a. Provide an appropriate solenoid valve for system pressure and blowdown flow requirements (manufacturer is ASCO 8211 Series or approved equal).
6. Totalizing Water Meter
   a. Provide totalizing water meters for condenser water make-up and blowdown lines for determination of evaporation credits. The meters shall be the appropriate size based on make-up and blowdown volume and line size. The meters must also be approved for use by the city or governmental agency providing evaporation credits. The mechanical contractor is responsible for having the meter certified by a qualified district tradesman or a governmental agency with the appropriate credentials (i.e. City of Killeen, Harker Heights, or Nolanville).
7. Pot Feeders
   a. Contractor shall supply pot feeders for each hot and chilled water system. The pot feeders must meet the following: 5-gallon capacity, 200 psi maximum operating pressure, legs, and filter bag assembly.
8. Corrosion Coupon Racks
   a. One inch PVC corrosion coupon racks with isolation valves, visual 5-21 gpm flow determination, and ports for at least one mild steel and one copper coupon complete with coupons must be provided for each condenser, hot, and chilled water system.

E. Installation:
1. A certified district technician will perform installation as indicated or specified on the drawings and/or where consulted by the design engineer. Technicians will follow all manufacturer installation and start-up instructions.

F. Renovation Projects:
1. The contractor shall provide the initial chemical cleaning, passivation, and initial treatment for all chilled and hot water systems included in the renovation.
2. The initial chemical cleaning, passivation, and initial treatment shall be applied in accordance with applicable local, state, and federal regulations and codes. At the conclusion of the process the initial treatment will achieve 300-600 ppm Nitrite in Chilled Water Systems and 500-1000 ppm Nitrite in Hot Water Systems.
3. The respective city code enforcement inspector must conduct system testing prior to the system being placed into operation to confirm proper application of cleaning, passivation, and initial treatment chemicals. KISD must receive a written report from the respective city code enforcement inspector that verifies proper application prior to the system being placed into operation.
4. Any taps, equipment, plumbing, etc. necessary to facilitate the correct cleaning, passivation, and initial treatment of the systems shall be the responsibility of the mechanical contractor. Cleaning, passivation, and initial treatment of any and all systems and equipment shall be performed prior to tie in with the existing system

Section 23 31 00 – HVAC Ducts and Casings

A. Metal Ductwork:
   1. All ductwork (excluding flex-duct, dish washer and kitchen exhaust) shall be sheet metal, and fabricated and installed per Sheet Metal and Air Conditioning Contractors' National Association (SMACNA). Dishwasher exhaust shall be aluminum and kitchen exhaust welded stainless steel.
   2. No fiberglass ductwork shall be accepted.

B. Flexible Ductwork:
   1. Maximum length of flexible ductwork is eight (8) feet.

C. Dampers:
   1. Acceptable Manufacturers
      a. Louvers and Dampers, Inc.
      b. Ruskin
      c. Nailor Industries
      d. American Warming and Ventilating
      e. Greenheck
      f. Pottorff

D. Duct Access Panels and Test Holes:
   1. Acceptable Manufacturers
      a. Ruskin
      b. American Warming and Ventilating
      c. Titus
      d. Accudor
   2. Duct access doors shall be hinged and gusseted, equipped with self-tightening latches.
   3. Access door for insulated duct shall be double thickness.

E. Connectors, Vanes, and Extractors:
   1. Flexible Duct Connectors
      a. Acceptable Manufacturers
         i. Metaledge
         ii. Ventglass
   2. Turning Vanes and Extractors
      a. Acceptable Manufacturers
         i. Young Regulator
         ii. Titus
         iii. Tuttle and Bailey

Section 23 34 23 – Power Ventilators – Centrifugal, Axial, Inline

A. Acceptable Manufacturers:
   1. Cook
   2. Greenheck
   3. ACME
   4. Penn Barry

Section 23 34 33 – Air Curtains

A. Acceptable Manufacturers:
   1. Mars
   2. Berner

Section 23 36 00 – Air Terminal Units (Including fan powered)

A. Acceptable Manufacturers:
   1. Titus
   2. Metalaire
   3. Krueger
   4. Nailor

Section 23 37 00 – Air Outlets and Inlets (Air Distribution Devices)

A. Acceptable Manufacturers:
   1. Titus
   2. Metalaire
   3. Nailor
   4. Price
   5. Tuttle & Bailey
   6. Krueger
   7. Pottorff

B. All inlets and outlets located 8’ and lower from the floor shall be heavy-duty steel construction; all others shall be aluminum of aluminum construction.

C. Diffusers:
   1. Square diffusers shall have field adjustable discharge patterns.

D. Intake and Relief Ventilators:
   1. Intake ventilators shall be provided with motorized low leakage damper.
   2. Relief ventilators shall be provided with low leakage gravity dampers.

E. Louvers:
   1. All louvers shall have drainable blades and shall be provided with a bird screen.

Section 23 51 00 – Breechings, Chimneys, and Stacks

A. Acceptable Manufacturers:
   1. Metalbestos
   2. American Metal Products
   3. AMPCO
   4. Van Packer

B. Type C:
   1. Required to be welded and insulated

C. Type B:
   1. Shall be UL/AGA approved
   2. Shall be stainless steel

Section 23 52 00 – Boilers

A. Finned Water Tube:
   1. Acceptable Manufacturers
      a. Lochinvar
      b. Teledyne Laars
      c. Ray Pak
      d. RBI
   2. Low NOX boilers only.
   3. Low pressure firing.

B. Fire Tube – Middle and High Schools Only.
   1. Acceptable Manufacturers
      a. Sellers
      b. Clever Brooks
      c. Kewanee
   2. Low NOX boilers only.

C. Low Pressure Firing:
   1. Acceptable Manufactuers
      a. Thermific (monular)
      b. CAMUS
      c. Other approved by KISD

D. Condensing cast iron boilers may be used for improved energy efficiency.

E. Boilers to be provided with requirements:
   1. Low water cutoff
   2. High limit cutoff
   3. Flow proving
   4. Pilot safety – 100%
   5. Spark ignition
   6. Auto re-light
   7. Time override with manual rest.
   8. Temperature control based on leaving water.

Section 23 54 00 – Furnaces

A. Acceptable Manufacturers:
   1. Reznor
   2. Sterling
   3. Modine
B. Design Requirements:
   1. Low pressure gas
   2. Coated alloy heat exchanger
   3. 1600 CFM and under shall be multi-speed, direct drive.
   4. Above 1600 CFM shall be belt drive with minimum 2 speed drive.
   5. High limit fan delay on/off.
   6. 100% pilot spark ignition.
   7. Automatic control valve, thermostat controlled.

Section 23 55 00 – Fuel Fired Heaters

A. Acceptable Manufacturers:
   1. Reznor
   2. Sterling
   3. Modine
B. Design Requirements:
   1. All units shall be low pressure natural gas and have integral hanger connections.
   2. Duct Furnaces: Shall have stainless steel heat exchangers and burners.
   3. Gas Fired Unit Heaters: Propeller fan single speed.

Section 23 57 00 – Heat Exchangers for HVAC – Frame and Plate Type

A. Acceptable Manufacturers:
   1. Alfa-laval
   2. Graham

Section 23 63 00 – Refrigerant Condensers

A. Acceptable Manufacturers:
   1. Carrier
   2. Trane
   3. York
B. Design Requirements:
   1. Minimum FIN thickness of 6 mil. Anything less than 6 mil must be coated with phenolic epoxy or other approved coating.
   2. Air cooled systems shall be sized for maximum 25 °F. delta T.
   3. Water cooled systems shall be sized for maximum 10 °F. delta T.
   4. Must be readily accessible for cleaning.
   5. Single point electrical connection.
   6. Provide hail guards.

Section 23 64 00 – Package Water Chillers

A. Acceptable Manufacturers:
   1. York
   2. Carrier
   3. Trane
   4. McQuay
      a. McQuay is acceptable under the following conditions. 5 year warranty on parts, labor, and refrigerant. McQuay shall also provide annual inspections with KISD personnel.

B. Minimum FIN thickness of 6 mil. Anything less than 6 mil must be coated with phenolic epoxy or other approved coating.

C. R-410 is the only acceptable standard for new system refrigerant.

D. R-22 refrigerant is acceptable if the chiller manufacturer guarantees the availability of R-22 at the then current market price throughout the useful life of the chiller or until 2033, whichever occurs first.

E. Air cooled chillers shall have an efficiency of 1.3KW/ton or better including condenser fans.

F. Water cooled chillers shall have an efficiency of 0.6 KW/ton or better.

G. Chillers over 80 tons shall be provided with High/Low Voltage and Loss of Phase cutouts.

H. Any system other than that specified in the "HVAC System Criteria" must have economic/efficiency justification and be accepted by KISD.

I. Provide single point electrical connection.

J. Reciprocating, screw, centrifugal, scroll are acceptable for replacement work only.

K. Screw and scroll only are acceptable for new work.

Section 23 65 00 – Cooling Towers – Open Circuit, Mechanical Draft Cooling Towers Only.

A. Acceptable Manufacturers:
   1. Marley
   2. BAC
   3. Evapco
   4. Ceramic Cooling Tower

B. Design Requirements:
   1. Metal towers coated inside and out.
   2. Propeller fan(s).
   3. Belt drives are preferred but direct drives are acceptable.
   4. Chillers over 80 tons shall be provide with High/Low voltage and Loss of Phase circuits.
   5. Variable frequency drives shall be used to control fan speed and temperature.
   6. Drive motor shall be kept out of the water spray.
   7. Basin heaters and associated control devices.
   8. Water make-up and level control devices.
   9. Vibration sensor and interlock to shut down tower as appropriate.

Section 23 65 33 – Liquid Coolers

A. Packaged chillers and water to air heat pump systems only.
B. Acceptable Manufacturers:
   1. BAC
   2. Marley
   3. Evapco
   4. Ceramic Cooling Tower

Section 23 70 00 – Central HVAC Equipment

A. The technology for HVAC equipment evolves rapidly. The information below is minimum design criteria. The engineer shall review all current efficiencies and technologies available to KISD. Examples include variable speed compressors, fans, base efficiencies, etc.
B. Controllers, valves, actuators, and any other DDC control and end devices necessary to accomplish the specified sequence of operation shall be provided by the controls contractor for field installation under their strict supervision.
C. Minimum SEER ratings:
   1. Packaged RTU's – 18 SEER
   2. Packaged Heat Pump Units – 16 SEER
D. Packaged HVAC Equipment:
   1. Acceptable Manufacturers
      a. Lennox
      b. Carrier
      c. Trane
      d. Aaon
E. Provide a minimum of 2" filter rack with all units. Do not provide metal frame filters in new schools.
F. The filter section shall be designed for 30% efficiency filter (as defined by ASHRAE 52-76.) The filter rack shall have vertical supports. The filters shall be mechanically compressed to prevent air by-pass.
G. Control modules manufactured by the AHU manufacturer are allowed when it benefits the District's ability to control the AHU equipment as efficiently as possible.

Section 23 72 00 – Energy Recovery Equipment

A. Wheels:
   1. Acceptable Manufacturers
      a. Venmar
      b. Cook
      c. Semco
      d. Greenheck
   2. The heat wheel media shall be cleanable with low-pressure steam, hot water with detergent or compressed air per manufacturer's Instructions, without damage.
   3. The cross contamination shall be less than 0.1% of the exhaust airflow.
   4. The media shall have a 42-Month warranty with the remaining portion having a 36 Month warranty. A deduct will apply for 12-Month only warranties – prior to deduct the EDFS and PM must be informed of the change in specification and the impact of available alternates meeting the warranty specification.

