NCC VOCATIONAL TECHNICAL SCHOOL DISTRICT

RENOVATIONS TO HOWARD HIGH SCHOOL OF TECHNOLOGY

BID PACKAGE 'C'

August 17, 2016

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END OF SECTION

SECTION 001113 ADVERTISEMENT FOR BID

Receipt of Bids

Public notice is hereby given that sealed bids for the following prime contract will be received for the renovations to the Howard High School of Technology. Bids will be received at the **NCC Vocational Technical School District 1417 Newport Road, Wilmington, Delaware 19804 until 2:00 PM local time on Thursday, September 15, 2016**, at which time they will be publicly opened and read aloud. ***Bids will not be accepted at the offices of EDiS. Bidder bears the risk of late delivery. Any bids received after the stated time will be returned unopened.*** The time and location of the bid opening may be extended with a minimum of 2 calendar days notice to the Bidders.

Contract HHS-26	Technology
Contract HHS-27	Access Controls
Contract HHS-28	Wood Flooring
Contract HHS-29	Casework

Bidding Document

Documents may be viewed and downloaded at EDiS' FTP site on or after Monday, August 22, 2016. Bidders requesting the log on information may obtain user name and password permission by contacting Jackie McKee with EDiS Company at jmckee@ediscompany.com. Each contractor will be required to provide the following information prior to receiving the log on information: company name, contact name, email address, phone number, fax number and postal mailing address.

It is the responsibility of each bidder to review and coordinate all Project Documents. This includes plans, specifications and addendums. Documents may be examined on the State of Delaware Online Bid Solicitation Directory, bids.delaware.gov, or at the office of the Construction Manager, EDIS Company, 110 S. Poplar Street, Suite 400, Wilmington, Delaware 19801.

Bid Security

A bid security in the amount of 10% of the bid including all alternates, plus a consent of surety must accompany each bid. Bid Security shall specify the Owner: NCC Vocational Technical School District 1417 Newport Road, Wilmington, Delaware 19804.

Pre-Bid Meeting

A pre-bid meeting will be held at **Howard High School, 401 East 12th Street Wilmington, Delaware 19801** on **Tuesday, August 30, 2016 at 3:30 PM local time.** A site visit will be conducted immediately following the pre-bid meeting. These site visits will be the only opportunities for the bidders to visit the existing building and review existing conditions affecting the work. Attendance is highly recommended but not mandatory.

Questions

Please contact EDiS Company, Kevin Lucas at klucas@ediscompany.com or 302-421-2893 or 302-420-3083 with questions.

Conformance to the Delaware Architectural Accessibility Act and the standards of the Architectural Accessibility Board is required on the Project.

Prevailing Wage Rates, as described by Delaware Law, must be adhered to where applicable.

Pursuant to the Office of Management and Budget (OMB) ***"4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects"*** requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds implement a Mandatory Drug Testing Program. The regulation can be downloaded from the following website:

http://regulations.delaware.gov/register/september2015/final/19%20DE%20Reg%20207%2009-01-15.pdf

END OF SECTION

Contract No. HHS-26 Technology

BID FORM

For Bids Due: _____

To: NCC Vocational Technical School District
1417 Newport Road
Wilmington, DE 19804

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.:_____ Taxpayer ID No.: _____

(Other License Nos.): _____

(A copy of Bidder's Delaware Business License must be attached to this form.)

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES
N/A

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

Unit Price No. 1: Data Drop: Provide a Cat 6 data jack complete with testing and termination. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations. _____ _____

Unit Price No. 2: Telephone Drop: Provide a Cat 6 telephone jack complete with testing and termination. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.	_____	_____
Unit Price No. 3: Interior Security Camera: Provide Interior Security camera rough in. Include two runs 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.	_____	_____
Unit Price No. 4: Exterior Security Camera: Provide Exterior Security camera rough in. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.	_____	_____
Unit Price No. 5: Security Motion Detector: Provide Dual Technology Motion Detector complete with testing and programming. Including 100 feet of alarm cabling. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.	_____	_____
Unit Price No. 6: Exterior doors (hardwired). Provide both add and deduct unit prices.	_____	_____
Unit Price No. 7: Interior rated doors (hardwired). Provide both add and deduct unit prices.	_____	_____
Unit Price No 8: Interior doors (WiFi/wireless). Provide both add and deduct unit prices.	_____	_____
Unit Price No. 9: Locker/cabinet locks – wire-free. Provide both add and deduct unit prices.	_____	_____
Unite Price No. 10: Additional contactless RFID cards. Provide both add and deduct unit prices.	_____	_____

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed fifteen percent (15%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for ninety (90) days the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ By: _____
(Authorized Signature)

(SEAL) _____
(Title)

Date: _____

ATTACHMENTS

Subcontractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
Affidavit of Employee Drug Testing Program (1 per contractor/subcontractor)
Delaware Business License
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

Subcontractor Category	Subcontractor	Address (City & State)	**Subcontractors tax payer ID # or Delaware Business license #**
1. Voice, Data, Video System:			
	_____	_____	_____
2. Integrated Telecom System:			
	_____	_____	_____
3. Intrusion Detection:			
	_____	_____	_____
4. Video Security Surveillance:			
	_____	_____	_____

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date _____.

All the terms and conditions of Contract No.: HHS-26 Technology have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE
(TYPED): _____

AUTHORIZED REPRESENTATIVE
(SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20_.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the New Castle County Vocational Technical School District in the sum of _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. _____to be paid to the New Castle County Vocational Technical School District for the use and benefit of the New Castle County Vocational Technical School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the New Castle County Vocational Technical School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the New Castle County Vocational Technical School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____day of_____ 20_____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

END OF SECTION

Contract No. HHS-27 Access Controls

BID FORM

For Bids Due: _____

To: NCC Vocational Technical School District
1417 Newport Road
Wilmington, DE 19804

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.:_____ Taxpayer ID No.: _____

(Other License Nos.): _____

(A copy of Bidder's Delaware Business License must be attached to this form.)

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES

Alternate No. 1: Provide a fully integrated system with Salto locksets, utilizing SoftwareHouse CCure 9000 as the integration software.

Add/Deduct _____($_____)

Alternate No. 2: Provide a fully integrated system with Salto locksets, utilizing Honeywell as the integration software.

Add/Deduct _____($_____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

Unit Price No. 1: Data Drop: Provide a Cat 6 data jack complete with testing and termination. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations. _____ _____

Unit Price No. 2: Telephone Drop: Provide a Cat 6 telephone jack complete with testing and termination. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations. _____ _____

Unit Price No. 3: Interior Security Camera: Provide Interior Security camera rough in. Include two runs 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations. _____ _____

Unit Price No. 4: Exterior Security Camera: Provide Exterior Security camera rough in. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations. _____ _____

Unit Price No. 5: Security Motion Detector: Provide Dual Technology Motion Detector complete with testing and programming. Including 100 feet of alarm cabling. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations. _____ _____

Unit Price No. 6: Exterior doors (hardwired). Provide both add and deduct unit prices. _____ _____

Unit Price No. 7: Interior rated doors (hardwired). Provide both add and deduct unit prices. _____ _____

Unit Price No 8: Interior doors (WiFi/wireless). Provide both add and deduct unit prices. _____ _____

Unit Price No. 9: Locker/cabinet locks – wire-free. Provide both add and deduct unit prices. _____ _____

Unite Price No. 10: Additional contactless RFID cards. Provide

both add and deduct unit prices. _____ _____

NOTE: The difference in price between Add and Deduct in the above Unit Prices should not exceed fifteen percent (15%).

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for ninety (90) days the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ By: _____
(Authorized Signature)

(SEAL) _____
(Title)

Date: _____

ATTACHMENTS

Subcontractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
Affidavit of Employee Drug Testing Program (1 per contractor/subcontractor)
Delaware Business License
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

Subcontractor Category	Subcontractor	Address (City & State)	**Subcontractors tax payer ID # or Delaware Business license #**
1. Access Controls:			

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date _____.

All the terms and conditions of Contract No.: HHS-27 Access Controls have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20_.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the New Castle County Vocational Technical School District in the sum of _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. _____to be paid to the New Castle County Vocational Technical School District for the use and benefit of the New Castle County Vocational Technical School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the New Castle County Vocational Technical School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the New Castle County Vocational Technical School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____day of_____ 20_____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

END OF SECTION

Contract No. HHS-28 Wood Flooring

BID FORM

For Bids Due: _____

To: NCC Vocational Technical School District
1417 Newport Road
Wilmington, DE 19804

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.:_____ Taxpayer ID No.: _____

(Other License Nos.): _____
(A copy of Bidder's Delaware Business License must be attached to this form.)

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES

Alternate No. 3: Provide yellow pine grade SB in lieu of basis of bid grade I

Add/Deduct _____($_____)

UNIT PRICES
N/A

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for ninety (90) days the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ By: _____
(Authorized Signature)

(SEAL) _____
(Title)

Date: _____

ATTACHMENTS

Subcontractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
Affidavit of Employee Drug Testing Program (1 per contractor/subcontractor)
Delaware Business License
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

Subcontractor Category	Subcontractor	Address (City & State)	**Subcontractors tax payer ID # or Delaware Business license #**
1. Wood Flooring:			

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date _____.

All the terms and conditions of Contract No.: HHS-28 Wood Flooring have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20_.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the New Castle County Vocational Technical School District in the sum of _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. _____to be paid to the New Castle County Vocational Technical School District for the use and benefit of the New Castle County Vocational Technical School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the New Castle County Vocational Technical School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the New Castle County Vocational Technical School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____day of_____ 20_____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

END OF SECTION

Contract No. HHS-29 Casework

BID FORM

For Bids Due: _____

To: NCC Vocational Technical School District
1417 Newport Road
Wilmington, DE 19804

Name of Bidder: _____

Bidder Address: _____

_____

Contact Name: _____ E-Mail Address: _____

Delaware Business License No.:_____ Taxpayer ID No.: _____

(Other License Nos.): _____
(A copy of Bidder's Delaware Business License must be attached to this form.)

Phone No.: ( ) _____ - _____ Fax No.: ( ) _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

$_____ ($_____)

ALTERNATES
N/A

UNIT PRICES
N/A

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for ninety (90) days the date of opening of bids, and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid (if required).

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

_____
(State of Corporation)

Business Address: _____
_____
_____
_____

Witness: _____ By: _____
(Authorized Signature)

(SEAL) _____
(Title)

Date: _____

ATTACHMENTS

Subcontractor List
Non-Collusion Statement
Bid Bond
Consent of Surety
Affidavit of Employee Drug Testing Program (1 per contractor/subcontractor)
Delaware Business License
(Others as Required by Project Manuals)

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor must be listed for each category where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the Owner, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.**

Subcontractor Category	Subcontractor	Address (City & State)	**Subcontractors tax payer ID # or Delaware Business license #**
1. Casework:			

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date _____.

All the terms and conditions of Contract No.: HHS-29 Casework have been thoroughly examined and are understood.

NAME OF BIDDER: _____

AUTHORIZED REPRESENTATIVE (TYPED): _____

AUTHORIZED REPRESENTATIVE (SIGNATURE): _____

TITLE: _____

ADDRESS OF BIDDER: _____

_____

_____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20_.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____of _____in the County of _____ and State of _____ as Principal, and _____of _____in the County of _____ and State of _____ as Surety, legally authorized to do business in the State of Delaware ('State"), are held and firmly unto the New Castle County Vocational Technical School District in the sum of _____ Dollars (S_____), or percent not to exceed _____ _____ Dollars (S_____) of amount of bid on Contract No. _____to be paid to the New Castle County Vocational Technical School District for the use and benefit of the New Castle County Vocational Technical School District for which payment well and truly to be made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bounden Principal who has submitted to the New Castle County Vocational Technical School District a certain proposal to enter into this contract for the furnishing of certain material and/or services within the State, shall be awarded this Contract, and if said Principal shall well and truly enter into and execute this Contract as may be required by the terms of this Contract and approved by the New Castle County Vocational Technical School District this Contract to be entered into within twenty days after the date of official notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or else to be and remain in full force and virtue.

Sealed with _____seal and dated this day of _____in the year of our Lord two thousand and _____(20__).

SEALED, AND DELIVERED IN THE PRESENCE OF

_____
Name of Bidder (Organization)

Corporate Seal

By:_____
Authorized Signature

Attest _____

_____
Title

_____
Name of Surety

Witness_____

_____

_____
Title

CONSENT OF SURETY

DATE_____

To:

Gentlemen:

We, the _____

_____
(Surety Company's Address)

_____

a Surety Company authorized to do business in the State of Delaware hereby agrees that if

_____
(Contractor)

_____
(Address)

_____

is awarded the Contract No. _____

We will write the required Performance and/or Labor and Material Bond required by Paragraph 9 of the Instructions to Bidders.

_____
(Surety Company)

By _____
(Attorney-in-Fact)

AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____day of_____ 20_____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

END OF SECTION

SECTION 005200 - AGREEMENT

1. SUMMARY

1.1. The Agreement Form for this Project is either the American Institute of Architects [Standard Form of Agreement between Owner and Contractor, Construction Manager as Advisor, AIA Document A132 - 2009 Edition]

1.2 A copy of AIA Document A132 – 2009 Edition is bound into this Project Manual following this page.

1.2.1 Under Article 5.1.4.5 add the following:

"Upon completion of the work under the Contract, the Owner may release 60% of the amount then retained. The balance of the amount retained will be held until:

A. All reports required of the Contract are received;
B. All Subcontractors in trades listed on the Bid Form are paid by the Contractor, unless the amount owed to the Subcontractor is disputed, in which case the Owner may withhold 150% of the amount withheld by the Contractor in its dispute with the Subcontractor; and
C. Final payment is authorized by the Owner."

END OF SECTION

DRAFT

AIA® Document A132™ – 2009

Standard Form of Agreement Between Owner and Contractor, *Construction Manager as Adviser Edition*

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

BETWEEN the Owner:
(Name, legal status, address and other information)

New Castle County Vocational Technical School District
1417 Newport Road
Wilmington, Delaware 4

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

Renovations to Howard High School of Technology

The Construction Manager:
(Name, legal status, address and other information)

EDiS Company
110 South Poplar Street, Suite 400
Wilmington, Delaware 19801

The Architect:
(Name, legal status, address and other information)

ABHA Architects
1621 North Lincoln Street
Wilmington, Delaware 19806

The Owner and Contractor agree as follows.

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

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

This document is intended to be used in conjunction with AIA Documents A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232™–2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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User Notes: (1129798000)

TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

10 INSURANCE AND BONDS

EXHIBIT A DETERMINATION OF THE COST OF THE WORK

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

« »

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

« »

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » (« ») days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

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Per the construction schedule in Section 013216 Construction Schedule in the project manual.

Portion of the Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

« »

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 4.2 below

[« »] Cost of the Work plus the Contractor's Fee without a Guaranteed Maximum Price, in accordance with Section 4.3 below

[« »] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below. Based on the selection above, also complete either Section 5.1.4, 5.1.5 or 5.1.6 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Stipulated Sum shall be « » ($ « »), subject to additions and deletions as provided in the Contract Documents.

§ 4.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.2.3 Unit prices, if any:
(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.2.4 Allowances included in the Stipulated Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Allowance
Miscellaneous Work as Directed by Construction Manager	$10,000

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

§ 4.3.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

§ 4.3.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

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User Notes: (1129798000)

« »

§ 4.3.3 The method of adjustment of the Contractor's Fee for changes in the Work:

« »

§ 4.3.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

« »

§ 4.3.5 Rental rates for Contractor-owned equipment shall not exceed « » percent (« » %) of the standard rate paid at the place of the Project.

§ 4.3.6 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager for the Owner, in writing, a Control Estimate within 14 days of executing this Agreement. The Control Estimate shall include the items in Section A.1 of Exhibit A, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price
§ 4.4.1 The Contract Sum is the Cost of the Work as defined in Exhibit A, Determination of the Cost of the Work, plus the Contractor's Fee.

§ 4.4.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

« »

§ 4.4.3 The method of adjustment of the Contractor's Fee for changes in the Work:

« »

§ 4.4.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

« »

§ 4.4.5 Rental rates for Contractor-owned equipment shall not exceed « » percent (« » %) of the standard rate paid at the place of the Project.

§ 4.4.6 Unit Prices, if any:
(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.4.7 Guaranteed Maximum Price
§ 4.4.7.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed « » ($ « »), subject to additions and deductions by changes in the Work as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.
(Insert specific provisions if the Contractor is to participate in any savings.)

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« »

§ 4.4.7.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

« »

§ 4.4.7.3 Allowances included in the Guaranteed Maximum Price, if any:
(Identify and state the amounts of any allowances, and state whether they include labor, materials, or both.)

Item	Allowance

§ 4.4.7.4 Assumptions, if any, on which the Guaranteed Maximum Price is based:

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the 25th day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the 5th day of the second month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment shall be made by the Owner not later than forty five (45) days after the Construction Manager receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

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

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of five percent (5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Section 7.3.9 of the General Conditions;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved

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User Notes: (1129798000)

in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%);

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

§ 5.1.4.4 The progress payment amount determined in accordance with Section 5.1.4.3 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to one hundred percent (100%) of the Contract Sum, less such amounts as the Construction Manager recommends and the Architect determines for incomplete Work and unsettled claims; and

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of the General Conditions.

§ 5.1.4.5 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

« »

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232–2009, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit A, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and

.3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

As described in the contract documents.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232–2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »
« »

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232–2009, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A232–2009.

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[« »] Litigation in a court of competent jurisdiction.

[X] Other: *(Specify)*

Per 007300, "any or all remedies at law or in equity,"

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009.

§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

§ 7.2.1 Subject to the provisions of Section 7.2.2 below, the Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2009.

§ 7.2.2 The Contract may be terminated by the Owner for cause as provided in Article 14 of AIA Document A232–2009; however, the Owner shall then only pay the Contractor an amount calculated as follows:

.1 Take the Cost of the Work incurred by the Contractor to the date of termination;

.2 Add the Contractor's Fee computed upon the Cost of the Work to the date of termination at the rate stated in Sections 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion; and

.3 Subtract the aggregate of previous payments made by the Owner.

§ 7.2.3 If the Owner terminates the Contract for cause when the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, and as provided in Article 14 of AIA Document A232–2009, the amount, if any, to be paid to the Contractor under Section 14.2.4 of AIA Document A232–2009 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.2.

§ 7.2.4 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders.

§ 7.2.5 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2009; in such case, the Contract Sum and Contract Time shall be increased as provided in Section 14.3.2 of AIA Document A232–2009, except that the term 'profit' shall be understood to mean the Contractor's Fee as described in Sections 4.3.2 and 4.4.2 of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

« » % « »

§ 8.3 The Owner's representative:

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User Notes: (1129798000)

(Name, address and other information)

Kevin Lucas
EDiS Company
110 South Poplar Street, Suite 400
Wilmington, Delaware 19801

§ 8.4 The Contractor's representative:
(Name, address and other information)

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.

§ 9.1.2 The General Conditions are AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
A232-2009	Supplementary General Conditions		

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

« »

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

As described in the contract documents.

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents are:

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Bid Form dated
Letter of Intent dated
State of Delaware Purchase Order

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232–2009.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232–2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount ($0.00)

This Agreement is entered into as of the day and year first written above.

NCC Vocational Technical School District	**Contractor**
OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

DRAFT

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User Notes: (1129798000)

SECTION 006113 – PERFORMANCE AND PAYMENT BONDS

1. PERFORMANCE AND PAYMENT BONDS

1.1 Bonds must be in the following form:

1. Form of Performance Bond (attached).
2. Form of Payment Bond (attached).

SECTION 006113 - FORM OF PAYMENT BOND

Bond Number:

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal ("Principal"), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety ("Surety"), are held and firmly bound unto the State of Delaware, New Castle County Vocational Technical School District ("Owner"), in the amount of _____ ($_____), to be paid to Owner, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this _____ day of_____, 20____.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, who has been awarded by Owner that certain contract known as Contract No. _____dated the _____ day of _____, 20__ (the "Contract"), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him. her, them or any of them, for all such materials, labor and service for which Principal is liable, shall make good and reimburse Owner sufficient funds to pay such costs in the completion of the Contract as Owner may sustain by reason of any failure or default on the part of Principal, and shall also indemnity and save harmless Owner from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of Surety and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and Surety hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to Surety as though done or omitted to be done by or in relation to Principal.

Surety hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of Surety and its bond. Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to Surety or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

Witness or Attest: PRINCIPAL

By: _____ _____

Name: _____

Title: _____

(Corporate Seal)

Witness or Attest: SURETY

By: _____ _____

Name: _____

Title: _____

(Corporate Seal)

SECTION 006113 - FORM OF PERFORMANCE BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal ("Principal"), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety ("Surety"), are held and firmly bound unto the State of Delaware, New Castle County Vocational Technical School District ("Owner"), in the amount of_____ ($_____) to be paid to Owner, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns. jointly and severally, for and in the whole, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20_____.

NOW THE CONDITION OF THIS OBLICATION IS SUCH, that if Principal, who has been awarded by Owner that certain contract known as Contract No. _____ dated the _____ day of _____, 20 (the "Contract"), which Contract is incorporated herein by reference, shall well and truly provide and furnish all materials, appliances and tools and perform all the work required under and pursuant to the terms and conditions of the Contract and the Contract Documents (as defined in the Contract) or any changes or modifications thereto made as therein provided, shall make good and reimburse Owner sufficient funds to pay the costs of completing the Contract that Owner may sustain by reason of any failure or default on the part of Principal, and shall also indemnify and save harmless Owner from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, hereby stipulates and agrees, if requested to do so by Owner, to fully perform and complete the work to be performed under the Contract pursuant to the terms, conditions and covenants thereof, if for any cause Principal fails or neglects to so fully perform and complete such work

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of Surety and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and Surety hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to Surety as though done or omitted to be done by or in relation to Principal.

Surety hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of Surety and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to Surety or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, Principal and Surety have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

Witness or Attest: PRINCIPAL

By: _____ _____

Name: _____

Title: _____

(Corporate Seal)

Witness or Attest: SURETY

By: _____ _____

Name: _____

Title: _____

(Corporate Seal)

END OF SECTION

SECTION 006216 – CERTIFICATE OF INSURANCE

In conjunction with Insurance Requirements AIA General Conditions, Article 11, the Contractor shall be bound by the following limits of liability insurance (for Contracts under this Bid Pack). The Contractor shall use the standard "ACORD" for titled "Certificate of Insurance" in submitting his liability insurance limits. The required limits to be inserted in accordance with the sample "ACORD" form in this section:

GENERAL NOTES

1. Other Insurance

   A. Contractor shall carry any necessary insurance required to cover Owned and Rental equipment that may be necessary for them to use in the performance of the Work.

2. Contractor shall have the following additional items added to his required "ACORD" form Certificate of Insurance:

   A. Name and Address of Insured (Contractor).
   B. Description of Operations/Locations -

3. Added Insured – NCC Vocational Technical School District and EDiS Company

4. Certificate Holder – New Castle County Vocational Technical School District
   1417 Newport Road
   Wilmington, Delaware 19804

Contractors shall note that although not a part of AIA Document A232 - 2009 Edition, these additional articles apply as noted to this Project.

A sample certificate is bound into the Project Manual immediately following this Document.

END OF SECTION

MAKE FILE

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY) XX/XX/XX

PRODUCER

PRODUCER INSURANCE AGENCY
PO BOX
PRODUCER STREET ADDRESS
PRODUCER CITY, ST PROD ZIP

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERD

SAMPLE SUBCONTRACTOR CERTIFICATE
(REQUIRED MINIMUM INSURANCE)

INSURERS AFFORDING COVERAGE

INSURER A: XXXXXX
INSURED B XXXXXX
INSURER C: XXXXXX
INSURER D:
INSURER E:

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	DATE (MM/YY)	LIMITS	
	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS MADE / X OCCUR GENL AGGREGATE LIMIT APPLIES PER: POLICY / X PRO-JECT / LOC	XXXXXXXXXXXXXXX	XXXXXXXX	XXXXXXXXXX	EACH OCCURRENCE	$ 1,000,000
					FIRE DAMAGE (Any one fire)	$ 300,000
					MED EXP (Any one person)	$ 10,000
					PERSONAL & ADV INJURY	$ 1,000,000
					GENERAL AGGREGATE	$ 2,000,000
					PRODUCTS - COMP/OP AGG	$ 2,000,000
	AUTOMOBILE LIABILITY X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIREDAUTOS X NON-OWNED AUTOS	XXXXXXXXXXXXXXXX	XXXXXXXXXXX	XXXXXXXXXXX	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
					BODILY INJURY (Per person)	$
					BODILY INJURY (Per accident)	$
					PROPERTY DAMAGE (Per accident)	$
	GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT	$
					OTHER THAN: AUTO ONLY: EA ACC	$
					AGG	$
	EXCESS LIABILITY X OCCUR / CLAIMS MADE DEDUCTIBLE RETENTION $	XXXXXXXXXXXXXXX	XXXXXXXXXXX	XXXXXXX	EACH OCCURRENCE	$ 5,000,000
					AGGREGATE	$ 5,000,000
						$
						$
						$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	XXXXXXXXXXXXXXX	XXXXXXXXXXX	XXXXXXXXXX	X WC STATU-TORY LIMITS / OTH-ER	$
					E.L. EACH ACCIDENT	$ 500,000
					E.L. DISEASE - EA EMPLOYEE	$ 500,000
					E.L. DISEASE - POLICY LIMIT	$ 500,000
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

Project: Renovations to Howard High School of Technology - New Castle County Vocational Technical School District and EDiS Company shall be named as Additional Insureds for both ongoing and completed operations. The endorsements providing the Additional Insured status for ongoing and completed operations must be attached to the Certificate of Insurance.

CERTIFICATE HOLDER X **ADDITIONAL INSURED; INSURER LETTER:** ——— **CANCELLATION**

New Castle County Vocational Technical School District
1417 Newport Road
Wilmington, DE 19804

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

© ACORD CORPORATION 1988

SECTION 007200 – GENERAL CONDITIONS

1. SUMMARY

A. The General Conditions for this Project are the American Institute of Architects General Conditions of the Contract for Construction, Construction Manager as Advisor Edition, AIA Document A232 - 2009 Edition.

B. A copy of AIA Document A232 - 2009 Edition is bound into this Project Manual following this page.

END OF SECTION

AIA® Document A232™ – 2009

General Conditions of the Contract for Construction, *Construction Manager as Adviser Edition*

for the following PROJECT:
(Name, and location or address)

Renovations to Howard High School of Technology
401 East 12th Street
Wilmington, Delaware 19801

THE CONSTRUCTION MANAGER:
(Name, legal status and address)

EDiS Company
110 South Poplar Street, Suite 400
Wilmington, Delaware 19801

THE OWNER:
(Name, legal status and address)

New Castle County Vocational Technical School District
1417 Newport Road
Wilmington, Delaware 19801

THE ARCHITECT:
(Name, legal status and address)

ABHA Architects
1621 North Lincoln Street
Wilmington, Delaware 19806

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

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

This document is intended to be used in conjunction with AIA Documents A132™–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding requirements).

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

§ 1.1.5 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect, or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

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the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to earry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Exccution of the Contract by the Contractor is a reprcscntation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measuremcnts of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contraetor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construetion Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences betwcen field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or proccdures, the Contractor shall evaluate the jobsite safety thereof and, exccpt as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Owner, through the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and

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Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

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

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at

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appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Projeet schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

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§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

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§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager and Architect access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner, Architect, or Construction Manager. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.3 Duties, responsibilities and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Construction Manager, Architect and Contractor. Consent shall not be unreasonably withheld.

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architeet (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

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§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7 and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar

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required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.16 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.18 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.19 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Doeuments as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the

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Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architeet has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respeet to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

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ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Construction Manager and Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's own forces or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may elean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

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§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor; a Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

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.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work
The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 Definitions
§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion
§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

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§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for

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Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques,

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sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction

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Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contraetor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work or designated portion thereof is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

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§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate the completion of Work of the Contractor and then forward the notice and Application, with the Construction Manager's recommendations, to the Architect who will promptly make such inspection. When the Architect, finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect through the Construction Manager prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents; or
- **.3** terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, eustody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors;
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction; and
- **.4** construction or operations by the Owner or other Contractors.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly

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employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB),encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

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§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the

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Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 Owner's Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

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§ 11.3.4 If the Contraetor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers eaeh in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnifieation, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insuranee shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in aceordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

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§ 11.4 Performance Bond and Payment Bond

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors or other Multiple Prime Contractors caused by the

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Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Construction Manager, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and

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(2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Construction Manager, Arehitect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.5.5 If the Construction Manager or Architect is to observe tests, inspections or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- **.2** An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- **.3** Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- **.4** The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

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

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

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.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

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

§ 15.1.6 Claims for Consequential Damages. The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

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.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Deeision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

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§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the partics mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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STATE OF DELAWARE DIVISION OF FACILITIES MANAGEMENT

SECTION 007300 - SUPPLEMENTARY GENERAL CONDITIONS A232-2009

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A232-2009. Where a portion of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

TABLE OF ARTICLES

1. GENERAL PROVISIONS
2. OWNER
3. CONTRACTOR
4. ADMINISTRATION OF THE CONTRACT
5. SUBCONTRACTORS
6. CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7. CHANGES IN THE WORK
8. TIME
9. PAYMENTS AND COMPLETION
10. PROTECTION OF PERSONS AND PROPERTY
11. INSURANCE AND BONDS
12. UNCOVERING AND CORRECTION OF WORK
13. MISCELLANEOUS PROVISIONS
14. TERMINATION OR SUSPENSION OF THE CONTRACT

ARTICLE 1: GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

Delete the last sentence in its entirety and replace with the following:

"The Contract Documents also include Advertisement for Bid, Instructions to Bidder, sample forms, the Bid Form, the Contractor's completed Bid and the Award Letter."

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following Paragraphs:

1.2.4 In the case of an inconsistency between the Drawings and the Specifications, or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation.

1.2.5 The word "PROVIDE" as used in the Contract Documents shall mean "FURNISH AND INSTALL" and shall include, without limitation, all labor, materials, equipment, transportation, services and other items required to complete the Work.

1.2.6 The word "PRODUCT" as used in the Contract Documents means all materials, systems and equipment.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

Delete Paragraph 1.5.1 in its entirety and replace with the following:

"All pre-design studies, drawings, specifications and other documents, including those in electronic form, prepared by the Architect under this Agreement are, and shall remain, the property of the Owner whether the Project for which they are made is executed or not. Such documents may be used by the Owner to construct one or more like Projects without the approval of, or additional compensation to, the Architect. The Contractor, Subcontractors, Sub-subcontractors and Material or Equipment Suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or Material and Equipment Supplier on other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and Architect's consultants.

The Architect shall not be liable for injury or damage resulting from the re-use of drawings and specifications if the Architect is not involved in the re-use Project. ."

Delete Paragraph 1.5.2 in its entirety.

ARTICLE 2: OWNER

2.1 General

2.1.2 Delete Paragraph 2.1.2 in its entirety.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 Delete the last sentence in this paragraph.