B. Controls:
   1. All DDC control end devices necessary to accomplish the specified sequence of operations shall be provided by controls contractor for field installation under their strict supervision. All installation will include measurement and verification (M&V) as a condition of the unit commissioning. The district energy manager will directly coordinate with the controls contractor to schedule M&V to ensure QA/QC.

Section 23 81 00 – Decentralized Unitary HVAC Equipment

A. Water Source Heat Pumps:
   1. Acceptable Manufacturers
      a. Lennox
      b. Carrier
      c. Trane
      d. Aaon
   2. Economic justification is required for implementation.

B. Packaged Air Conditioning Units:
   1. Computer Room Air Conditioning Units
      a. DX split systems may be used.
         i. Acceptable Manufacturers
            (1) Lennox
            (2) Carrier
            (3) Trane
            (4) York
   2. Packaged Rooftop Air Conditioning Units
      a. Acceptable Manufacturers
         i. Lennox
         ii. Carrier
         iii. Trane
         iv. Aaon

C. Design Requirements:
   a. Units are to be curb mounted
   b. Provide multiple compressors for units 10 tons and larger.
   c. Integral exhaust with energy recovery system
   d. DX Unit with hot refrigerant gas re-heat and total energy heat wheel. The unit shall be provided with gas or electric heat.
   e. Total energy heat recovery wheel exhausting spare air, with desiccant unit with DX cooling of the dry air and heat rejection to the regeneration air.
   f. The system shall include:
      i. Minimum 2” filter rack
      ii. Bird screen on intake
      iii. For DX units, hail guards for condenser section
      iv. For DX unit, thermostat and space/supply air cooling/heating temperature controller. Interface to CS shall include enable/disable, status and general alarm.

D. DX or Chilled Water:
   1. Integral exhaust with energy recovery system

2. DX Unit with "modulating" hot refrigerant gas re-heat and total energy heat wheel. The unit shall be provided with gas or electric heat.
3. Total energy heat recovery wheel exhausting spare air to the outside, with desiccant unit with DX cooling of the dry air and heat rejection to the regeneration air.
4. The system shall include:
   a. Minimum 2" filter rack
   b. Bird screen on intake.
   c. For DX unit, hail-guards for condenser section.
   d. Each unit shall have a preheat coil for freeze protection if chilled water.
   e. For DX unit, thermostat and space/supply air cooling/heating temperature controller. Interface to CS shall include enable/disable, status and general alarm.

Section 23 82 00 – Heating and Cooling Units

A. Fan Coil Units:
   1. Controls: See Section 23 09 00 – Instrumentation and Controls for HVAC.
   2. Acceptable Manufacturers
      a. Lennox
      b. Carrier
      c. Trane
      d. International Enviro-Tec

B. Unit Ventilators:
   1. Controls: See Section 23 09 00 – Instrumentation and Controls for HVAC.
   2. Acceptable Manufacturers
      a. Magic Aire
      b. International Enviro-Tec
      c. Trane
      d. Herman-Nelson
      e. Carrier
      f. Johnson Controls
      g. Tempspec (Note: Tempspec units will have all actuators & valves factory installed. They shall be furnished by the controls contractor.)

C. Design Requirements:
   1. Casing to be powder coated.
   2. 14 gauge front panels on vertical units.
   3. Hinged access panels with cam locks.
   4. 11" end pockets or larger for piping and controls.
   5. Removable fan boards.
   6. 1/2" insulation.

D. Fan Motor:
   1. Fan motors shall be ECM.
   2. The unit controls shall vary the speed in response to variance from set point.
   3. Manually adjustable fans are not acceptable.
   4. Fan motors shall have unit mounted disconnects.

E. Coils:
   1. All units shall have the cooling coil first in air stream followed by a re-heat coil.
   2. Coils must be fully accessible for cleaning from access panels.
   3. Coils hidden behind un-removable panels are not acceptable.

F. Filters:
   1. 1" pleated media with metal frames.

2. Shall be removable from front or bottom of units.

G. Dampers:
1. Provide for outside and return air.
2. Shall have rubber edged seals.

H. Certification:
1. All units must carry ARI 840 Certification.
2. All united must carry ARI 440 or 220 Coil Performance Certification.

I. Controls:
1. Controllers, valves, actuators and any other DDC control end devices necessary to accomplish the specified sequence of operations shall be provided by controls contractor for field installation under their strict supervision.

J. Drain Pans:
1. Constructed of ABS plastic or stainless steel.
2. Shall be IAQ fully draining.
3. Galvanized pans are not acceptable.
4. Shall be easily removed for cleaning.

Section 23 82 16 – Air Coils

A. Acceptable Manufacturers:
1. Lennox
2. Carrier
3. Trane

B. Design Requirements:
1. Use copper tubes with aluminum fins.
2. Provide stainless steel frame.
3. Double thickness, internally insulated stainless steel drain pan, conforming to the requirements of ASHRAE 62.1.

Division 26

ELECTRICAL

Section 26 05 00 – Common Work Results for Electrical

A. General Electrical Requirements:

1. Electrical consultant shall contact electric utility provider to arrange for new or expended electrical service. Electrical consultant shall provide utility company with electrical load analysis so the power company can determine the size of the service.
2. Provide a main circuit breaker for each service. The "Six Main Rule" shall not be used.
3. At the main circuit breaker, a shunt trip/relay shall be added. This is for the KISD fire alarm monitoring service to be alerted for power outages of at least 15 minutes.
4. Size service conductors and main circuit breaker shall have a minimum spare capacity of 25% for expansion.
5. KISD desired service is 277/480 volts, 3 phase, 4 wire, 60 hertz, and grounded WYE system.
6. KISD requires the "standard service" design as determined by the utility company. KISD will not pay for a "non-standard" electrical service.
7. Standard Service shall be pad mounted underground service or overhead service and meet the power company standards. Pads shall meet power company standards.
8. If overhead service is the standard service, a free-standing bussed electrical service weatherhead shall be installed on W6X5 galvanized I-beams with 2" X 4" galvanized channels welded to the I-beams. A concrete housekeeping pad shall be poured to encompass the free-standing bussed weatherhead and conduit. Provide 3'-6" minimum working clearance in front of the gear as you face it for maintenance access.
9. In general, electrical equipment shall not be installed in rooms below the finished grade elevation.
10. Unless site conditions complicate or prohibit underground service, run all service entrance conductors on school property in approved raceway and include one empty conduit of same size. Install electrical conduit to a depth prescribed by the NEC and/or authority having jurisdiction but not less than 36" deep, in red concrete encasement plus two red caution tapes. All buried electrical conduits other than secondary electrical service shall be installed to a depth prescribed by the NEC and/or authority having jurisdiction but not less than 36" deep in PVC conduit covered with caution plastic tape before backfill. All underground primary feeders shall be installed per electric utility company specifications. Underground distribution feeders and branch circuits shall be installed in schedule 40 PVC conduit with grounding conductor sized per N.E.C. 90o elbows shall be rigid galvanized steel and stub ups through concrete floor to be PVC coated rigid galvanized steel. Concrete encasement not required under building slab or other paved areas.
11. All panel boards and distribution panels shall have a neutral and ground bus. All panel boards shall have a hinged front cover.
12. All computer rooms, MDF's, and IDF's are to include a lockable electric panel with key.

13. There are to be no electrical panels located in corridors.
14. Switchboards and switchgear equipment shall be located in mechanical/electrical rooms only. Switchgear shall not be located in boiler rooms.
15. Locate panel boards in kitchens and shops to serve their respective loads.
16. All mechanical chiller feeders, variable speed drive motor controllers or full voltage non-reversing motor controllers for pumps, air handling units, fans and any other 3 phase HVAC equipment loads shall be equipped with integral phase failure protection, coordinate with mechanical drawings to ensure proper motor starter/control equipment specification.
17. Specify for the manufacturer of the switchgear to provide a coordination study and fault current analysis.
18. Provide dedicated power outlets at locations where tech cart charging occurs. KISD to identify location(s).

B. Special Notes About Wiring:
1. Wiring to all non-dedicated electrical receptacles and switches are required to utilize parallel circuiting by the use of "pig tails" to each device so that if an outlet is removed or fails, electrical continuity of the circuit will not be compromised.
2. Splice all electrical wiring by twisting the wires together and use of approved and listed compression wire nuts for the application.
3. Do not use end-to-end butt-splicing connections for any wiring.

C. Labeling:
1. Conduit Labeling: Main feeder conduits to each panel board and distribution panel shall be labeled. Labeling shall be legible and permanent, labeling shall include
2. "Main Feeder to panel (insert panel name)"
3. "Panel (insert panel name) contains breakers or over current device"

D. Raceways:
1. Steel set screw fittings for electrical conduit are allowed only for EMT located in conditioned spaces.
2. All exterior raceways shall be rigid galvanized steel.
3. All underground raceways shall be schedule 40 PVC.

E. Conductors:
1. All building wire shall be rated at 600 volt, using copper conductors and THHN/THWN insulation.
2. All low voltage cable shall be rated at 300 volt and be plenum rated. This cable may be routed in plenums in accessible areas without a raceway.

F. Building Electrical Systems:
1. Surge Suppression
   a. Transient voltage surge suppressors shall be used in all main switchboards, all distribution boards and 120/208 lighting panels to control transient voltages. Each surge suppressor must be protected with an over-current protection device and rated for the appropriate short circuit current. TVSS shall also be installed on the disconnecting means beside all chillers.
   b. Unit shall be UL approved rated for 200,000 AIC and warranted for 10 years with parts and labor.
2. For service entrance/main switchboard applications (1200 amperes and larger), specify a SPD with a minimum surge current rating of 125kA per protection mode, and 250kA per phase.
3. Specified units shall meet/exceed the following additional requirements:
   a. SPD shall be listed and labeled to UL1449 (Second Edition) and UL1283.
   b. SPD shall provide protection in all modes, L-N, L-G, N-G, (where applicable).
   c. UL1449 Suppressed Voltage Rating (SVR) shall not exceed the following.

d. SPD UL1449 Short Circuit Rating shall be greater than the fault current at the point of application. In no case should the rating be less than 65kAIC.

e. SPD shall be life cycle tested to survive 15,000 IEEE Category C3 impulses in each protection mode, with less than 10% degradation.

f. Documentation of life cycle testing and UL 1449 short circuit rating must be provided.

g. Documentation of the maximum surge current (single pulse) rating, UL1449 SVR, and noise attenuation must be provided in accordance with NEMA LS-1, 1992.

G. Distribution Panel Locations (277/480V, 3 Phase, 4 Wire):

1. For distribution panel applications (400 – 1200 amperes) specify a SPD with a minimum surge rating of 80kA per protection mode and 160kA per phase and current.
2. Specified unit shall meet all of the additional requirements listed for the service entrance units.

System voltage	**Suppressed Voltage Rating**			
L-N	L-G	N-G	L-L	
120/240	400 volts	400 volts	400 volts	800 volts
120/208	400 volts	400 volts	400 volts	800 volts
240	800 volts	800 volts		
277/480	800 volts	800 volts	600 volts	1500 volts
480	1200 volts	1500 volts		

H. Panelboard Locations (120/208V, 3 phase, 4 wire):

1. For lighting and appliance panelboards serving receptacles, specify a SPD with a minimum surge current rating of 65kA per protection mode and 130kA per phase.
2. Specified unit shall meet all of the additional requirements listed for the service entrance units except as noted below:
   a. SPD shall be life cycle tested to survive 6,000 IEEE Category C3 impulses in each protection mode, with less than 10% degradation.