2.2.3 Add the following sentence:

"The Contractor, at their expense shall bear the costs to accurately identify the location of all underground utilities in the area of their excavation and shall bear all cost for any repairs required, out of failure to accurately identify said utilities."

2.2.5 Delete Subparagraph 2.2.5 in its entirety and substitute the following:

2.2.5 The Contractor shall be responsible to provide all Contract Documents (plans/specs) for their contract use. Owner will not supply documents.

ARTICLE 3: CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

Delete the third sentence in Paragraph 3.2.4.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

Add the following Paragraphs:

3.3.2.1 The Contractor shall immediately remove from the Work, whenever requested to do so by the Owner, any person who is considered by the Owner or Architect to be incompetent or disposed to be disorderly, or who for any reason is not satisfactory to the Owner, and that person shall not again be employed on the Work without the consent of the Owner or the Architect.

3.3.4 The Contractor must provide suitable storage facilities at the Site for the proper protection and safe storage of their materials. Consult the Owner and the Architect before storing any materials.

3.3.5 When any room is used as a shop, storeroom, office, etc., by the Contractor or Subcontractor(s) during the construction of the Work, the Contractor making use of these areas will be held responsible for any repairs, patching or cleaning arising from such use.

3.4 LABOR AND MATERIALS

Add the Following Paragraphs:

3.4.4 Before starting the Work, each Contractor shall carefully examine all preparatory Work that has been executed to receive their Work. Check carefully, by whatever means are required, to insure that its Work and adjacent, related Work, will finish to proper contours, planes and levels. Promptly notify the General Contractor/Construction Manager of any defects or imperfections in preparatory Work which will in any way affect satisfactory completion of its Work. Absence of such notification will be construed as an acceptance of preparatory Work and later claims of defects will not be recognized.

3.4.5 Under no circumstances shall the Contractor's Work proceed prior to preparatory Work proceed prior to preparatory Work having been completely cured, dried and/or otherwise made satisfactory to receive this Work. Responsibility for timely installation of all materials rests solely with the Contractor responsible for that Work, who shall maintain coordination at all times.

3.5 WARRANTY

Add the following Paragraphs:

3.5.1 The Contractor will warrant all materials and workmanship against original defects, except injury from proper and usual wear when used for the purpose intended, for two year after Acceptance by the Owner, and will maintain all items in condition that conforms with the Contract Documents during the period of warranty.

3.5.2 Non-conforming workduring the period of warranty will be corrected by the Contractor at its expense upon demand of the Owner, it being required that the Work conforms to the Contract Documents at the expiration of the warranty period.

3.5.3 In addition to the General Warranty there are other warranties required for certain items for different periods of time than the one year as above, and are particularly so stated in that part of the specifications referring to same. The said warranties will commence at the same time as the General Warranty.

3.5.4 If the Contractor fails to remedy any failure, defect or damage within a reasonable time after receipt of notice, the Owner will have the right to replace, repair, or otherwise remedy the failure, defect or damage at the Contractor's expense.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following Paragraphs:

3.11.1 During the course of the Work, the Contractor shall maintain a record set of drawings on which the Contractor shall mark the actual physical location of all piping, valves, equipment, conduit, outlets, access panels, controls, actuators, including all appurtenances that will be concealed once construction is complete, etc., including all invert elevations.

3.11.2 At the completion of the project, the Contractor shall obtain a set of reproducible drawings from the Architect, and neatly transfer all information outlined in 3.11.1 to provide a complete record of the as-built conditions.

3.11.3 The Contractor shall provide two (2) prints of the as-built conditions, along with the reproducible drawings themselves, to the Owner and one (1) set to the Architect. In addition, attach one complete set to each of the Operating and Maintenance Instructions/Manuals.

3.17 In the second sentence of the paragraph, insert “indemnify and” between “shall” and “hold”.

ARTICLE 4: ARCHITECT AND CONSTRUCTION MANAGER

4.1 General

4.1.2 Insert “As required by law,” at the beginning of the first sentence.

4.2 Administration of the Contract

Delete the first sentence of Paragraph 4.2.10 and replace with the following:

The Architect will review and approve or take other appropriate action upon the Contractor’s submittals such as Shop Drawings, Product Data and Samples for the purpose of checking for conformance with the Contract Documents.

Delete the second sentence of Paragraph 4.2.10 and replace with the following:

The Architect’s action will be taken with such reasonable promptness as to cause no delay in the Work in the activities of the Owner, Contractor or separate Contractors, while allowing sufficient time in the Owner’s professional judgment to permit adequate review.

Add the following to Paragraph 4.2.16:

There will be no full-time project representative provided by the Owner or Architect on this project.

Add to Paragraph 4.2.19 “and in compliance with all applicable codes, regulations and ordinances.” to the end of the sentence.

ARTICLE 5: SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Delete Paragraph 5.2.3 in its entirety and replace with the following:

5.2.3 If the Owner, Architect or Construction Manager has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Architect or Construction Manager has no reasonable objection, subject to the statutory requirements of 29 Delaware Code § 6962(d)(10)b.3 and 4.

ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

Delete Paragraph 6.1.3 in its entirety and replace with the following:

"When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Constructor who executes each separate Owner-Contractor Agreement."

6.2 MUTUAL RESPONSIBILITY

6.2.3 In the second sentence, strike the word "shall" and insert the word "may".

ARTICLE 7: CHANGES IN THE WORK

(SEE ARTICLE 7: CHANGES IN WORK IN THE GENERAL REQUIREMENTS)

ARTICLE 8: TIME

8.2 PROGRESS AND COMPLETION

Add the following Paragraphs:

8.2.1.1 Refer to Specification Section SUMMARY OF WORK for Contract time requirements.

8.2.4 If the Work falls behind the Progress Schedule as submitted by the Contractor, the Contractor shall employ additional labor and/or equipment necessary to bring the Work into compliance with the Progress Schedule at no additional cost to the Owner.

8.3 DELAYS AND EXTENSION OF TIME

8.3.1 Strike "arbitration" and insert "remedies at law or in equity".

Add the following Paragraph:

8.3.2.1 The Contractor shall update the status of the suspension, delay, or interruption of the Work with each Application for Payment. (The Contractor shall report the termination of such cause immediately upon the termination thereof.) Failure to comply with this procedure shall constitute a waiver for any claim for adjustment of time or price based upon said cause.

Delete Paragraph 8.3.3 in its entirety and replace with the following:

8.3.3 Except in the case of a suspension of the Work directed by the Owner, an extension of time under the provisions of Paragraph 8.3.1 shall be the

Contractor's sole remedy in the progress of the Work and there shall be no payment or compensation to the Contractor for any expense or damage resulting from the delay.

Add the following Paragraph:

8.3.4 By permitting the Contractor to work after the expired time for completion of the project, the Owner does not waive its rights under the Contract.

8.3.5 The parties agree that Paragraph 8.3.3 of the Supplementary General Conditions does not apply to the Construction Manager in the event of a delay caused by a party other than the Construction Manager.

ARTICLE 9: PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add the following Paragraphs:

9.2.1 The Schedule of Values shall be submitted into Building Blok (EDiS' Web-Based Project Management software) using AIA Document G702, Continuation Sheet to G703.

9.3 APPLICATIONS FOR PAYMENT

Add the following Paragraph:

9.3.1.3 Application for Payment shall be submitted on AIA Document G702 "Application and Certificate for Payment", supported by AIA Document G703 "Continuation Sheet". Said Applications shall be fully executed and notarized.

Add the following Paragraphs:

9.3.4 Until Closeout Documents have been received and outstanding items completed the Owner will pay 95% (ninety-five percent) of the amount due the Contractor on account of progress payments.

9.3.5 The Contractor shall provide a current and updated Progress Schedule to the Architect with each Application for Payment. Failure to provide Schedule will be just cause for rejection of Application for Payment.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Add the following to 9.5.1:

.8 failure to provide a current Progress Schedule;
.9 a lien or attachment is filed;
.10 failure to comply with mandatory requirements for maintaining Record Documents.

9.6 PROGRESS PAYMENTS

Delete Paragraph 9.6.1 in its entirety and replace with the following:

9.6.1 After the Architect and the Construction Manager have approved and issued a Certificate for Payment, payment shall be made by the Owner within 30 days after Owner's receipt of the Certificate for Payment.

9.7 FAILURE OF PAYMENT

In first sentence, strike the first reference to "seven" and insert "thirty (30)". Also strike "binding dispute resolution" and insert "remedies at law or in equity".

9.8 SUBSTANTIAL COMPLETION

9.8.5 In the second sentence, strike "shall" and insert "may".

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

Add the following Paragraphs:

10.1.1 Each Contractor shall develop a safety program in accordance with the Occupational Safety and Health Act of 1970. A copy of said plan shall be furnished to the Owner and Architect prior to the commencement of that Contractor's Work.

10.1.2 Each Contractor shall appoint a Safety Representative. Safety Representatives shall be someone who is on site on a full time basis. If deemed necessary by the Owner or Architect, Contractor Safety meetings will be scheduled. The attendance of all Safety Representatives will be required. Minutes will be recorded of said meetings by the Contractor and will be distributed to all parties as well as posted in all job offices/trailers etc.

10.2 SAFETY OF PERSONS AND PROPERTY

Add the following Paragraph:

10.2.4.1 As required in the Hazardous Chemical Act of June 1984, all vendors supplying any material that may be defined as hazardous must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a caution warning on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in foreseeable emergency situations. Material Safety Data Sheets shall be provided directly to the Owner, along with the shipping slips that include those products.

10.3 HAZARDOUS MATERIALS

Delete Paragraph 10.3.3 in its entirety.

Delete Paragraphs 10.3.6 in its entirety.

ARTICLE 11: INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.4 Strike "the Owner" immediately following "(1)" and strike "and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations."

11.2 OWNER'S LIABILITY INSURANCE

Delete Paragraph 11.2 in its entirety.

11.3 PROPERTY INSURANCE

Delete Paragraph 11.3 and its subparagraphs in their entirety and replace with the following:

11.3 The Owner will not provide Builder's All Risk Insurance for the Project. The Contractor and all Subcontractors shall provide property coverage for their tools and equipment, as necessary. Any mandatory deductible required by the Contractor's Insurance shall be the responsibility of the Contractor.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.1 Add the following sentence: "The bonds will conform to those forms approved by the Office of Management and Budget."

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.2.2 AFTER SUBSTANTIAL COMPLETION

Add the following Paragraph:

12.2.2.1.1 At any time during the progress of the Work, or in any case where the nature of the defects will be such that it is not expedient to have corrected, the Owner, at its option, will have the right to deduct such sum, or sums, of money from the amount of the Contract as it considers justified to adjust the difference in value between the defective work and that required under contract including any damage to the structure.

12.2.2.2 Strike "one" and insert "two".

12.2.2.3 Strike "one" and insert "two".

12.2.5 In second sentence, strike "one" and insert "two".

ARTICLE 13: MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Strike "except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4."

Insert "except that, if the parties have selected arbitration as the method of dispute resolution, the Delaware Arbitration Act, 10 Del. C. §5701, shall govern Section 15.4."

13.6 INTEREST

Strike "the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located." Insert "30 days of presentment of the authorized Certificate of Payment at the annual rate of 12% or 1% per month.

13.7 TIME LIMITS ON CLAIMS

Strike the last sentence.

Add the following Paragraph:

13.8 CONFLICTS WITH FEDERAL STATUTES OR REGULATIONS

13.8.1 If any provision, specifications or requirement of the Contract Documents conflict or is inconsistent with any statute, law or regulation of the government of the United State of America, the Contractor shall notify the Architect and Owner immediately upon discovery.

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

Delete Paragraph 14.4.3 in its entirety and replace with the following:

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and cost incurred by reason of such termination along with reasonable overhead.

ARTICLE 15: CLAIMS AND DISPUTES

15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

Delete Paragraph 15.1.6 and its subparagraphs in their entirety.

15.2 INITIAL DECISION

Delete Paragraph 15.2.5 in its entirety and replace with the following:

15.2.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be subject to mediation and other remedies at law or in equity.

Delete Paragraph 15.2.6 and its subparagraphs in their entirety.

15.3 MEDIATION

15.3.1 Strike “binding dispute resolution” and insert “any or all remedies at law or in equity”.

15.3.2 In the first sentence, delete “administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedure in effect on the date of the Agreement,”. Also strike “binding dispute resolution” and insert “remedies at law and in equity”.

15.4 ARBITRATION

Delete Paragraph 15.4 and its subparagraphs in their entirety.

END OF SUPPLEMENTARY GENERAL CONDITIONS

SECTION 007343 – WAGE RATE REQUIREMENTS

1. SUMMARY

A. In accordance with Delaware Code, Title 29, Chapter 69, Section 6912, all laborers and mechanics of the Contractor and all subcontractors employed to perform work directly upon the site of the work shall be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account the full amounts accrued at the time of payment computed at wage rates not less than those determined by the Division of Industrial Affairs, Department of Labor, State of Delaware, as the prevailing rates in this area.

B. This approved scale of wages must be posted by the Contractor in a prominent and easily accessible place at the site of the work.

C. It is further stipulated that there may be withheld from the Contractor such accrued payment as may be considered necessary by the contracting officer to pay laborers and mechanics employed by the Contractor or any subcontractors on the work the difference between the rates of wages required and the rate of wages received by such laborers and mechanics and not refunded to the Contractor, subcontractor or their agents.

D. Where wage rates are published in this Manual they are issued by the State Department of Labor on the date indicated and is included for the convenience of Bidders. The Owner, the Architect, and the Construction Manager, accept no responsibility for the accuracy or applicability of any rates included herein. The actual wage rate determinations which will apply to the work will be those in effect on the first day of public advertisement for bids as determined by the State Department of Labor. It will be the responsibility of each bidder to contact the State Department of Labor and to incorporate these rates in his bid.

E. "In accordance with Delaware Code, Title 29, Section 6912, as amended July 5, 1994, contractors shall furnish sworn payroll information to the Department of Labor on a weekly basis for each contract which exceeds $15,000 for renovation work and $100,000 for new construction. The construction contract amount is based on a cumulative total of all contracts bid for a specific project. Payroll forms for submission may be obtained from the Department of Labor."

1. A Payroll Report, available from the Department of Labor is to be used to provide this information.

F. A copy of the Prevailing Wages for the project is attached hereto.

END OF SECTION

New Castle County Vocational Technical School District
Renovations to Howard High School of Technology
Bid Package 'C'

August 17, 2016

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR **BUILDING CONSTRUCTION** EFFECTIVE MARCH 15, 2016

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	22.58	27.81	40.47
BOILERMAKERS	67.59	34.29	50.41
BRICKLAYERS	50.49	50.49	50.49
CARPENTERS	52.81	52.81	41.97
CEMENT FINISHERS	70.82	30.05	21.89
ELECTRICAL LINE WORKERS	44.90	38.50	29.36
ELECTRICIANS	65.10	65.10	65.10
ELEVATOR CONSTRUCTORS	83.06	63.69	31.54
GLAZIERS	69.30	69.30	55.95
INSULATORS	54.38	54.38	54.38
IRON WORKERS	61.20	61.20	61.20
LABORERS	43.60	43.60	43.60
MILLWRIGHTS	66.83	66.83	53.40
PAINTERS	46.72	46.72	46.72
PILEDRIVERS	72.97	38.86	31.43
PLASTERERS	29.47	29.47	21.84
PLUMBERS/PIPEFITTERS/STEAMFITTERS	65.95	50.85	55.34
POWER EQUIPMENT OPERATORS	61.36	61.36	43.28
ROOFERS-COMPOSITION	23.49	23.40	20.87
ROOFERS-SHINGLE/SLATE/TILE	18.16	18.07	16.98
SHEET METAL WORKERS	65.14	65.14	65.14
SOFT FLOOR LAYERS	49.77	49.77	49.77
SPRINKLER FITTERS	54.57	54.57	54.57
TERRAZZO/MARBLE/TILE FNRS	55.72	55.72	46.92
TERRAZZO/MARBLE/TILE STRS	63.98	63.98	54.33
TRUCK DRIVERS	28.39	27.10	20.68

CERTIFIED: 3/16/16

BY: _____
ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: New Castle County-Howard High school Bid Package A , New Castle County

SECTION 008114 – DRUG TESTING FORMS

1. SUMMARY

A. Pursuant to 4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds submit Testing Report Forms to the Owner no less than quarterly. See the form attached hereto.

B. The Contractor will notify the Owner in writing of any positive results of random drug testing. See the form attached hereto. The results must be reported to the Owner within 24 hours of receipt of the test results.

EMPLOYEE DRUG TESTING REPORT FORM

Period Ending:_____

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds submit Testing Report Forms to the Owner no less than quarterly.

Project Number: _____

Project Name: _____

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Number of employees who worked on the jobsite during the report period:_____

Number of employees subject to random testing during the report period:_____

Number of Negative Results _____ Number of Positive Results _____

Action taken on employee(s) in response to a failed or positive random test:

_____

_____

_____

Authorized Representative of Contractor/Subcontractor: _____
(typed or printed)

Authorized Representative of Contractor/Subcontractor: _____
(signature)

Date: _____

EMPLOYEE DRUG TESTING
REPORT OF POSITIVE RESULTS

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds to notify the Owner in writing of a positive random drug test.

Project Number: _____

Project Name: _____

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

_____

_____

Name of employee with positive test result:_____

Last 4 digits of employee SSN:_____

Date test results received:_____

Action taken on employee in response to a positive test result:

_____

_____

_____

Authorized Representative of Contractor/Subcontractor: _____
(typed or printed)

Authorized Representative of Contractor/Subcontractor: _____
(signature)

Date: _____

This form shall be sent by mail to the Owner within 24 hours of receipt of test results.

Enclose this test results form in a sealed envelope with the notation "Drug Testing Form – DO NOT OPEN" on the face thereof and place in a separate mailing envelope.

END OF SECTION

4000 Office of Management and Budget
4100 Division of Facilities Management

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects

1.0 Purpose

The Office of Management and Budget ("Office"), has developed these regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 **Del.C.** §6908(a)(6). The regulations establish the mechanism, standards and requirements of a Mandatory Drug Testing Program that will be incorporated by reference into all Large Public Works Contracts awarded pursuant to 29 **Del.C.** §6962.

2.0 Definitions

"**Contractor**" means an entity such as, but not limited to, an individual, firm, partnership or corporation that has a contractual obligation to perform work for contracts awarded pursuant to 29 **Del.C.** §6962.

"**Division of Facilities Management**" and "**DFM**" means the Division of Facilities Management within the Office of Management and Budget.

"**Drug Testing Firm**" is an entity engaged in the business of providing drug testing services for businesses, individuals, governments or any entity that requires drug testing of Employees, applicants, licensees, etc., in compliance with these requirements.

"**Employee**" means an individual employed by a Contractor or Subcontractor who works on the Jobsite of a Large Public Works Contract but does not fulfill a clerical or administrative function. For the purpose of this definition, clerical or administrative functions shall refer to job responsibilities that do not generally require an employee to work outside of the Contractor's Jobsite office, home office or other employer-provided office. For the purposes of this regulation, the term "Employee" shall also include supervisors and foremen working on the Jobsite. The term "Employee" shall also include delivery personnel employed by a Contractor or Subcontractor working on or delivering materials and equipment to and from a Jobsite.

"**Impairment**" **or** "**Impaired**" means symptoms that an Employee while working may be under the influence of drugs or alcohol that may decrease or lessen the Employee's performance of the duties or tasks of the Employee's job position, including symptoms of the Employee's speech, walking, standing, physical dexterity, agility, coordination, actions, movement, demeanor, appearance, clothing, odor, irrational or unusual behavior, negligence or carelessness in operating equipment, machinery or production or manufacturing processes, disregard for the safety of the Employee or others, or other symptoms causing a reasonable suspicion of the use of drugs or alcohol.

"Jobsite" means the site or area directly or indirectly owned, operated or controlled by the Owner in which the Contractor or Subcontractor performs work or delivers services to the Owner. For the purpose of this definition, "Jobsite" does not mean a remote work site not under the direct or indirect control of the Owner in which work is performed to fulfill the Contractor's or Subcontractor's obligations.

"Large Public Works Contract" means a contract for a public works construction awarded pursuant to 29 **Del.C.** §6962.

"Mandatory Drug Testing Program" and "**Program**" means a defined set of basic procedures, requirements and rules that must be used by a Contractor or Subcontractor to test Employees for drugs in compliance with these requirements.

"Owner" is the state agency, school district or entity that awards a Large Public Works Contract to a Contractor pursuant to 29 **Del.C.** §6962.

"Positive Test Result" and "**Fail a Drug Test**" means the result reported by a Health and Human Services certified laboratory when a specimen contains a drug or drug metabolite equal to or greater than the cutoff concentration. For purposes of these regulations, an Employee shall not be considered to have a Positive Test Result nor shall an Employee be considered to "Fail a Drug Test" if:

- The Employee is a Registered Qualifying Patient and;
- The drug detected was marijuana, a component of marijuana, or marijuana metabolites.

"Random Drug Testing" means that an Employee is chosen at random for testing without advance notice, from a pool of Employees working on the Jobsite. Specific requirements for random drug testing conducted under these regulations are described in Section 5.0.

"Registered Qualifying Patient" means a person (1) validly issued and in possession of an unexpired Registry Identification Card as defined by 16 **Del.C.** §4902A (14), and (2) subject to confirmation through a "verification system" as set forth at 16 **Del.C.** §4902A(17).

"Subcontractor" means an entity such as, but not limited to, an individual, firm, partnership or corporation that has a contractual obligation to perform work for, or supply services to a Contractor as defined in section 2.1.

"Testing Result Forms" means a form summarizing drug testing completed monthly by the Contractor and Subcontractor and submitted to the Owner in accordance with requirements contained in the bid solicitation.

3.0 Employee drug testing documentation requirements.

3.1 The following documentation requirements apply:

3.1.1 At bid submission - A solicitation for a Large Public Works Contract must require each Contractor that submits a bid for the work to submit with the bid signed individual affadavit(s) for the Contractor and each listed Subcontractor certifying that the Contractor and Subcontractor has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for their Employees that complies with this regulation.

3.1.2 Two business days prior to contract execution – The awarded Contractor shall provide to the Owner copies of the Employee Drug Testing Program for the Contractor and for all listed Subcontractors.

3.1.3 During contract execution – Contractors that employ additional Subcontractors on the jobsite may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program. A Contractor or Subcontractor shall not commence work until the Owner has concluded the Employee Drug Testing Program complies with this Regulation as per Section 3.2.

3.1.4 In the event of an emergency a Contractor may employ additional Subcontractors on the jobsite prior to submitting the Subcontractor's Employee Drug Testing Program provided that said Program is submitted to the Owner as soon as practicable.

3.2 A Contractor or Subcontractor shall be treated as having a Mandatory Drug Testing Program that complies with this regulation if the Program includes the following:

3.2.1 The Program meets the minimum standards in section 4.0 of this regulation.

3.2.2 The Program provides for the frequency of testing of Employees as per section 5.0 of this regulation:

3.2.3 The Program imposes disciplinary measures on an Employee who fails a drug test as per section 6.0 of this regulation.

3.3 Prequalified Contractors and Subcontractors – A Contractor or Subcontractor may meet the provisions of Section 3.1 if they are Prequalified through the DFM Prequalification and if the DFM Prequalification includes provisions requiring an Employee Mandatory Drug Testing Program that meet the requirements of Sections 4.0, 5.0 and 6.0 of this Regulation

3.4 The State shall not be obligated to pay, and the Contractor or Subcontractor shall expressly agree that, any portion of work performed by a Contractor or Subcontractor commenced before that Contractor or Subcontractor has complied with Sections 3.1 and 3.2, provided however that emergency work as referenced in 3.1.4 may not be subject to this provision.

4.0 Minimum Standards for a Mandatory Drug Testing Program

4.1 Testing for the presence of drugs in an Employee's system and the handling of test specimens shall be conducted in accordance with guidelines for the collection, chain-of-custody procedures, laboratory testing, and Medical Officer Review procedures contained within the Mandatory Guidelines for Federal Workplace Drug Testing Programs published by the Substance Abuse and Mental Health Services Administration (SAMHSA). http://workplace.samhsa.gov/DrugTesting/Level_1_Pages/mandatory_guidelines5_1_10.html

All tests must be processed by a federal Health and Human Services certified laboratory. Contractors must provide documentation detailing the procedures used in the collection, testing and reporting of drug tests sufficient to show conformance with SAMHSA guidelines.

4.2 Contractors and Subcontractors subject to these regulations may procure the services of an appropriate Drug Testing Firm to administer their program. A Contractor or Subcontractor may also implement a Mandatory Drug

Testing Program using in-house personnel and resources. However a Contractor or Subcontractor doing so shall have to demonstrate that the program meets or exceeds the requirements specified herein to the satisfaction of the Owner.

4.3 Employees subject to drug testing shall be tested using at a minimum a seven-panel protocol testing plus alcohol screening for the following:

Substance	Common Name	Cutoff
Marijuana metabolite		50 ng/ml
Cocaine metabolite		150 ng/ml
Opiate metabolite		2000 ng/ml
Acetylmorphine	Heroin metabolite	10 ng/ml
Phencyclidine	PCP	25 ng/ml
Amphetamines (including Methamphetamines)	Meth	500 ng/ml
MDMA	Ecstasy	250 ng/ml
Alcohol		0.04% BAC

4.4 The frequency of Random Drug Testing and the methodology for selecting Employees to be screened are defined in section 5.0 and shall be incorporated into Contractor and Subcontractor mandatory testing procedures. A Contractor or Subcontractor may incorporate rules or requirements that exceed the requirements defined herein.

5.0 Drug Testing Requirements – Frequency for the Testing of Employees

5.1 Initial Drug Testing - Employees commencing work on a Jobsite must be tested with the exception that an Employee who has passed a random or scheduled drug test within the past 60 days from the date of commencing work shall be permitted to work at the Jobsite without further testing; however, the Employee is still subject to random testing.

5.2 Random Drug Testing - During the course of a project, each Contractor and Subcontractor with Employees on the Jobsite shall implement Random Drug Testing according to the following requirements.

5.2.1 All Employees will be subject to random, unannounced testing.

5.2.2 The selection of Employees shall be made by a scientifically valid method of randomly generating an Employee identifier from a Contractor or Sub-contractor's pool of Employees.

5.2.3 No less that 10% of a Contractor's or Subcontractor's anticipated workforce based on construction schedules validated by certified payrolls shall be randomly selected each month for testing. Contractors or Subcontractors with less than 10 Employees shall test at least one of their Employees, selected randomly per month. Each Employee shall have an equal chance of selection each time the selection is made. Because the selection process is random, some Employees may not be tested within a year, while others may be tested more than once.

5.2.4 Employees notified that they have been selected must report within four hours for testing to a site specified. Employees so notified must have been given such notification at least four hours before the scheduled closing time of the testing facility. Any failure to report for random testing, or to cooperate with the testing procedure shall be considered a positive result.

5.2.5 Purposely impeding or delaying an Employee's fulfillment of the testing requirements herein by a Contractor or Subcontractor may subject the Contractor or Subcontractor to sanctions listed in Section 8.

5.3 Reasonable Suspicion Testing – An Employee will be required to take a drug test at any time his or her employing Contractor, Subcontractor or the Owner reasonably believes that he or she has an Impairment caused by drugs and/or alcohol. Further, an Employee may be required to take a drug test at any time his or her employing Contractor, Subcontractor or the Owner finds drug paraphernalia and/or open alcohol containers on the Jobsite.

5.4 Return to Duty Testing – As required in Section 6.0.

5.5 Accident Triggered Testing – An Employee will be required to take a drug test and may be subject to an onsite alcohol breathalyzer test at any time there is a Jobsite accident involving loss or significant property damage, injury or death to an Employee of the Contractor, Subcontractor, or Owner or member of the public.

5.5.1 As soon as practicable following an accident, the Contractor will notify the Employee(s) whose performance could have contributed to the accident of the need for the test.

5.5.2 The appropriate Contractor shall ensure that an Employee, required to be tested under this section, is tested as soon as practicable, but no longer than 4 hours after the accident. Employees so notified must have been given such notification at least four hours before the scheduled closing time of the testing facility. If the drug test is not conducted within 4 hours, attempts to conduct the test must cease and the reasons for the failure to test documented.

5.5.3 An Employee who is subject to post-accident testing who fails to remain readily available for such testing, including notifying a supervisor of his or her location if he or she leaves the scene of the accident prior to submission to such test, may be deemed to have refused to submit to testing.

5.5.4 If an Employee fails or refuses to be tested, he/she must be removed from the Jobsite.

5.5.5 Nothing in this section shall be construed to require the delay of necessary medical attention for the injured following an accident, or to prohibit an Employee from leaving the scene of an accident for the period necessary to obtain assistance in responding to the accident, or to obtain necessary emergency medical care.

5.6 All testing required by this section shall be administered according to the standards outlined in Section 4.0.

6.0 Consequences of a Positive Test Result

6.1 The disciplinary measures contained within a Contractor's or Subcontractor's drug testing program for an employee who tests positive to a mandatory drug test must include at a minimum, all of the following:

6.1.1 The Employee is subject to an immediate suspension from any public works Jobsite.

6.1.2 The Employee is not eligible for reinstatement by the Contractor or Subcontractor to any public works Jobsite until 30 days after the Employee tests negative on a seven drug panel plus alcohol test certified by a medical review officer.

6.1.3 The Employee is subject to unscheduled monthly random testing for at least one (1) year after reinstatement, or during the term of the Large Public Works Contract, whichever is less.

6.1.4 An Employee who has tested positive for more than one drug test within a three year period shall be permanently banned from working at public works Jobsites.

6.1.5 An Employee who has tested positive for marijuana, a component of marijuana, or marijuana metabolites and is a Registered Qualifying Patient shall be exempted from the disciplinary actions contained in this section unless:

6.1.5.1 The Employee was Impaired by marijuana at the Jobsite

6.1.5.2 Employment of the Registered Qualifying Patient would cause the Owner to lose monetary or licensing-related benefits under Federal law.

6.2 A Contractor or Subcontractor shall report the Positive Test Result to the Employee's professional licensing board, if applicable.

7.0 Contractor and Subcontractor Certification of Compliance with Regulations

7.1 During the term of the contract:

7.1.1 During the term of the contract, Contractors and Subcontractors shall submit Testing Report Forms to the Owner as set forth herein:

7.1.1.1 The Testing Report Forms shall be submitted to the Owner no less than quarterly.

7.1.1.2 An Owner may require monthly submissions of the Testing Report Forms.

7.1.1.3 A Contractor or Subcontractor that is employed on the Jobsite for less than 30 days shall not be subject to the reporting requirements contained in Sections 7.1.1 and 7.1.2 of this regulation, unless the Owner specifies that such reporting is required in the Invitation to Bid or Specifications relating to the work to be performed.