I. Switchgear:

1. Switchboards, transformers and motor control centers will be set on concrete pads not less than 6” above finished floor.
2. Switchboards shall have a 0.2% accurate digital meter connected (voltage and amp) to the primary bus after the main circuit breaker. The digital meter shall provide the following information: volts, amps, kVA, kW, kVARS, Power Factor, kWH, THD amp, Harmonic power flows.
3. Locate switchgear of any kind in mechanical or electric rooms only, not in classrooms, restrooms, corridors, vestibules, offices or other areas where unauthorized access may occur.
4. In general, transformers shall be 480 volt – 208Y/120 volt 3-phase 4-wire. Transformers serving loads other than 208 volt shall be selected accordingly.
5. Transformers 45kVA and above shall be floor mounted, except when existing conditions do not allow it. Refer to the N.E.C. for additional requirements.
6. Switchgear, switchboards, panel boards, transformers, disconnect switches, and motor starters shall have an engraved Bakelite nameplate. Nameplates shall be white with black letters and show panel designation and be attached with stainless steel screws.
7. Each panel board shall have a directory card. A type written directory card identifying the load served by each branch circuit in the frame on the panel door under a clear plastic cover. Spares and spaces shall be written with erasable pencil for future use.
8. Balance loads on all phases in each panel to within 10% of respective phase loads.

9. All motors 1 HP and greater shall have phase failure protection and under voltage protection on all 3 phases.

J. Branch Circuits:
   1. 120 volt receptacles circuits and 277 volt lighting circuits shall be routed in separate raceways.
   2. A grounding conductor shall be provided with all feeders and branch circuits (size based on the N.E.C.)
   3. Classrooms shall be served with one-120 volt 20 amp branch circuit for teacher's receptacles, two 120 volt 20 amp branch circuits for computers and 277 volt for lighting.
   4. All branch circuits homeruns serving computers, printers, copiers, fax machines, etc. shall utilize Phase "A", "B", and "C" with a 200% neutral.
   5. All branch circuit conduits shall be routed overhead. Conduits serving floor outlets may be routed in the slab.

K. Grounding:
   1. Building steel and piping system
      a. Provide a bonding jumper between building steel and metallic piping systems to bond them to the electrical grounding system.
   2. Neutral
      a. The neutral shall be grounded only at the service entrance and other separately derived systems. The neutral shall be kept separate from the grounding system and shall not be used as a ground.
   3. Transformer
      a. The center point (neutral) of each wye connected transformer shall be bonded to the case and a grounding electrode conductor shall be connected to a ground rod or building steel and cold water pipe. All separately derived systems such as isolation transformers must be grounded at the common point by connecting to a ground rod or building steel. The equipment ground for electrical service shall not be used as a grounding point for any transformers.
   4. Grounding Conductor
      a. A grounding conductor and metallic conduit system shall bond all equipment served by the electrical system. Provide a flexible bonding jumper for isolated metallic piping and ductwork and around expansion fittings and joints.
   5. Special Grounding
      a. Provide a #6 AWG copper grounding conductor for each telephone board, television system, projectors, "Permethian Boards", fire alarm system, elevators, etc. Terminate the grounding conductor on ground bus and to the building electrical grounding system.
   6. Theatrical, auditorium, cafeteria/cafetorium sound system, UPS, computers and all electric equipment non-linear loads: It is required to specify isolated ground branch circuits.

L. Classroom Power Requirements:
   1. Provide one circuit for no more than four duplex receptacles. (Note: Quad to be counted as (2) duplex receptacles).

M. Service Yard Power Requirements:
   1. Provide two 20A, 120V, GFCI receptacles with NEMA-3R cover plate mounted in the wall of the building at ADA specified height (recommend 18" above finished grade to centerline of receptacle).

N. Mechanical Equipment Rooms, Electrical Equipment Rooms and Custodial Rooms Power Requirements:
   1. Provide at least one, 20 amp, 120v receptacle in custodial rooms, mechanical or electrical rooms and storage rooms, located on the wall adjacent to the strike side of the door.

O. Roof Power Requirements:

1. Provide at least one 20A, 120V, GFCI receptacle with NEMA-3R cover plate within 25 feet of roof mounted HVAC equipment, unless the equipment is already provided with such.

P. Exterior Building Power Requirements:
1. Provide 20A, 120V, GFCI receptacle in weather proof enclosures at ADA specified height (recommend 18" above finished grade to centerline of receptacle), flush mounted in the exterior wall of the building adjacent to each exterior door and at strategic locations. These receptacles shall be for maintenance purposes.

Q. Miscellaneous Location Power Requirements:
1. Receptacles installed in masonry walls shall be installed on top of a block course, omitting the mortar bed at the box. The purpose of this requirement is to allow the standard device plate to overlap the indention of the mortar joint.
2. Corridors shall have GFCI receptacles spaced no further apart than 40 feet apart.
3. Provide power and key operated on/off switch for roll-up overhead grilles at reception areas, corridors, etc.

R. NOTE: NO MC CABLE OR FLEX CONDUIT IS ALLOWED WITH THE EXCEPTION THAT FLEX CABLE MAY BE USED FOR LIGHT FIXTURES IN LENGTHS LESS THAN 72".

S. Emergency Power/Lighting:
1. Emergency power sources shall be batteries.
2. Provide emergency lighting in ALL instructional spaces every classroom, every electrical room and every mechanical room.
3. All emergency lighting shall be switched/controlled locally with the fixture group it is associated with and automatically illuminate upon loss of power. For mechanical and electrical rooms, do not put on occupancy sensor or any other automatic control. For mechanical and electrical rooms put every fixture in the room on emergency power and control with a local switch, fixtures in these rooms need not come on automatically, intent is for supervisory/service personnel to have total local control of mechanical and electrical room lighting by local switch only but it must be on an emergency power source.
4. Provide emergency lighting throughout the school using the center lamp of the 2'x4' fixtures or two lamps in a 4 lamp fixture or 2 lamp strip emergency light shall meet the requirements of NFPA 101 including the following:
   a. All corridors, restrooms, mechanical rooms, electrical room, storage rooms over 25 square feet, kitchen, library, data closets, cafeteria/auditorium, gyms, locker rooms, laundry rooms, stages, auditoriums and band halls. Egress lighting shall not be switched.
   b. All classrooms shall have one emergency light per 900 square feet. The center lamp of the 2 x 4 fixture located by the exit door(s) shall be circuited to the emergency power panel and shall not be switched.
   c. The walk-in refrigerators and freezers in the kitchen shall be circuited to the emergency power panel.
   d. The fire alarm panel, security panel and school intercom system shall be circuited to the emergency power panel.
   e. BAR and FAR room equipment shall be circuited to the emergency power panel.
   f. Telephone equipment shall be circuited to the emergency power panel.
   g. Submit load calculations for emergency power to KISD. Included 25% spare capacity.
   h. Provide emergency power to designated electrical receptacles for the following:
      i. Special Education Classrooms
      ii. Pre-Kindergarten Classrooms
      iii. Nurses Clinic
      iv. DDC Panel

i. All exit signs and emergency lighting systems shall be connected to the emergency generator. Exit signs shall be on separate circuits from all other loads.

T. Emergency Batteries:
1. When an emergency generator is not used, all life safety loads shall use rechargeable batteries for back up power.
2. Wall mounted emergency fixtures shall use nickel-cadmium batteries and contain 2 lamps.

Section 26 05 26 – Grounding and Bonding for Electrical Systems

A. Acceptable Manufacturers:
1. Copper Weld
2. Cad Weld
3. Bundy

Section 26 05 33 – Raceway and Boxes for Electrical Systems

A. Raceways
1. Acceptable Manufacturers
a. Allied
b. Triangle
c. Republic
d. Carlen
e. Wheatland
f. Cemex
g. Western Tube

B. Fittings
1. Acceptable Manufacturers
a. Appleton
b. Crouse Hinds
c. Steel City
d. OOZY
e. Gender
f. Carlen
g. Race

Section 26 22 00: Low Voltage Transformers

A. General Purpose Transformers:
   1. Acceptable Manufacturers
      a. General Electric
      b. Square D
      c. Siemens
      d. Cutler Hammer
      e. Hammond Power Solutions

B. Harmonic Mitigating Transformers:
   1. Acceptable Manufacturers
      a. Power Quality International
      b. Power Smiths
      c. Hammond Power Solutions

C. Install grounding electrode conductor in a main ground bar bolted to the bottom of the transformer except the primary equipment grounding conductor which is connected to the case. (Do not use individual lugs). No splicing in transformer feeders is acceptable. Comply with Article 250.

Section 26 24 13: Switchboards

A. Switchboards:
   1. Acceptable Manufacturers
      a. General Electric
      b. Square D
      c. Siemens
      d. Cutler Hammer
   2. Minimum physical dimensions for all switchboards shall be 45”x45”.
   3. The end of bus bars on both sides shall have an insulated end cap and insulated fire board installed in the covers.
   4. No conduits shall be allowed to enter the top of outdoor switchboards.
   5. Outdoor switchboards/switchgear shall be ANSI – 61 grey color.
   6. Coordinate with Architect to ensure all indoor switchboards are located in rooms that have panic hardware in the direction of egress on all doors serving the room, doors must swing out.

Section 26 24 16: Panelboards

A. Branch Circuit and Panelboards:
   1. Acceptable Manufacturers
      a. General Electric
      b. Square D
      c. Siemens
      d. Cutler Hammer

Section 26 24 19: Motor Control Centers

A. Acceptable Manufacturers:
   1. General Electric
   2. Square D,
   3. Siemens
   4. Cutler Hammer

Section 26 25 00: Bus Duct Assemblies

A. Acceptable Manufacturers:
   1. General Electric
   2. Square D,
   3. Siemens
   4. Cutler Hammer

Section 26 27 13: Electricity Metering

A. Acceptable Manufacturers:
   1. General Electric
   2. Square D,
   3. Siemens
   4. Cutler Hammer

Section 26 27 16: Cabinets and Enclosures

A. Acceptable Manufacturer:
   1. Hoffman

Section 26 27 26: Wiring Devices

A. Wiring Devices
   1. Acceptable Manufacturers:
      a. Levittown
      b. Hubbell
      c. Pass and Seymour
   2. All devices shall be industrial grade using 302/304 stainless steel cover plates. Specify "toggle" type switches.

B. Safety Switches
   1. Acceptable Manufacturers
      a. General Electric
      b. Square D
      c. Siemens
      d. Cutler Hammer

Section 26 28 16: Enclosed Switches and Circuit Breakers

A. Automatic Transfer and Isolation:
   1. Acceptable Manufacturers
      a. General Electric
      b. Onan
      c. Kohler
      d. ASCO

B. Circuit Breakers and Fuses:
   1. Acceptable Manufacturers
      a. General Electric
      b. Square D
      c. Siemens
      d. Cutler Hammer

Section 26 29 16: Enclosed Controllers (Contactors)

A. Acceptable Manufacturers:
   1. ASCO
   2. Square D
   3. General Electric
   4. Cutler Hammer

Section 26 32 33: Uninterruptable Power Supply Systems

A. Acceptable Manufacturers:
   1. Liebert
   2. Power Ware
   3. Best Power

Section 26 35 33: Power Factor Correction Equipment

A. Acceptable Manufacturers:
   1. Square D
   2. General Electric
   3. Siemens
   4. Cutler Hammer

Section 26 41 00: Facility Lightning Protection

A. Acceptable Manufacturers:
   1. Bonded Lightning Protection Systems
   2. Advanced Lightning Technology
   3. Thompson Lightning Protection

Section 26 43 00: Transient Voltage Surge Suppression

A. Acceptable Manufacturers:
   1. Liebert
   2. Current Technologies
   3. Leviton
   4. Square D
   5. General Electric
   6. Cutler Hammer

B. Coordinate with Architect to ensure all indoor Transient Voltage Surge Suppression (TVSS) equipment is located in rooms that have panic hardware in the direction of egress on all doors serving the room, doors must swing out.

C. TVSS equipment shall be installed with the shortest leads possible from the panel board served, target length is 48", shorter where possible.

Section 26 50 00: Lighting

A. Lighting Criteria:

1. Daylighting solutions will be the initial design consideration and must balance with the designed HVAC cost for conditioning of occupied space. Site planning, orientation, fixture considerations, and the intended use of the space will be considered throughout the design process. This will be reflected as a model in the Building Information Modeling (BIM) during the design phase.

B. Objective Lighting

1. Provide a complete point-by-point photometric summary for each room type and each parking lot on each project for KISD Design Development review and written approval. Photometrics shall be measured and verified prior to substantial completion and included in the documentation of the commissioning process.
2. The following ratios are suggested levels of the proposed lighting design by area. These are only suggestions and may be overridden by the design engineer or by code requirement:

C. KISD Objective Light Levels	
Building/Space Type	Guideline Illuminance Range (footcandles)
School Interiors	
Art Classrooms	30-100
Art Classrooms	30-101
Offices	30-100
Classrooms	
Areas where students or employees read/write	50-76
Hallways	20-30
Computer Labs or Workspaces	20-50
Cafeteria/Cafetorium	20-50
Common areas (group study areas)	20-50
Auditoriums/assembly places	15-30
Stage Lighting	45
Nursing Office/Station	50-100
Gymnasium (practice)	50
Gymnasium (Varsity or Competition)	75
Chemistry Classrooms	50-100
Libraries	30-100
Functional Areas	
Custodial & Stockroom storage	30
Mechanical Rooms	45
Loading and unloading	20
Kitchens	50
Difficult tasks	100
Highly difficult tasks	200
Building/Space Type	Guideline Illuminance Range (footcandles)

Exterior	
Athletic Fields	30-50
Track	30
Tennis Courts	50
Playgrounds (alternate lighting only)	10-30
Building security	1-5
Floodlighting (low/high brightness or surroundings)	5-30
Parking (Max:Min ratio of 10:1)	3-5

4. Average maintained foot-candle level.
5. Maximum to minimum.
6. Average to minimum foot-candle ratios of the proposed lighting design.
7. Obtain KISD written approval of submitted photometrics (light levels) and proposed fixtures prior to proceeding with construction documents related to lighting.
8. Parking lot lighting shall be designed to control light angles to avoid light trespass on adjacent properties.
9. All general lighting located on interior and exteriors of schools shall be LED fixtures.
10. Exterior lighting site lighting shall be LED.
11. Fluorescent Lighting – If KISD determines that fluorescent lighting is required, the fixtures shall be as follows:
    a. Four foot-long fluorescent lamps shall have a CRI of 82 or better with a Kelvin lamp color temperature rating of 4,100oF and a minimum rated lamp life of 24,000 hours.
    b. T5 fluorescent ballast shall be electronic, program start less than 10% total harmonic distortion rated at 50,000 starts and greater than .98 power factor for primary lamp, and .88 ballast factor. Compact fluorescent ballast shall be electronic, rated at 100,000 starts, program start less than 10% total harmonic distortion when operating at nominal line voltage of primary lamps. When available, all indoor HID ballast shall be pulse start using vertically mounted pulse start lamps.
    c. Provide 2'x4' lay-in luminaries with 3-T5 lamps, and electronic ballast and the body shall be a minimum of 4" deep with .125" thick acrylic prismatic lens. 2'x4' direct luminaries with 2 high output T5 lamps with appropriate ballasts shall be considered for energy savings when they can satisfy photometric light level requirements. With KISD approval individual fixtures less than 4" deep may be considered to avoid lowering a ceiling when an unanticipated conflict reduces typical clearances for fixtures.
12. Computer Labs: Provide 2'x4' lay-in luminaries with a minimum of 2-T5 lamps, electronic ballast dual level switching that meets IES RP-24 for VDT use. Body shall not be more than 6" deep.
13. Elementary School Cafetorium General Lighting: Provide standard 2x4 fixtures for cafeterias.
14. Elementary School Cafetorium Theatrical Lighting: In addition to general lighting include the following:
    a. Provide recommendations from the Theatrical and or Lighting Consultant to KISD for review and approval.
15. Middle School Cafetoriums General Lighting: Provide standard 2x4 fixtures
16. Middle School Theatrical Lighting: Provide recommendations from Theatrical and or Lighting Consultant to KISD for review and approval.
17. High School Cafeterias General Lighting: Provide standard 2x4 fixtures.

18. High School Theatrical Lighting: Provide recommendations from Theatrical and or Lighting Consultant to KISD for review and approval.
19. Auditoriums: Provide recommendations from Theatrical and/or Lighting Consultant based on layout and materials identified by the architect to KISD for review and approval. Provide submittals indicating layout of the fixtures and circuitry. Label all circuits in all boxes, and conduits. Use twist lock receptacles instead of duplex receptacle.
20. Service Yards: Service yards shall be provided with LED luminaires, and wall mounted security lights positioned to eliminate light trespass beyond the service yard area.
21. Mechanical Equipment Rooms: Mechanical equipment rooms shall be provided with 4 foot, LED strip fixtures with wire-guards. Do not use automatic switching in any electrical rooms or mechanical rooms provide a 2-hour manual twist on timer switch. Install emergency lighting at these locations: one at the exit door and others in the critical areas such as equipment.
22. Exterior Building/Security: Provide wall mounted cut-off security lights using LED spaced appropriately, around the entire perimeter of the building, over exit doors, and near windows positioned to eliminate light trespass and glare into adjoining properties.
23. Use multiple circuitries (i.e. combine one fixture at each pole on one circuit for night light purposes). All other fixtures in that one pole with one circuit. Use a lighting contactor controlled by a photocell with an override time clock.
24. Provide light fixtures with LED lamps at pedestrian canopies and entrance soffits. Specify recessed fixtures for areas with ceilings, and surface mounted fixtures for areas without ceilings. Specify vandal resistant fixtures.
25. All exterior lighting shall be operated by a photocell with an on/off/auto switch and digital time clock. Exterior lights are not to be controlled by the BAS system
26. Parking Lots:
    a. Parking lots shall be illuminated LED lighting systems with photovoltaic sensors to minimize use when not required.
    b. Parking lot light pole standard heights shall be as follows:
        i. Elementary Schools – 30 ft.
        ii. Middle Schools – 30 ft.
        iii. High Schools – 40 ft.
        iv. Stadium Lots – 50 ft.
    c. Fixtures close to property lines and adjoining private residences shall utilize a “street side cut-off” device in the fixture to eliminate light trespass on the adjacent property.
    d. Lighting circuits shall be labeled “Circuit A”, and “Circuit B”.
        i. Circuit A shall include: 1) one circuit at each pole, 2) alternating soffit lights at covered walkways and bus loading areas, and 3) soffit lights at all secondary entrances.
        ii. Circuit B shall include: 1) one lighting circuit at each pole, 2) alternating soffit lights at covered walkways and bus loading areas, and 3) soffit lights at all primary entrances.
        iii. Specify for the electrical contractor to provide all contactors for the lighting systems.
        iv. Contactor panels are not acceptable.
        v. Provide external mounted contactors at each exterior lighting panelboard permanently labeled for parking lot Circuit A or Circuit B.
        vi. Each circuit shall be protected by in-line fuses at each lighting standard.
        vii. Fixtures shall be mounted on cross-arms with swivels for 180-degree adjustment in both horizontal and vertical directions.

27. Exit Signs: Exit lighting shall be LED type. Institutional grade, vandal proof, wet location, cast aluminum or polycarbonate. Provide nickel-cadmium battery backup when an emergency generator is not used. The circuitry for all exit lights and egress lights shall be on dedicated branch circuits, do not share any conductors with any other building loads.
28. Marquee Lighting: Shall be LED. Provide electrical circuits for school marquee lighting (freestanding sign) to be controlled by a switch located in the main administration area, provide label on switch.
29. Gymnasium Lighting: Proposed fixture submittals/spec information must be provided for KISD review and approval prior to issue of drawings for bid. Gymnasium fixtures shall be LED.
30. Local Indoor Lighting Control
    a. All lighting circuits shall be controlled by occupancy sensors by division 26. Every space shall also have a local manual override OFF switch for local control of the lighting.
    b. For new schools, all instructional spaces shall be provided with dual level lighting controls for teaching purposes. The lighting shall be divided and controlled to provide even light distribution suitable for note taking when viewing films or slide presentations. LED lighting is an required with a dimmable switch – this option provides optimal lighting for the use and conditions of the space.
    c. Provide key operated switches in all public areas (i.e., cafeteria, gym, library, corridor, etc.) as per code.
31. Sports lighting shall have override switches located in a locked room at the stadium or athletic facility.
32. Lamps - Acceptable Manufacturers: General Electric, Osram Sylvania, North American Phillips
33. Luminaires
    a. Acceptable Manufacturers
        i. Cooper
        ii. Insite
        iii. Evenlite
        iv. Genlyte
        v. General Electric
        vi. Hubbell
        vii. Kenall
        viii. Lithonia
34. Lighting Controls

D. Elementary School Dimming Systems
E. Middle School Dimming Systems
F. Auditorium Dimming Systems
G. Auxiliary Equipment Rack
H. Control Systems

Section 26 60 00: Electrical Training and Final Electrical Equipment Labeling

A. General:
   1. Provide complete training to Owner for all major electrical equipment categories including but not limited to switchboards, lighting systems, motor control centers, surge suppression equipment, elevators, low voltage relay lighting control systems and emergency lighting.
   2. Conduct training on main switchgear with the manufacturer's representative. Coordinate suitable date and time with Owner. Provide a copy of the manufacturer's switchgear shop drawing, showing rating of vertical and horizontal bussing at training session. During the training session the manufacturer shall operate the main circuit breaker from the ON to the OFF position and then back to the ON position. Reset instructions for the main device shall be permanently mounted on the switchboard.
   3. Conduct training on all Lighting Systems, Motor Control Sessions, electrical panels, transformers, transient voltage surge suppression devices (TVSS), surge protective devices (SPD). The equipment manufacturer for each equipment type shall provide training. A building one-line diagram and electrical diagram, showing the connection of each equipment type shall be provided by the Contractor to be referenced during the training.
   4. For switchboard and panelboard training, provide copy of the selective coordination study, as-built one-line diagram and as-built riser diagram during the training session to the Owner's electrical maintenance personnel.
   5. Final labeling shall be complete prior to performing training. Final labeling shall include typed panel schedule directories, with room numbers that match the approved Architectural graphics package of final room numbers. All above ceiling junction boxes shall also be labeled prior to training with circuit number of all circuits that pass through the junction box. Provide a list of light fixtures; by Type in accordance with the plans, that includes the original equipment manufacturer's model number along with replacement lamp model, voltage and catalog number for each fixture type. Present lighting fixture and replacement lamp list to Owner's electrical personnel at Lighting System training session.
   6. Final labeling shall include permanent labels on all panels, transformers and disconnects that match the one-line and riser diagrams.