7.1.2 The forms shall at a minimum contain the following information:

7.1.2.1 The number of Employees who worked on the Jobsite during the previous month.

7.1.2.2 The number of Employees subjected to random testing during the previous month.

7.1.2.3 The number of negative results and the number of positive results.

7.1.2.4 Action taken by the Contractor or Subcontractor on an Employee who failed or tested positive to a random test.

7.1.3 Testing Result Forms may be submitted electronically to an Owner.

7.1.4 Any Positive Test Result including the Employee name and action taken in response by a Contractor or Subcontractor must be reported by the Contractor or Subcontractor to the Owner within 24 hours of the Contractor or Subcontractor receiving the test results. A Positive Test Result must be submitted to the Owner in writing.

7.1.5 The Owner shall have the right to periodically audit all Contractor and Subcontractor test results at the Contractor or Subcontractor's offices.

7.1.6 The failure to comply with these reporting requirements shall be considered a material breach of any agreement relating to the performance of work by the Contractor or Subcontractor.

8.0 Penalties

8.1 A Contractor or Subcontractor on a Large Public Works contract that fails to implement a Mandatory Drug Testing Program in accordance with this regulation or falsifies testing results shall be subject to the following sanctions:

8.1.1 Written warning (1st offense).

8.1.2 Prohibition from bidding on new public works jobs for a period not to exceed three months (2nd offense) and one year (3rd offense).

8.1.3 For subsequent offenses, debarment or bond revocation.

8.2 Notwithstanding any other provision of this regulation, if any failure to comply with the requirements of this regulation are particularly flagrant or egregious, the Owner may seek a termination for cause, a temporary suspension, a determination that the Contractor or Subcontractor is not responsible, debarment or bond revocation, and any other statutory, common law, or equitable remedy.

19 DE Reg. 207 (09/01/15)

SECTION 011100 - SUMMARY OF WORK

1. RELATED DOCUMENTS

   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Sections, apply to work of this Section.

2. CONTRACTS

   A. The work will be performed under separate prime contracts managed by the Construction Manager.

3. ALTERATIONS & COORDINATION

   A. Contractor shall be responsible to coordinate their work with the work of others, including, but not limited to, the preparation of general coordination drawings, diagrams and schedules, and control of site utilization, from the beginning of activity, through project close-out and warranty periods.

4. KNOWLEDGE OF CONTRACT REQUIREMENTS

   A. The Contractor and his Subcontractors, Sub-subcontractors and material men shall consult in detail the Contract Documents for instructions and requirements pertaining to the Work, and at his and their cost, shall provide all labor, materials, equipment and services necessary to furnish, install and complete the work in strict conformance with all provisions thereof.

   B. The Contractor will be held to have examined the site of the Work prior to submitting his proposal and informed himself, his Subcontractors, Sub-subcontractors and material men of all existing conditions affecting the execution of the Work.

   C. The Contractor will be held to have examined the Contract Documents and modifications thereto, as they may affect subdivisions of the Work and informed himself, his Subcontractors, Sub-subcontractors and material men of all conditions thereof affecting the execution of the Work.

   D. The Scope of Work for the Contract is not necessarily limited to the description of each section of the Specifications and the illustrations shown on the Drawings. Include all minor items not expressly indicated in the Contract Documents, or as might be found necessary as a result of field conditions, in order to complete the Work as it is intended, without any gaps between the various subdivisions of work.

   E. The Contractor will be held to be thoroughly familiar with all conditions affecting labor in the area of the Project including, but not limited to, Unions, incentive pay, procurements, living, parking and commuting conditions and to have informed his

Subcontractors and Sub-subcontractors thereof.

5. CONTRACT DOCUMENTS INFORMATION

A. The Contract Documents are prepared in accordance with available information as to existing conditions and locations. If, during construction, conditions are revealed at variance with the Contract Documents, notify the Construction Manager immediately, but no more than three (3) days from the day the variance is first known. Failure to give timely notice shall operate to waive any claim Contractor might otherwise have for an adjustment to Contract Time or Sum as a consequence of such variance.

B. The Specifications determine the kinds and methods of installation of the various materials, the Drawings establish the quantities, dimensions and details of materials, the schedules on the Drawings give the location, type and extent of the materials.

C. Dimensions given on the Drawings govern scale measurements and large scale drawings govern small scale drawings, except as to anything omitted unless such omission is expressly noted on the large scale drawings.

D. The techniques or methods of specifying to record requirements varies throughout text, and may include “prescriptive”, “open generic/descriptive”, “compliance with standards”, “performance”, “proprietary”, or a combination of these. The methods used for specifying one unit of work has no bearing on requirements for another unit of work.

E. Whenever a material, article or piece of equipment is referred to in the singular number in the Contract Documents, it shall be the same as referring to it in the plural. As many such materials, articles or pieces of equipment shall be provided as are required to complete the Work.

F. Whenever a material, article or piece of equipment is specified by reference to a governmental, trade association of similar standard, it shall comply with the requirements of the latest publication thereof and amendments thereto in effect on the bid date.

G. In addition to the requirements of the Contract Documents, Contractor’s work shall also comply with applicable standards of the construction industry and those industry standards are made a part of Contract Documents by reference, as if copied directly into Contract Documents, or as if published copies were bound herein.

H. Where compliance with two (2) or more industry standards, contract requirements, or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, then the most stringent requirements, which are generally recognized to be also the most costly, is intended and will be enforced, unless specifically detailed language written into the Contract Documents clearly indicates that a less stringent requirement is to be fulfilled.

Refer apparently equal but different requirements, and uncertainties as to which level of quality is more stringent, to Architect for decision before proceeding.

I. Reference standards referenced directly in Contract Documents or by governing regulations have precedence over non-reference standards which are recognized in industry for applicability of work.

J. Contractor's bid is based on the complete set of Contract Documents including documents not specifically issued as part of the bid pack but referenced in same.

6. SCOPE OF WORK/GENERAL INFORMATION

A. A Scope of Work for each contract to be awarded on the project follows in this section. When a Contract has been awarded to a Contractor, the successful Contractor will be listed after the title of the Contract. When no Contract has yet been awarded, no Contractor's name will be listed. Previous Scopes of Work include addendum changes.

B. Contractor is responsible for performing the work listed in the Summary of Work for his contract. Contractor is also responsible for knowing the work that has been assigned to preceding contracts. No additional compensation or extension of time will be allowed a Contractor due to his ignorance of the work assigned to his Contract or to other contracts which may affect his work. The Contractor is responsible, however, for all items which are covered in the Specifications and Drawings relating to their Contract if not specifically mentioned in the Summary of Work.

C. The Construction Manager will provide on-site a source for temporary electric, temporary water and portable sanitation facilities only. It is each Contractor's responsibility to make the necessary connections, including all material for temporary electric and water. Please note that utility charges for office trailers will be the responsibility of the individual Contractors.

D. A dumpster will be provided on site for free use by Contractors to dispose of non-hazardous, common, work-related refuse. Clean-up is the responsibility of each Contractor. Clean up shall be performed on a daily basis. Contractors not complying will be advised in writing and back charged for all costs associated with the cleanup of their work.

E. Contractors are reminded that there are limited storage areas available on site. Off-site storage will be the responsibility of each individual Contractor. Neither the owner or construction manager will be charged additional costs for storage during the project.

F. Office trailer permits off site will be the responsibility of each individual Contractor. On site Contractor's field offices, one (1) per Contractor, if required, will be located as directed by the Construction Manager.

G. Contractor will be prepared to discuss and submit a detailed project schedule seven (7) days after receipt of Notice to Proceed and to begin its submittal process. The Project Schedule is an integral part of this contract. Certain construction sequences and priorities must take place in order to meet the target dates. Concentrated work periods will occur and each Contractor is responsible to staff the project as required by the current Construction Schedule or as directed by the Construction Manager. Contractor will cooperate with the Construction Manager in planning and meeting the required sequences of work and Project Schedule as periodically updated by the Construction Manager.

H. All bids must include insurance limits in accordance with Article 11 of the Section 007300 SUPPLEMENTARY CONDITIONS.

I. Hoisting, scaffolding and material handling is the responsibility of each Contractor, unless otherwise noted.

J. Contractor will be responsible for layout of its own work. The Construction Manager will provide benchmark and layout of the building line.

K. Contractor will be responsible to keep clean public roadways soiled by construction traffic on a daily basis. If cleaning is not done, the Construction Manager may perform the cleaning on an overtime basis and backcharge the Contractor responsible.

L. Contractor Scopes of Work and Schedule are interrelated. Familiarity with each is required.

M. The Construction Manager will provide testing services for soil, concrete and steel. Other testing as required by the Contract Documents will be in accordance with the technical specifications and/or the individual scope of work. Refer to Specification Section 004500 - QUALITY CONTROL.

N. Safety is the responsibility of each individual Contractor. The project will be governed under the guidelines of OSHA.

O. Inter-Contractor shop drawing distribution will be performed by the Construction Manager. Contractor is individually responsible for either coordinating his work with these distributed drawings or notifying the Construction Manager, in writing, of any discrepancies.

P. Coordination with other trades will be required. The Contractor will be required to attend periodic coordination meetings with other trades where requirements, conflicts and coordination issues will be discussed and resolved. Attendance when requested will be mandatory. If inter-Contractor coordination is not satisfactorily performed, the conflicting Contractors shall mutually share the cost to relocate and/or reinstall their work.

Q. Contractor shall submit a schedule of values to the Construction Manager, through Building Blok Management System, prior to the submission of their first invoice for approval.

R. Contractor is expected to review and coordinate its Work with the complete set of Contract Documents, including all items noted as by his trade whether or not shown on that particular set of drawings. Documents are available at the site for review.

S. Contractor is responsible for obtaining all necessary permits required for his work, including street permits. Unless otherwise noted, building permit shall be secured by the Construction Manager. Any subcontractor who will be restricting access to street, right of way or adjacent property must notify the Construction Manager 48 hours in advance.

T. Contractor's License: Submit a copy of all business licenses required by local and state agencies.

U. Contractor shall absorb, without additional compensation, any and all costs of working beyond normal hours to maintain job progress in accordance with the current construction schedule.

V. No asbestos or PCB's in or on any material or equipment will be accepted or allowed on this project. All hazardous materials will be treated in accordance with all State and Federal regulations.

W. Each individual Contractor will provide fine clean up on a daily basis. Fine cleaning will be defined as those means/methods utilized to ensure that all odors, dust, and debris will be non-existent within the project area at the end of each workday. In addition, means and methods shall be utilized that prevent the migration of odors, dust, debris, and excessive noise from migrating into non-working areas. An approved cleanup plan will be required before the initial start of the work. The construction manager reserves the right to stop the work, or any portion thereof, upon failure to provide the required cleaning. Contractors will be individually back charged by the Construction Manager for cleanup not satisfactorily performed by the Contractor.

X. In the event asbestos is uncovered, the Contractor shall notify the Construction Manager of the areas requiring removal of asbestos. The Construction Manager shall then coordinate the removal with the Owner.

Y. This project is to be constructed adjacent to and in existing buildings. Contractor shall exercise all due precautions to minimize noise, air pollution and any other construction hazards which in any way would cause discomfort or danger to the occupants of the existing building in the area.

Z. Existing mechanical, electrical, plumbing, sprinkler, medical gas, fire alarm, etc. systems will be shut off and locked out by the Owner as required by the Work. Tie-in and

modifications to those systems will be performed by the specific Contractor associated with the work as indicated in the Contract Documents. Re-energizing and re-startup of all systems should be performed by the Owner.

AA. NOT USED

AB. Normal work hours for this project are from 7:00 a.m. to 3:30 p.m. Any work to be performed outside of these hours must receive prior approval from the Construction Manager. Requests to work beyond normal work hours shall be submitted at least 48 hours prior.

AC. Contractor is responsible for having a competent project superintendent/foreman on-site during all work performed under its contract.

AD. In the event the Contractor has non-English speaking employees or subcontractors on the project, they shall have a superintendent or foreman on site, at all times, who speaks English and can communicate with Contractor's employees. Should the Contractor fail to meet this requirement, at any time, Construction Manager may direct all Work to stop until the proper supervision is on site. The Contractor will be responsible for maintaining the project work schedule and make up at its own expense, any delay to the Schedule resulting from the work stoppage.

AE. Punch List Procedures: Contractor shall be given a copy of the punch list with his appropriate work identified. Contractor shall have nine (9) calendar work days to complete its punch list work. On the 10th day or as determined by the Construction Manager, the Construction Manager shall employ other contractors, as required, to complete any incomplete punch list work and retain from the appropriate Contractors retainage all costs incurred.

AF. Contractor shall provide the necessary safety barricades and railings required to complete their work and comply with all OSHA, local code and contract specifications.

AG. Temporary Protection: Provide temporary protection to ensure that no damages occur to existing or new finishes, building components, materials, equipment, etc. In addition, provide all approved signage and safety devices applicable to the referenced temporary protection. An approved temporary protection plan will be required before the initial start of the work.

AH. All contractors will be responsible to review and be familiar with the classroom mock up; established to provide a level of expectation to the bidders during the bidding process.

AI. The contractor's shall be responsible for all quality control and the craftsmanship of the final products delivered.

AJ. Should any work not meet the expectations of the mock ups and the contract documents

it will be rejected and replaced at the contractors cost.

AK. Contractors are expected to be present with their estimating team at the Pre-Construction meeting; this meeting with discuss the level of expectation expected by all contractors. These meetings are not mandatory; but you are responsible to view and understand the existing conditions of the project before bidding

"FOR REFERENCE ONLY"

CONTRACT NO. HHS - 20 – ELECTRICAL AND IT INFRASTRUCTURE

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification Sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 2	Existing Conditions
Division 15	Mechanical
Division 16	Electrical
Section 019113	General Commissioning Requirements
Section 019115	Exterior Enclosure Commissioning
Section 078413	Fire Protection, HVAC & Plumbing Penetration Firestopping
Section 083100	Access Doors and Panels
Section 260500	Common Work Results for Electrical
Section 260502	Electrical Demolition for Remodeling
Section 260503	PCB Removal
Section 260510	Elevator Equipment Wiring and Provisions
Section 260519	Conductors and Cables
Section 260526	Grounding and Bonding
Section 260528	Electrical Firestopping
Section 260529	Hangers and Supports
Section 260533	Raceways and Supports
Section 260534	Surface Metal Raceway
Section 260535	Outlet Poles for Power and Communications
Section 260536	Miscellaneous Raceway Systems
Section 260543	Underground Ductbanks
Section 260553	Electrical Identification
Section 260573	Short Circuit Analysis, Coordination Study, and Arc Flash Hazard Analysis
Section 260923	Lighting Control Devices
Section 260924	Lighting Control Systems
Section 260926	Occupancy Sensors
Section 261120	Utility Incoming Service Provisions
Section 262200	Transformers
Section 262413	Switchboards
Section 262416	Panelboards
Section 262726	Wiring Devices
Section 262813	Fuses
Section 262816	Enclosed Switches and Circuit Breakers
Section 262913	Motor Controllers

Section 263213	Engine Generators
Section 263600	Automatic Transfer Switches
Section 264113	Lightning Protection System
Section 264313	Surge Protective Devices
Section 265100	Interior Lighting
Section 270000	General Communications Provisions
Section 270500	Common Work Results for Communications
Section 270528	Conduit and Backboxes for Communications Systems
Section 270529	Hangers and Supports for Communications
Section 275200	Grounding and Bonding for Communications
Section 283112	Public Safety First Responder Radio Amplification System
Section 283117	Fire Alarm System
Section 285200	Grounding & Bonding for Electronic Safety and Security
Section 285800	Conduit & Backboxes for Electronic Safety and Security

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Provide a complete electrical system as indicated on the drawings, schedules and in the specifications.

2. Include all conduits, raceways and infrastructures as indicated.

3. This Contractor shall include all conduits, raceways, cable trays and infrastructures including pull strings for all electrical and technology drawings (E&T series drawings).

4. Division 15 of the specifications should be reviewed as it relates to the power wiring and other requirements for HVAC equipment including the coordination of furnishing and installing motor starters and controllers as detailed in the Specifications and on the Drawings.

5. Excavation and backfill for underground electrical work as required below is the responsibility of this Contractor. Soil types shall be in accordance with Del DOT standard specifications.

6. This Contractor shall install the electrical duct banks.

7. Backfilling is the responsibility of this Contractor. Soil types shall be in accordance with project documents. Assume excavated material can be used for backfill.

8. Concrete for duct banks, light standards, above ground conduit encasement, equipment bases and any other concrete work specifically related to the electrical work. Include requirements of New Castle County, State and local codes for concrete encasement.

9. Provide temporary power and lighting for duration of projects, Phase I & Phase II.

10. Temporary electric installation, maintenance and removal. Refer to Division 1, Specification Section 015113 - TEMPORARY ELECTRIC, for specific scope.

11. Rough in and final connection and related work for equipment provided under other contracts (i.e. kitchen, elevators, HVAC, sprinkler, motorized doors, etc.)

12. Permits and inspections.

13. Penetrations through walls, floors, etc. including cutting, patching and fire safing.

14. Testing.

15. Clean up.

16. The Concrete Contractor shall furnish, install and maintain stone fill under slab. The Sitework Contractor shall leave the building pad site at subgrade to within +/- ¼" in preparation to receive stone fill. The Mechanical and Electrical Contractors shall complete their work under the slab on grade and shall be responsible to return the pad to the subgrade elevation left by the Sitework Contractor. The Concrete Contractor shall then adjust the select material to final subgrade, fine grade the slab and place the vapor barrier and stone fill.

17. All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.

18. Hoisting, rigging and scaffolding.

19. Provide all primary service work, including all utility company related costs/fees for this work.

20. Provide a complete fire alarm system. Water flow devices are supplied and installed by the Sprinkler Contractor and wired by this Contractor. Include tie-in to fire sprinkler flow and tamper switch.

21. Heat tracing.

22. Special systems (CCTV, sound, security, time clock, sound masking). Provide raceways and infrastructure per documents.

23. Lightning protection with master UL certification.

24. Grounding of building columns and interior spaces as required.

25. Pull strings and boxes for voice/data boxes.

26. As-built drawings.

27. Provide rough-in and final connection and related work for equipment provided under other contracts (i.e. kitchen, elevators, HVAC, sprinkler, motorized doors, etc.). Provide power to automatic hardware. Low voltage wiring from the controller to hardware shall be provided by the Technology Contractor.

28. Provide complete audio and audiovisual systems.

29. Provide rough-in and final connection of kitchen equipment and appliances. Refer to Specification Section 11400 Food Service Equipment for specifics. Coordinate power/plug requirements with rough in for equipment with the Kitchen Equipment Contractor.

30. Provide stage lighting systems including fixtures, controls, wiring, light grids, supports and attachments.

31. Provide emergency generator. Include initial supply of fuel and remaining.

32. Provide an additional specialty lighting fixture allowance of $75,000.

33. Provide an allowance of $60,000 for electrical re-routing not scheduled on the documents.

34. This Contractor to cut, cap and drop all electrical equipment, conduits, raceways, etc as indicated on the electrical demolition plans. Removal will be by the demolition contractor.

35. This Contract to include coordination time required to work with the Demolition Contractor for utility disconnects.

36. This Contractor to include the electrical work required for both Phase I and Phase II.

37. Include a minimum of four (4) additional mobilizations to the site in your base price.

38. Coordination with the Technology Contractor will be required and part of your base bid.

CONTRACT NO. HHS-26 - TECHNOLOGY

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 270000	General Communications Provisions
Section 270500	Common Work Results for Communications
Section 270528	Conduit and Backboxes for Communications Systems
Section 270529	Hangers and Supports for Communications
Section 270530	Cable Trays for Communications
Section 270544	Sleeves & Sleeve Seals for Communications Pathways
Section 271100	Communications Equipment Room
Section 275200	Grounding and Bonding for Communications
Section 275313	Integrated Telecommunications System
Section 271500	Voice Data Video Systems
Section 280500	Common Work Results for Electronic Safety and Security
Section 280544	Sleeves & Seals for Electronic Safety and Security
Section 281600	Intrusion Detection
Section 281000	Access Control
Section 282300	Video Security Surveillance
Section 283112	Public Safety First Responder Radio Amp System
Section 283117	Fire Alarm System
Section 285200	Grounding & Bonding for Electronic Safety and Security
Section 285800	Conduit & Backboxes for Electronic Safety and Security

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Permits and inspections.

2. Penetrations through walls, floors, etc. including cutting, patching and fire safing.

3. Coordinate your contractor work with Section 283112 and 283117.

4. Testing.

5. Clean up.

6. All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.

7. Access controls, Section 281000 is a separate contract. This contract must coordinate with 281000 Contractor.

8. Action, Informational, and Closeout Submittals

9. Cabling for Voice/Data and Cameras is by others.

10. Public Address System

11. Video Surveillance System

12. Grounding of building columns and interior spaces as required.

13. Conduits, pull strings and boxes for systems by others.

14. This Contractor shall maintain existing system(s) included within this scope of work during all phases of construction.

15. This Contractor shall coordinate all wireless equipment with District owned Virtual Server and program as necessary.

16. Plywood backboards

17. Contractor shall coordinate with others as required to assure proper operation of a complete system.

18. As-built drawings.

19. This Contractor to include an allowance of $100,000 for work to be determined by the Owner and Construction Manager.

20. Phasing: This Contract to be installed in two Phases. Proposal to includes costs for both phases. In addition to main building, phase II shall also include 1972 Building.

    a. Phase I: June 2016 – August 2017
    b. Phase II: June 2017 – August 2018

21. Furnish, install and coordinate all Owner furnished equipment (see attached matrix).

SYSTEM / PRODUCT	FURNISH	INSTALL
270000	Telecom Contractor	Telecom Contractor
270500	Telecom Contractor	Telecom Contractor
270528	Contractor	Contractor
270529	Telecom Contractor	Telecom Contractor
270530	Contractor	Contractor

SYSTEM / PRODUCT	FURNISH	INSTALL
270544	Telecom Contractor	Telecom Contractor
271100	Telecom Contractor	Telecom Contractor
271500 (everything except cabling)	Telecom Contractor	Telecom Contractor
275200	Telecom Contractor	Telecom Contractor
275313 (everything except cat6 cabling)	PA/Intercom Contractor	PA/Intercom Contractor
275313 CLOCKS – CAT6 Cabling	Telecom Contractor	Telecom Contractor
DATA – CAT 6 cabling	Telecom Contractor	Telecom Contractor
Telecom Cabinets & Wire Management	Owner	Telecom Contractor
UPS for Telecom Cabinets	Owner	Owner
Network Switches	Owner	Owner
IP POE Intercom CAT6 Cabling	Telecom Contractor	Telecom Contractor
281000 Access Control	Security Contractor	Security Contractor
281600 Intrusion Detection System	Security Contractor	Security Contractor
282300 Video Security Surveillance	Owner	Telecom Contractor

NOTE: The Electrical Contractor will own the infrastructure as shown on the T series drawings. This Contractor will own interconnection structure and raceways between systems to provide a complete system.

CONTRACT NO. HHS-27 – ACCESS CONTROL

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Section 280500	Common Work Results for Electronic Safety and Security
Section 280544	Sleeves & Seals for Electronic Safety and Security
Section 281600	Intrusion Detection
Section 281000	Access Control
Section 282300	Video Security Surveillance
Section 283112	Public Safety First Responder Radio Amp System
Section 283117	Fire Alarm System
Section 285200	Grounding & Bonding for Electronic Safety and Security
Section 285800	Conduit & Backboxes for Electronic Safety and Security

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Permits and inspections.

2. Penetrations through walls, floors, etc. including cutting, patching and fire safing.

3. Coordinate your contractor work with Section 080000 – Doors, Frames, & Hardware.

4. Testing.

5. Clean up.

6. All guarantees and warranties to begin at the substantial completion of the entire project. Maintain equipment prior to substantial completion.

7. Electronic door hardware

8. Computer hardware for door access

9. Monitoring and recording equipment for door access

10. Low Voltage Wiring

11. Intrusion detection system, including but not limited to control panel and cabling.

12. This Contractor is responsible for developing, installing, programming, and testing software on computer furnished by Others in a District-owned Virtual Server.

13. Conduits, pull strings and boxes for systems by others.

14. As-built drawings.

15. Training and Start-Up

16. Action, Informational, and Closeout Submittals

17. This Contractor to include an allowance of $20,000 for data cabling, jacks, supports, labeling, testing, terminations, and all required products for a complete installation for the access control receives/control modules from the MDF and IDF rooms.

18. This Contractor to include an allowance of $1,500 per hardwired door for power and fire alarm (conduits, wiring, back boxes, interface, circuits, disconnects, breakers, etc.) required for access control system installation. Allowance to be utilized based on selected access control system and required power/fire alarm interface.

19. This Contractor to include an allowance to provide 400 locker/cabinet keyless locks XS4 - Locker or similar.

20. This Contractor to include an allowance to provide 200 credentials of contactless RFID cards.

21. This Contractor to include an allowance of $50,000 for work to be determined by the Owner and Construction Manager.

22. Phasing: This Contract to be installed in two Phases. Proposal to includes costs for both phases. In addition to main building, Phase II shall also include 1972 building.

    a. Phase I: June 2016 – August 2017
    b. Phase II: June 2017 – August 2018

NOTE: The Electrical Contractor will own the infrastructure as shown on the T series drawings. This Contractor will own interconnection structure and raceways between systems to provide a complete system.

CONTRACT NO. HHS -28 – WOOD FLOORING

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification Sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 2	Existing Conditions
Section 01 9113	General Commissioning Requirements
Section 01 9115	Exterior Enclosure Commissioning
Section 09 6429	Wood Strip Flooring

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Provide flooring in accordance with the finish schedule and specifications.

2. Prepare subfloor for finished flooring including leveling and patching. Base bid shall include all flashing patching and surface preparation required to perform the work of this Contractor. Include preparation of existing conditions.

3. Include all sub floor sleeper systems as required.

4. Thresholds and transition strips to other materials.

5. Provide all sanding, epoxy and floor finish.

6. Cleaning and protection.

7. Attic stock.

8. Provide cutting and fitting around work of others.

9. This Contractor shall field measure existing structure for pertinent dimensions after notification is given existing structure is available.

10. This Contractor shall include leveling of hardwood floor substrate at all areas hardwood floors are to be installed.

11. Note: all demolition of wood floors to be by the Asbestos abatement contractor.

12. This contractor shall include an allowance of $40,000 for additional work to be directed by the Construction Manager.

23. Phasing: This Contract to be installed in two Phases. Proposal to includes costs for both phases.

    a. Phase I: June 2016 – August 2017
    b. Phase II: June 2017 – August 2018

CONTRACT NO. HHS - 29 – LAMINATE CASEWORK AND MILLWORK

A. Work included in this contract consists of, but is not necessarily limited to, all labor, materials and equipment for:

- Technical Specification Sections:

Division 0	Bidding and Contract Requirements
Division 1	General Requirements
Division 2	Existing Conditions
Section 01 9113	General Commissioning Requirements
Section 01 9115	Exterior Enclosure Commissioning
Section 06 1000	Rough Carpentry
Section 06 4100	Architectural Wood Casework
Section 12 3400	Laminate Clad Casework
Section 12 3600	Countertops

This contract also includes, but is not necessarily limited to, all labor, materials and equipment for the following:

1. Furnish and install all laminate casework, custom casework, refurbished casework and millwork.

2. Coordinate all work with other trades.

3. Coordinate with plumbing and electrical submittal for cut outs in counter tops and casework.

4. Provide all caulking and sealants for all work provided by this contract.

5. Note: this contractor will be manufacturing and relocating existing millwork for this project.

6. This Contractor shall include an allowance of $30,000 for work to be directed by the Owner and Construction Manager.

7. This Contractor shall field measure existing structure for pertinent dimensions after notification is given existing structure is available.

8. Phasing: This Contract to be installed during Phase I dates between June 2016 and August 2017.

SECTION 012100 - ALLOWANCES

1. RELATED DOCUMENTS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

B. Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

C. Refer to Scope Information Sheets for all contracts bound in the Project Manual under Section 011100 - SUMMARY OF WORK. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

D. For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

E. Include in the Contract Sum all lump sum and unit cost allowances stated in the Contract Documents.

F. Designate in the construction progress schedule the delivery dates for products specified under each allowance.

G. Designate in the Schedule of Values the quantities of materials required under each unit cost allowance.

2. ALLOWANCES FOR PRODUCTS

A. The amount of each allowance includes:

1. The cost of the product or labor to the Contractor or Subcontractor, less any applicable trade discounts.

2. Delivery to the site.

3. Labor required under the allowance, only when labor in specified to be included in the allowance. If labor is not specified to be included in the allowance, it shall be included in the Contractor's bid and in the resulting Contract Sum.

4. Applicable taxes.

5. Profit and overhead.

B. In addition to the amount of each allowance, include in the Contract Sum the Contractor's costs for:

1. Handling at the site; including unloading, uncrating and storage.

2. Protection from the elements and from damage.

3. Labor for installation and finishing, except where labor is specified to be a part of the allowance.

4. Other expenses required to complete the installation.

5. Contractor's and Subcontractor's overhead and profit.

C. Refer to Scope Information Sheets under Section 011100 - SUMMARY OF WORK for the amount of each lump sum allowance and for work specified in the specification sections.

3. ADJUSTMENT OF COSTS

A. Should the net cost be more or less than the specified amount of the allowance, the Contract Sum will be adjusted accordingly by Change Order.

1. For products and labor specified under a unit cost allowance, the unit cost shall apply to the quantities actually used with a nominal allowance for waste, as determined by receipted invoices, or by field measurement.

B. At Contract closeout, reflect all approved changes in Contract amounts in the final statement of accounting.

END OF SECTION

SECTION 012200 - UNIT PRICES

1. GENERAL PROVISIONS

   A. The general provision of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

   B. Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

   C. For work being constructed under separate prime contract, provisions of this Section apply to each contract being bid.

2. BASE BID

   A. The Base Bid shall consist of all work shown or specified in the Contract Documents, exclusive of any Additive Unit Prices specified herein.

   B. The Base Bid shall include all work in any Subtractive Unit Prices specified herein.

3. UNIT PRICES

   A. State in the Bid Form the amount to be added to (or subtracted from) the Base Bid per unit of measurement for each Unit Price specified. State this amount to include all overhead and profit. No surcharge in addition to the Unit Price listed will be permitted.

   B. See Section 002113, INSTRUCTIONS TO BIDDERS for related information.

   C. For description of Unit Prices requested, refer to the specification. The method of stating the Unit Prices is described in the Bid Form.

   D. Where both add and deduct unit prices are requested, there shall not be more that a 10% variation between the two.

4. APPLICATION OF UNIT PRICES

   A. Unit prices stated in the Bid Form will apply from the time the Bid is submitted until Contract completion.

5. MEASUREMENT OF QUANTITIES

   A. Quantities shall be determined by field measurement by contractor personnel and as verified by the Construction Manager.

   B. At the Contractor's option, and at his expense, measurement may be made by a

registered surveyor.

6. LIST AND DESCRIPTION OF UNIT PRICES

A. Unit Price No. 1: Data Drop: Provide a Cat 6 data jack complete with testing and termination. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.

B. Unit Price No. 2: Telephone Drop: Provide a Cat 6 telephone jack complete with testing and termination. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.

C. Unit Price No. 3: Interior Security Camera: Provide Interior Security camera rough in. Include two runs 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.

D. Unit Price No. 4: Exterior Security Camera: Provide Exterior Security camera rough in. Include 300 feet of Cat 6 plenum cable. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.