B. Validation and Training:
   1. Test the exit and egress lighting by shutting off main circuit breaker at incoming service and demonstrating that emergency lighting comes on automatically. Allow batteries to fully discharge on battery-powered systems, including lighting. Discharge Test should be conducted as long as it takes for full discharge, not limited to 90 minutes. Upon full discharge of emergency/battery-powered lighting, reset main device to closed position and demonstrate emergency systems are recharging and returning properly to their normal state.
   2. Provide training on all low voltage relay lighting control systems, training session shall be performed by equipment manufacturer and shall demonstrate system operation, troubleshooting and basic programming. Training session shall be videotaped on a CD or DVD, present copy to Owner at end of relay lighting control training session or within 48 hours.
   3. Provide complete training of electrical personnel on the operation of elevators, including basic trouble shooting on elevator machine control panels as well as resetting of and replacement of motor control circuit protectors such as circuit breakers and fused equipment. Provide a copy of the elevator shop drawings at the test for reference by

Owner's electrical personnel including all relevant data such as load testing. Provide a copy of all necessary keys at the testing for the Owner's electrical personnel. Provide a videotape record of the elevator training on a CD or DVD, present copy to Owner at end of elevator training session or within 48 hours.

Division 27

COMMUNICATIONS

Section 27 05 00 – Technology Materials and Methods

A. Technology System Design Requirements: Voice, video and data cabling projects may be bid and contracted directly thru the Owner and may not part of the general contractor scope of work. Verify with KISD to determine how Technology is to be procured prior to the start of design.

B. Voice, video and data cabling projects are separate from security, audio visual and building control systems that are not directly associated with the data/voice system.

C. Design Requirements:

1. 100% Design Development Milestone Requirements:
   a. Locate all telecommunication rooms, service entrances and identify all backbone pathways.
   b. Plans shall include schematic layouts of closets, legends and details.
2. 60% Construction Document Milestone Requirements:
   a. Include plans, pathways, room layouts, backbone schematic diagrams and telecommunication specifications.
3. 100% Construction Document Milestone Requirements:
   a. Include backbone riser diagrams for all intra-building cross connects and inter-building cross connect locations. Also include service entrances and room layouts, wall elevations of all communication rooms, rack elevations, grounding bus-bar, termination boards, conduits, cables trays, floor penetration locations and pull boxes.
   b. Detailed room layouts indicating all technology outlets with identification to determine number of drops to each outlet.

Section 27 11 00 – Telecommunications Room Requirements

A. Building Demarcation Point (BDP)

1. The BDP is the main point of service entry for all telephone, fiber and cable building service connection points. Locate on ground floor and locate in Building Communications Room (BCR) is preferred.
2. If BDP is not located in BCR:
   a. One wall in room to be bearing wall and not contain storage material and provide at standard working height to avoid ladders or scaffold to service equipment.
   b. Provide with at least one 120V power branch circuit and have 50-foot candles of illumination measured at 36” above floor.

c. Provide termination backboard at least 8'x8' with two coats of fire retardant paint (both sides).
d. Not to be used as a route to hold other building systems such as boiler rooms, air exchange rooms, janitorial closets, water heaters, wet sinks or electrical rooms.
e. Provide ground bus bar in room; do not provide a ceiling.

3. Install (4) - 4" service conduits to be routed underground at minimum depth of 36" from communications hand hole located at property line. Coordinate hand hole location with service companies.
4. Provide wide sweeping bends not less than ten times diameter of conduit and no more than two bends (180 degrees total) between pull boxes.
5. All bends to be rigid steel conduit.
6. Hand holes sizes to be 30"W x 48"L x 48"D installed in 6" deep rock/gravel bottom with ground rod installed in hand hole.
7. Stub up conduit to extend 4" above finished floor and contain bushings.
8. Slope conduits away from building and seal all conduits after cable installed.
9. Service providers to fasten all entrance conduits to building upon installation.

B. Building Communications Room (BCR):

1. Primary communications room for the building, also known as MDF. Houses all telephone equipment for building, network equipment, video surveillance, cable television hardware, fire alarm main panel, intercom systems, and district-wide area network equipment.
2. Location and Requirements of BCR room:
   a. Not to be used as a route to hold other building systems such as boiler rooms, air exchange rooms, janitorial closets, water heaters, wet sinks or electrical rooms.
   b. Locate in central area of building near administration area.
   c. 12'W minimum x 20'L minimum size for an elementary school, 12'W minimum x 24'L minimum for middle and high schools. Provide floor drain in room if risk of water entering facility.
   d. Cover walls with 3/4" plywood, painted with fire retardant paint from 8" above finished floor to 8'-8" above finished floor.
   e. 10'-0" minimum clearance to structure, no ceiling.
   f. Locate 3'-0" out-swinging door at corner of corridor side of BCR.
   g. Provide ground bus bar in room.
   h. All conduit stub ups, sleeves, and cores shall be located within 6" of walls.
3. Air conditioning requirements of BCR room:
   a. Primary cooling for the room to be provided by a stand-alone cooling system separate from building air conditioning system.
4. Electrical Requirements of BCR room:
   a. Power for telecommunications equipment shall not be on same panel serving convenience receptacles, lighting or HVAC equipment.
   b. Provide duplex convenience outlet every 10'-0" on-center along perimeter room wall.
   c. Each technology / security cabinet/rack shall be served by (1) one dedicated 120v, 20A, single pole circuit, locate receptacle at 72" above finished floor behind cabinet/rack.
   d. For PBX equipment, provide (2) dedicated 208v, 20A single-phase double pole circuit on wall behind phone equipment.
   e. Each rack/cabinet shall contain a horizontal plug strip with 12-foot extension cord rated for 20A receptacle, on/off switch, circuit breaker and minimum six standard outlets.

f. Provide grounding system via 12”x4”x1/4” solid copper bus bar mounted 12” below top of plywood backboard.
g. Bond all incoming conduits, racks, ductwork, piping, cable trays and termination frames with #6 AWG copper strap with termination lugs.
h. Tie all Floor Communication Rooms (FCR) together with #3/0 copper conductor.
i. Install #3/0 copper bonding conductor installed from service equipment in electrical entrance facility to grounding bus bar in BCR.
j. Provide 50-foot candles of illumination in room measured at 36” above finished floor.
k. Provide dual level switching for fixtures and provide emergency lighting connection as per building emergency lighting standard.
l. Do not use fixtures designed for ceiling grids or suspended with wire. Wall mounted fixtures, coordinate locations with equipment to mitigate obstructions and enable full service access.

C. Floor Communications Room (FCR):
1. Space requirements: Power, lighting, and cooling requirements for FCR room to match BCR requirements listed above.
2. Dedicated space housing communications equipment serving technology/voice outlets on immediate floor. Also known as IDF closet.
3. Stack FCR closets on floors so each closet is directly above / below the other. Install (4)-2” conduits between rooms/floors.
4. Minimum size of FCR is 9’x8’ (standard size). An alternative size of 9’x3’, double doors swinging out, is also available to use if approved by Owner.
5. Provide positive air in room.

Section 27 13 00 – Communications Support Systems

A. Backbone and Horizontal Cabling Support Systems:
1. Cable Tray Systems: Provide continuous cable tray pathway at or within corridors for all data cable. Connect BCR to FCRs for horizontal runs with continuous cable tray. Provide conduit for all fiber connections. Cable tray shall not penetrate walls. Provide 4” conduit sleeves at wall penetrations.
2. Installed by general contractor on project and needs to be coordinated other building systems installed (ductwork, piping, equipment) in area as well as scheduling of installation during construction.
3. No power cables allowed in cable tray system.
4. Basket type tray with U-shape round wire mesh mounted from wall or inverted “T” mounts. 12”W x 4”H, example: Chalfant WMST412S.
5. Minimize bends and offsets during installation and provide cable waterfalls at large cable drops from tray system.
6. Provide 6” clear above and each side of tray from all obstructions.
7. Install cable tray near corner of room when entering all telecommunication headend closets.

B. Conduit Distribution:
1. All telecommunication outlets shall receive 1” ID EMT from outlet to accessible ceiling.
2. Provide bushings on all conduits to protect cabling during installation.
3. Provide pullstring in all conduits.
4. For any half-height (pony) walls, contractor shall install a dedicated 1” conduit with pullstring for every two technology boxes installed. Conduits shall route directly from technology boxes up wall in direction of nearest BCR/FCR headend room and terminate above ceiling for the installation of technology cabling.

C. Telecommunications Outlet Boxes:
1. Telecommunication boxes to be 4”x4”x2-1/2” boxes mounted at 18” AFF for standard mounting height.
2. At counter locations with backsplash, mount at 6” above counter surface. At counter locations without backsplash, install at 12” above counter surface.
3. Do not install boxes back to back.
4. All video monitor boxes shall be mounted at 84” unless noted otherwise.
5. Install boxes for wall mounted telephones at 54” AFF.

Section 27 30 00 – Voice Communications

A. Two-Way Radio System
1. All schools shall be provided with a two-way radio system.
2. Repeaters
   a. Acceptable Manufacturer
      i. Motorola – SLR5000 Base/Repeater
   b. Include RF Output 50W Power
   c. An APC Model No. SURTD5000RMXLP3U Smart-UPS shall be provided by KISD
3. System Management
   a. Acceptable Manufacturer
      i. MOTOTRBO Network Management Software
         (1) Client Workstation
4. Antenna System
   a. The antenna system will be discussed between KISD and the approved Vendor after repeater and roof penetration locations are determined.
   b. Provide note on drawing stating that “Provide allowance for a roof penetration, power source, and antenna cable run with conduit to base unit.”
5. Display Radios
   a. Acceptable Manufacturers
      i. Motorola
      ii. Kenwood
   b. Basis of Design
      i. Kenwood 2360
      ii. Provide 30 radio units
   c. Alternate Manufacturers
      i. Other equipment manufacturers may be considered by KISD subject to approval of complete technical data, samples, and results of independent testing laboratory tests of proposed equipment, submitted in accordance with project specifications.