E. Unit Price No. 5: Security Motion Detector: Provide Dual Technology Motion Detector complete with testing and programming. Including 100 feet of alarm cabling. Complete with outlet, coverplate, backbox, conduit installed concealed, labeling, testing and terminations.

F. Unit Price No. 6: Exterior doors (hardwired). Provide both add and deduct unit prices.

G. Unit Price No. 7: Interior rated doors (hardwired). Provide both add and deduct unit prices.

H. Unit Price No 8: Interior doors (WiFi/wireless). Provide both add and deduct unit prices.

I. Unit Price No. 9: Locker/cabinet locks – wire-free. Provide both add and deduct unit prices.

J. Unite Price No. 10: Additional contactless RFID cards. Provide both add and deduct unit prices.

END OF SECTION

SECTION 012300 - ALTERNATES

1. GENERAL PROVISIONS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

B. Refer to provisions in AIA Document A232 – 2009 Edition, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

C. For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

2. BASE BID

A. The Base Bid shall consist of all work shown or specified in the Contract Documents, exclusive of any Additive Alternates specified herein.

B. The Base Bid shall include all work in any Subtractive Alternates specified herein.

3. ALTERNATES

A. State in the Bid Form the amount to be added to the Base Bid for each Alternate specified.

B. See Section 002113 - INSTRUCTIONS TO BIDDERS for related information.

C. The description of Alternates contained herein is in summary form. Detailed requirements for materials and execution shall be as specified in other sections and as shown on drawings.

Alternate No. 1: Provide a fully integrated system with Salto locksets, utilizing SoftwareHouse CCure 9000 as the integration software.

Alternate No. 2: Provide a fully integrated system with Salto locksets, utilizing Honeywell as the integration software.

Alternate No. 3: Provide yellow pine grade SB in lieu of basis of bid grade I.

END OF SECTION

SECTION 013216 - CONSTRUCTION SCHEDULE

1. PRE-BID CONSTRUCTION SCHEDULE

A. Time is a critical element of this Project. By entering a bid, the Contractor agrees to adhere to the intermediate Milestone Dates and Dates of Substantial and Final Completion established herein. The Contractor also understands that all work must be performed in an orderly and closely coordinated sequence in order to achieve the specified Milestones and Completion Dates, and the Contractor hereby agrees to perform his work in conformance with the Pre-Bid Construction Schedule established herein, or with the then current and approved Project Construction Schedule as amended from time to time by the Construction Manager.

B. The Pre-Bid Construction Schedule includes allowances for time lost due to adverse and abnormal weather conditions, other than floods, hurricanes, tornadoes, lightening and other like acts of God. The Contractor understands and agrees that it shall not be entitled to any extensions of the Contract Time or adjustment to the Contract Sum, except as allowed in the General Conditions of the Contract for Construction. The Contractor further acknowledges that the Work may be required to be performed during the winter season, that conditions during this season may be adverse and abnormal, but that such conditions will not be the basis for an extension of the Contract Time or adjustment to the Contract Sum.

2. SCHEDULING OF THE WORK AFTER AWARD OF CONTRACT

A. After award of Contract, or issuance of a Notice to Proceed, the Contractor will meet with the Construction Manager to review the Pre-Bid Construction Schedule, and the overall project plan for construction. Following the above review the Contractor will meet with each subcontractor and supplier to view the detailed plans for performing his Work. Following these meetings and within fourteen (14) days after award of the Contract or issuance of a Notice to Proceed, the Contractor shall prepare and submit for the Construction Manager's approval a Work Schedule providing for the expeditious, timely and practical execution of the Work. The Contractor's Work Schedule shall include activity descriptions and durations for shop drawings, fabrication, delivery and installation. If the Construction Manager so requests, the Contractor shall provide adequate explanation regarding crew sizes, production rates and similar data used to arrive at the durations and sequences.

B. The Construction Manager shall review the Contractor's Work Schedule, coordinate it with the separate work by other contractors, the Owner and the Construction Manager, and after coordination, shall incorporate it into the approved Project Construction Schedule. The approved Project Construction Schedule shall be issued to the Contractor and the Contractor shall perform his Work in conformity therewith.

C. The Contractor shall submit proposed schedule revisions and obtain the written

approval of the Construction Manager therefore before deviating from the Project Construction Schedule.

C. The Construction Manager will incorporate approved schedule revisions into the Project Construction Schedule, and shall otherwise update and revise the Project Construction Schedule as the Construction Manager, at his sole discretion, deems necessary.

3. ADHERENCE TO THE SCHEDULE

A. The Contractor shall start each part of its Work on the date designated for start in the approved Project Construction Schedule unless advised by the Construction Manager. The Contractor shall carry the Work forward expeditiously with adequate forces, equipment and materials, and shall complete each part of his work on or before the date designated in the approved Project Construction Schedule.

B. If the Construction Manager determines that the Contractor is behind schedule, the Construction Manager shall have the right to require that the Contractor take steps, at the Contractor's expense, to accelerate its Work. Such steps shall include increases in manpower, equipment and materials and/or overtime as the Construction Manager may deem necessary. If the Contractor fails to comply with the Construction Manager's instructions relating to improved rate of progress, the Contractor may be held in default under the appropriate provisions of the General Conditions of the Contract.

C. Each Contractor shall, if directed by the Construction Manager, provide the Construction Manager a 2-week look ahead of anticipated manpower showing the number of men, classification, and anticipated work.

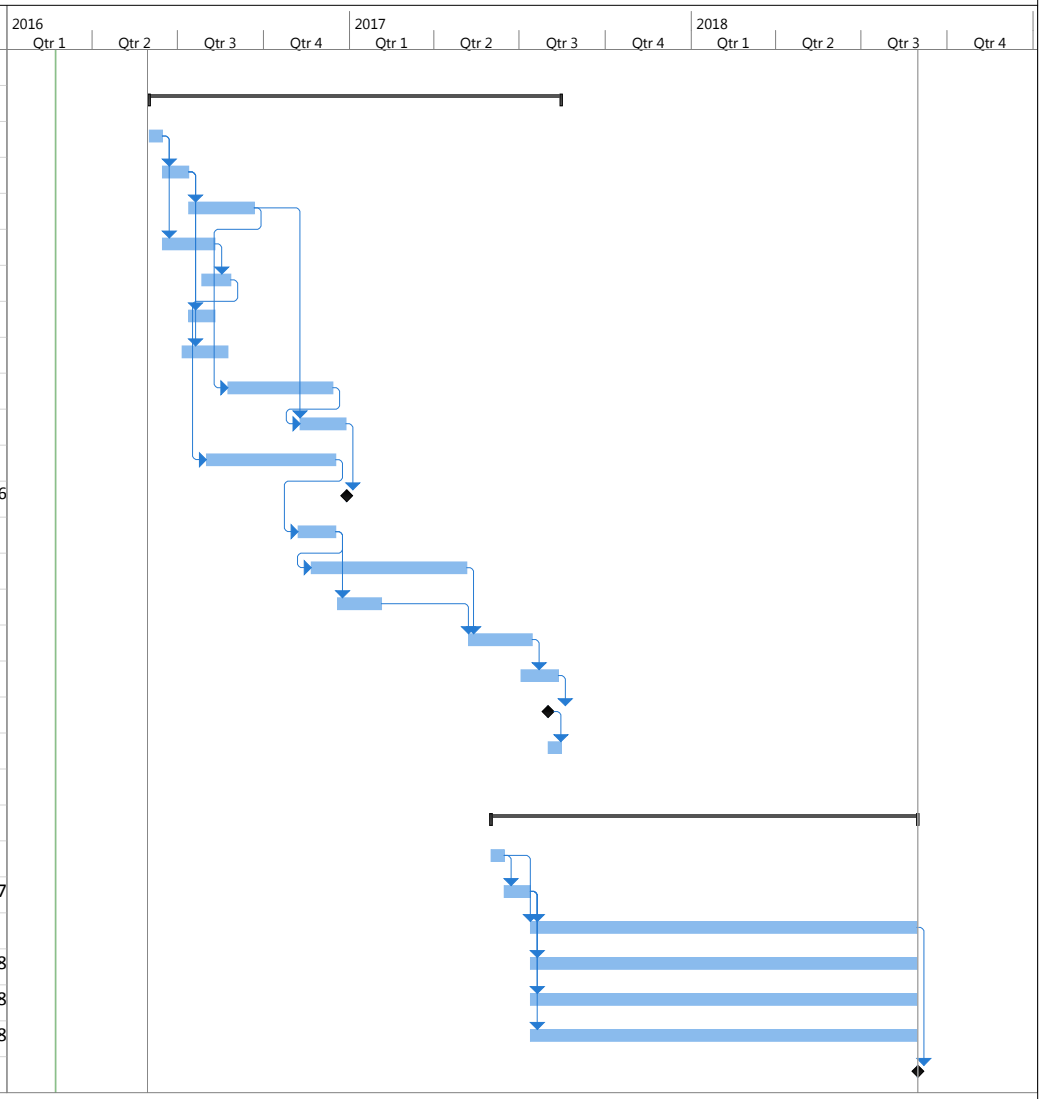
END OF SECTION

NCC Vocational Technical School District
Renovations to Howard High School of Technologyu
Bid Package 'C'

July 29 2016

NCC Howard HS Phase I
BP-A Bid Schedule
12/22/2016

ID	Task Mode	Task Name	Duration	Start	Finish
1					
2		**PHASE I BP-A Construction Duration**	**314 days**	**Wed 6/1/16**	**Mon 8/14/17**
3		Mobilization	10 days	Wed 6/1/16	Tue 6/14/16
4		Asbestos Abatement	20 days	Wed 6/15/16	Tue 7/12/16
5		Demolition and Removal	50 days	Wed 7/13/16	Tue 9/20/16
6		Site - Underground Utilities	40 days	Wed 6/15/16	Tue 8/9/16
7		UG Plumbing and Concrete Replacement	23 days	Wed 7/27/16	Fri 8/26/16
8		Temporary Plumbing Rerouting	20 days	Wed 7/13/16	Tue 8/9/16
9		Temporary HVAC Rerouting	35 days	Wed 7/6/16	Tue 8/23/16
10		MEP Rough In	80 days	Wed 8/24/16	Tue 12/13/16
11		Roof Demolition and Replacement	35 days	Wed 11/9/16	Tue 12/27/16
12		Building construction and Renovations	100 days	Mon 8/1/16	Fri 12/16/16
13		Building Watertight	1 day	Wed 12/28/16	Wed 12/28/16
14		MEP Rough Interior	30 days	Mon 11/7/16	Fri 12/16/16
15		Interior Construction / Finishes	120 days	Mon 11/21/16	Fri 5/5/17
16		MEP Start Up	35 days	Mon 12/19/16	Fri 2/3/17
17		Final Finishes and Accessories	50 days	Mon 5/8/17	Fri 7/14/17
18		Punchlist and Clean Up	30 days	Mon 7/3/17	Fri 8/11/17
19		Substantial Completion	1 day	Mon 7/31/17	Mon 7/31/17
20		Owner Occupy Space	10 days	Tue 8/1/17	Mon 8/14/17
21					
22		**PHASE II BP-B Construction Duration**	**326 days**	**Thu 6/1/17**	**Thu 8/30/18**
23		Mobilize	10 days	Thu 6/1/17	Wed 6/14/17
24		Asbestos Abatement	20 days	Thu 6/15/17	Wed 7/12/17
25		General Construction	295 days	Thu 7/13/17	Wed 8/29/18
26		BPA - HVAC & Plumbing	295 days	Thu 7/13/17	Wed 8/29/18
27		BPA - Electrical	295 days	Thu 7/13/17	Wed 8/29/18
28		BPA - Fire Sprinkler	295 days	Thu 7/13/17	Wed 8/29/18
29		Substantial Completion	1 day	Thu 8/30/18	Thu 8/30/18



Project: Howard HS Phase I Bid
Date: Mon 2/22/16

Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone	

SECTION 012600 - CHANGE ORDER PROCEDURES

1. GENERAL:

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

B. Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

C. The Construction Manager is responsible for processing all change orders. Each request will be assigned a change order request (COR) number. The Change Order Request & Execution Form will be initiated via the web-based project management system (Building Blok) used by the CM.

D. It is to be clearly understood that no extra work shall commence without an approved written and executed change order from the Owner.

2. INITIATING A CHANGE ORDER:

A. Specific changes initiated by the Owner, Architect, Construction Manager (CM) or Contractor will be processed as follows:

1. The Owner will authorize the Architect to prepare sufficient documents to establish an accurate price. These documents to be forwarded to the Construction Manager and Owner "for pricing only, not authorized for construction." The Construction Manager will develop the estimate (within 2 weeks) showing a breakdown by trades with all trade contractor quotes. The Owner will approve or reject the change request within two (2) weeks. If the Owner elects to proceed with the change, the Construction Manager will prepare formal change orders to the various trade contractors involved in the change and reference in all formal change orders the original change order request number.

2. Field Change: Contractor shall immediately notify the Construction Manager of a change due to field conditions or site conditions. If documents cannot be prepared for pricing due to schedule constraints, the Construction Manager will make every effort in estimating the field change. If the Owner and Construction Manager agree that certain field changes should be handled on a time and material basis, the Construction Manager will closely monitor the Contractor's labor and material affecting this change. At the completion of the work a formal change order will be issued.

3. Contractor Change: If a Contractor initiates a change order for work not included in the Contract, the Construction Manager and Architect will research the validity of the request, verify quantities and pricing and submit to the Owner for approval on a change order request.

B. The additional cost, or credit to the Owner resulting from a change in the Work shall be by mutual agreement of the Owner, Contractor, Construction Manager and the Architect.

3. PROCESSING A CHANGE ORDER:

A. The Contractor will fill in the Change Order Request & Execution Form (COREF) with a brief description of the change, any time extension, and cost changes.

B. The Contractor will attach to the COREF copies of the written quotations from the trade contractors, Contractors, and suppliers. The Labor Detail Sheet and the Change Order Detail forms must be added as an attachment to the COREF. The Contractor and each sub-tier contractor (as applicable) must fill out the Labor Detail Sheet and Change Order Detail Sheet. Samples of these forms are attached.

C. In all cases, this cost or credit shall be based on the "DPE" wages required and the "invoice price" of the materials/equipment needed.

D. "DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes direct salary plus customary fringe benefits (prevailing wage rates) and documented statutory costs such as workman's compensation insurance, FICA, and unemployment insurance (a maximum multiplier of 1.35 times DPE).

1. "Fringe Benefit" is any medical, life or disability insurance, paid time off, etc.

2. "Worker's Compensation" is the insurance required for injuries including medical leave, etc.

3. "FICA" is the costs association with Social Security and Medicare insurance.

4. "Unemployment insurance" is the cost associated with the governmental assessment for employee's unemployment benefits.

E. "Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and/or equipment that is paid by the Contractor (or Subcontractor) to a material distributor, direct factory vendor, store, material provider, or equipment leasing entity.

F. In addition to the above, the Contractor is allowed markup for overhead and profit on additional work performed as outlined in Specification Section 012613, Contractor Compensation.

G. Building Blok Procedures: The Contractor will submit all change order requests and supporting documentation via the Building Blok web-based project management system. Each Contractor will be issued a unique login and password. Each contractor must submit the information as follows:

1. Create a new change order, from your "To-Do List" by clicking on the "Create Issue"

tab in the upper right corner and select "Change Order Request".

2. The Contractor will enter a brief description of the change in the "Summary" block. A detailed description of the change will be entered in the "Description of Change" block, to include any changes to documents or time extension. The cost of the change will be entered in the "Total Cost Change" block.

3. The Labor Detail Sheet and the Change Order Detail forms must be added as an attachment to the request. The Contractor and each sub-tier contractor (as applicable) must fill out the Labor Detail Sheet and Change Order Detail Sheet. Samples of these forms are included behind this section. In addition to these forms, the Contractor also must attach any material and equipment rental quotations. All of these documents should be scanned and saved as a PDF file. Click on the "Browse" box to upload the file. Be sure to wait until Building Blok tells you the file was "Uploaded Successfully".

4. Once the information is entered on the form and the proper attachments are uploaded, the contractor will click "Save". The Contractor will be prompted to enter their password to approve an electronic signature. Once you save the request you will have an opportunity to check it before submitting it to the CM. After you verify the COREF is correct click "Recommend Approval" to submit the change request to the CM. The Contractor will then be prompted to re-enter the password to approve an electronic signature and complete the submission request. Click on "Home" in the upper left corner to make sure the change order does not appear on your To-Do List.

5. The Change Order Request will then be reviewed by the CM Project Manager and Recommended for Approval, Rejected, or returned to the Contractor for additional information. Once the Construction Manager, Owner, and Architect have approved the request all parties will receive an email from Building Blok notifying them that a fully executed Change Order and Contract Recalculation Form can be downloaded from Building Blok. Hard copies of the executed change order and recalculation form will not be provided by the CM.

6. Once approved on Building Blok, the Contractor is to print out a copy of the approved change order request form and send a signed hard copy of the request with a printout of the associated back-up to the Construction Manager.

It is to be clearly stated that no extra work shall commence without an approval from the **Owner or Construction Manager** or Owner's representative.

END OF SECTION

CHANGE ORDER REQUEST & EXECUTION FORM

110 South Poplar Street
Suite 400
Wilmington, DE 19801

Tel. 302-421-5700
Fax 302-421-5715

DATE:	PROJECT NAME: Howard High School
CONTRACT:	REQUEST NUMBER:
CONTRACTOR:	CHANGE ORDER NUMBER:
	STATE PO NUMBER:

The following is a summary of the request submitted by the contractor as described above. All supporting documents have been attached and described herewith. This summary shall contain a total amount of compensation requested by the contractor as well as any request for an extension in contract time. It shall be understood that the amounts described below shall remain valid for a period of sixty days from the date described above unless otherwise stated.

A detailed breakdown of Labor, material, equipment, and subcontract costs must be attached to be considered for review.

1. Summary Description(s):
2. Changes to the Contract Drawings:
3. Changes to the Project Manual:
4. Total Cost Change:
5. Total Time Change:

REVIEWED

This request has been reviewed and____approval_____disapproval is recommended by:

Name Title Date

APPROVED

This change order request is not approved until executed by all parties bound by a contractual relationship. Upon execution it shall represent a modification to the agreement and is subject to all terms and conditions of the contract documents.

Contractor:	Architect:
Signed By:	Signed By:
Title:	Title:
Date:	Date:
EDiS Company	Owner:
Signed By:	Signed By:
Title:	Title:
Date:	Date:

CHANGE ORDER DETAIL FORM

(Provided by contractor, subcontractor or sub tier contractor)

DATE SUBMITTED:

CONTRACT:

CONTRACTOR:

PROJECT NAME: Renovations to Howard High School of Technology

CHANGE ORDER REQUEST #:

LABOR SECTION

TRADESMAN(s):	LABOR HOURS	RATE (per schedule)	SUBTOTAL
Subtotal			

MATERIAL SECTION

MATERIAL:	QUANTITY	UNIT COST	SUBTOTAL
Subtotal			

EQUIPMENT SECTION

EQUIPMENT:	QUANTITY	UNIT COST	SUBTOTAL
Subtotal			

SUBTOTAL	
SUBCONTRACTOR/ SUB TIER*	
OH & PROFIT (10% on sub/sub tier only))	
BOND COST	
OH & PROFIT (15% on own work)	
GRAND TOTAL	

3/2012

CHANGE ORDER DETAIL FORM

(Provided by contractor, subcontractor or sub tier contractor)

DATE SUBMITTED:

CONTRACT:

CONTRACTOR:

PROJECT NAME:

CHANGE ORDER REQUEST #:

LABOR SECTION

TRADESMAN(s):	LABOR HOURS	RATE (per schedule)	SUBTOTAL
Subtotal			

MATERIAL SECTION

MATERIAL:	QUANTITY	UNIT COST	SUBTOTAL
Subtotal			

EQUIPMENT SECTION

EQUIPMENT:	QUANTITY	UNIT COST	SUBTOTAL
Subtotal			

SUBTOTAL	
SUBCONTRACTOR/ SUB TIER*	
OH & PROFIT (10% on sub/sub tier only))	
BOND COST	
OH & PROFIT (15% on own work)	
GRAND TOTAL	

SECTION 012613 - CONTRACTOR COMPENSATION

1. GENERAL

A. The Contractor agrees to perform any additional Work, for the net cost of materials and labor (including wages paid, payroll taxes, and all insurance) plus the following percentage for all of his overhead and profit, which includes Field Supervision:

The percentages to be added or allowed for any Work change involving both added Work and omitted Work shall be applied only to the net difference in cost.

1. 15% mark-up (10% overhead and 5% profit) by the Contractor on Work performed by his own forces.

2. For work done by a Subcontractor, 10% for subcontractor overhead and 5% for subcontractor profit to which the Contractor may add 7.5% for his overhead and profit combined.

3. Contractor mark-up shall include supervision, home and field overhead, all self-owned small tools and equipment.

B. When the Contractor is directed to perform overtime work at the CM (Owner) expense to accelerate contractual work, the cost for same shall only be the actual premium costs incurred by the Contractor.

END OF SECTION

SECTION 012900 - PAYMENT PROCEDURES

1. GENERAL PROVISIONS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

B. Refer to provisions in AIA Document A232 - 2009 Edition, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISOR EDITION, for requirements in addition to those specified in Division 1.

C. For work being constructed under separate prime contracts, provisions of this Section apply to each contract being bid.

2. REQUIREMENTS INCLUDED

A. Submit Applications for Payment to Construction Manager in accordance with the schedule and procedures established in the Contract Documents.

3. RELATED REQUIREMENTS

A. Owner-Contractor Agreement.

B. Conditions of the Contract: Article 9 PAYMENTS AND COMPLETION.

C. Section 01 31 13: Project Coordination Meetings

D. Section 01 33 00: Submittal Procedures

E. Section 01 77 00: Closeout Procedures

4. FORMAT AND DATA REQUIRED

A. Submit itemized applications inputted into Building Blok (EDiS' Web-Based Project Management software), examples of which will be furnished to the Contractor at the Pre-Construction meeting.

B. Provide itemized data on Continuation Sheet:

1. Format, schedules, line items and values: Duplicates of those of the schedule of values previously accepted by the Construction Manager.

C. Once approved on Building Blok, print out two copies and submit signed and notarized copies to the Construction Manager.

5. PREPARATION OF APPLICATIONS FOR PROGRESS PAYMENTS

A. Form: AIA Document G702/CMa

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated on Continuation Sheets.

B. Continuation Sheets:

1. Line items of components of Work will be subject to Owner's review and approval under the Provisions of Section 013300 - SUBMITTALS, and the General Conditions. Continuation Sheets shall follow Schedule of Values submitted with the first application for payment.

2. Fill in total list of all scheduled components of Work, with item number and scheduled dollar value for each item. Fill in values of work completed in the period.

3. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored; round off values to nearest dollar.

4. List each Change Order executed prior to date of submission, at the end of the Continuation Sheets; list by Change Order Number, and description, as for an original component item of work.

5. Contractor is to include a line item for "Closeout Documents" equaling 3.5% of their contract value.

6. PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified in progress payments.

7. SUBMITTAL PROCEDURES

A. Complete Payment Applications:

1. Submit completed Application to the Construction Manager by the date stipulated in the Project Manual.

B. Number: Submit 2 copies of each Building Blok invoice signed and notarized payment application.

END OF SECTION

SECTION 013113 - PROJECT COORDINATION MEETING

1. PROJECT COORDINATION MEETING

   A. An on-site project coordination meeting will be held on a biweekly basis throughout the project construction period.

2. ATTENDANCE

   A. Attendance at the project coordination meeting is mandatory of each Contractor or major supplier on the project.

   B. The representative of the Contractor shall be the Project Manager and field superintendent, unless a substitute representative has been approved by the Construction Manager.

   C. Contractor will begin attending the Project Coordination Meetings at least 4 weeks prior to mobilization on site, and will continue until the Contractor has fulfilled the obligations of his Contract.

3. AGENDA

   A. The Construction Manager will set the agenda for the biweekly Project Coordination Meeting.
   B. At a minimum, the Contractor shall be prepared to discuss the following:

      1. Actual vs. as planned progress for the prior two week period.

      2. Planned construction activities for the next four weeks.

      3. Contract document clarifications.

      4. Coordination items with other contractors.

      5. Quality Control.

      6. Recently issued change orders.

      7. Potential change orders.

      8. Submittals and shop drawings.

      9. Other items requiring Construction Manager's attention.

END OF SECTION

SECTION 013119 – PRE-INSTALLATION MEETINGS

1. PRE-INSTALLATION MEETINGS

   A. An on-site pre-installation meeting will be held at least two weeks prior to commencement of installation of work.

2. ATTENDANCE

   A. Attendance at the pre-installation meeting is mandatory of each Contractor and/or major supplier as required for each specific meeting listed below.

   B. The following individuals shall attend these meetings:
      - Contractors' Project Manager
      - Contractors' Field Superintendent
      - Contractors' Safety Representative (as needed)
      - Key Subcontractors, Suppliers, and Vendors
      - EDiS Project Manager
      - EDiS Field Manager
      - EDiS Safety Director (as needed)
      - EDiS MEP Specialist (as needed)
      - Owner's Representative (as needed)
      - Architect/Engineer (as needed)
      - Governmental Agency Representatives (as needed)
      - Testing/Inspection Agency Representatives (as needed)
      - Utility Company Representatives (as needed)

3. SUBMITTALS

   A. Each contractor is responsible to have all submittals and mock-ups, as related to the pre-installation meeting scope of work, submitted and approved prior to commencement of the pre-installation meeting.

4. LIST OF REQUIRED MEETINGS
   - Foundations & Concrete Slabs
   - Underslab Utilities
   - Structural Steel Erection & Miscellaneous Metals OSHA mandated Safety Meeting
   - Roofing OSHA mandated Safety Meeting
   - Masonry
   - Windows, Storefront, & Glazing
   - Doors/Frames/Hardware
   - Casework & Millwork
   - Acoustical Ceilings
   - Paint and VWC
   - Flooring (VCT, Carpet)
   - Epoxy Flooring
   - Food Service Equipment

- Partition Walls
  - Metal Studs
  - Drywall
  - Insulation
  - Doors/Frames/Hardware
- Fire Protection
  - Fire Sprinkler Systems
  - Fire Alarm Systems
- MEP Coordination
  - Mechanical Piping Roughin
  - Plumbing Roughin
  - Insulation
  - Electrical Roughin
  - Electrical – Bonding, grounding, lightning protection
  - Automatic Temperature Controls
  - Commissioning

5. AGENDA

A. At a minimum, the Contractor shall be prepared to discuss the items as listed on the agenda template shown on the following page:

PROJECT: RENOVATIONS HOWARD HIGH SCHOOL OF TECHNOLOGY
PRE-INSTALLATION MEETING: (Phase of Work)

A. ATTENDEES:

NAME	COMPANY	WORK ITEM	CONTRACT

B. TESTING & INSPECTION REQUIREMENTS

C. REVIEW CONTRACT DRAWINGS AND SPECIFICATIONS

Drawing / Spec No.	Comments / Conflicts

D. REVIEW SCOPES OF WORK

E. REVIEW RELEVANT RFI'S

F. REVIEW SUBMITTALS

G. REVIEW MATERIALS AND DELIVERIES

H. REVIEW SCHEDULE AND SEQUENCE OF WORK

I. JOB SITE SAFETY

- Safety Plans must be submitted before the start of work
- Certificates of Insurance need to be submitted before the start of work
- Minimum PPE – Hardhats, steel toe boots, safety glasses
- Lock-out, Tag, Test and Try ALL utilities is critical before the start of demolition
- Signage & HAZCOM Requirements
- Potential Hazards
    - Excavations >4 ft
    - Slips/trips/falls
    - Existing utilities to remain and protected

- Overhead debris
- Power tools
- Heavy equipment

J. COORDINATION WITH OTHER TRADES

K. ACTION ITEMS AND RESPONSIBILITY

L. CLOSEOUT

END OF SECTION

SECTION 013125– WEB-BASED PROJECT MANAGEMENT SYSTEM

1. GENERAL PROVISIONS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

B. Refer to provisions in AIA Document A232 – 2009 EDITION, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, for requirements in addition to those specified in Division 1.

C. Refer to Scope Information Sheets for all contracts bound in the Project Manual under Section 011100 - SUMMARY OF WORK. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

D. All Contractors shall use Internet/Web-based project management software to transmit documents, track, and otherwise manage this project.

E. Use of this project management software will not change any contractual responsibilities of the construction team members.

2. DEFINITIONS

A. System: A real time web-based software that shares data, translates data, organizes data, facilitates communication, archives actions, and offers scheduling prompts to identified Users.

B. Users: Authorized participants of this project furnished with a unique password and authorized to access the system to view/input/export data. Owner, Construction Manager, Architect, and the Contractors are all Users. Other Users may be added as necessary.

C. Contacts: Entities identified to automatically receive specific transmissions or entities selected to receive specific information sent by the system through to an e-mail address.

D. Signees: Those individuals identified, by the Contractors, authorized to sign change orders and payment applications via electronic signature. This electronic signature is as contractually binding as an original signature on paper.

3. USE OF SYSTEM

A. The use of the system is mandatory for the documentation of the transmittal of all non-oral information, even if the actual transmission of the information is by another means.

B. The use of the system will be mandatory by the Contractors to send, retrieve, and respond to data.

C. In addition to this web-based project management system, the Contractors will be required to use electronic mail (email) for day-to-day communication and correspondence. Email will be the primary means of transmitting written communication (i.e. meeting minutes, draft pay applications, etc.).

4. QUALITY ASSURANCE

A. A three hour training session in the use of the software for this project will be offered by the Construction Manager at a location convenient to the project site. Attendance by one member of each Contractor's organization is mandatory. Additional attendees may enroll based on availability of training space. All attendees must have a working knowledge of computers. Training can not begin until three working days after the receipt of the submittals indicated below.

B. Technical assistance will be provided by on-line help, email, or telephone for all Users through-out the life of the project.

5. SUBMITTALS

A. Submit to the Construction Manager, within 5 days following the receipt of the letter of intent to award, in an electronic template, the following:

1. Electronic logo of organization (as needed)
2. Names, mailing address and electronic address of its Users and Contacts.
3. Designation the role/responsibility for each User

6. SOFTWARE AND HARDWARE REQUIREMENTS

A. Each User shall provide and maintain a computer with high speed internet access and an email address. The computer shall have a high speed internet browser (Internet Explorer 8.0 or higher, Firefox version 3.6.12 or higher, Google Chrome or Safari version 5.0 or higher) and a high speed cable Internet access, high speed DSL or T1 line.

B. License(s) to Use System - Each Contractor will be provided unlimited licenses to use the system for this project. Each license will allow secure unlimited usage from the notice to proceed until the original contract completion date.

7. SYSTEM DESCRIPTION

A. The web based project management system is a "secure, real-time, interactive, centralized database" specifically established and maintained for the management of

this construction project. The product is designed to facilitate communication and improve the time management of its users by facilitating the sharing of information. Information will be available 24/7, from any computer meeting the specifications listed above. The information is fully protected. The electronic platform allows information to be transmitted across the internet reducing printing and postage costs and the time associated with such activities.