Section 27 50 00 – Local Sound Reinforcing System

A. Local Sound Reinforcing System:
1. Acceptable Manufacturers
   a. TOA
   b. Bogen
   c. Rauland
   d. Bi-Amp
   e. Atlas/Soundolier
   f. Peavey
   g. Sound Tube
   h. Orbit
2. Provide a local sound reinforcing system in all gyms, cafetoriums, cafeterias, auditoriums and sports fields.
3. Elementary Cafetoriums
   a. Equipment rack shall be a Middle Atlantic rack, model #DWR-24-22 with plexiglass door. Provide with rack light and 8 power outlet inputs #ACRL-291. Provide with powder-coated black utility drawer #UD3.
4. Provide separate commercial grade amplifier with microphone and auxiliary inputs (CD player, tape player, etc.)
5. Provide rack mounted equipment as listed below for each sound rack on project.
   a. 2 channel 500 watt @ 4 ohm amp with DSP software
   b. 8 input 2 output mixer
   c. 31 band equalizer
   d. CD/DVD/Blue-Ray player capability
6. Provide separate speakers independent of the paging system.
7. Two-way loud speaker (8 ohm) with flying mount kit, speaker bracket, and connector. Provide quantity of two (2) unless cafeteria can be split which will then require two (2) speakers in each space that can be combined or as separate systems.
8. Speakers near the stage in the Multipurpose Room should have the capability to be switched on/off independently from the speakers in the other half of the space so that a function can occur at the stage while another function is occurring in the dining area.
9. Provide microphones, wireless microphones and hanging microphones as noted below:
   a. Dukane/Shure Cardoid Microphone #SM58S, quantity of 2.
   b. Shure Wireless Microphone System Kit with Handheld/Lav. #SLX124/85/SM58. Quantity of 2.
   c. Atlas Microphone wall outlet #SG-XLR-F1, quantity of 2.
   d. Atlas Microphone desk stand #DS-7, quantity of 2.
   e. Atlas Microphone stand #MS-43E, quantity of 2.
   f. Dukane/Shure 25’ microphone cable #SU-C25J, quantity of 3.
   g. Shure hanging microphone #EZO/G, quantity of 3.
10. Provide assisted listening system: Williams Sound, #PPA-375E with 4 receivers, rack mount kit #RPK 005, and antenna #ANT 005.
11. All wiring shall be at least 18-gauge over all shield and 2C-16AWG plenum for speakers.
12. All wire labeling shall be on Brady labels, model #PM-1M “Porta-Mark”.
13. Provide auxiliary input at rack to tie in an external source to house system.
14. Any substitution of equipment or product numbers must be approved by KISD.
15. All final walk-thru’s of complete installation and delivery of spare or accessory products must be scheduled and signed off by KISD Facilities Services Project Manager or Directorate Representative. All final delivery of products must have a sign off receipt

from contractor to KISD Alarm Communications and signed receipt of delivery included in close out documents.

Section 27 51 00 – Intercom System

A. Acceptable Manufacturers:
   1. Dukane
   2. Telecor

B. Wiring and equipment installation shall be by manufacturer's approved installer.

C. Provide a two-way communication system throughout the school.

D. This shall include speakers in all corridors and rooms except janitor room and closets. Provide exterior speakers near all exits. All speakers located in offices and work rooms, conference rooms and libraries shall use a wall mounted volume control.

E. Corridor speakers, grade levels, classrooms and external (outside) horns/speakers shall be on independent zones.

F. Outside speakers shall be Atlas Soundolier #APF-15T or Quam System 6VP.

G. Provide call-in buttons in all classrooms, lounges and kitchens.

H. Provide administration phones at the reception desk, principal and assistant principal's office.

I. Provide a master clock controller

J. This system shall use a TripLite UPS, model #SMART-1500SLT with rack mounting equipment.

K. This system shall be capable of tuning into AM/FM radio stations, playing music CDs, and with auxiliary input (USB, Bluetooth, RCA, HDMI, or 3.5mm wire plug) to broadcast audio to selected zones.

L. Contractor shall provide a network interface device that will connect to intercom system via the KISD network (Digione) sp model #70001851. This device will need to be connected to the school network system. KISD will be responsible for programming this device.

M. For supporting low voltage cables run concealed above ceilings, use Cast "C" clamps, "U" straps, or ring hangers attached to rods, and/or brackets fastened to structure. Do not run cables loose on ceiling tiles. Group cables in bundles. Do not run intercom cables alongside of any other cables, must be at least 5-inches away from any other cables to prevent noise interference.

N. Ground all electrical apparatus in accordance with the National Electric Code.

O. Provide one additional spare audio/call in card for future growth.

P. All manufactured articles, material, and equipment shall be applied, installed connected, erected, used, cleaned, adjusted, and conditioned as recommended by the manufacturers, or as indicated in their published literature, unless specifically herein specified to the contrary.

Q. All final walk-thru's of complete installation and delivery of spare or accessory products must be scheduled and signed off by KISD Alarm Communications. All final delivery of products must have a sign off receipt from contractor to KISD Alarm Communications and signed receipt of delivery included in close out documents.

Division

28

ELECTRONIC SAFETY AND SECURITY

Section 28 05 00 – Security Materials and Methods

A. Security System Design Requirements:
   1. Security drawings to be on separate plans from any other building systems.
   2. 100% Design Development Milestone Requirements:
      a. Locate all room locations that will house security panels and headend equipment.
   3. 60% Construction Document Milestone Requirements:
      a. Locate all security device locations, door contacts, motion detectors, and security cameras with lens information.
      b. Locations of all security keypads, control panels, expansion modules and power supplies. Include mounting heights of all devices.
      c. Specifications detailing manufacturers and product numbers of devices to be installed.
   4. 100% Construction Document Milestone Requirements:
      a. All device and equipment locations as listed in previous design submissions above.
      b. Detailed risers and equipment room layouts for all security equipment to be installed.
      c. Complete and detailed specifications indicating product information and installation requirements.

B. Security Contractor Requirements:
   1. Intrusion Detection System Contractor Requirements
      a. Responsible for complete installation of all security devices, wiring and commissioning of security systems.
      b. Provide all programming of security systems and devices.
      c. Provide training for all systems installed.
      d. Furnish and install interim monitor at BCR to verify camera views. Contractor is responsible to remove the interim monitor from closet once all camera views have been configured and are complete.
   2. Security Camera Equipment Furnished and Installed by District.
   3. KISD will furnish and install multiplexer at BCR telecommunication room where DVR equipment will be installed. KISD will provide and install server racks, DVR equipment, DVR recording software, UPS equipment, coax patch cables from DVR to multiplexer, KVM switcher, keyboard/mouse/monitors and all client computers and software required to operate camera system.

C. Security contractor qualifications:

1. Minimum of five years of experience in security industry.
2. Certified by the manufacturer of all the components they are installing.
3. Provide 24-hour support, 7 days a week within 2 hours during normal business days and 4 hours during non-business work hours.
4. Licensed in the state of Texas.
5. Provide a reference of at least three other projects similar in size to current work scope.
6. Submittal Requirements
   a. Provide detailed 1/8" scale plans indicating device locations, wiring pathways, equipment product cutsheets, block diagrams, schedule and system operation manuals.
7. Close out documents shall include as-built reproducible documents in a hard copy and electronic (Adobe pdf and AutoCAD) formats.
8. All training on security systems shall be two hour sessions with district and school staff and be recorded for entire session. Provide Owner with two copies of recorded training session.

D. Security Installation Requirements:
1. Cabling Installation
   a. Support wiring every 5'-0" on center with no more than 12" cable sag between supports and without over tension of cables.
   b. Label cabling with machine labels 18" of each end of cable keyed to the door, room, or corridor number.
   c. Group cabling according to signal or power levels.
   d. At headend rack, group power cables on one side of rack and coax cables on opposite side of rack.
   e. Provide service loops at all cables and use Velcro tie wraps at all closet locations. Provide Velcro tie wraps at 4' intervals maximum and dress in neat and orderly fashion.
   f. Do not run cables above red iron joist.
   g. No splices in any cables.
   h. All exterior exposed coaxial cable shall be contained in waterproof flexible conduit with appropriate fittings.
   i. Provide waterproofing and fireproofing of all sleeves and openings as required.
   j. Security contractor is responsible to coordinate with the project electrical contractor on all power and raceway requirements for project.
   k. Install 3/4" conduit with bushings for all exterior penetrations from device to nearest available above ceiling location.
   l. Provide 24-month materials and labor warranty for all security systems installed.

Section 28 13 00 – Access Control

A. Equipment/Contractors:
1. Access Control for all new construction must interface with KISD's existing manufacturer LENEL and their software OnGuard Pro – OnGuard 7.4
2. Existing WiQ locks shall be upgraded to Proximity read heads at each applicable school/facility building when able.
3. Access Control contractor must be a licensed security contractor and authorized representative (VAR) for LENEL and BEST ACCESS. Contractor must also submit certification documentation indicating that technicians are indeed certified.
4. Contractor shall have a MINIMUM of ten (10) years of experience with the design, programming, installation, and project management of access control systems.

5. The proposed contractor shall have a minimum of five (5) years of recent experience with the proposed manufacturer's products.
6. The contractor submitting and installing the work shall be the authorized OnGuard contractor. There shall be no subcontracting of this scope of work. The only exception to this would be the installer of the cabling.
7. Use LENEL 2220/4420 controller hardware and 1320 door boards for all new construction. Contractor will add licenses for additional Readers in chunks of 64 readers to the Owner's existing OnGuard account.
8. Contractor will size out the appropriate manufactured wall mounted panels to accept the number of doors and additional inputs as project requires.
9. Connect the built-in NIC with the data drop provided by the Div. 27 00 00 contractor. The data drop shall be located above the ceiling where the panel location. The access control contractor shall provide and install surface mounted conduit or finger Panduit pathways from the top of the access control panel to above ceiling or 8 feet above finish floor if open ceiling. Provide a protective bushing on the end of each conduit. Size the conduits as needed and secure.
10. The contractor will provide and install a dedicated power supply for all panels. Coordinate with the job electrician on-site or district electrician to obtain home run power to the power supply. The use of electrical cords as a means of power connection is not approved.
11. Provide as required auxiliary power supply(s) and battery backup, U.L. Listed and labeled for access control systems.
12. Door Hardware Equipment:
    a. Recessed Magnetic Door Contacts: Interlogix 1076W-N, Exterior doors only
    b. Surface Mounted Door Contacts: Interlogix 2505A-L, Exterior doors only
    c. Reception Office to Hallway: Door receives BEST institutional lock. Provide Strike: HES – 5000-C.
    d. Reception Office Door Release Buttons: Schlage 660-PB
    e. Use electrified door locks only, i.e. quiet, low amperage motorized panic devices or BEST electrified locksets.
    f. Electric strikes are not permitted except when required by BEST institutional lockset.
    g. Electrified 4 wire hinge or mortised power transfer need with BEST cylindrical electrified lockset.
    h. On exterior access control openings, provide one (1) electrified device per set of doors. The right most door leaf, adjacent to the card reader, is to receive the electrified device.
    i. All exterior panic devices must have RX option on all door leaves (request to exit switch).
    j. All exterior doors and doors with electrified panic hardware or locksets need power transfer hinges on associated door leaves.
    k. Door contacts (DC) and request to exit switches (RX) are not required on interior doors.
    l. Each exterior door set shall have one door prop local alarm device. The door prop alarm is to sound after the door has been held open longer that 5 minutes or 300 seconds. It shall continue to sound until the door is shut and will auto reset.
    m. Door prop alarms shall only be disabled by disabling power or via programming. No keyed on/off option is allowed.

B. Auxiliary Power:
1. Provide as required, auxiliary power supply(s) and battery backup, U.L. Listed and labeled for access control systems.

2. Provide low battery reporting as part of the access control system programming. Standby battery operation time shall equal, or exceed, the standby operation time of the main panel; in any case, provide a minimum of 8 amp hours battery backup.
3. Provide a U.L. Listed cabinet suitable for surface mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and a painted standard finish. The back box and door shall be constructed of 0.060" minimum steel with provisions for electrical conduit connections into the sides and top. The cabinet shall provide storage for backup batteries. The door shall provide a key lock to access system components, key alike with main panel. The cabinet shall be attack resistant and fitted with front and back tamper switches. All components shall be securely mounted and all cable routed and tie wrapped in a neat, professional manner.
4. All cables will route via conduit pathways connecting the main power supply to the main alarm panel location. Placement of this sleeve is the responsibility of the access control contractor.
5. Electrical Contractor shall provide power through a 120 VAC, 20-ampere breaker from spares scheduled in nearest panel.
6. All electrical wiring shall be done on terminal strips – no wire nuts or caps are permitted at any time on any panel.
7. Manufacturer/Model: Provide Altronix or LENEL OEM power supplies. No exceptions.

C. Door Power Supplies:
1. The door hardware contractor will provide the door power supplies. Reference the door hardware specifications for any information regarding the power supplies or door hardware.
2. The access control contractor will wire / connect the power supply to both the provided power source, to the EPT transfer hinge and to the door hardware for a complete circuit. The EPT will be provided and installed by the door hardware contractor. Coordinate all installation wiring with the hardware contractor.
3. Access Control contractor shall mount all door hardware in MDF or IDF locations for ease of service. The proper cable gauge specified must be provided to handle voltage drop over distance and the minimum recommended gauge sizes need to be followed, per the door hardware manufacturer.

D. Card Readers:
1. All card readers shall be HID – MultiClass SE Single Gange Reader, no exceptions as follows.
   a. Standard Reader – HID MultiClass SE RP40 Multi-Technology Readers, 3.3” wide x4.8” tall x 1.0” deep.
   b. Mullion Reader – HID MulitClass SE RP15 Multi-Technology Readers, 1.9” wide x 6.0” tall x 0.9” deep.
2. Electrical contractor will have a conduit and single gang back box for each reader location. All readers will be flush mounted to the exterior or interior wall as shown.
3. Contractor will seal all exterior mounted reader locations with a clear UV resistant sealant to prevent insect or water damage.
4. Silicon will dry clear and must be UV resistant.
5. Route the wiring to the nearest access control panel.
6. Card readers shall be placed on the right side of the door as you enter door from the outside unless placement cannot be made. For all pairs of doors, the right hand door as you face from the outside shall be the door tied to access control system.
7. The left hand door, as you face from the outside, should be an inactive leaf but the hardware should provide RTE functionality and paralleled with the active leaf.

E. Proximity Cards:
1. Contractor shall provide 200 new access control cards with each new installation.
2. Acceptable manufacturer: HID P/N 1336LGGMN

3. FC Code is 113.
4. Card number shall start at (Owner provided information).

F. General:

1. Contractor will upgrade "Best Onguard Access System" to current version and perform initial programming necessary to complete the system, within our standards. KISD Access Control Department will complete programing for building access.
2. Contractor with KISD will update all clients if required.
3. All cabling for the approved manufacturer's hardware must meet the factory specifications, including the requirements for cable that is stranded, twisted, with an overall shield to eliminate electrical interference.
4. Pair counts and wire gauge must meet the approved manufacturer's specifications based upon the distances and power level required.
5. In an effort to standardize, plastic tie wraps are not permitted at any time on an installation. Contractor is forbidden to bring any plastic tie wraps onto the project grounds at any time. Contractor will use Velcro based ties to secure the cable bundles. Exception: Small tie wraps can be used inside panels to help control wires. They are not to be used anywhere else.
6. Access control contractor will use their own sleeves as needed to penetrate any walls and will fire stop the sleeves to meet all applicable codes. It will be the contractor's responsibility to plan for any such penetrations. All penetrations will require sleeves and will be fire stopped to meet local and national codes.
7. Magnetic locks are not to be installed in KISD unless pre-approved by KISD Executive Director for Facilities Services.
8. Contractor is required to setup and attend a pre-installation meeting between installing contractor General Contractor/Construction Manager, the Access Control Engineer, and KISD Facilities. Meeting must be held prior to any wiring or installation of security equipment has been started.
9. Card readers shall be placed on the right side of the door as you enter door from the outside unless placement cannot be made. For all pairs of doors, the right hand door as you face from the outside shall be the door tied to access control system.
10. All final walk-through's of complete installation and delivery of spare or accessory products must be scheduled and signed off by KISD Facilities. All final delivery of products must have a sign off receipt from contractor to KISD Facilities and signed receipt of delivery included in close out documents.

G. Emergency Lockdown System

1. The Emergency Building Lockdown System sequence of operation shall include the "ACCESS" switch connected directly to a building access system controller input port, which is programmed to initiate a building lockdown when activity on that port is detected. When the switch is activated, the building access control system shall initiate the following sequence of operation:
   a. The access control system shall place the building access control system in lockdown status.
   b. An email status message shall be generated and sent to a building specific contact list.
   c. A lockdown event shall be recorded in the system log file.
   d. The access control system shall deny building entry via card reader for all users below a designated access level.
   e. All electric "dogging" (retracting of the door latch) entry doors that are scheduled to be unlocked, shall become locked to prevent outside entry.
   f. Exit door (controlled and non-controlled) shall remain unlocked from the inside to allow free egress. If applicable, corridor WON doors shall become closed. Listed mag door hold opens shall release and allow the doors to close and lock.

2. After an official "all clear" is announced:
   a. The designated school administrator will pull the latching HUB-2B button out of its recessed position, allowing the school to come out of lockdown mode. This shall end the lockdown and return the access control system to normal operation.
   b. Specify HUB-2B Latching Button for lockdown purposes.

Section 28 16 00 – Intrusion Detection Systems

THIS SPECIFICATION SECTION IS NOT UTILIZED BY KISD

Section 28 21 00 – Security Camera Systems

A. Cameras
   1. Do not install pan/tilt/zoom (PTZ) cameras.
   2. Indoor cameras vandal proof AXIS P33V Series and outdoor cameras AXIS P33VE or pre-approved equal. All cameras will be furnished and installed by KISD.
   3. All cameras mounted less than 9'-0" shall be installed in vandal resistant housings and wall mounted. No cameras are to be mounted above 14'-0" without prior approval from KISD School Safety Department
   4. All office areas to receive dome ceiling mounted cameras.
   5. Stairs, elevators and multi-purpose rooms shall use AXIS P33 Series V & VE Series.
   6. Cameras shall be POE.
   7. KISD will provide and install digital video recording equipment-remote PC-based.
   8. Local DVR looping shall be mounted in BCR as standard and can be mounted in FCR locations with approval from KISD to reduce cabling distances.
   9. KISD will provide and install UPS equipment.

B. Recommended Camera Quantities per Building Type
   1. Review placement and number of cameras with Owner prior to project being issued.
   2. Design of camera layout must comply with areas of coverage listed below and depend on overall school layout and function of campus.
   3. The numbers listed below are the recommended number of cameras based on school-type.

Elementary	Total
Small – 4(up to 499) – 15 Campus, 5 Food Nutrition	20
Medium – 10(500 to 699) – 18 Campus, 5 Food Nutrition	23
Large – 18(over 700) – 20 Campus, 5 Food Nutrition	25
Middle School – 25 Campus, 5 Food Nutrition	30
High School – 105 Campus, 14 Food Nutrition	119
CATE – 73 Campus (Incl. AG Barn), 12 Cafeteria/Kitchen	85
Pathways – 30 Campus, 2 Food Nutrition	32
Gateway High School	45
Gateway Middle School	30

C. Areas Requiring Video Surveillance:
   1. All Building entrances from exterior into corridors, provide interior camera near entrance to focus on face of person entering, with additional corridor camera viewing door and length of corridor from a distance.
   2. Corridors to be covered with camera layout overlapping 75' maximum per camera if/when possible.

3. Cafeteria and Multi-Purpose Rooms area shall receive two cameras minimum in tamper resistant housing.
4. Restroom entrance/exits shall be covered from both sides of corridor longitudinally to view faces of persons entering or exiting restrooms.
5. Gymnasiums shall receive two cameras minimum, one on each end, installed in opposite corners of gym.
6. Exterior cameras to monitor parking areas, playground areas, bus loading/unloading and kitchen delivery entrance.
7. All surveillance coverage decisions to be in accordance with the above camera quantities allowed by campuses.

D. Security Camera Cabling:
1. Cat 5E UTP for video cabling to camera is not to exceed 300 feet. KISD to provide and install patch cables from patch panels to the network.
2. Installation
   a. All final walk-thru's of complete installation and delivery of spare or accessory products must be scheduled and signed off by KISD School Safety. All final delivery of products must have a sigh off receipt from contractor to KISD School Safety. All final delivery of products must have a sign off receipt from contractor to KISD School Safety and sign receipt of delivery included in close out documents.

E. KISD School Safety Department will determine final count and locations of security cameras.

Section 28 46 00 – Fire Detection and Alarm

A. The required fire alarm and evacuation system providing a system with the following functions and operation.
1. Locate main fire alarm panel in BCR room.
2. The system shall:
   a. Provide a complete fire alarm and evacuation system, Class A wired, tested according to the manufacture's specifications, and fully commissioned to ensure connectivity to all applicable systems in the facility (elevators, lighting, alarms, monitoring system (through an IP DACH network connection)).
   b. Monitor the integrity of alarm initiating devices and shall be provided with automatically charged stand-by batteries to maintain system operation for 24-hours in the normal supervisory more and have sufficient capacity to operate in the alarm mode for 5-minutes at the conclusion of the supervisory time period. Batteries shall be supervised for connection to the system and a low voltage threshold. The automatic battery charger shall be capable of charging a fully discharged battery to 70% capacity in 12 hours.
   c. The fire alarm control panel shall be Silent Knight – Fahrenheit IFP-2100 ECS. All sub-panels shall be analog addressable (i.e. Power Booster) Silent Knight – Model #5895XL. No substitutions are allowed.
   d. Monitor all duct detectors, flow switch and other points required by code as a minimum. Each group of air handling units in one location shall be on a separate zone. Each air handling unit shall have its own remote panel within the mechanical room tied back to the master panel in the office area, with a separate alarm indicator for each detection point.
   e. Have a manual pull station at the panel as per code requirement and A.D.A.
   f. System Operation:
      i. Alarm initiating devices shall be identified by zone light emitting diodes (LED's) or numeric display on the control panel.

ii. Cause the respective red zone alarm LED on the control panel to flash until the acknowledge switch is actuated at the control panel. Once acknowledged, the zone LED will be constantly illuminated until the actuated device is restored to normal and the system is reset.

iii. The audible alarm-indicating appliance shall sound in general alarm ANSI pattern throughout the entire facility system speakers until the system alarm acknowledge/silence switches are operated.

iv. After the acknowledge switch is operated, activation of a subsequent initiating device on another zone shall cause the audible indicating appliances to resound and the visual indicating appliances to flash.

v. Each alarm initiating circuit shall be electrically supervised. Any disarrangement of system wring such as opens or grounds shall activate the audible and visual indicators at the control panel. Actuation of the trouble silence switch shall silence the audible trouble indicator, but the trouble LED will remain lit. The trouble LED numeric display shall be non-canceling, except by an actual clearing of the trouble condition and restoring the trouble silence switch to normal.

g. The control panel shall obtain its primary operating power from a 120 BAC single-phase 60 Hz supply provided with a dedicated and secured disconnect switch. The fire alarm and evacuation system shall comply with NFPA 72 and all applicable local codes. Provide horn/strobe and smoke detectors at all Pre-K and Kindergarten classrooms.