B. The system contains a directory of the project participants.

C. The system includes templates, with the CM's letterhead, for each document created inside the system. The template allows the use of "pull down" menus to complete significant portions of each document.

D. The system allows the templates (and attached documents created outside the system) to be distributed to Users and Contacts.

E. The System contains "translation software" to permit the viewing (and marking) of documents created outside the system. The system can view documents created by different software programs and can deliver images of its translation to any computer meeting the criteria listed above.

F. The system can be personalized by the Construction Manager to automatically send e-mail notices upon issuance of certain documents if such a practice facilitates the User's business needs.

G. The system is the product of ***Building Blok LLC*** (www.buildingblok.com) and will be continuously updated.

H. The Construction Manager will administer the Building Blok User accounts for this project.

8. DOCUMENTS CREATED INSIDE THE SYSTEM

A. The following documents shall be created on templates inside the system.

1. Transmittals for submittals processed in the system. The transmittals are automatically created by the system when the submittal is uploaded.
2. Submittal Register showing all of the submittals required of the contract, assigned to each Contractor.
3. Submittal Log: The CM will maintain submittal log after it is initialized.
4. RFI (Requests for Information)
5. Change Orders
6. RFP (Requests for Proposal)
7. ASI (Architect's Supplemental Instructions)
8. Tasks & Memos as determined by the CM

9. Payment Applications
10. Closeout Tracking Log

B. The following documents may, at each Users option, be created on the system.

1. Morning & Afternoon Activity Reports generated by the system
2. E-mails: Contacts that do not have access to the system may be sent information from the system, by the system.
3. Reports of information on the system
4. Project Notices: "Broadcast" messages can be sent to other Users system entry screen.

9. DOCUMENTS CREATED OUTSIDE THE SYSTEM AND DISTRIBUTED BY THE SYSTEM

A. The following documents are expected to be created outside the system and distributed through the system. The actual documents may be scanned or electronically attached to the transmittal.

1. Technical Submittals: Shop drawings, product data, testing reports, certifications, installation instructions, operation & maintenance manuals, will be submitted and distributed through the system. The Architect will return all submissions through the system electronically. The Construction Manager will distribute submittals (after Architect's action) electronically. Contractors may download and distribute submittals to their subcontractors and suppliers or elect to print paper copies for distribution, or both.
2. Photographs: Digital photographs and scanned images can be loaded onto the system and shared.
3. Schedule of Values/ Payment Applications: (The "pencil" review of these documents can occur inside the system).
4. Change Orders: (The "pencil" review of these documents can occur inside the system.)
5. Schedules: The schedule document(s) will be available for review on the system.
6. Data created in other software may be uploaded to the system electronically.

10. DOCUMENTS CREATED OUTSIDE THE SYSTEM AND DISTRIBUTED OUTSIDE THE SYSTEM

A. The following documents are expected to be created outside the system and distributed outside the system. The actual documents may be scanned or electronically attached to the transmittal.

1. Schedules: The Construction Manager will develop the Master Schedule through Microsoft Project 2003. The schedule will be distributed either through hard copies at meetings or through email.
2. Product samples, color samples, physical samples are still required to be provided

per the technical specifications, however, the transmittal documenting the distribution shall be done inside the system and submitted electronically and printed to accompany the actual submission.

3. Meeting minutes will be created using Microsoft Word 2003 and distributed through hard copies at meetings or through email.
4. AIA closeout documents, which require an "original" signature, will created and distributed outside the system.

END OF SECTION

SECTION 013219 - SUBMITTAL REGISTER

1. SUBMITTALS/SUBMITTAL REGISTER

A. The Contractor shall submit all items listed or specified within the sections of the Specifications included in its Work. Submittals shall include such items as: contractor's, manufacturer's or fabricator's drawings; descriptive literature including, but not limited to, catalog cuts, diagrams, operation charts or curves; test reports; samples, operations and maintenance manuals, including parts lists; certifications; warranties and other required submittals. Submittals pertinent to materials and equipment which are subject to advance approval shall be scheduled and made prior to the acquisition or the delivery thereof.

B. The Contractor shall carefully control procurement operations to assure that each individual submittal is made on or before the dates required for timely performance of its Work.

C. Within seven (7) days after award of Contract or issuance of Notice to Proceed, the Contractor shall execute and submit to the Construction Manager, seven (7) copies of the Submittal Register, on a form to be provided by the Construction Manager, on which shall be listed each item of equipment and material of each type for which fabricator's drawings and/or related descriptive data, test reports, samples, spare parts, operation and maintenance manuals, or other types of submittals required by the Specifications. The Submittal Register form shall be reproduced by the Contractor. The order of listing of items on the Register shall conform to the sequence of the items as they occur within the divisions. Drawings of component items forming a system or that are interrelated shall be scheduled to be correlated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time shall be allowed for review and approval and possible resubmittal of any item subject to approval, because no delay damages or time extensions will be allowed for time lost in late submittals or resubmittals. The Construction Manager and Architect/Engineer will review the Submittal Register for approval action. The approved Register will become a part of the Contract and Contractor will be subject to requirements thereof. The Contractor shall revise and/or update the Register monthly to take into account all changes in the Contract. Each such revised edition and/or revision to the Register shall be resubmitted to the Construction Manager. This Register shall be coordinated with related submittals of other Contractors.

2. SAMPLES

A. Submit tagged or labeled samples in triplicate, unless another quantity is otherwise specified by the Construction Manager.

B. Tags or labels shall be securely affixed and contain as a minimum the following information: Project Name, Contractor's Name, Contract Title and Number, Date, Transmittal Number, Product Manufacturer's or Fabricator's Name and Product Identifier.

END OF SECTION

SECTION 013226 - CONTRACTOR DAILY REPORTS

1. CONTRACTOR DAILY REPORTS

   A. The Contractor shall submit a Daily Report to the Construction Manager on the forms provided covering the following subjects:

      1. Work in Progress, including areas where work is being performed, nature of the operations in progress, and the manpower assigned.

      2. Extra Work (Time and Material) in progress.

      3. Materials Received.

      4. Trade labor breakdown including identification of all workers on site and the number of hours (or portions thereof) worked by each.

      5. Inspection Checklist (performed daily).

   B. The Contractor shall submit the Daily Report to the Construction Manager by 9:00 AM on the next workday following the workday covered in the Daily Report.

2. DAILY EXTRA WORK REPORT

   A. The Contractor shall submit on the form provided a Daily Extra Work Report on each day he performs authorized Extra Work on a time and material basis.

   B. A separate Daily Extra Work Report shall be submitted for each separate authorized Extra Work item done on a time and material basis.

   C. The Contractor shall submit his Daily Extra Work Report as an attachment to his Daily Report by 9:00 AM on the next workday following the workday covered in the Daily Extra Work Report.

3. Sample Daily Report

   A. A sample daily report follows this section for your reference.

END OF SECTION

EDiS COMPANY

CONTRACTOR'S DAILY REPORT

Project Name: Renovations to Howard High School of Technology

Date:

Contractor:

Contract No. & Description:

Weather:

Foreman's Name (Print)

TRADE	*CLASS	MANPOWER COUNT	TOTAL MAN HOURS	TODAY'S DESCRIPTION / LOCATION OF WORK
	TOTAL			

* *INDICATE: F = FOREMAN; J = JOURNEYMAN; A = APPRENTICE*

Work Status/Work Planned:

Construction Equipment:

Qualified Operator(s)

Deliveries or Materials:

Machinery, tools, material, and equipment to be used:

Inspection of work area, machinery, tools, material, or equipment

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable requirement
Is prohibited. Such machine, tool, material or equipment shall either be identified as unsafe by tagging or locking The controls to render them inoperable or shall be physically removed from its place of operation.

Please See Other Side

Below is a general checklist of requirements on this project. Contractors will check off items that pertain to their contract and project tasks. Notify EDiS Field Manager of any issues. This checklist is not meant to be all inclusive. Please refer to additional OSHA regulations for compliance.

House Keeping

- ☐ Material Storage Area's Orderly
- ☐ Trash Containers Available and Emptied daily
- ☐ Fire Hazards
- ☐ Lighting and ventilation
- ☐ Exits and Stair clear passage
- ☐ Walkways, corridors clear passage
- ☐ Daily debris /trash removal
- ☐ _____

Personal Protective Equipment

- ☐ Hard Hats being worn
- ☐ Safety Glasses with side shields being worn
- ☐ Secondary Eye/Face protection
- ☐ Respirators as required
- ☐ Hand protection when needed
- ☐ Ear protection when needed
- ☐ Inspected & Maintained
- ☐ _____

Fire Prevention

- ☐ Fire extinguishers inspected
- ☐ Flammable / Combustibles properly store
- ☐ Approved Fuel cans used and labeled
- ☐ Oxygen / Acetylenes stored properly
- ☐ _____

Electrical

- ☐ GFI in use
- ☐ Three prong insulated extension cords used
- ☐ Extension cords in good condition
- ☐ Lockout / Tag-out program in use
- ☐ _____

Excavations

- ☐ Miss Utility been contacted
- ☐ Properly Barricaded
- ☐ Ladders in use at depths over 4'-0"
- ☐ Ladders every 25'-0" distance
- ☐ Shored, sloped, benched as required
- ☐ Dewatering as needed
- ☐ _____

Ladders

- ☐ Good condition
- ☐ Correct pitch
- ☐ Extends 3'-0" above landing
- ☐ Open and secured / tied off
- ☐ _____

Scaffolds

- ☐ Certified Scaffold Installer
- ☐ Guardrails, toe boards, and planking secured
- ☐ Appropriate signage
- ☐ Adequate cross bracing
- ☐ Secured to building over 25'-0" in height
- ☐ _____

Cranes

- ☐ Rated Load Capacity available in cab
- ☐ Swing Radius barricaded
- ☐ Appropriate certificates / decals / hand signals
- ☐ Daily safety inspection log completed
- ☐ _____

Fall Protection

- ☐ Fall protection plan on file
- ☐ Full harness / shock absorbing lanyard used
- ☐ Anchoring points secured
- ☐ Perimeter barricades
- ☐ Open sided floor protection
- ☐ 6'-0" Tie-off utilized
- ☐ _____

Paperwork

- ☐ MSDS Information
- ☐ Contractors Safety Program
- ☐ Hazardous Communications Training
- ☐ Hazardous Communications Program
- ☐ Contractor Qualified Representation
- ☐ _____

Other

- ☐ _____
- ☐ _____

Foreman / Competent Person:

Print Name_____

SECTION 013300 – SUBMITTAL PROCEDURES

1. GENERAL PROVISIONS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate, apply to the Work specified in this Section.

2. ITEMS TO BE SUBMITTED AT START OF WORK

A. Performance/Labor and Material Payment Bond(s): One (1) copy of each bond simultaneously with the signed Agreement. See General Conditions Article 11.4 and Supplementary Conditions.

B. Policies or Certificates of Insurance: Two (2) copies simultaneously with the signed Agreement. See General Conditions Article 11 and Supplementary Conditions.

C. Contractor's License: Submit a copy of all business licenses required by local and state agencies.

D. Contractor's Schedule of Values: Two (2) copies for approval within 21 days after the Agreement is signed. See General Conditions Article 9.2 and provisions in this Section.

E. Contractor's Progress Schedule: Two (2) copies for review and reference within 21 days after the Agreement is signed. See General Conditions Article 3.10 and provisions in this Section.

F. Submittal Schedule: Two (2) copies for review and reference within 21 days after the Agreement is signed. See provisions in this Section.

G. Products List: Two (2) copies for approval within 30 days after the Agreement is signed. See provisions in Section 016200 - MATERIAL AND EQUIPMENT.

3. NON-RESIDENT CONTRACTOR & SUBCONTRACTORS BONDS

A. Refer to requirements in Section 011100 - INSTRUCTIONS TO BIDDERS for filing of Surety Bonds with the Division of Revenue.

B. If such bonds are required on this project, it will be the responsibility of the Contractor to produce evidence to the Construction Manager that they have been filed, or if not required, to supply a notarized statement that they are not required. This must be done within seven (7) days after award of Contract and in any event before construction starts.

4. RELATED REQUIREMENTS

A. See Section 017700 - CONTRACT CLOSE OUT: for submittal requirements for Contract Close out.

5. SUBMITTALS

A. All submittals shall be directed to the Construction Manager in the manner directed by the Construction Manager, and paragraph 9 of this section. Contractor shall use the Contractor Submittal Form appended to this section.

B. Prepare a Submittal's Schedule for Shop Drawings, Product Data and Samples. Show:

1. The dates for Contractor's submittals.

2. The dates submittals will be required for Owner-furnished products.

3. The date approved submittals will be required from the Architect.

C. Should the Architect or Construction Manager elect to omit any items from the list of items to be reviewed, it shall not relieve the Contractor from compliance with the Contract Documents with regard to that item. In such instance, the Contractor may still elect to have submittals prepared for his own use without review by the Architect or Construction Manager.

6. SHOP DRAWINGS

A. Conform to provisions in General Conditions applying to Shop Drawings.

B. Present in a clear and thorough manner.

1. Identify details by reference to sheet and details, schedule or room numbers shown on Contract Drawings.

2. Maximum sheet size: 30″ x 42″.

7. PRODUCT DATA

A. Conform to provisions in General Conditions applying to Product Data.

B. Preparation:

1. Clearly mark each copy to specifically identify products or models pertinent to project.

2. Show performance characteristics and capacities.

3. Show dimensions and clearances required.

4. Show wiring or piping diagrams and controls.

C. Manufacturer's standard schematic drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the Work.

2. Supplement standard information to provide information specifically applicable to the Work.

8. SAMPLES

A. Conform to provisions in General Conditions applying to Samples.

B. Provide samples of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the project, with integrally related parts and attachment devices.

2. Full range of color, texture and pattern.

C. Field samples and mock-ups; See requirements, if any, in other specification Sections.

9. SUBMITTAL REQUIREMENTS

A. Make submittals promptly through the Construction Manager in accordance with published schedule, and in such sequence as to cause no delay in the Work or in the Work of any other contractor.

B. Number of submittals required.

1. Shop drawings: Submit eight (8) copies for each submittal. Copies will be marked up with corrections and comments, stamped and returned. Any additional copies required by the Contractor shall be made by him.

2. Product Data: Submit a clear .pdf scan of each submittal on to Building Blok. Scanned shop drawings will be marked up with corrections and comments, stamped and returned. Any additional copies required by the Subcontractor shall be made by him from the returned scan.

3. Samples: Submit three (3) each. Submit a scanned picture of the submittal on to

Building Blok with a transmittal document showing the date sent to the construction manager. When approved it will be returned to the Construction Manager to be retained at the site for reference use.

C. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contract identification.

4. The names of the Contractor, Supplier and Manufacturer.

5. Identification of the product, with the specification section number.

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the Work or materials.

8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. An 8 inch x 3 inch blank space for Contractor and Architect's stamps.

12. Contractor's stamp, initialed or signed, certifying review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents. Submittals which have not been stamped with this stamp or its approved equivalent will be returned without being reviewed.

D. Shop Drawing coordination and interface with work of other Contracts and adjacent work is the responsibility of each individual Contractor.

E. All submittals shall be accompanied by the contractor's submittal form, a copy of which is part of this section. The contractor's submittal form must be completed in its entirety by the contractor.

10. RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Architect and resubmit until approved.

B. Shop drawings and Product Data:

1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

2. Indicate any changes which have been made other than those requested by the Architect.

C. Samples: Submit new samples as required for initial submittal.

11. FINAL DISTRIBUTION OF APPROVED SUBMITTALS

A. The Construction Manager will receive and log submittals and forward to Architect after processing.

B. The Construction Manager will distribute copies of Shop Drawings and Product Data which carry the Architect's stamp to:

1. Contractor that made submittal.

2. Jobsite File.

3. Record Document File.

4. Other Contractors, as required for coordination.

C. The Construction Manager will distribute samples as required.

D. The Contractor will distribute copies of Shop Drawings and Product Data which carry the Architect's stamp to:

1. Subcontractors.

2. Suppliers.

3. Fabricators.

12. SCHEDULE OF VALUES

A. Input online using Building Blok version of AIA Document G703, Continuation Sheet to G702.

13. PROGRESS SCHEDULE

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar chart for each trade or operation.

2. Horizontal time scale: Identify the first work day of each week.

3. Scale and spacing: To allow space for notations and future revisions.

4. Minimum sheet size 11 inches by 17 inches.

B. Format of listings: The chronological order of the start of each item of work.

C. Show the complete sequence of construction by activity.

D. Show the dates for the beginning, and completion of, each major element of construction such as:

1. Site clearing.

2. Site utilities.

3. Foundation work.

4. Structural framing.

5. Subcontractor work.

6. Equipment installation.

E. Show projected percentage of completion for each item as of the first day of each month.

F. Update Progress Schedule monthly and submit with Application for Payment and Schedule of values.

G. Indicate progress of each activity to date of submission.

H. Show changes occurring since previous submission of schedule:

1. Major changes in scope.

2. Activities modified since previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

I. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays and the impact of the schedule.

2. Corrective action recommended, and its effect.

3. The effect of changes on schedules of other prime contractors.

J. Submit one reproducible transparency.

K. After review, distribute copies of the schedule to:

1. Jobsite File.

2. Subcontractors.

3. Architect.

4. Owner.

L. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

END OF SECTION

SECTION 013500 – CONTRACTOR EMPLOYEE BACKGROUND CHECK

1. It is the Contractor's responsibility to perform background checks and screen all employees working onsite. The background check must include checking for a previous history of Child Abuse Convictions, Child Molestation Convictions, Felony Convictions, and Drug Convictions within the last 5 years. Any employee with any of these convictions may not enter the job site or school campus. This background check must be completed and screened by the contractor prior to an employee entering the job site. The background check cannot be any older than 1 year prior to the date of the contract between the Contractor and the Owner. The Construction Manager, the Owner's representative and the Owner have the right to request that the screening data be submitted on a case-by-case basis.

2. The contractor is required to provide the Construction Manager written notice verifying background checks were completed and screened by the contractor prior to an employee entering the job site. This notice will contain the individual's name and the last four digits of their social security numbers. Notices must be received no later than two (2) working days before access is required. Notices will be forwarded electronically to the Construction Manager. A sample notice follows this section for your reference.

END OF SECTION

Date

Project Manager
EDiS Company
110 South Poplar Street
Wilmington, DE 19805

RE: INSERT PROJECT NAME - Certification of Background Checks

Dear _____:

This letter is to certify that background checks have been completed in accordance with Section 013500 Contractor Employee Background Check. The following individuals are certified as having met the requirements of the specification:

Name	Last 4 SSN
Mr. John Smith	1234

If you require any additional information you may contact INSERT POINT OF CONTACT, PHONE NUMBER AND EMAIL ADDRESS.

Sincerely,

Company

NAME
TITLE

SECTION 013523 - SAFETY PROGRAM

1. GENERAL

A, The Contractor shall be responsible for initiating, maintaining and supervising all safety activities and programs in connection with the Work.

B. Contractor shall be responsible for the safety of its personnel.

C. Hard hats and safety glasses must be worn by all personnel on the jobsite, except in contractor's administrative office/trailer. All equipment must comply with OSHA standards. All job site personnel shall wear long pants, shirts (no tank tops), high visibility garments, and work boots.

2. SAFETY PROGRAM

A. Prior to commencing the Work, the Contractor shall submit to the Construction Manager (1) electronic copy and (1) bound copy of its safety program and one (1) copy of MSDS information in a 2" ringed notebook. One paper copy of the safety program and MSDS will be retained by the Construction Manager in the field office.

B. The safety program shall outline those hazards peculiar to the Contractor's Work, and the steps to be taken to eliminate or reduce the risk of injury or loss due to those hazards. The program shall be site specific. Contractor shall implement and enforce its safety program, which is in accordance with all OSHA, Federal, State and local laws.

C. Contractor shall designate a qualified Safety Supervisor to implement the safety program. Unless otherwise approved by the Construction Manager, the Safety Supervisor shall be the Contractor's field Superintendent/Foremen.

D. Contractor shall furnish the names and qualifications of the competent persons and qualified persons who may be required for their scope of work by the Contractor's safety procedures, and by federal, state and/or local regulations. Examples include competent persons and/or qualified persons for steel erection, excavation, scaffold erection, confined space entry, crane and rigging operations, annual crane inspections, fall protection including horizontal lifeline systems, etc.

E. The employer shall verify compliance by preparing a written certification record. The written certification record shall contain the name or other identity of the employee trained, the date(s) of the training and the signature of the person who conducted the training or the signature of the employer. If the employer relies on training conducted by another employer or completed prior to the effective date of this section, the certification record shall include the date the employer determined the prior training was adequate rather than the date of actual training.

F. Copies of any and all documents, including information stored electronically, such as safety and health program handbooks and training certification records.

1. The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury. Please forward certification (document) of training for each employee on an EDiS project. The latest training certificate shall be maintained.

G. Contractor Daily Reports with Safety Inspection Checklist will be submitted daily to Field Manager, verifying inspection of work area, machinery, equipment and tools.

H. Prior to starting work on-site, the Contractor shall arrange with the on-site Field Manager to have their employees complete the EDiS Company Zero Accidents Safety Orientation program.

I. Contractor shall hold weekly safety toolbox talks with all of its employees every Monday at 12:30 PM. The Contractor shall designate a responsible, capable person to conduct these meetings. Contractor's safety supervisor or superintendent must submit to the Construction Manager weekly toolbox talks attendance sheets and the topics discussed.

3. SUBSTANCE ABUSE POLICY STATEMENT

The Construction Manager is committed to providing a safe work site environment for its employees and Contractors' employees. The Construction Manager does not condone or permit employees and Contractors' employees to use or be under the influence of drugs or alcohol while they are on any of the Construction Manager work sites. The Policy is as follows:

A. It is a violation of the Construction Manager's policy for employees and Contractors' employees to use, possess, sell, trade, or otherwise engage in the use of illegal drugs and alcohol.

B. It is a violation for employees and Contractors' employees to report to work while influenced by illegal drugs or alcohol.

C. It is a violation for employees and Contractors' employees to use prescription drugs illegally (i.e. to use prescription drugs that have not been legally obtained) and to use prescription drugs in a manner other than the prescribed intentions.

D. Employees and Contractors' employees who are taking medication, which is prescribed by their physician, are expected to discuss potential side effects with their prescribing physician, as it relates to the work requirements.

Violations of this policy will require disciplinary action. If any employees or Contractors' employees are observed or suspected of being influenced by drugs or alcohol, they will be instructed to stop work and may be required to leave the work site.

4. EXECUTION

A. Contractor shall comply with all applicable federal, state and local laws, regulations and orders relating to occupational safety and health, and related procedures, and shall, to the extent permitted by law, indemnify and hold Construction Manager, Owner and Architect, and their respective directors, officers, or agents and employees, harmless from any and all liability, public or private, penalties, contractual or otherwise, losses, damages, costs, attorney's fees, expenses, causes of action, claims or judgments resulting from a claim filed by anyone in connection with the aforementioned acts, or any rule, regulation or order promulgated thereunder, arising out of the Contractor's Work, this Agreement or any subcontract executed in prosecution of the Work. Contractor further agrees in the event of a claim of violation of any such laws, regulations, orders or procedures arising out of or in any way connected with the performance of this agreement, Construction Manager may immediately take whatever action is deemed necessary by Owner and/or Construction Manager to remedy the claim or violation. Any and all costs or expenses paid or incurred by Owner and/or Construction Manager in taking such action shall be borne by Contractor, and may be deducted from any payments due Contractor.

B. The Contractor agrees to (1) take all necessary steps to promote safety and health on the job site; (2) cooperate with Owner and/or Construction Manager and other Contractors in preventing and eliminating safety and health hazards: (3) train, instruct and provide adequate supervision to ensure that its employees are aware of, and comply with, applicable Federal and State safety and health laws, standards, regulations and rules, safe healthful work practices and all applicable safety rules, regulations and work practices and procedures (4) not create any hazards or expose any of its employees, employees of the Owner and/or Construction Manager or employees of Contractors to any hazards; and (5) where the Contractor is aware of the existence of a hazard not within its control, notify the Construction Manager of the hazard as well as warn exposed persons to avoid the hazard.

C. The Contractor's Superintendent or Safety Supervisor shall immediately, verbally report, and promptly thereafter confirm in writing to the Construction Manager any unsafe conditions or practices that are observed, or violations of job safety which are not within the Contractor's control.

D. Contractors shall immediately, verbally report, and promptly thereafter confirm in writing, to the Construction Manager any unsafe practices or conditions that are observed which are not under the Contractor's control.

E. The Contractor's Superintendent or Safety Supervisor shall insure that adequate first aid supplies are available, and that personnel are qualified to administer first aid/CPR, as required by State and/or Federal regulations.

F. Contractor shall promptly notify Construction Manager of any personal injury requiring medical treatment of any of the Contractor's employees at the Project site; or of significant damage to property arising in connection with Contractor's performance, as promptly as possible after the occurrence of such injury or damage. Within twenty-four hours of such occurrence, Contractor shall furnish to Construction Manager a complete written report of such injury or damage.

G. Contractor certifies that the forgoing terms shall be made applicable to all Contractors' suppliers, materialmen or anyone furnishing labor and/or materials to the site.

H. The Contractor shall continue to educate his job Safety Supervisor or Superintendent of their responsibilities, which shall include:

1. Instructing workers and subcontractors under its supervision in safe work practices and work methods at the time they are given work assignments.

2. Ensuring that its workers and subcontractors have and use the proper protective equipment and suitable tools for the job.

3. Continuously checking to see that no unsafe practices or conditions are allowed to exist on any part of his job.

4. Acquainting its workers and subcontractors with all applicable safety requirements and seeing that they are enforced.

5. Setting a good example for his workers.

6. Making a complete investigation of accidents to determine facts necessary to take corrective action.

7. Promptly completing a "Supervisor's Investigation Form" with his Supervisor's assistance and distributing as required. This form will be provided by the Construction Manager.
8. Holding weekly "tool box" safety meetings with his men to:

   a. Discuss observed unsafe work practices or conditions including a review of current Construction Manager safety report.

   b. Review the accident experience of his crew and discuss correction of accident

causes.

c. Encourage safety suggestions from his men.

9. Seeing that prompt medical treatment is administered to an injured employee.

10. Correcting or reporting immediately to job superintendent any observed unsafe conditions, practices or violations of job security.

11. Making all reports required by these Contract Documents to the Construction Manager in a full and timely fashion.

5. SAFETY MEETINGS

A. The Contractor's Project Manager or Superintendent shall attend weekly or biweekly supervisory job meetings. The first topic of these meetings will be job site safety. The weekly safety reports will be reviewed and violations must be corrected immediately. Contractors will be encouraged to participate in the on-going jobsite safety.

6. TOOL BOX SAFETY MEETINGS

A. The Contractor shall schedule weekly "tool box" safety sessions to be held by his job safety supervisor or superintendent for all of his employees.

B. A member of the Contractor's management staff shall periodically attend "tool box" safety sessions to evaluate their effectiveness and offer any appropriate suggestions for improvement.

7. REPORTS

A. Contractors shall report all accidents or injuries on a timely basis in accordance with all applicable regulations.

B. Contractors shall promptly complete an accident investigation report of all accidents.

C. A record of all "tool box" safety sessions shall be made and submitted to the Construction Manager on forms to be provided.

8. SAFETY REPRESENTATIVE

A. The Construction Manager may employ the services of a Safety Representativ*e* on the project.

B. The Safety Representative *will* visit the job site on a weekly basis to determine if the work is being performed in a safe manner and in accordance with OSHA, State and

Local safety regulations. Safety representative is not responsible for observing and documenting all possible safety violations. The Contractor's Safety Representative or Superintendent shall attend job site safety inspections with the Safety Representative on a weekly basis.

C. The Safety Representative will file a written report with the Construction Manager at the end of each inspection listing the safety violations observed during the inspection.

D. The Construction Manager will distribute the Safety Representative's report to all Contractors. All safety violations must be corrected immediately.

9. RIGHT TO STOP THE WORK DUE TO SAFETY VIOLATIONS

A. The Construction Manager, in its sole discretion, may order the Contractor to stop the work due to safety violations under the following circumstances:

1. If the Construction Manager observes the Contractor is violating safety regulations and the Contractor takes no immediate action to correct the violation.

2. If the Contractor has been notified by the Construction Manager in writing that he is in violation of safety regulations and fails to take action to correct the violation within 24 hours of the notice.

B. If the Construction Manager directs the Contractor to stop the work due to safety violation, it will be done in accordance with the General Conditions of the Contract. Contractor shall not be permitted an adjustment of the Contract Time or Sum for the days lost to any suspension of work.

C. If the Construction Manager or Safety Representative observes Contractor's employee violating this safety program or OSHA Standards in an habitual manner, or creating a serious life safety violation, the Construction Manager or Safety Representative may instruct the Contractor's superintendent or foreman to remove the violator from the work site for failure to comply with the safety program and the contract.

10. EMERGENCY PROCEDURES

A. The Construction Manager shall establish a central meeting location for the assembly of all Contractors' employees in the event of a major job site emergency.

B. Contractor shall assemble all of their personnel and account for all employees. Contractor must immediately report to the Project Superintendent with the status of their employees.

11. FALL PROTECTION PROCEDURES

A. Contractor is responsible, in accordance with federal, state, local laws and regulations including OSHA. Contractor to provide and enforce their own site specific fall protection program and equipment. The following fall protection procedures shall be enforced by all Contractors as a minimum standard.

All workers on walking/working surfaces with unprotected sides or edges six feet (6') or higher above the next lower level must be protected from falls by the use of guardrail systems, net systems, fall arrest systems or control access zone programs. It is intended that when fall protection is required, it is required 100% of the time. All contractors are reminded that relevant industry regulations require that contractors comply with the following standards.

1. Workers constructing or working near leading edges must be protected.

2. Workers on the face of formwork or reinforcing steel must be protected at a height of 6 feet (6') or greater.

3. Scaffolds shall be guarded at 6 feet (6') above next lower level.

4. Brick layers performing overhand bricklaying and related work six feet (6') or higher above lower levels must be protected from falls.

5. Roofers must comply with OSHA standards for roof work.

6. The Contractor's controlled access zone plan shall be included in their site-specific safety program and shall be submitted prior to the start of work. Contractors are responsible for assuring programs are OSHA compliant.

7. Guidelines for Residential Construction or any interpretations will not be accepted in lieu of 1926 Standards.

8. Contractors must provide certification per OSHA CFR29 § 1926.503(b) of employee training and retraining on fall protection upon request.

B. Contractor shall provide its own fall protection. Fall protection may be provided by guardrail systems, net systems, or personal fall arrest systems. All fall protection systems must comply with OSHA standards.

C. Stepladders, exposed to shafts or edges of the building, greater than six feet (6') above the next lower level, must be tied off or otherwise secured. Employee must wear fall protection, i.e. harness/lanyard.