B. System Control Features:

1. Operator interface switches for alarm acknowledge/silence, system reset, trouble silence with ringback, municipal connection circuit disconnect.
2. Capability to refer back to remote panels in mechanical rooms, with alarm indicator for each detection point.
3. Visible LED indicators or numeric display through a locked door with protective glass window for AC Power ON (green), Power Trouble (yellow), Alarm for each zone (red), Trouble for each zone (yellow), Signal Circuit Trouble (yellow), Annunciator Trouble (yellow).
4. Field programmable microprocessor selectivity via dip switches or numeric display for the selection of:
   a. Signal circuit type of operation, shall consist of selective code, zone code, general alarm, time limit cutout, alarm silence inhibit, and separate zone by pass.
   b. Functional System Test capability which when in the test mode, activated initiating devices will report the individual resident zone at the control panel. Integrity of the installation conductors and indicating appliance circuit can be verified by momentarily opening any circuit. The indicating appliance will operate four seconds and automatically reset.
   c. Off-site monitoring output capability of the remote station reverse polarity, local energy master box or shunt master box types shall be field selectable within the control panel.
5. Metal oxide varistors (MOV's) shall be provided on the system power supply and the municipal connection circuit to provide transient suppression protection to the control panel.
6. The fire alarm system control panel specification has been based on Silent Knight 5820. Products produced by other manufacturers shall be reviewed by Killeen ISD Facilities Services Executive Director in Conjunction with Central Services prior to acceptance.
7. The panel shall be constructed of steel with baked enamel scratch resistant paint and shall have a key operated locked door with shatter resistant glass viewing window.

8. All Control panel batteries shall be 12Volt 18amp hour or greater. Installation dates should be clearly marked on batteries.
9. The system shall utilize KISD system approved station devices supplied by the manufacturer of the fire alarm control panel.

C. Manual Fire Alarm Station:
1. Station shall be non-coded, pull type with supervision. Station shall be double-action and when operated shall remain mechanically "locked" until reset.
2. All initiating devices shall be UL approved.
3. Detecting devices shall be photo detectors.

D. System Wiring:
1. The system wiring and installation shall be in compliance with applicable codes, project drawings and as required by the manufacturer. All wiring shall be color coded, tagged and checked to assure that it is free from shorts and grounds. All systems wiring shall be tested by Megger Fox – 600 volts for one minute.
2. All wiring shall be non-power, unlimited power supply or plenum rated.

E. System Testing:
1. The completed system shall be tested in accordance with NFPA Standard 7211. International Building Code, and National Electrical Code. Testing shall include, but not limited to dampers, duct detection, air handler shut down and fire doors, where applicable.

F. System Service Support:
1. The system's vendor must employ factory certified trained technicians and maintain a factory certified service organization. This organization must provide 24 hour emergency service.

G. Future expansion:
1. The system shall include 25% additional capacity for future expansion.

H. Panel Programming:
1. Shall include device descriptions and zoning per floor per building (i.e. zone 1= main building first floor Administrative Suite, zone 2= main building first floor corridor east, zone 3=main building classrooms). Panel programming shall be supplied to owner via a hardcopy and electronic.

I. Installation:
1. All wiring shall be in compliance with NEC, local building codes and Article 760 of NFPA Standard 70.
2. Fire Alarm wiring shall be U.L.L. approved and not less than #18 gauge.
3. Wiring conduits should not be used for any purpose other than fire alarm wiring. (No Exceptions)
4. All wiring shall be color coated and marked at each termination or junction box indicating the circuit served (i.e. power supply).
5. All sub-panels shall be located in the MDF, IDF, electrical closet or mechanical rooms only.
6. All junction boxes including the cover are to be painted red in color for identification purposes.
7. All wiring or use plenum rated cable installed in conduit – EMT for indoors and IMC for outdoors.
8. All sensors shall be photo detection. All duct detectors shall be analog addressable ionization.
9. Horn/Strobe wiring shall be four wiring conductor cable to separate the strobe from the horn and ANSI purposes.
10. All control panels and sub panels shall clearly indicate electrical breaker location, including room number, panel number and breaker number.

J. Test and Reports:

1. A trained technical representative of the equipment supplier shall supervise the final control panel connections and testing of the system. Upon completion of the acceptance test the Killeen ISD Maintenance Department will be instructed in the proper operation of the system.
2. The installation contractor shall functionally test each and every device in the entire system for purposes of operation and response. Written certification shall be provided upon completion of the test.
3. Contractor shall be made responsible for maintaining existing fire alarm operational throughout construction duration. In certain cases, the existing fire alarm equipment is currently under warranty from the initial installation. If the contractor requires the temporary or permanent relocation of fire alarm devices in order to complete contractor's work, then contractor will be responsible for disconnecting, removing, securing, protecting, reinstalling, re-testing and re-certifying such equipment or system. The installing vendor listed below must perform any alteration to the existing fire alarm system. If no vendor is indicated, contractor may select a qualified fire alarm vendor of its choosing. Contractor is responsible for all costs and coordination of any disconnection, removal, shunting, reconnection, testing, and re-certification of the fire alarm system required to accomplish the renovation work and receive certificates of certification from the City of Killeen Fire Department.

Division 32

SITEWORK

Section 32 12 16 – Asphalt Paving

A. Asphalt Paving: Use for resurfacing existing asphalt paving only. All new paving shall be concrete as specified below.
B. Tack coat: RC-2, Texas Department of Transportation Item 300.
C. Hot-Mix Asphalt Paving:
   1. Texas Department of Transportation Item 340, Type D. The paving mixtures shall consist of a uniform mixture of aggregate, hot asphalt cement, and additives if allowed or required. The mix shall be designed in accordance with TXDOT Construction Bulletin C-14 and Test Method Tex-204-F. The mixture shall be designed to produce an acceptable mixture at an optimum density of 96.0 percent, when tested in accordance with Text Method Tex-207-F and Text Method Tex-227-F.
   2. The operating range for control of laboratory density during production shall be optimum density plus or minus 1.5 percent. The materials used in the mixture design shall produce a mixture with a stability value of at least 35, unless otherwise shown on the Drawings, when tested in accordance with Text Method Tex-208-F.
D. Pavement Markings:
   1. Apply at manufacturers recommended rates to provide minimum 12 to 15 mils dry thickness.
   2. KISD shall approve all markings prior to application to ensure standardization, sustainability, and confirm the purpose is met in the final product.

Section 32 13 13 – Concrete Paving

A. Require broom finish on exterior sidewalks, ramps, porches, etc.
B. Include a minimum of 5-foot wide paved access to and around the flagpole. Must be ADA accessible.
C. Exterior walk and paving expansion, butt, and construction joints shall have pourable grade two-part polysulfide or urethane sealant. Saw cut contraction joints do not need to be sealed. Require prepared joint to be wire brushed and air blasted to thoroughly clean joint before installing sealant.

Section 32 16 13 – Curbs, Gutters, Sidewalks, and Driveways

A. Curbs and Gutters:

1. Locate mower access points at locations in curbs to allow for complete access to campus grounds by facilities grounds keeping personnel.

Section 32 18 16 – Playground Surfacing

A. Specification shall be based on "Fibar" wood fiber system.
B. Use of "weed resistant fabric" shall be required. This enables trouble-free maintenance using equipment, reduces cost, and provides flexibility in moving play spaces to alternate locations in future site adjustments.

Section 32 31 13 – Chain Link Fences and Gates

A. Framing Products: Vinyl coated, black.
   1. Framework: All framing members heavy galvanized; 2.0 oz. zinc per sq. ft.
   2. Posts: standard weight Schedule 40 steel.
      a. Line Posts: 2 in. o.d.
      b. Corner, End, and Terminal Posts: 3 in. o.d.
   3. Gate Posts: galvanized, 1.8 oz. zinc per sq. ft.
      a. Gates up to 6 feet wide: 2.875 in. o.d., weighing 5.79 lb/ft.
      b. Gates 6 to 12 feet wide; 4 feet high: 4 in. o.d. Schedule 40 pipe.
      c. Gates 6 to 12 feet wide; over 4 feet high: 6-5/8 in. o.d. Schedule 40 pipe.
      d. Top Rails and Braces: 1-5/8 in. o.d.
   4. Chain Link Fabric: Vinyl coated, black.
   5. Fences and Gates: galvanized, 2 oz. zinc per sq. ft. of surface area, one piece fabric, full height as scheduled, 2 inch mesh of No. 9 gauge wire, 6' -0" high.
   6. Ties: 9 gauge core/6 gauge finish galvanized steel wire. Aluminum wire is prohibited.
   7. Truss Rods: Steel rods with minimum diameter of 5/16.
   8. Fasteners: Galvanized nuts and bolts.
B. Ornamental fencing by KISD Facilities approval only.

Section 32 80 00 – Irrigation

A. Irrigation:
   1. Approved Manufacturers
      a. Rain Bird Controller ESP-LX
      b. Rain Bird Series PEB plastic valves
      c. Rainbird Drip Control Kit XCZ-100-B-COM and/or MP Rotator may be considered for applicable LEED credit.
      d. Hunter equivalent of Rain Bird products listed above are approved.
      e. No TORO, ORBIT, or generic-brand systems may be used as a substitute.
   2. Pressure Pipe:
      a. Upside – Schedule 40 PVC minimum.
      b. Downside – Schedule 20 PVC minimum.
   3. Valves and Fittings
      a. Schedule 80 PVC minimum.
   4. Sprinkler spacing shall be "head-to-head" spaced at 50% of the sprinkler's diameter to ensure uniform coverage.
   5. All systems shall have ground moisture content sensors to mitigate the waste of water resources and reduce cost.

6. Drip irrigation emitters shall be self-cleaning and operate at pressures between 10-50 psi and be capable of delivering 1-2 gph.
7. KISD shall approve all irrigation designs.
8. Verify Middle School and High School irrigation requirements with KISD Project Manager.

Section 32 90 00 – Plantings

A. Any landscaping and necessary permanent irrigation beyond code requirements should be minimized. Do not design large planting beds which become a maintenance and sustainability challenge over time, increases resource workload, and adds significantly to life-cycle costs.

B. Designs will prohibit foundation planting due to the potential nesting of rodents and pests and maintenance in tight spaces. Planting of flowering trees (no less than the drip line distance of a full-grown diameter tree) away from the building is acceptable.

C. KISD written approval is required to include any plant material not covered by an automatic irrigation system other than large play fields and lawns.

D. Due to cost, large lawn areas should be hydro-mulched and not sodded. Exceptions should be reviewed with KISD and may involve time of year and construction schedules.

E. Edging is required in each location between a planting bed and lawn areas. Edging can be steel or recycled plastic.

F. Side slope of storm water detention areas should be carefully considered, and specifications should include establishing a lawn, not just an application of hydro-mulch. To establish lawn may require topsoil, erosion control, sodding, and irrigation.

G. Provide the proposed plant list to KISD Operations and Maintenance Grounds Supervisor before any plant selections are finalized for approval.

H. The following list of trees and shrubs are NOT approved for planting on any KISD campus.

1. Canopy Trees:
   a. Cedar Elm
   b. Bald Cypress
   c. Lacebark Elm
2. Ornamental Trees
   a. Tree Yaupon
   b. Desert Willow
3. Shrubs
   a. Dwarf Yaupon
   b. Dwarf Abelia
   c. Pavonia
   d. Nellie R. Stevens Holly
   e. Dwarf Buford Holly
   f. Dwarf Indian Hawthorne
   g. Red Knockout Rose

I. Provide a growth period for plant, sod, and hydro-mulch establishment as recommended by the Landscape Architect.

Division

33

UTILITIES

Section 33 40 00 – Storm Drainage Utilities

A. When feasible, all downspouts shall be connected to underground storm drainage system.
B. Overflow parking areas may be suitable for detention but requires city ordnance review and engineer approval. All detention ponds shall have topsoil, hydro, erosion control and temp watering.
C. For student safety, openings in drain inlet cover grates should be appropriately specified.