D. The Safety Cable System shall not be altered or removed without a written request submitted to the Project Manager with a copy to the Field Manager. It shall be the responsibility of each and every Contractor that is removing or altering the Safety

Cable System to maintain the fall protection safety provided by the safety cable and not leave the area unprotected. Each and every Contractor shall be responsible to re-install the Safety Cable System immediately after work is completed. Each and every Contractor shall be responsible to re-install the Safety Cable System in accordance to OSHA standards.

E. Fall protection will be enforced for Structural Steel Erectors.

1. As for a Contractor engaged in structural steel erection, the Contractor is specifically advised that structural steel erectors shall comply with all protection requirements for all work at a height of six feet (6') or greater above the next lower level, 100 percent of the time, by any of the following means.

a. Standard guardrail system.

b. Personal Fall Arrest System (PFAS) – full body harness with shock absorbing lanyard. Maximum free fall distance permitted, with lanyard and lanyard attachment shall not exceed six feet (6'). Anchor point must be capable of supporting five thousand pounds. Perimeter guard cables or alignment cables may not be used for anchor points.

c. Access to work area shall be provided by ladders. There shall be sufficient number of ladders available to reduce the amount of "beam walking." When it is absolutely necessary to traverse a beam, 100% fall protection must be utilized.

d. Steel erection Contractors must, at all times, be able to certify in writing that each of his employees has been properly trained in both OSHA fall protection standards and the Contractor's site specific project fall protection procedures.

e. Prior to the erection of the steel, the Contractor shall meet with the Project Manager and Safety Representatives to review and document site specific procedures.

12. AIRBORNE CONTAMINENTS PROCEDURES

A. Contractor must provide and use equipment furnished with Exhaust Purifiers / Scrubbers when any equipment produces airborne containments and will be used in an enclosed building.

B. The Contractor shall verify air quality by the use of air monitoring equipment and document such verified air quality on the daily report. The monitoring equipment shall, at a minimum, be designed with an auditory alarm and shall provide continuous

monitoring of these four gases: Oxygen, Hydrogen Sulfide, Carbon Monoxide and Combustible gases.

C. The Contractor must provide administrative or engineering controls to protect its workers from exposure to occupational health, environmental or other hazards to be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed by local, state, and federal regulations. Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with 1926.103.

END OF SECTION

CONTRACTOR
COMPETENT / QUALIFIED PERSON DESIGNATION LOG

Project: **Field Manager:**

Contract: Contrctor:	Applicable to Subcontractor (yes / no)		Foreman	Competent Person (if not foreman)
Subpart C-General Provisions				
1926-20 General Safety				
Subpart D - Health and Environmental Controls				
1926-53 Ionizing Radiation				
1926-55 Gases, Vapors, Fumes, Dusts, Mists				
1926-57 Ventilation				
1926.59 Hazard Communication				
1926.62 Lead				
Subpart E - Personal Protective Equipment				
1926.101 Hearing				
1926.103 Respirator Protection				
Subpart H - Materials Handling, Storage				
1926.251 Rigging Equipment for Material Handling				
Subpart J - Welding and Cutting				
1926.354 Welding, Cutting and Heating				
Subpart K - Electrical				
1926.404 Wiring Design and Protection				
Subpart L - Scaffolding				
1926.451 Scaffolding				
Subpart M - Fall Protection				
1926.502 Fall Protection Criteria and Practices				
1926.503 Training				
Subpart N - Cranes, Derrick -Redesignated 1926.1501				
Subpart O - Motor Vehicles and Equipment				
1926.601 Motor Vehicles				
Subpart P - Excavations				
1926.651 Specific Excavation Requirements				
1926.652 Requirements to Protective Systems				
Subpart S - Tunnels, Shafts, Caissons				
1926.800 Tunnels, Shafts, Caissons				
1926.803 Compressed Air				
Subpart T - Demolition				
1926.850 Preparatory Operations				
1926.852 Chutes				
1926.859 Mechanical Demolition				

Contract: Contrctor:	Applicable to Subcontractor (yes / no)		Foreman	Competent Person (if not foreman)
Subpart V - Power Transmission and Distribution				
1926.955 Overhead Lines				
Subpart X - Stairways and Ladders				
1926.1053 Ladders				
1926.1060 Training Requirements				
Subpart Z - Toxic and Hazardous Substances				
1926.1101 Asbestos				
1926.1101 thru 1926.1148 Toxic and Hazardous Substances				

I certify that the listed employees are competent persons, as defined and required by specific OSHA standards. They are capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Name (print)

Contractor Signature

Date

PU09, Revised 3/2012

Certification of Training Documents to be Submitted with Safety Policy/Program

Provide a certification of training for employees on your safety program.

In addition, Contractor shall provide certification of training on the following programs, as they pertain to your contract and project tasks. Certification of training must include: Employee's name, date of training, person conducting the training, topics covered, and a statement that the student has successfully completed the course. This list is not meant to be all inclusive: please refer to OSHA regulations for applicable safety requirements.

a. ☐ Scaffold: 1926.454

b. ☐ Fall Protection 1926.503

c. ☐ Crane Operator: 1926.1427

d. ☐ Signal person (this is for any persons connecting material or equipment for lifting): 1926.1428

e. ☐ Crane maintenance: 1926.1429

f. ☐ Steel erection fall protection: 1926.761

g. ☐ Respiratory protection (medical clearance and training records complying with 1910.134

h. ☐ Powder-actuated tools: 1926.302

i. ☐ Motor Vehicles (are those vehicles that operate within an off-highway jobsite, not open to public traffic): 1926.21

SECTION 01370
BIM COORDINATION
Modified by Chris Donahue 5/16/2015

1. DEFINITIONS

1.1. **Base Structural Model** – the structural steel mill order drawing file showing all structural elements. This model is not necessarily fully detailed with all connections.

1.2. **Base Architectural Model** – a combination of the Base Structural Model and key architectural elements. This model is to be used by all coordination participants as the background file in which to develop their work. No information within this model will be changed through the coordination process. It is for reference only.

1.3. **Base Composite Model** – this model includes all trade drawing files within the Base Architectural Model as a representation of the completed systems. This model is used to run the intermediate clash reports and is considered a work in progress.

1.4. **Final Coordination Model** – this model shows all trades' systems fully coordinated within the Base Architectural Model. All clashes have been resolved. No further coordination is required. The work shown within this model represents the upcoming installations of each system.

1.5. **Completed Coordination Model** – this model is the close-out submittal to the Owner and includes the information within the Final Coordination Model as well as any project updates that have taken place during installations such as RFI responses, as-built conditions, etc.

1.6. **Building Information Model -** A Building Information Model(s) is a digital representation of the physical and functional characteristics of the Project and is referred to in this document as the "Model(s)," which term may be used herein to describe a Model Element, a single Model or multiple Models used in the aggregate. "Building Information Modeling" means the process and technology used to create the Model.

1.7. **Level of Development** - The Level(s) of Development (LOD) describes the level of completeness to which a Model Element is developed.

1.8. **Model Element** - A Model Element is a portion of the Building Information Model representing a component, system or assembly within a building or building site. Model Elements are represented by the Construction Specifications Institute (CSI) UniFormat™ classification system in the Model Element Table in Exhibit 1 - Article 3.

1.9. **Model Element Author** - The Model Element Author is the party responsible for developing the content of a specific Model Element to the LOD required for a particular phase of the Project. Model Element Authors are identified in the Model Element Table in Exhibit 1 - Article 3.

1.10. **Model User** - The Model User refers to any individual or entity authorized to use the Model on the Project for analysis, estimating, or scheduling.

2. COORDINATION DRAWING PROCESS – GENERAL REQUIREMENTS.

2.1. The coordination model shall be derived from the design base composite model which shall be in a (Program File Format – Ex: Revit 2014) format and utilized by all coordination participants. The A/E is to provide this base composite model as needed at each plan deliverable for coordination efforts. This model will be utilized to establish field installation sequence, resolve trade coordination issues prior to installation, and to make the most efficient use of installation space without sacrificing system performance for mechanical, electrical, structural and architectural systems. (Program File Format – Ex: NAVISWORKS or IFC) design review software will be used to document, identify and resolve interferences between all trades.

2.2. Communication is a critical element to the success of this coordination process. All project team members must be in constant communication to keep the process moving forward according to the sign-off schedule (5.1). Constant collaboration is expected of all team participants and each participant should be proactive in identifying and resolving design, engineering, and model interferences.

2.3. EDiS Company will facilitate and lead the 3D coordination modeling process. It is the responsibility of all coordination participants to resolve discrepancies pertaining to their own model. All trades shall be responsible for collisions/clashes/coordination issues involving their respective trade(s) and proposed work. Coordinated work takes precedence over field routed systems.

2.4. Coordination meetings will occur weekly starting TBD. Selected coordination team members are required to generate a clash-free model inclusive of all systems. The following participants are required to attend the weekly coordination meetings:

<u>Bid Package A</u>:

Contract HHS-05	Structural and Miscellaneous Steel
Contract HHS-07	Metal Framing, Drywall, Plaster
Contract HHS-08	Acoustical Ceilings and Panels
Contract HHS-17	Conveying Equipment

<u>Bid Package B</u>:

Contract HHS-19	Mechanical & Plumbing
Contract HHS-20	Electrical and IT Infrastructure
Contract HHS-21	Fire Protection
Contract HHS-22	Testing, Adjusting and Balancing
Contract HHS-24	ATC
Contract HHS-25	Conveying Equipment

<u>Bid Package C</u>:

Contract HHS-26	Technology
Contract HHS-27	Access Controls

2.5. A mandatory coordination kick-off meeting for all participants will review; team collaboration, the execution process, the coordination schedule, establishing zones per system, use of the coordinated elements during construction, project specific information and requirements, and model/document standards.

2.6. DELETE

2.7. Section 5 of this document will provide the coordination schedule per level/zone.

2.8. Coordination meetings will be held at Virtual Goto Meeting to review the model's progress per the schedule and process indicated.

2.9. Utility corridors and above ceiling space for each trade, will be established by the group at the beginning of the process. These zones will be adjusted through the coordination process to meet installation requirements and feasibility.

2.10. All participants are required to identify the submittals required for accurate detailing of the coordination model (such as equipment, light fixtures, etc.) and to obtain final approval so the information can be incorporated into the modeling process.

2.11. The 3D coordination modeling process does not replace the standard submittal process and will not be considered as a submittal. Exceptions: N/A

2.12. The coordination meeting:

2.12.1. The purpose is to review and resolve items on the current clash report in conjunction with the project coordination schedule. The meetings will focus on clashes that cannot be resolved by internal collaboration. EDiS Company will facilitate the meeting and will make final decisions on clash resolution that are the least impact to the project as a whole. COORDINATION MEETINGS WILL NOT BE USED TO RESOLVE INDIVIDUAL MODELER'S/ENGINEER'S/ARCHITECTURE'S/SUBCONTRACTOR'S WORK. If a Subcontractor does not post a clash-free system of its own work or that only contains a very limited number of clashes internally (Example: Fire Sprinkler Clashing with Fire Sprinkler), that Subcontractor will be considered unprepared for the meeting and will be responsible for any delays to the project schedule and any associated costs due to that delay which shall be determined by EDiS Company.

2.12.2. Each team participant will review the clash report prior to the subsequent coordination meeting in order to clean up any clashes that can be made without review by all participants.

2.12.3. All project participants are expected to be prepared for the meeting with new drawing work of the next area to be coordinated per the coordination schedule and any drawing changes based on the published clash report. Each participant will have available any shop model, submittals or other materials required to solve identified or potential conflicts.

2.12.4. The coordination schedule will be maintained and all identified conflicts addressed and resolved per the construction schedule. The coordination schedule may change as a result of design and/or model changes requested and made by the Owner, Architect or Engineer. In addition, the coordination schedule assumes selection of equipment is made within the time frame of the construction schedule as needed so it is incorporated into the coordination efforts without delay.

2.12.5. All agreed upon corrections to identified clashes determined by the team at the Coordination Meeting are to be updated and resolved prior to the next meeting.

2.13. When an area of the model is fully coordinated and clash-free, each participant agrees:

2.13.1. That each trades work is fully coordinated and will be installed per the signed off area as reflected in the coordination model. Sign off drawings from each trade are turned over in PDF form with projects title block. EDiS Company will include legend and title block for trade PDF file.

2.13.2. All trades to provide Total Coordination drawings at the time of sign off. TCD's are drawings which include all trades sign off models. Models are submitted for turn over to EDiS Company. The purpose for TCD's is to provide coordinated building models for jobsite coordination. Models from subcontractors to include all but not limited to: item elevations, product type and all equipment tags.

2.13.3. During the installation of each trade's work, EDiS Company will refer to the signed off report and the 3D model to resolve any conflicts. Each installation firm agrees to install all work per the signed off drawings/model, without deviation. If a deviation, during installation, takes place without prior approval from all detailing parties, it will be the responsibility of the installing contractor to tear out the work and install it as shown on the signed off drawings/coordination model. The cost of this work will be evaluated when the issues arise; however, the party responsible for the conflict will be responsible for the cost of the fix, including the additional detailing time of all parties involved.

2.13.4. The model is not considered to be the final coordination model until the BIM Coordinator, EDiS Company's Project Manager, A/E, and Owner has approved all clash free systems and routings and documents are signed off by all parties (contractors).

2.14. Should a conflict arise during installation that was missed during the coordination process, and not a result of deviating from the signed off area, the coordination team will work together to find a solution that is optimal for all trades and the project.

2.15. The final coordination model shall be kept up to date by all participants during construction to include as-built information and any other pertinent data that is essential to the project. The data will be submitted electronically in Revit, AutoCAD, NWC, PDF format. Items to be included are:

2.15.1. RFI responses.

2.15.2. Design change orders or designs that are in addition to the original contract documents.

2.15.3. Equipment will be tagged with all (Owner required) identification information within the model (ex. Equipment schedule information and O&M Manuals). This identification information will be the same and correspond to all other close-out documentation. This close-out documentation including O&M manuals, maintenance information, etc. will be included in PDF form.

2.15.4. EDiS will provide a location for the subcontractor to submit the required documentation at a later time. EDiS will generate the completed coordination model based on these documents for turn-over to the owner.

2.15.5. Tekla or Navisworks will be utilized to link PDF closeout documents, select RFI's, select Images, etc., to the closeout model. Subcontractors need to provide closeout documents in the format requested by EDiS for the closeout model as well as adding smart data to other model type files as determined necessary by EDiS within the time frame ABHA dictates. For example, if Revit files are needed to produce the closeout model, EDiS may direct subcontractor to set up certain Revit views for the exporting of files which make up the as-built models. ABHA may also request that the subcontractor create viewpoints for their equipment in as-built model.

2.16. Data for coordination will be available on the Box.com, to be referenced by the other participants. Models and drawing files will never be tampered with by non-owners of the file. If a mistake occurs

and a drawing is inadvertently modified, the responsible party is required to alert the project team. (See attachment)

2.17. The Owner's commissioning agent can attend the coordination meeting to review the detailing effort for commissioning related items.

2.18. All trades will provide Level of Development (LOD) (400) models for weekly coordination meeting.

3. REQUIREMENTS OF THE LEAD COORDINATOR

3.1. The Lead Coordinator will be EDiS Company.

3.2. Identification of a common insertion point for all drawing files. (Utilize Revit Models origin)

3.3. A/E to provide Lead Coordinator model exports to 2D/3D CAD of each trade component as needed to coordination. Origins to be maintained in exports.

3.4. Using the A/E's files, the Lead Coordinator will utilize & maintain the base architectural model.

3.4.1. The base architectural model is a combination of the base structural model and other architectural elements. These architectural elements will include all elevated 3D architectural elements including, but not limited to, all walls that extend to the deck, fire and smoke walls, soffits and associated framing, ceiling planes, and finish floor planes.

3.4.2. This model will consist of cleaned-up floor plans void of any excessive notations, leaders, bubbles, marks, grid lines, etc. that are not required for detailing development and that may potentially cause a conflict in the base composite model.

3.4.3. In the event of changes to the A/E's contract documents, the A/E must revise the base architectural model/MEP/structural models and distributed to all coordination participants. This will require subcontractor participation as need by A/E to complete the revised models for directive. Revision work will be directed by Owner through an executed change order.

3.4.4. The base architectural models will be distributed and maintained by ABHA and EDiS Company.

3.5. Collation of all trades' detailing models as posted to the project's web-based posting site into a Base Composite Model thru the use of Navisworks.

3.5.1. Establish a standard two inch (2") soft tolerance within the clash detection software. This tolerance will result in a reported clash for any elements drawn closer than two inches (2") to one another.

3.5.2. Assess and include most current clash files including the generation of a clash reports and distribution to all project participants per the coordination schedule.

3.5.3. Collect final as-built files from all trades and generate a Final Coordination Model to submit to CM as part of the close-out requirements.

3.5.4. Coordination meeting minutes shall be kept by EDiS Company Lead Coordinator or EDiS' Project Manager showing issues and resolution dates.

4. REQUIREMENTS OF THE STRUCTURAL STEEL Subcontractor

4.1. Obtain from the A/E Structural Revit files to be used in the generation of the base structural model.

4.2. The structural subcontractor will develop and provide the base structural model within the time frame dictated by EDiS and provide structural model updates to ensure the coordination team is coordinating the MEP/FP to the most up-to-date structural model.

4.3. All structural framing members in the final sizes and locations (typically referred to as a "mill order" or "procurement" model) will be shown in the model as 3D objects with surfaces. At the discretion of the lead coordinator, this model may be void of all hardware and secondary structural steel but should include the major components: primary steel, metal decking, slab on metal decking, and gusset plates.

4.4. The structural insertion/datum point must match the architectural insertion/datum location. No detailing work shall take place until the insertion points of the architectural and structural models match.

4.5. The steel subcontractor is responsible for resolving their own modeling issues (i.e.: steel not to scale, missing key structural components, missing surface data, and model showing as wire frame data, model exported to proper file format, etc.). The steel subcontractor is responsible to provide a steel design model in a usable format for all coordination participants to reference as the base structural model.

4.6. A FINAL 3D steel model and 2D shop drawings shall be submitted to the structural engineer of record, and used for field erection. It must be completed and submitted in accordance to the BIM schedule. This model shall consist of:

4.6.1. All primary and secondary steel including metal deck, slab on metal deck, actual gusset plate sizes, connection details, edge of slab details (pour stop), brick relief angles, embeds, anchor bolts, and other miscellaneous metals. Curtain Wall embeds modeled by others.

4.6.2. Submit final approved files to Lead Coordinator for insertion into the coordinated model, and to the design team in the form of shop drawings and/or (Navisworks compatible model.

5. DETAILING REQUIREMENTS OF ALL PARTICIPANTS

5.1. File sharing information:

5.1.1. The in-progress (Coordination Software – Ex: IFC/NWC/Cad) naming convention will be: project-trade-level. Example: Project Designation -MechPipe-1, Project Designation -HVAC-1, Project Designation –Fire Protection-1, Project Designation -Elec-1, Project Designation -Plumbing-1. Project Designation -TeleCom-1 or AV-1, Project Designation –Pneumatic Tube-1, etc. Additional designations may be added based on project specific scope and deliverable requirements and/or deemed as a critical component to the coordination process.

5.1.2. Each model posted by the contractor shall contain sub-layers for the purpose of system identification and isolation during the clash detection process. Example: **HVAC-1** shall contain sub-layers for Supply, Return, Exhaust, Fire Smoke-Dampers, VAV clearance, AC Door Access, Fan Coil Units, FCU Access, Equipment, Equipment Pads, Equipment Clearances, and Hangers (designated per system). **MechPipe-1** shall contain sub-layers Hydronic Pipe Supply, Hydronic Pipe Return, Chilled Pipe Supply, Chilled Pipe Return, Shutoff Access, Equipment, Equipment Pads, Equipment Clearances, and Hangers. **Plumbing-1** shall contain sub-layers Domestic Water Supply, Domestic Water Return, (with additional layer designations for hot and cold), Gas, Med-

Gas, Shutoff Access (designated per system), Sanitary, Vent, Roof Drain, Rain Conductors, Equipment, Equipment Pads, Equipment Clearances, and Hangers (designated per system)**. Elec-1** shall contain sub-layers for Lights, Light Clearance, Conduit, (with additional layer designation for power and data), Cable Tray, Cable Tray Access Clearance, Pull Boxes, Pull Box Access Clearance, J-Boxes, Elec. Panels, Elec. Panel Access Clearance, Elec. Troughs, Elec. Trough Access Clearance, Equipment, Equipment Clearances, Equipment Pads, and Hangers. **Fire Protection1** shall contain sub-layers Mains, Branches, Shutoff Access, and Hangers. **Pneumatic Tube-1** shall contain sub-layers Equipment, Equipment Access, and Hangers. Additional sub layers may be added based on project specific scope and deliverable requirements and/or deemed as a critical component to the coordination process.

5.1.3. Clash detection files will be posted to **BuildingBlok.com** before **12:00 PM**, on **Wednesday and Friday** by each of the trades. The lead coordinator will also post updated coordination models as needed. The lead coordinator will maintain the master coordination files. The weekly coordination model will be name abbreviated Project Name-Floor-Coordination Model-Month-Day-Year.

All coordination participants will maintain a current control copy of their own drawing files outside of the project's web-based posting site. Control drawings are to include all previously posted files.

5.2. Trade Colors in the Coordination environment:

5.2.1. Duct Supply – Dark Green, Duct Return- Light Blue - Duct Exhaust –Light Green, Mech Pipe-Orange, Pressure lines/Gas – Tan, Sanitary/Vent – Brown, Rain Conductors/Roof Drains – Maroon, Domestic Water- Blue, Fire – Red, Pneumatic – Purple, Electrical – Yellow, All Base Architectural Elements (walls, soffits, ceiling & floor planes, etc.) will assume Arch model color scheme saved in the export or Lead Coordinator will modify select color scheme in the coordination model. Steel – Dark Grey, Any hangers and equipment (that is fed per the designated system) will assume the same color of that system it is associated with. Additional color schemes may be added based on project specific scope and deliverable requirements and/or deemed as a critical component to the coordination process.

5.3. When posting drawing files for coordination:

5.3.1. Posted subcontractor coordination files of each trades system should be clash-free with in their respective data. To clarify; trades should refrain from posting data that shows their systems clashing with itself.

5.3.2. When coordination of an area is completed there should not be any unresolved clashes remaining.

5.3.3. These files should be void of any text, dimensions or any other notations.

5.4. Each coordination participant is required to submit three (3) complete sets of installation drawings as well as electronic PDF's prior to any work being installed in the field. If A/E spec requires more or less than that will govern over this document. These complete drawings are to be fully dimensioned and notated. Items to be noted in the final, fully coordinated drawing paper and electronic files of each system include:

5.4.1. Bottom and top elevations of duct, pipe, conduit racks, cable trays etc. must be indicated (where applicable).

5.4.2. Dimensions shall be shown from the gridlines to the centerline of each element drawn (round duct, pipe, cable tray, etc.) and from finished floor.

5.4.3. Height to top of light housing assembly must be indicated.

5.4.4. Labeling of all equipment.

5.5. During the coordination drawing effort, priority will be given to those systems that have the least flexibility. The following list is a descending order of the system priority and shall be used as a general guideline. Throughout the coordination drawing effort, adjustments and deviations to this list can be made with the approval of EDiS Company. (0'- 6") clear above the ceiling shall be maintained for access and construction of the ceiling, whenever possible. Required maintenance and/or code access spaces and set-backs take precedence over all systems.

5.5.1. Gravity Pipe

5.5.2. Plumbing Vent

5.5.3. Ductwork and appurtenances

5.5.4. Cable tray

5.5.5. Recessed light fixtures

5.5.6. Fire protection piping and fixtures

5.5.7. Electrical conduit over (3/4") in diameter

5.5.8. Pneumatic tube and other record or material conveying systems

5.5.9. HVAC piping

5.5.10. Plumbing, supply and medical gas piping

5.5.11. Electrical conduit smaller than 3/4" in diameter

5.5.12. Above ceiling miscellaneous metal supports

5.5.13. Provide all copper tube routes (racks) for mechanical systems, including valves, clearance zones and hangers.

5.6. Items to be included in the detailed drawing progress include:

5.6.1. All systems must be fully detailed and shown as individual elements including ductwork, all piping 3/4" and larger, pneumatic tubing, exterior wall connections, any piping that is smaller than ½" that is racked or banked, etc.

5.6.2. Ductwork is to include size, layout and routing of all metal and flex ductwork, re-heat coils, terminal units, filters registers, grilles, diffusers, and similar features; provide notation for diffuser boot sizes and heights and any other special features

5.6.3. All valves, dampers and VAV's or heat pumps will note any items requiring access for service and maintenance as well as access doors in inaccessible ceilings.

5.6.4. All piping valves, boxes, supports, etc. are to be fully detailed

5.6.5. Sprinkler head locations shall be shown on ceiling plans.

5.6.6. All electrical conduits two inches (2") or more in diameter are to be modeled and shown in addition to smaller diameter conduit that is racked or banked.

5.6.7. Electrical items such as hangers, supports, electrical fixtures, lights, speakers, detectors, sensors, cable trays, raceways, sleeves, pull boxes, and access space claims, etc. must be shown.

5.6.8. If an element is not shown, under the lead coordinators approval, it will be assumed to be field routed and to not interfere with the other elements that are shown or within code clearances. Contractors who field route their elements are responsible to ensure their installation will be feasible and void of creating a clash in the field. Coordinated items take precedence over field routing.

5.6.9. All major hangers and supports (including sway bracing, equipment bracing, hangers, etc.), penetrations, openings must be shown for all systems. Sharing of supports with other systems is discouraged, but can be accomplished with prior owner and/or field inspector approval.

5.6.10. All insulation must be shown with appropriate thicknesses. All insulation & clearance zones will be modeled or accounted for during the clash detection process.

5.6.11. Fire spray: If required by your building type, establish a safe thickness from all structural objects with which to run your clashes. Assume fire spray will be two inches (2") thick.

5.6.12. Engineered stud framing must be modeled for king studs and doors.

5.6.13. Code clearances and maintenance access clearances must be shown and maintained; these include, but are not limited to access to VAVs, air handling units, egresses around pumps and tanks, smoke FDs, electrical panels, pneumatic tube transfer units, cable tray access, pull boxes, valve access, etc.

5.6.14. All trades must coordinate and detail their systems with the intent of installing each system at the optimal elevation above ceiling, taking into consideration, access to equipment for maintenance, repairs, connections, filters and removal while eliminating or minimizing the impact to surrounding components.

5.7. Established Clash Files are to be incorporated to ensure proper coordination. List of those files to be provided by the Lead Coordinator.

5.8. Refer to Appendix B – Soft Clash Requirements for additional soft-clash requirements.

6. SCHEDULE OF DRAWING COMPLETION AND SIGN-OFF

6.1. The participants should plan on the coordination process taking three (3) months. The coordination schedule is as follows:

This table will be populated at the BIM Coordination Kick-off Meeting. OR Schedule to be developed as part of the master construction schedule development (see Section 00230).

Zone	Floor	Coordination Meeting	Sign-Off Date

6.2. At the completion of each floor, the team will determine the specific "priority walls" that will be constructed full-height ahead of other interior partitions and MEP installations.

6.3. 3D MEP/FP Coordination Team

6.3.1. The goal of the coordination team will be to integrate the architectural, structural, mechanical, electrical, fire protection, and project specific elements into a collaborative 3D model to identify and resolve issues pertaining to MEP/FP systems and to ensure succinct and expedited field installations of these systems following the release of each zone/floor after clash free conditions are met. (Filled out at BIM Coordination Kick-off Meeting)

BIM Coordinator	**EDiS Company**
Main Contact	Chris Donahue
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	EDiS Coordination Team
Main Contact	Hugo DeLaRosa
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Project Manager	**EDiS Company**
Main Contact	Kevin Lucas
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Electrical	**Nickle Electrical**
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Plumbing and Piping	**Worth & Company**
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Architectural	**ABHA Architects**
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Email Address	cnilekani@abha.com
MEP/FP Engineers	**Gipe Associates**
Main Contact	Adam Kegan
Phone Number	410-822-8688
Email Address	akegan@gipe.net
Structural Steel	**Summit Steel**
Main Contact	Joe Nicotra
Phone Number	302-325-3220
Email Address	summitst1@verizon.net
Miscellaneous Steel	**Summit Steel**
Main Contact	Joe Nicotra
Phone Number	302-325-3220
Email Address	summitst1@verizon.net

EXHIBIT 1

ARTICLE 1: GENERAL PROVISIONS

1.1 This document defines protocols, expected levels of development, and authorized uses of Building Information Models on this Project. It assigns specific responsibility for the development of each Model Element to a defined Level of Development at each Project phase. Where a provision in this Exhibit conflicts with a provision in the Agreement into which this Exhibit is incorporated, the provision in this Exhibit will prevail.

1.1.1 The parties agree to incorporate this Exhibit by reference into any other agreement for services or construction for the Project.

ARTICLE 2: LEVEL OF DEVELOPMENT (LOD)

2.1 The following LOD descriptions identify the specific content requirements and associated authorized uses for each Model Element at five progressively detailed levels of completeness. Each subsequent LOD builds on the previous level and includes all the characteristics of previous levels.

2.2 **LOD 100**

2.2.1 **Model Content Requirements**. Overall building massing indicative of area, height, volume, location, and orientation may be modeled in three dimensions or represented by other data.

2.2.2 **Authorized Uses**

2.2.2.1 **Analysis**. The Model may be analyzed based on volume, area and orientation by application of generalized performance criteria assigned to the representative Model Elements.

2.2.2.2 **Cost Estimating**. The Model may be used to develop a cost estimate based on current area, volume or similar conceptual estimating techniques (e.g., square feet of floor area, condominium unit, hospital bed, etc.).

2.2.2.3 **Schedule**. The Model may be used for project phasing and overall duration.

2.3 **LOD 200**

2.3.1 **Model Content Requirements**. Model Elements are modeled as generalized systems or assemblies with approximate quantities, size, shape, location, and orientation. Non-geometric information such as object name and quantities should be attached to Model Elements.

2.3.2 **Authorized Uses**

2.3.2.1 **Analysis**. The Model may be analyzed for performance of selected systems by application of generalized performance criteria assigned to the representative Model Elements.

2.3.2.2 **Cost Estimating**. The Model may be used to develop conceptual cost estimates based on the approximate data provided and conceptual estimating techniques (e.g., volume and quantity of elements or type of system selected).

2.3.2.3 **Schedule**. The Model may be used to show ordered, time-scaled appearance of major elements and systems.

2.4 **LOD 300**

2.4.1 **Model Content Requirements**. Model Elements are modeled as specific assemblies accurate in terms of quantity, size, shape, location, and orientation. Existing building elements are modeled as shown on building record drawings. Non-geometric information such as object description and object tags (door number, equipment number, etc) and quantities should be included with each object. Examples of the details required for systems modeled to LOD 300 include, but are not limited to:

- Site Utilities
- Masonry
- Steel decking
- Correct slopes for gravity piping for sanitary, storm or wet fire suppression systems.
- Piping materials specifically called out on documents included with model element attributes (generic manufacturer for system components are acceptable).
- Insulation around Pipe and Ducting.
- Duct dampers included with the duct system.
- Doors/Frames (hollow metal and storefront)
- Owner Furnished Fixtures, Equipment, etc. generically modeled as space claims by the Model Element Author (MEA).

2.4.2 **Authorized Uses**

2.4.2.1 **Construction**. Suitable for the generation of traditional construction documents. Contractors may utilize this model for coordination purposes and creation of shop drawings.

2.4.2.2 **Analysis**. The Model may be analyzed for performance of selected systems by application of specific performance criteria assigned to the representative Model Elements.

2.4.2.3 **Schedule**. The Model may be used to show ordered, time-scaled appearance of detailed elements and systems.

2.5 **LOD 400**

2.5.1 **Model Content Requirements.** Model Elements are modeled as specific assemblies that are accurate in terms of size, shape, location, quantity, and orientation with complete fabrication, assembly, and detailing information. Non-geometric information such as manufacturer name, model and installation should also be included with each object in addition to the information added in LOD 300. Examples of items and details required in LOD 400 models include, but are not limited to:

- Concrete
- Concrete reinforcing steel (in plank)
- Anchor bolts
- Structural steel
- Steel stairs, handrails

- Floor/roof penetration steel
- Significantly sized support hangers and stanchions for all systems
- Uni-Strut associated with system components if it is located in a tight overhead space (case by case basis)
- Architectural millwork/casework
- Metal panels and support steel
- Curtainwall system
- Steel stud framing including kickers and trusses at floor penetrations.
- Valve locations (clearance)
- Access panels (these should be modeled with the system they provide access to).
- Conduit racks or other substantially wide / bundled electrical routing. (these can be generically modeled, i.e. extruded boxes, space claims)
- Single conduit runs associated with any system (lighting, power, controls, etc) if needed to coordinate concrete coring.
- Kitchen equipment
- MEP/FP & Low Voltage Equipment
- MEP/FP & Low Voltage Systems
- Pull box locations and any extra space claims for their access.

2.5.2 **Authorized Uses**

2.5.2.1 **Construction**. Model Elements are virtual representations of the proposed element and are suitable or construction.

2.5.2.2 **Analysis**. The Model may be analyzed for performance of approved selected systems based on specific Model Elements.

2.5.2.3 **Schedule**. The Model may be used to show ordered, time-scaled appearance of detailed specific elements and systems including construction means and methods.

2.6 **LOD 500**

2.6.1 **Model Content Requirements**. Model Elements are modeled as constructed assemblies actual and accurate in terms of size, shape, location, quantity, and orientation. Non-geometric information should be updated with actual installed items.

2.6.2 **Authorized Uses**

2.6.2.1 **General Usage**. The Model may be utilized for maintaining, altering, and adding to the Project, but only to the extent consistent with any licenses granted in the Agreement or in a separate licensing agreement.

2.6.2.2 **Other Authorized Uses**. The Model will be a tool for accessing as-built information for facility management and maintenance purposes.

ARTICLE 3: MODEL ELEMENTS

3.1 **Reliance on EDiS Company's Model Element Matrix**

3.1.1 The EDiS Company Model Element Matrix at the end of this section identifies (1) the LOD required for each Model Element at the end of each Project phase, and (2) the Model Element Author responsible for developing the Model Element to the LOD identified. Each Model Element Author's content is intended to be shared with subsequent Model Element Authors and Model Users throughout the course of the Project.

3.1.2 It is understood that while the content of a specific Model Element may include data that exceeds the required LOD identified in the Model Element Table for a particular phase, Model Users and subsequent Model Element Authors may rely on the accuracy and completeness of a Model Element consistent only with the content required for a LOD identified in the Model Element Table.

3.1.3 Any use of, or reliance on, a Model Element inconsistent with the LOD indicated in the Model Element Table by subsequent Model Element Authors or Model Users shall be at their sole risk and without liability to the Model Element Author. To the fullest extent permitted by law, subsequent Model Element Authors and Model Users shall indemnify and defend the Model Element Author from and against all claims arising from or related to the subsequent Model Element Author's or Model User's modification to, or unauthorized use of, the Model Element Author's content.

3.2 **Table Instructions**

3.2.1 The Model Element Table at the end of this section indicates the LOD to which each Model Element Author (MEA) is required to develop the content of the Model Element at the conclusion of each phase of the Project. EDiS Company holds the rights of this table and all ownership right for edits are performed via EDiS Company.

3.3 EDiS Company's Model Element Matrix AIA Document G202-2013 (attached).

END OF SECTION

AIA® Document G202™ – 2013

Project Building Information Modeling Protocol Form

(Row deleted)

PROJECT:
Renovations to Howard High School of Technology
401 East 12th Street
Wilmington, Delaware 19801

PROTOCOL VERSION NUMBER: 1
DATE: August 17, 2016
PREPARED BY: Chris Donahue/Jackie McKee
DISTRIBUTION TO
New Castle County Vocational Technical School District
1417 Newport Road
Wilmington, Delaware 19804

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

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

This document is intended to be used in conjunction with a Project specific AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, which the Parties will incorporate into their agreement for the Project, and a Project specific AIA Document G201™–2013, Project Digital Data Protocol Form.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 LEVEL OF DEVELOPMENT

3 MODEL ELEMENTS

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 For each Project Participant that has incorporated the Project specific AIA Document E203™–2013, Building Information Modeling and Digital Data Protocol Exhibit, dated August 17, 2016 , into its agreement for the Project, identify and provide the contact information for individuals responsible for implementation of the Modeling protocols. If, for any Project Participant, more than one individual will be responsible for implementation of the Modeling protocols, list each individual separately and describe the unique Modeling Role assigned to each individual.

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User Notes:

Modeling Role	Project Participant	Individual Responsible	Contact Information
BIM Manager	EDiS BIM Services	Chris Donahue	EDiS Company 110 South Poplar Street, Suite 300 Wilmington, De 19801 302-421-2963 cdonahue@ediscompany.com

§ **1.2** This document establishes the Modeling protocols for the Project. For purposes of these protocols, the Model is comprised of the following information and other data sets:
(Paragraph deleted)

§ **1.3 Collaboration Protocols.** The Project Participants' protocols for the collaborative utilization of the Model, if any, including communications protocols, a collaboration meeting schedule and colocation requirements, are as follows:

§ **1.4 Technical Requirements.** The technical requirements relating to the utilization of Building Information Modeling, including specific software and hardware requirements are as follows:

Revit, Navisworks, Bluebeam Autodesk fabrication

§ **1.5 Training and Support.** –NOT USED

§ **1.6 Model Standard.** The Model shall be developed in accordance with the following Model Standard, if any:

§ **1.7 Model Management Protocols and Processes**
The following Model Management Protocols and Processes shall apply to the Project only if specifically designated in the table below as being applicable.

Model Management Protocols and Processes		Applicability to Project	Location of Detailed Description
§ 1.7.1	Model origin point, coordinate system, precision, file formats and units	Applicable	0, 0, 0
§ 1.7.2	Model file storage location(s)	Applicable	EDiS BIM Services & Newforma
§ 1.7.3	Processes for transferring and accessing Model files	Applicable	Drop Box & BuildingBlok
§ 1.7.4	Naming conventions	Applicable	EDiS Standard
§ 1.7.5	Processes for aggregating Model files from varying software platforms		Autodesk CAD MEP & Navisworks
§ 1.7.6	Model access rights	N/A	
§ 1.7.7	Design coordination and clash detection procedures.	Applicable	EDiS
§ 1.7.8	Model security requirements	Applicable	Confidential Between EDiS, ABHA & NCC Vo-Tech School District

§ **1.8** Insert a description of each Model Management Protocol and Process identified in Section 1.7, if not further described in an exhibit attached to this document:

See attached document.

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§ 1.9 Terms in this document shall have the same meaning as those in AIA Document E203–2013.

ARTICLE 2 LEVEL OF DEVELOPMENT

§ 2.1 The Level of Development (LOD) descriptions, included in Section 2.2 through Section 2.6 below, identify the specific minimum content requirements and associated Authorized Uses for each Model Element at five progressively detailed levels of completeness. The Parties shall utilize the five LOD descriptions in completing the Model Element Table at Section 3.3.

§ 2.2 LOD 100 – NOT USED

§ 2.2.1 Model Element Content Requirements. The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e., cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.

§ 2.2.2 Authorized Uses

§ 2.2.2.1 Analysis. The Model Element may be analyzed based on volume, area and orientation by application of generalized performance criteria assigned to other Model Elements.

§ 2.2.2.2 Cost Estimating. The Model Element may be used to develop a cost estimate based on current area, volume or similar conceptual estimating techniques (e.g., square feet of floor area, condominium unit, hospital bed, etc.).

§ 2.2.2.3 Schedule. The Model Element may be used for Project phasing and determination of overall Project duration.

§ 2.2.2.4 Other Authorized Uses. Additional Authorized Uses of the Model Element developed to LOD 100, if any, are as follows:

§ 2.3 LOD 200 – NOT USED

§ 2.3.1 Model Element Content Requirements. The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

§ 2.3.2 Authorized Uses

§ 2.3.2.1 Analysis. The Model Element may be analyzed for performance of selected systems by application of generalized performance criteria assigned to the representative Model Elements.

§ 2.3.2.2 Cost Estimating. The Model Element may be used to develop cost estimates based on the approximate data provided and quantitative estimating techniques (e.g., volume and quantity of elements or type of system selected).

§ 2.3.2.3 Schedule. The Model Element may be used to show ordered, time-scaled appearance of major elements and systems.

§ 2.3.2.4 Coordination. The Model Element may be used for general coordination with other Model Elements in terms of its size, location and clearance to other Model Elements.

§ 2.3.2.5 Other Authorized Uses. Additional Authorized Uses of the Model Element developed to LOD 200, if any, are as follows:

§ 2.4 LOD 300 – Refer to Section 01370 – BIM Coordination (attached)

§ 2.4.1 Model Element Content Requirements. The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

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§ 2.4.2 Authorized Uses
§ 2.4.2.1 Analysis. The Model Element may be analyzed for performance of selected systems by application of specific performance criteria assigned to the representative Model Element.

§ 2.4.2.2 Cost Estimating. The Model Element may be used to develop cost estimates suitable for procurement based on the specific data provided.

§ 2.4.2.3 Schedule. The Model Element may be used to show ordered, time-scaled appearance of detailed elements and systems.

§ 2.4.2.4 Coordination. The Model Element may be used for specific coordination with other Model Elements in terms of its size, location and clearance to other Model Elements including general operation issues.

§ 2.4.2.5 Other Authorized Uses. Additional Authorized Uses of the Model Element developed to LOD 300, if any, are as follows:

§ 2.5 LOD 400
§ 2.5.1 Model Element Content Requirements. The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

§ 2.5.2 Authorized Uses
§ 2.5.2.1 Analysis. The Model Element may be analyzed for performance of systems by application of actual performance criteria assigned to the Model Element.

§ 2.5.2.2 Cost Estimating. Costs are based on the actual cost of the Model Element at buyout.

§ 2.5.2.3 Schedule. The Model may be used to show ordered, time-scaled appearance of detailed specific elements and systems including construction means and methods.

§ 2.5.2.4 Coordination. The Model Element may be used for coordination with other Model Elements in terms of its size, location and clearance to other Model Elements, including fabrication, installation and detailed operation issues.

§ 2.5.2.5 Other Authorized Uses. Additional Authorized Uses of the Model Element developed to LOD 400, if any, are as follows:

§ 2.6 LOD 500 – NOT USED
§ 2.6.1 Model Element Content Requirements. The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information may also be attached to the Model Elements.

§ 2.6.2 Authorized Uses. Specific Authorized Uses of the Model Element developed to LOD 500, if any, are as follows:

ARTICLE 3 MODEL ELEMENTS
§ 3.1 Reliance on Model Elements
§ 3.1.1 At any particular Project milestone, a Project Participant may rely on the accuracy and completeness of a Model Element only to the extent consistent with the minimum data required for the Model Element's LOD for that Project milestone as identified below in the Model Element Table, even if the content of a specific Model Element includes data that exceeds the minimum data required for the identified LOD.

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§ 3.1.2 Coordination and Model Refinement

Where conflicts are found in the Model, regardless of the phase of the Project or LOD, the Project Participant that identifies the conflict shall promptly notify the Model Element Authors and the Project Participant identified in AIA Document E203–2013 Section 4.8 as being responsible for Model management. Upon such notification, the Model Element Author(s) shall act promptly to evaluate, mitigate and resolve the conflict in accordance with the processes established in Section 1.7.7, if applicable.

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§ 3.2 Table Instructions

§ 3.2.1 The Model Element Table in Section 3.3 indicates the LOD to which each Model Element shall be developed at each identified Project milestone and the Model Element Author.

§ 3.2.2 Abbreviations for each Model Element Author to be used in the Model Element Table are as follows:

Abbreviation	Model Element Author (MEA)
ABHA	Anderson, Brown & Higley Architects
EDiS	EDiS Company
BP	Bid Package

§ 3.3 Model Element Table Abbreviations: ABHA - Anderson, Brown & Higley Architects EDiS - EDiS Company BP - Bid Package	Design Intent Model			Design Development			Construction Documents			Means & Methods Model – Phase I Bid Package A See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package B See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package C See Attachment for Scope Participant			Notes (See Sec 3.4)
Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
A SUBSTRUCTURE																			
A10 FOUNDATIONS																			
A1010 Standard Foundations	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
A1010.10 Wall Foundations	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
A1010.30 Column Foundations	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
A1010.90 Standard Foundation Supplementary Components	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
A1020 Special Foundations – N/A																			
A1020.10 Driven Piles																			
A1020.15 Bored Piles																			
A1020.20 Caissons																			
A1020.30 Special Foundation Walls																			

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§ 3.3 Model Element Table Abbreviations: ABHA - Anderson, Brown & Higley Architects EDiS - EDiS Company BP - Bid Package		Design Intent Model			Design Development			Construction Documents			Means & Methods Model – Phase I Bid Package A See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package B See Attachment for Scope Participant			Means & Method Model – Phase II Bid Package C See Attachment for Scope Participant			Notes (See Sec 3.4)
Model Elements Utilizing CSI UniFormat™		LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
A1020.40	Foundation Anchors																			
A1020.50	Underpinning																			
A1020.60	Raft Foundations																			
A1020.70	Pile Caps																			
A1020.80	Grade Beams																			
A20 SUBGRADE ENCLOSURES– N/A																				
A2010	**Walls for Subgrade Enclosures**																			
A2010.10	Subgrade Enclosure Wall Construction																			
A2010.20	Subgrade Enclosure Wall Interior Skin																			
A2010.90	Subgrade Enclosure Wall Supplementary Components																			
A40 SLABS-ON-GRADE																				
A4010	**Standard Slabs-on-Grade– N/A**																			
A4020	**Structural Slabs-on-Grade– N/A**																			
A4030	**Slab Trenches– N/A**																			
A4040	**Pits and Bases– N/A**																			
A4090	**Slab-On-Grade Supplementary Components**																			
A4090.10	Perimeter Insulation	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
A4090.20	Vapor Retarder	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
A4090.30	Waterproofing																			
A4090.50	Mud Slab																			

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
A4090.60 Subbase Layer																			
A60 WATER AND GAS MITIGATION																			
A6010 Building Subdrainage																			
A6010.10 Foundation Drainage	100	ABHA		200	ABHA		300	ABHA											
A6010.20 Underslab Drainage	100	ABHA		200	ABHA		300	ABHA											
A6020 Off-Gassing Mitigation– N/A																			
A6020.10 Radon Mitigation																			
A6020.50 Methane Mitigation																			
A90 SUBSTRUCTURE RELATED ACTIVITIES																			
A9010 Substructure Excavation																			
A9010.10 Backfill and Compaction - SPCC	100	ABHA		200	ABHA		300	ABHA											
A9020 Construction Dewatering– N/A																			
A9030 Excavation Support– N/A																			
A9030.10 Anchor Tiebacks																			
A9030.20 Cofferdams																			
A9030.40 Cribbing and Walers																			
A9030.60 Ground Freezing																			
A9030.70 Slurry Walls																			
A9040 Soil Treatment – SPEC– N/A																			
B SHELL																			
B10 SUPERSTRUCTURE																			

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§ 3.3 Model Element Table

Abbreviations:
ABHA - Anderson, Brown & Higley Architects
EDiS - EDiS Company
BP - Bid Package

		Design Intent Model			Design Development			Construction Documents			Means & Methods Model – Phase I Bid Package A See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package B See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package C See Attachment for Scope Participant			Notes (See Sec 3.4)
Model Elements Utilizing CSI UniFormat™		LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
B1010	**Floor Construction**																			
B1010.10	Floor Structural Frame	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B1010.20	Floor Decks, Slabs, and Toppings	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03								
B1010.30	Balcony Floor Construction																			
B1010.40	Mezzanine Floor Construction - Reno	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-07								
B1010.50	Ramps	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-03, 07								
B1010.90	Floor Construction Supplementary Components	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B1020	**Roof Construction**																			
B1020.10	Roof Structural Frame	100	ABHA		200	ABHA		300	ABHA											
B1020.20	Roof Decks, Slabs, and Sheathing	100	ABHA		200	ABHA		300	ABHA											
B1020.30	Canopy Construction	100	ABHA		200	ABHA		300	ABHA											
B1020.90	Roof Construction Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
B1080	**Stairs (Reno & New)**																			
B1080.10	Stair Construction	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B1080.30	Stair Soffits	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B1080.50	Stair Railings	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B1080.60	Fire Escapes - Reno	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B1080.70	Metal Walkways																			
B1080.80	Ladders	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
B20 EXTERIOR VERTICAL ENCLOSURES																			
B2010 Exterior Walls																			
B2010.10 Exterior Wall Veneer	100	ABHA		200	ABHA		300	ABHA											
B2010.20 Exterior Wall Construction	100	ABHA		200	ABHA		300	ABHA											
B2010.30 Exterior Wall Interior Skin	100	ABHA		200	ABHA		300	ABHA											
B2010.40 Fabricated Exterior Wall Assemblies	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B2010.50 Parapets	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-05								
B2010.60 Equipment Screens																			
B2010.80 Exterior Wall Supplementary Components																			
B2010.90 Exterior Wall Opening Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
B2020 Exterior Windows																			
B2020.10 Exterior Operating Windows	100	ABHA		200	ABHA		300	ABHA											
B2020.20 Exterior Fixed Windows	100	ABHA		200	ABHA		300	ABHA											
B2020.30 Exterior Window Wall																			
B2020.50 Exterior Special Function Windows	100	ABHA		200	ABHA		300	ABHA											
B2050 Exterior Doors and Grilles																			
B2050.10 Exterior Entrance Doors	100	ABHA		200	ABHA		300	ABHA											
B2050.20 Exterior Utility Doors	100	ABHA		200	ABHA		300	ABHA											
B2050.30 Exterior Oversize Doors	100	ABHA		200	ABHA		300	ABHA											
B2050.40 Exterior Special Function Doors	100	ABHA		200	ABHA		300	ABHA											

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§ 3.3 Model Element Table Abbreviations: ABHA - Anderson, Brown & Higley Architects EDiS - EDiS Company BP - Bid Package	Design Intent Model			Design Development			Construction Documents			Means & Methods Model – Phase I Bid Package A See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package B See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package C See Attachment for Scope Participant			Notes (See Sec 3.4)
Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
B2050.60 Exterior Grilles	100	ABHA		200	ABHA		300	ABHA											
B2050.70 Exterior Gates	100	ABHA		200	ABHA		300	ABHA											
B2050.90 Exterior Door Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
B2070 Exterior Louvers and Vents																			
B2070.10 Exterior Louvers	100	ABHA		200	ABHA		300	ABHA											
B2070.50 Exterior Vents	100	ABHA		200	ABHA		300	ABHA											
B2080 Exterior Wall Appurtenances																			
B2080.10 Exterior Fixed Grilles and Screens	100	ABHA		200	ABHA		300	ABHA											
B2080.30 Exterior Opening Protection Devices	100	ABHA		200	ABHA		300	ABHA											
B2080.50 Exterior Balcony Walls and Railings	100	ABHA		200	ABHA		300	ABHA											
B2080.70 Exterior Fabrications	100	ABHA		200	ABHA		300	ABHA											
B2080.80 Bird Control Devices	100	ABHA		200	ABHA		300	ABHA											
B2090 Exterior Wall Specialties																			
B30 EXTERIOR HORIZONTAL ENCLOSURES																			
B3010 Roofing																			
B3010.10 Steep Slope Roofing	100	ABHA		200	ABHA		300	ABHA											
B3010.50 Low-Slope Roofing	100	ABHA		200	ABHA		300	ABHA											
B3010.70 Canopy Roofing	100	ABHA		200	ABHA		300	ABHA											
B3010.90 Roofing Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
B3020 Roof Appurtenances																			

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Model Elements Utilizing CSI UniFormat™	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	
B3020.10 Roof Accessories	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3020.30 Roof Specialties	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3020.70 Rainwater Management	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3040 Traffic Bearing Horizontal Enclosures– N/A																			
B3040.10 Traffic Bearing Coatings																			
B3040.30 Horizontal Waterproofing Membrane																			
B3040.50 Wear Surfaces																			
B3040.90 Horizontal Enclosure Supplementary Components																			
B3060 Horizontal Openings																			
B3060.10 Roof Windows and Skylights	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3060.50 Vents and Hatches	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					
B3060.90 Horizontal Opening Supplementary Components	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3080 Overhead Exterior Enclosures																			
B3080.10 Exterior Ceilings	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3080.20 Exterior Soffits	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
B3080.30 Exterior Bulkheads	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*											
C INTERIORS																			
C10 INTERIOR CONSTRUCTION																			
C1010 Interior Partitions - Replaster																			
C1010.10 Interior Fixed Partitions	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*		*300*	*BPA HHS-06*								

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
C1010.20 Interior Glazed Partitions	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-06								
C1010.40 Interior Demountable Partitions	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-06								
C1010.50 Interior Operable Partitions	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-06								
C1010.70 Interior Screens	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-06								
C1010.90 Interior Partition Supplementary Components	100	ABHA		200	ABHA		300	ABHA		300	BPA HHS-06								
C1020 Interior Windows																			
C1020.10 Interior Operating Windows	100	ABHA		200	ABHA		300	ABHA											
C1020.20 Interior Fixed Windows	100	ABHA		200	ABHA		300	ABHA											
C1020.50 Interior Special Function Windows	100	ABHA		200	ABHA		300	ABHA											
C1020.90 Interior Window Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
C1030 Interior Doors																			
C1030.10 Interior Swinging Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.20 Interior Entrance Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.25 Interior Sliding Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.30 Interior Folding Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.40 Interior Coiling Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.50 Interior Panel Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.70 Interior Special Function Doors	100	ABHA		200	ABHA		300	ABHA											
C1030.80 Interior Access Doors and Panels	100	ABHA		200	ABHA		300	ABHA											

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
C1090.30 Service Walls	100	ABHA		200	ABHA		300	ABHA											
C1090.35 Wall and Door Protection	100	ABHA		200	ABHA		300	ABHA											
C1090.40 Toilet, Bath, and Laundry Accessories	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-06								
C1090.45 Interior Gas Lighting	100	ABHA		200	ABHA		300	ABHA											
C1090.60 Safety Specialties																			
C1090.70 Storage Specialties																			
C1090.90 Other Interior Specialties																			
C20 INTERIOR FINISHES																			
C2010 Wall Finishes																			
C2010.10 Tile Wall Finish	100	ABHA		200	ABHA		300	ABHA											
C2010.20 Wall Paneling	100	ABHA		200	ABHA		300	ABHA											
C2010.30 Wall Coverings	100	ABHA		200	ABHA		300	ABHA											
C2010.35 Wall Carpeting	100	ABHA		200	ABHA		300	ABHA											
C2010.50 Stone Facing	100	ABHA		200	ABHA		300	ABHA											
C2010.60 Special Wall Surfacing	100	ABHA		200	ABHA		300	ABHA											
C2010.70 Wall Painting and Coating	100	ABHA		200	ABHA		300	ABHA											
C2010.80 Acoustical Wall Treatment	100	ABHA		200	ABHA		300	ABHA											
C2010.90 Wall Finish Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
C2020 Interior Fabrications																			
C2030 Flooring																			

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Model Elements Utilizing CSI UniFormat™		LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
C2030.10	Flooring Treatment	100	ABHA		200	ABHA		300	ABHA											
C2030.20	Tile Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.30	Specialty Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.40	Masonry Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.45	Wood Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.50	Resilient Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.60	Terrazzo Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.70	Fluid-Applied Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.75	Carpeting	100	ABHA		200	ABHA		300	ABHA											
C2030.80	Athletic Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.85	Entrance Flooring	100	ABHA		200	ABHA		300	ABHA											
C2030.90	Flooring Supplementary Components	100	ABHA		200	ABHA		300	ABHA											
C2040	**Stair Finishes**																			
C2040.20	Tile Stair Finish	100	ABHA		200	ABHA		300	ABHA											
C2040.40	Masonry Stair Finish	100	ABHA		200	ABHA		300	ABHA											
C2040.45	Wood Stair Finish	100	ABHA		200	ABHA		300	ABHA											
C2040.50	Resilient Stair Finish	100	ABHA		200	ABHA		300	ABHA											
C2040.60	Terrazzo Stair Finish	100	ABHA		200	ABHA		300	ABHA											
C2040.75	Carpeted Stair Finish	100	ABHA		200	ABHA		300	ABHA											
C2050	**Ceiling Finishes**																			
C2050.10	Plaster and Gypsum Board Finish	100	ABHA		200	ABHA		300	ABHA											

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Model Elements Utilizing CSI UniFormat™	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	
C2050.20 Ceiling Paneling	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*		*400*	*BPA HHS-08*								
C2050.70 Ceiling Painting and Coating																			
C2050.80 Acoustical Ceiling Treatment	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*		*400*	*BPA HHS-08*								
C2050.90 Ceiling Finish Supplementary Components	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*		*400*	*BPA HHS-08*								
C2090 Interior Finish Schedules– N/A																			
D SERVICES																			
D10 CONVEYING																			
D1010 Vertical Conveying Systems																			
D1010.10 Elevators	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*		*400*	*BPA HHS-17*		*400*	*BPB HHS-19, 21, 21*					
D1010.20 Lifts	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*		*400*	*BPA HHS-17*		*400*	*BPB HHS-19, 21, 21*					
D1010.30 Escalators– N/A																			
D1010.50 Dumbwaiters– N/A																			
D1010.60 Moving Ramps– N/A																			
D1030 Horizontal Conveying– N/A																			
D1030.10 Moving Walks																			
D1030.30 Turntables																			
D1030.50 Passenger Loading Bridges																			
D1030.70 People Movers																			
D1050 Material Handling– N/A																			
D1050.10 Cranes																			

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D1050.20 Hoists																			
D1050.30 Derricks																			
D1050.40 Conveyors																			
D1050.50 Baggage Handling Equipment																			
D1050.60 Chutes																			
D1050.70 Pneumatic Tube Systems																			
D1080 Operable Access Systems– N/A																			
D1080.10 Suspended Scaffolding																			
D1080.20 Rope Climbers																			
D1080.30 Elevating Platforms																			
D1080.40 Powered Scaffolding																			
D1080.50 Building Envelope Access																			
D20 PLUMBING																			
D2010 Domestic Water Distribution																			
D2010.10 Facility Potable-Water Storage Tanks	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					
D2010.20 Domestic Water Equipment	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					
D2010.40 Domestic Water Piping	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					
D2010.60 Plumbing Fixtures	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					
D2010.90 Domestic Water Distribution Supplementary Components	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					
D2020 Sanitary Drainage																			
D2020.10 Sanitary Sewerage Equipment	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-19*					

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
D2020.30 Sanitary Sewerage Piping	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2020.90 Sanitary Drainage Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2030 Building Support Plumbing Systems																			
D2030.10 Stormwater Drainage Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2030.20 Stormwater Drainage Piping	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2030.30 Facility Stormwater Drains	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2030.60 Gray Water Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2030.90 Building Support Plumbing System Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2050 General Service Compressed-Air																			
D2060 Process Support Plumbing Systems																			
D2060.10 Compressed-Air Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2060.20 Vacuum Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D2060.30 Gas Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D30 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)																			
D3010 Facility Fuel Systems																			
D3010.10 Fuel Piping	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
D3010.30 Fuel Pumps	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3010.50 Fuel Storage Tanks	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3020 Heating Systems																			
D3020.10 Heat Generation	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3020.70 Decentralized Heating Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3020.90 Heating System Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3030 Cooling Systems																			
D3030.10 Central Cooling	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3030.90 Cooling System Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3050 Facility HVAC Distribution Systems																			
D3050.30 Facility Steam Distribution	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3050.50 HVAC Air Distribution	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3050.90 Facility Distribution Systems Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3060 Ventilation																			
D3060.10 Supply Air	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					

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(1733243189)

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EDiS - EDiS Company
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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
D3060.20 Return Air	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3060.30 Exhaust Air	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3060.40 Outside Air	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3060.60 Air-to-Air Energy Recovery	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3060.70 HVAC Air Cleaning	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D3060.90 Ventilation Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
D40 FIRE PROTECTION																			
D4010 Fire Suppression																			
D4010.10 Water-Based Fire-Suppression	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D4010.50 Fire-Extinguishing	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D4010.90 Fire Suppression Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D4030 Fire Protection Specialties																			
D4030.10 Fire Protection Cabinets	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D4030.30 Fire Extinguishers	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D4030.70 Fire Extinguisher Accessories	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D50 ELECTRICAL																			
D5010 Facility Power Generation																			

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Model Elements Utilizing CSI UniFormat™	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	
D5010.10 Packaged Generator Assemblies	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*	*If applic able*				
D5010.60 Power Filtering and Conditioning																			
D5010.70 Transfer Switches	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5010.90 Facility Power Generation Supplementary Components	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5020 Electrical Service and Distribution																			
D5020.10 Electrical Service	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5020.30 Power Distribution	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5020.70 Facility Grounding	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5020.90 Electrical Service and Distribution Supplementary Components	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5030 General Purpose Electrical Power																			
D5030.10 Branch Wiring System	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5030.50 Wiring Devices	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5030.90 General Purpose Electrical Power Supplementary Components	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHS-20*					
D5040 Lighting																			

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
D5040.10 Lighting Control	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D5040.20 Branch Wiring for Lighting	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D5040.50 Lighting Fixtures	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D5040.90 Lighting Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D5080 Miscellaneous Electrical Systems																			
D5080.10 Lightning Protection	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D5080.70 Transient Voltage Suppression	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D5080.90 Miscellaneous Electrical Systems Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D60 COMMUNICATIONS																			
D6010 Data Communications																			
D6010.10 Data Communications Network Equipment	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		
D6010.20 Data Communications Hardware	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		
D6010.30 Data Communications Peripheral Data Equipment	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		
D6010.60 Data Communication Program and Integration Services	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		
D6020 Voice Communications																			
D6020.10 Voice Communications	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
Switching and Routing Equipment																			
D6020.20 *Voice Communications Terminal Equipment*	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		
D6030 Audio-Video Communication																			
D6030.10 *Audio-Video Systems*	100	ABHA		200	ABHA		300	ABHA								400	BPB HHS-26		
D6030.50 *Electronic Digital Systems*	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
D6090 Communications Supplementary Components																			
D6090.10 *Supplementary Components*	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20		400	BPB HHS-26		
D70 ELECTRONIC SAFETY AND SECURITY																			
D7010 Access Control and Intrusion Detection																			
D7010.10 *Access Control*																			
D7010.50 *Intrusion Detection*																			
D7030 Electronic Surveillance																			
D7030.10 *Video Surveillance*	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
D7030.50 Electronic Personal Protection	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					
D7050 Detection and Alarm																			
D7050.10 Fire Detection and Alarm	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-21					
D7070 Electronic Monitoring and Control																			
D7070.10 Electronic Detention Monitoring and Control																			
D7090 Electronic Safety and Security Supplementary Components																			
D7090.10 Supplementary Components																			
D80 INTEGRATED AUTOMATION																			
D8010 Integrated Automation Facility Controls																			
D8010.10 Integrated Automation Control of Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					
D8010.20 Integrated Automation Control of Conveying Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					
D8010.30 Integrated Automation Control of Fire-Suppression Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					
D8010.40 Integrated Automation Control of Plumbing Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
D8010.50 Integrated Automation Control of HVAC Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					
D8010.60 Integrated Automation Control of Electrical Systems	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-24					
E EQUIPMENT AND FURNISHINGS																			
E10 EQUIPMENT																			
E1010 Vehicle and Pedestrian Equipment– N/A																			
E1010.10 Vehicle Servicing Equipment																			
E1010.30 Interior Parking Control Equipment																			
E1010.50 Loading Dock Equipment																			
E1010.70 Interior Pedestrian Control Equipment																			
E1030 Commercial Equipment																			
E1030.10 Mercantile and Service Equipment– N/A																			
E1030.20 Vault Equipment– N/A																			
E1030.25 Teller and Service Equipment– N/A																			
E1030.30 Refrigerated Display Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
E1030.35 Commercial Laundry and Dry Cleaning Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
E1030.40 Maintenance Equipment																			

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
E1030.50 Hospitality Equipment																			
E1030.55 Unit Kitchens																			
E1030.60 Photographic Processing Equipment																			
E1030.70 Postal, Packaging, and Shipping Equipment																			
E1030.75 Office Equipment																			
E1030.80 Foodservice Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
E1040 Institutional Equipment																			
E1040.10 Educational and Scientific Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-19					
E1040.20 Healthcare Equipment	100																		
E1040.40 Religious Equipment	100																		
E1040.60 Security Equipment	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
E1040.70 Detention Equipment																			
E1060 Residential Equipment– N/A																			
E1060.10 Residential Appliances																			
E1060.50 Retractable Stairs																			
E1060.70 Residential Ceiling Fans																			
E1070 Entertainment and Recreational Equipment																			
E1070.10 Theater and Stage Equipment	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-08								
E1070.20 Musical Equipment																			
E1070.50 Athletic Equipment																			

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
E1070.60 Recreational Equipment																			
E1090 Other Equipment																			
E1090.10 Solid Waste Handling Equipment																			
E1090.30 Agricultural Equipment	100	ABHA		200	ABHA		300	ABHA											
E1090.40 Horticultural Equipment	100	ABHA		200	ABHA		300	ABHA											
E1090.60 Decontamination Equipment	100																		
E20 FURNISHINGS																			
E2010 Fixed Furnishings																			
E2010.10 Fixed Art	100	ABHA		200	ABHA		300	ABHA											
E2010.20 Window Treatments	100	ABHA		200	ABHA		300	ABHA											
E2010.30 Casework	100	ABHA		200	ABHA		300	ABHA		400	BPA HHS-11								
E2010.70 Fixed Multiple Seating	100	ABHA		200	ABHA		300	ABHA											
E2010.90 Other Fixed Furnishings	100	ABHA		200	ABHA		300	ABHA											
E2050 Movable Furnishings																			
E2050.10 Movable Art	100	ABHA		200	ABHA		300	ABHA											
E2050.30 Furniture	100	ABHA		200	ABHA		300	ABHA											
E2050.40 Accessories	100	ABHA		200	ABHA		300	ABHA											
E2050.60 Movable Multiple Seating	100	ABHA		200	ABHA		300	ABHA											
E2050.90 Other Movable Furnishings	100	ABHA		200	ABHA		300	ABHA											
F SPECIAL CONSTRUCTION AND DEMOLITION																			

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
F2010.20 Asbestos Remediation																			
F2010.30 Lead Remediation																			
F2010.40 Polychlorinate Biphenyl Remediation																			
F2010.50 Mold Remediation																			
F30 DEMOLITION																			
F3010 Structure Demolition																			
F3010.10 Building Demolition	100	ABHA		200	ABHA		300	ABHA											
F3010.30 Tower Demolition	100	ABHA		200	ABHA		300	ABHA											
F3010.50 Bridge Demolition	100	ABHA		200	ABHA		300	ABHA											
F3010.70 Dam Demolition	100	ABHA		200	ABHA		300	ABHA											
F3030 Selective Demolition																			
F3030.10 Selective Building Demolition	100	ABHA		200	ABHA		300	ABHA											
F3030.30 Selective Interior Demolition	100	ABHA		200	ABHA		300	ABHA											
F3030.50 Selective Bridge Demolition	100	ABHA		200	ABHA		300	ABHA											
F3030.70 Selective Historic Demolition	100	ABHA		200	ABHA		300	ABHA											
F3050 Structure Moving																			
F3050.10 Structure Relocation	100	ABHA		200	ABHA		300	ABHA											
F3050.30 Structure Raising	100	ABHA		200	ABHA		300	ABHA											
G SITEWORK– N/A																			
G10 SITE PREPARATION																			
G1010 Site Clearing																			

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Model Elements Utilizing CSI UniFormat™	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	
G1010.10 Clearing and Grubbing																			
G1010.30 Tree and Shrub Removal and Trimming																			
G1010.50 Earth Stripping and Stockpiling																			
G1020 Site Elements Demolition																			
G1020.10 Utility Demolition																			
G1020.30 Infrastructure Demolition																			
G1020.50 Selective Site Demolition																			
G1030 Site Element Relocations																			
G1030.10 Utility Relocation																			
G1050 Site Remediation																			
G1050.10 Physical Decontamination																			
G1050.15 Chemical Decontamination																			
G1050.20 Thermal Decontamination																			
G1050.25 Biological Decontamination																			
G1050.30 Remediation Soil Stabilization																			
G1050.40 Site Containment																			
G1050.45 Sinkhole Remediation																			
G1050.50 Hazardous Waste Drum Handling																			
G1050.60 Contaminated Site Material Removal																			
G1050.80 Water Remediation																			

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§ 3.3 Model Element Table Abbreviations: ABHA - Anderson, Brown & Higley Architects EDiS - EDiS Company BP - Bid Package	Design Intent Model			Design Development			Construction Documents			Means & Methods Model – Phase I Bid Package A See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package B See Attachment for Scope Participant			Means & Methods Model – Phase II Bid Package C See Attachment for Scope Participant			Notes (See Sec 3.4)
Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
G1070 Site Earthwork																			
G1070.10 Grading																			
G1070.20 Excavation and Fill																			
G1070.30 Embankments																			
G1070.35 Erosion and Sedimentation Controls																			
G1070.40 Soil Stabilization																			
G1070.45 Rock Stabilization																			
G1070.50 Soil Reinforcement																			
G1070.55 Slope Protection																			
G1070.60 Gabions																			
G1070.65 Riprap																			
G1070.70 Wetlands																			
G1070.80 Earth Dams																			
G1070.90 Site Soil Treatment																			
G20 SITE IMPROVEMENTS– N/A																			
G2010 Roadways																			
G2010.10 Roadway Pavement																			
G2010.20 Roadway Curbs and Gutters																			
G2010.40 Roadway Appurtenances																			
G2010.70 Roadway Lighting																			
G2010.80 Vehicle Fare Collection																			

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§ 3.3 Model Element Table

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Model Elements Utilizing CSI UniFormat™	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	
G2080.50 Planting Accessories																			
G2080.70 Landscape Lighting																			
G2080.80 Landscaping Activities																			
G30 LIQUID AND GAS SITE UTILITIES– N/A																			
G3010 Water Utilities																			
G3010.10 Site Domestic Water Distribution																			
G3010.30 Site Fire Protection Water Distribution																			
G3010.50 Site Irrigation Water Distribution																			
G3020 Sanitary Sewerage Utilities																			
G3020.10 Sanitary Sewerage Utility Connection																			
G3020.20 Sanitary Sewerage Piping																			
G3020.40 Utility Septic Tanks																			
G3020.50 Sanitary Sewerage Structures																			
G3020.60 Sanitary Sewerage Lagoons																			
G3030 Storm Drainage Utilities																			
G3030.10 Storm Drainage Utility Connection																			
G3030.20 Storm Drainage Piping	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHA-19*					
G3030.30 Culverts																			
G3030.40 Site Storm Water Drains	*100*	*ABHA*		*200*	*ABHA*		*300*	*ABHA*					*400*	*BPB HHA-19*					
G3030.50 Storm Drainage Pumps																			

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Model Elements Utilizing CSI UniFormat™	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	LOD	MEA	Notes	
G4010.40 Electrical Transformers	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4010.50 Electrical Switchgear and Protection Devices	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4010.70 Site Grounding	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4010.90 Electrical Distribution System Instrumentation and Controls	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4050 Site Lighting																			
G4050.10 Area Lighting	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4050.20 Flood Lighting	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4050.50 Building Illumination	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G4050.90 Exterior Lighting Supplementary Components	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G50 SITE COMMUNICATIONS																			
G5010 Site Communications Systems																			
G5010.10 Site Communications Structures	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G5010.30 Site Communications Distribution	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G5010.50 Wireless Communications Distribution	100	ABHA		200	ABHA		300	ABHA					400	BPB HHS-20					
G90 MISCELLANEOUS SITE CONSTRUCTION																			
G9010 Tunnels																			
G9010.10 Vehicular Tunnels																			
G9010.20 Pedestrian Tunnels																			
G9010.40 Service Tunnels																			

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Model Elements Utilizing CSI UniFormat™	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	*LOD*	*MEA*	*Notes*	
G9010.90 Tunnel Construction Related Activities																			

§ 3.4 Model Element Table Notes

Notes:

Identify all filter locations and covers.
Scope participant list is attached.
Model Element Table is an add on document to all bid packages noted above and relating to all contractors scope of work. The table identifies all bid package requirements to provide Building Information Models (BIM) during the BIM coordination process. In addition, refer to BIM protocol instruction to see LOD descriptions.

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NCC Vocational Technical School
Renovations to Howard High School of Technology
Project Building Information Modeling (BIM)
Scope Participant List

Bid Package A:

Contract HHS-05	Structural and Miscellaneous Steel
Contract HHS-07	Metal Framing, Drywall, Plaster
Contract HHS-08	Acoustical Ceilings and Panels
Contract HHS-09	Terrazzo Flooring
Contract HHS-17	Conveying Equipment

Bid Package B:

Contract HHS-19	Mechanical & Plumbing
Contract HHS-20	Electrical and IT Infrastructure
Contract HHS-21	Fire Protection
Contract HHS-22	Testing, Adjusting and Balancing
Contract HHS-24	ATC
Contract HHS-25	Conveying Equipment

Bid Package C:

Contract HHS-26	Technology
Contract HHS-27	Access Controls

AIA® Document E203™ – 2013

Building Information Modeling and Digital Data Exhibit

This Exhibit dated the 17th day of August in the year 2016 is incorporated into the agreement (the "Agreement") between the Parties for the following Project:
(Name and location or address of the Project)

Renovations to Howard High School of Technology
401 East 12th Street
Wilmington, Delaware 19801

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

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

This document is intended to be incorporated into an agreement between the parties and used in conjunction with AIA Documents G201™–2013, Project Digital Data Protocol Form, and G202™–2013, Building Information Modeling Protocol Form. It is anticipated that other Project Participants will incorporate a project specific E203–2013 into their agreements, and that the Parties and other Project Participants will set forth the agreed-upon protocols in AIA Documents G201–2013 and G202–2013.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 TRANSMISSION AND OWNERSHIP OF DIGITAL DATA

3 DIGITAL DATA PROTOCOLS

4 BUILDING INFORMATION MODELING PROTOCOLS

5 OTHER TERMS AND CONDITIONS

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 This Exhibit provides for the establishment of protocols for the development, use, transmission, and exchange of Digital Data for the Project. If Building Information Modeling will be utilized, this Exhibit also provides for the establishment of the protocols necessary to implement the use of Building Information Modeling on the Project, including protocols that establish the expected Level of Development for Model Elements at various milestones of the Project, and the associated Authorized Uses of the Building Information Models.

§ 1.2 The Parties agree to incorporate this Exhibit into their agreements with any other Project Participants that may develop or make use of Digital Data on the Project. Prior to transmitting or allowing access to Digital Data, a Party may require any Project Participant to provide reasonable evidence that it has incorporated this Exhibit into its agreement for the Project, and agreed to the most recent Project specific versions of AIA Document G201™–2013, Project Digital Data Protocol Form and AIA Document G202™–2013, Project Building Information Modeling Protocol Form.

§ 1.2.1 The Parties agree that each of the Project Participants utilizing Digital Data on the Project is an intended third party beneficiary of the Section 1.2 obligation to incorporate this Exhibit into agreements with other Project Participants, and any rights and defenses associated with the enforcement of that obligation. This Exhibit does not create any third-party beneficiary rights other than those expressly identified in this Section 1.2.1.

§ 1.3 Adjustments to the Agreement

§ 1.3.1 If a Party believes that protocols established pursuant to Sections 3.2 or 4.5, and memorialized in AIA Documents G201–2013 and G202–2013, will result in a change in the Party's scope of work or services warranting an adjustment in compensation, contract sum, schedule or contract time, the Party shall notify the other Party. Failure to provide notice as required in this Section 1.3 shall result in a Party's waiver of any claims for

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adjustments in compensation, contract sum, schedule or contract time as a result of the established protocols.

§ **1.3.2** Upon such notice, the Parties shall discuss and negotiate revisions to the protocols or discuss and negotiate any adjustments in compensation, contract sum, schedule or contract time in accordance with the terms of the Agreement.

§ **1.3.3** Notice required under this Section 1.3 shall be provided within thirty days of receipt of the protocols, unless otherwise indicated below:
(If the Parties require a notice period other than thirty days from receipt of the protocols, indicate the notice period below.)

§ 1.4 Definitions

§ 1.4.1 Building Information Model. A Building Information Model is a digital representation of the Project, or a portion of the Project, and is referred to in this Exhibit as the "Model," which term may be used herein to describe a Model Element, a single model or multiple models used in the aggregate, as well as other data sets identified in AIA Document G202–2013, Project Building Information Modeling Protocol Form.

§ 1.4.2 Building Information Modeling. Building Information Modeling or Modeling means the process used to create the Model.

§ 1.4.3 Model Element. A Model Element is a portion of the Model representing a component, system or assembly within a building or building site.

§ 1.4.4 Level of Development. The Level of Development (LOD) describes the minimum dimensional, spatial, quantitative, qualitative, and other data included in a Model Element to support the Authorized Uses associated with such LOD.

§ 1.4.5 Authorized Uses. The term "Authorized Uses" refers to the permitted uses of Digital Data authorized in the Digital Data and/or Building Information Modeling protocols established pursuant to the terms of this Exhibit.

§ 1.4.6 Model Element Author. The Model Element Author is the entity (or individual) responsible for managing and coordinating the development of a specific Model Element to the LOD required for an identified Project milestone, regardless of who is responsible for providing the content in the Model Element. Model Element Authors are to be identified in Section 3.3, Model Element Table, of AIA Document G202–2013.

§ 1.4.7 Digital Data. Digital Data is information, including communications, drawings, specifications and designs, created or stored for the Project in digital form. Unless otherwise stated, the term Digital Data includes the Model.

§ 1.4.8 Confidential Digital Data. Confidential Digital Data is Digital Data containing confidential or business proprietary information that the transmitting party designates and clearly marks as "confidential."

§ 1.4.9 Written or In Writing. In addition to any definition in the Agreement to which this Exhibit is attached, for purposes of this Exhibit and the Agreement, "written" or "in writing" shall mean any communication prepared and sent using a transmission method set forth in this Exhibit, or the protocols developed pursuant to this Exhibit, that permits the recipient to print the communication.

§ 1.4.10 Written Notice. In addition to any terms in the Agreement to which this Exhibit is attached, for purposes of this Exhibit and the Agreement, "written notice" shall be deemed to have been duly served if transmitted electronically to an address provided in this Exhibit or the Agreement using a transmission method set forth in this Exhibit that permits the recipient to print the communication.

§ 1.4.11 Party and Parties. The terms "Party" and "Parties" refer to the signing parties to the Agreement.

§ 1.4.12 Project Participant. A Project Participant is an entity (or individual) providing services, work, equipment or materials on the Project and includes the Parties.

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ARTICLE 2 TRANSMISSION AND OWNERSHIP OF DIGITAL DATA

§ 2.1 The transmission of Digital Data constitutes a warranty by the Party transmitting Digital Data to the Party receiving Digital Data that the transmitting Party is the copyright owner of the Digital Data, or otherwise has permission to transmit the Digital Data for its use on the Project in accordance with the Authorized Uses of Digital Data established pursuant to the terms of this Exhibit.

§ 2.2 If a Party transmits Confidential Digital Data, the transmission of such Confidential Digital Data constitutes a warranty to the Party receiving such Confidential Digital Data that the transmitting Party is authorized to transmit the Confidential Digital Data. If a Party receives Confidential Digital Data, the receiving Party shall keep the Confidential Digital Data strictly confidential and shall not disclose it to any other person or entity except as set forth in Section 2.2.1.

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

§ 2.3 By transmitting Digital Data, the transmitting Party does not convey any ownership right in the Digital Data or in the software used to generate the Digital Data. Unless otherwise granted in a separate license, the receiving Party's right to use, modify, or further transmit Digital Data is specifically limited to designing, constructing, using, maintaining, altering and adding to the Project consistent with the terms of this Exhibit, and nothing contained in this Exhibit conveys any other right to use the Digital Data.

§ 2.4 Where a provision in this Article 2 conflicts with a provision in the Agreement into which this Exhibit is incorporated, the provision in this Article 2 shall prevail.

ARTICLE 3 DIGITAL DATA PROTOCOLS

§ 3.1 Anticipated Types of Digital Data. The anticipated types of Digital Data to be used on the Project are as follows: *(Indicate below the information on the Project that shall be created and shared in a digital format. If the Parties indicate that Building Information Modeling will be utilized on the Project, the Parties shall also complete Article 4.)*

Anticipated Digital Data	**Applicability to the Project** *(Indicate Applicable or Not Applicable)*	**Location of Detailed Description** *(Section 3.1.1 below or in an attachment to this exhibit and identified below)*
Project Agreements and Modifications	Applicable	
Project communications	Applicable	
Architect's pre-construction submittals	Applicable	
Contract Documents	Applicable	
Contractor's submittals	Applicable	
Subcontractor's submittals	Applicable	
Modifications	Applicable	
Project payment documents	Applicable	
Notices and claims	Applicable	
Building Information Modeling	Applicable	

§ 3.1.1 Insert a detailed description of the anticipated Digital Data identified in Section 3.1, if not further described in an attachment to this Exhibit.

See attached Exhibit

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§ **3.2** As soon as practical following execution of the Agreement, the Parties shall further describe the uses of Digital Data, and establish necessary protocols governing the transmission and Authorized Uses of Digital Data, in consultation with the other Project Participants that are expected to utilize Digital Data on the Project.

§ **3.2.1** Unless another Project Participant is identified below, the Architect shall prepare and distribute to the other Project Participants Digital Data protocols for review, revision and approval.
(If a Project Participant other than the Architect shall be responsible for preparing draft and final Digital Data protocols, identify that Project Participant.)

EDiS Company

§ **3.2.2** The agreed upon Digital Data protocols shall be set forth in AIA Document G201–2013 and each Project Participant shall memorialize their agreement in writing to such Digital Data protocols.

§ **3.2.3** The Parties, together with the other Project Participants, shall review and, if necessary, revise the Digital Data protocols at appropriate intervals as required by the conditions of the Project.

§ **3.3** The Parties shall transmit, use, store and archive Digital Data in accordance with the Digital Data protocols set forth in the latest version of AIA Document G201–2013 agreed to by the Project Participants.

§ 3.4 Unauthorized Use
§ 3.4.1 Prior to Establishment of Digital Data Protocols
If a Party receives Digital Data prior to the agreement to, and documentation of, the Digital Data protocols in AIA Document G201–2013, that Party is not authorized to use or rely on the Digital Data. Any use of, or reliance on, such Digital Data is at that Party's sole risk and without liability to the other Party and its contractors, consultants, agents and employees.

§ 3.4.2 Following Establishment of Digital Data Protocols
Following agreement to, and documentation of, the Digital Data protocols in AIA Document G201–2013, if a Party uses Digital Data inconsistent with the Authorized Uses identified in the Digital Data protocols, that use shall be at the sole risk of the Party using the Digital Data.

§ 3.5 Digital Data Management
§ **3.5.1** Centralized electronic document management system use on the Project shall be:
(Check the appropriate box. If the Parties do not check one of the boxes below, the default selection shall be that the Parties will not utilize a centralized electronic document management system on the Project.)

[X] The Parties intend to use a centralized electronic document management system on the Project.

[ ]The Parties do not intend to use a centralized electronic document management system on the Project.

§ **3.5.2** If the Project Participants intend to utilize a centralized electronic document management system on the Project, the Project Participants identified in Section 3.5.3 shall be responsible for managing and maintaining such system. The Project Participants responsible for managing and maintaining the centralized electronic document management system shall facilitate the establishment of protocols for transmission, use, storage and archiving of the centralized Digital Data and assist the Project Participants identified in Section 3.2.1 above in preparing Digital Data protocols. Upon agreement to, and documentation of, the Digital Data protocols in AIA Document G201–2013, the Project Participants identified in Section 3.5.3 shall manage and maintain the centralized electronic document management system consistent with the management protocols set forth in the latest version of G201–2013 approved by the Project Participants.

§ **3.5.3** Unless responsibility is assigned to another Project Participant, the Architect shall be responsible for managing and maintaining the centralized electronic document management system. If the responsibility for management and maintenance will be assigned to another Project Participant at an identified Project milestone, indicate below the Project Participant who shall assume that responsibility, and the Project milestone.
(Identify the Project Participant responsible for management and maintenance only if the Parties intend to utilize a centralized electronic document management system on the Project.)

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Responsible Project Participant	Project Milestone
EDiS Company	Bid Package A, B & C, Closeout

ARTICLE 4 BUILDING INFORMATION MODELING PROTOCOLS

§ 4.1 If the Parties indicate in Section 3.1 that Building Information Modeling will be used on the Project, specify below the extent to which the Parties intend to utilize Building Information Modeling and identify the provisions of this Article 4 governing such use:

[ ]The Parties shall utilize Building Information Modeling on the Project for the sole purpose of fulfilling the obligations set forth in the Agreement without an expectation that the Model will be relied upon by the other Project Participants. Unless otherwise agreed in writing, any use of, transmission of, or reliance on the Model is at the receiving Party's sole risk. The remaining sections of this Article 4 shall have no force or effect.

[ ]The Parties shall develop, share, use and rely upon the Model in accordance with Sections 4.2 through 4.10 of this Exhibit.

§ 4.2 Anticipated Building Information Modeling Scope. Indicate below the portions of the Project for which Modeling will be used and the anticipated Project Participant responsible for that Modeling.

Project Portion for Modeling	Responsible Project Participant
Bid Package A:	
HHS-05	Structural and Miscellaneous Steel
HHS-07	Metal Framing, Drywall, Plaster
HHS-08	Acoustical Ceilings and Panels
HHS-17	Conveying Equipment
Bid Package B:	
HHS-19	Mechanical & Plumbing
HHS-20	Electrical and IT Infrastructure
HHS-21	Fire Protection
HHS-24	ATC
HHS-25	Conveying Equipment
Bid Package C:	
HHS-26	Technology
HHS-27	Access Controls

§ 4.3 Anticipated Model Authorized Uses. Indicate below the anticipated Authorized Uses of the Model for the Project, which Authorized Uses will be agreed upon by the Project Participants and further described for each LOD in AIA Document G202–2013.

§ 4.4 Ancillary Modeling Activities. Indicate additional Modeling activities agreed upon by the Parties, but not to be included in AIA Document G202–2013, if any.
(Describe any Modeling activities, such as renderings, animations, performance simulations, or other similar use, including the anticipated amount and scope of any such Modeling activities.)

All parties identified in contract scopes and AIA E203 4.2 are required to provide 3D modeled electronic document in Autocad, Navisworks and/or Revit to participate in Building Information Modeling construction coordination process.

§ 4.5 Modeling Protocols. As soon as practical following execution of the Agreement, the Parties shall, in consultation with the other Project Participants that are expected to utilize Building Information Modeling on the Project, further describe the Authorized Uses of the Model and establish necessary protocols governing the

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development of the Model utilizing AIA Document G202–2013.

§ **4.5.1** The Modeling protocols shall address the following:

- .1 Identification of the Model Element Authors;
- .2 Definition of the various LOD for the Model Elements and the associated Authorized Uses for each defined LOD;
- .3 Identification of the required LOD of each Model Element at each identified Project milestone;
- .4 Identification of the construction classification systems to be used on the Project;
- .5 The process by which Project Participants will exchange and share the Model at intervals not reflected in Section 3.3, Model Element Table, of AIA Document G202–2013;
- .6 The process by which the Project Participants will identify, coordinate and resolve changes to the Model;
- .7 Details regarding any anticipated as-designed or as-constructed Authorized Uses for the Model, if required on the Project;
- .8 Anticipated Authorized Uses for facilities management or otherwise, following completion of the Project; and
- .9 Other topics to be addressed by the Modeling protocols: *(Identify additional topics to be addressed by the Modeling Protocols.)*

§ **4.5.2** Unless responsibility is assigned to another Project Participant identified below, the Architect shall prepare and distribute Modeling protocols to the other Project Participants for review, revision and approval.
(If a Project Participant other than the Architect shall be responsible for preparing draft and final Modeling protocols, identify that Project Participant.)

§ **4.5.3** The agreed upon Modeling protocols shall be set forth in AIA Document G202–2013 and each Project Participant shall memorialize their agreement in writing to such Modeling protocols.

§ **4.5.4** The Parties, together with the other Project Participants, shall review, and if necessary, revise the Modeling protocols at appropriate intervals as required by the conditions of the Project.

§ **4.6** The Parties shall develop, use and rely on the Model in accordance with the Modeling protocols set forth in the latest version of AIA Document G202–2013, which document shall be included in or attached to the Model in a manner clearly accessible to the Project Participants.

§ 4.7 Unauthorized Use

§ 4.7.1 Prior to Establishment of Modeling Protocols

If a Party receives any Model prior to the agreement to, and documentation of, the Modeling protocols in AIA Document G202–2013, that Party is not authorized to use, transmit, or rely on the Model. Any use, transmission or reliance is at that Party's sole risk and without liability to the other Party and its contractors, consultants, agents and employees.

§ 4.7.2 Following Establishment of Modeling Protocols

Following agreement to, and documentation of, the Modeling protocols in AIA Document G202–2013, if a Party uses or relies on the Model inconsistent with the Authorized Uses identified in the Modeling protocols, such use or reliance shall be at the sole risk of the Party using or relying on the Model. A Party may rely on the Model Element only to the extent consistent with the minimum data required for the identified LOD, even if the content of a specific Model Element includes data that exceeds the minimum data required for the identified LOD.

§ 4.8 Model Management

§ **4.8.1** The requirements for managing the Model include the duties set forth in this Section 4.8. Unless assigned to another Project Participant, the Architect shall manage the Model from the inception of the Project. If the responsibility for Model management will be assigned to another Project Participant, or change at an identified

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Project milestone, indicate below the identity of the Project Participant who will assume that responsibility, and the Project milestone.

Responsible Project Participant **Project Milestone**

§ 4.8.2 Model Management Protocol Establishment. The Project Participant responsible for managing the Model, in consultation with the other Project Participants that are expected to utilize Building Information Modeling on the Project, shall facilitate the establishment and revision of Model management protocols, including the following:

.1 Model origin point, coordinate system, precision, file formats and units
.2 Model file storage location(s)
.3 Processes for transferring and accessing Model files
.4 Naming conventions
.5 Processes for aggregating Model files from varying software platforms
.6 Model access rights
.7 Identification of design coordination and clash detection procedures.
.8 Model security requirements
.9 Other: *(Identify additional Model management protocols to be addressed.)*

§ 4.8.3 Ongoing Responsibilities. The Project Participant responsible for managing the Model shall do so consistent with the Model management protocols, which shall also include the following ongoing responsibilities:

.1 Collect incoming Models:
  .1 Coordinate submission and exchange of Models
  .2 Create and maintain a log of Models received
  .3 Review Model files for consistency with Sections 4.8.2.1 through 4.8.2.5
  .4 Maintain a record copy of each Model file received
.2 Aggregate Model files and make them available for Authorized Uses
.3 Maintain Model Archives and backups consistent with the requirements of Section 4.8.4 below
.4 Manage Model access rights
.5 Other: *(Identify additional responsibilities.)*

§ 4.8.4 Model Archives. The individual or entity responsible for Model management as set forth in this Section 4.8 shall compile a Model Archive at the end of each Project milestone and shall preserve it without alteration as a record of Model completion as of that Project milestone.

§ 4.8.4.1 Additional Model Archive requirements, if any, are as follows:

§ 4.8.4.2 The procedures for storing and preserving the Model(s) upon final completion of the Project are as follows:

§ 4.9 Post-Construction Model. The services associated with providing a Model for post-construction use shall only be required if specifically designated in the table below as a Party's responsibility.
(Designate below any anticipated post-construction Model and related requirements, the Project Participant responsible for creating or adapting the Model to achieve such uses, and the location of a detailed description of the anticipated scope of services to create or adapt the Model as necessary to achieve such uses.)

Post-Construction Model	Applicability to Project *(Applicable or Not Applicable)*	Responsible Project Participant	Location of Detailed Description of Requirements and Services *(Section 4.10 below or in an attachment to this exhibit and identified below)*

Init. /

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§ 4.9.1	Remodeling	Not Applicable		
§ 4.9.2	Wayfinding and Mapping	Not Applicable		
§ 4.9.3	Asset/FF & E Management	Not Applicable	EDiS Company	
§ 4.9.4	Energy Management			
§ 4.9.5	Space Management			
§ 4.9.6	Maintenance Management			

§ 4.10 Insert a detailed description of the requirements for each Post-Construction Model identified in Section 4.9 and the anticipated services necessary to create each Post-Construction Model, if not further described in an attachment to this Exhibit.

ARTICLE 5 OTHER TERMS AND CONDITIONS

Other terms and conditions related to the transmission and use of Digital Data are as follows:

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SECTION 014500 - QUALITY CONTROL

1. DESCRIPTION

A. Quality control services include inspections and tests performed by independent agencies and governing authorities, as well as by the Contractor. Inspection and testing services are intended to determine compliance of the work with requirements specified. Specific quality control requirements are specified in individual specification sections.

2. RESPONSIBILITIES

A. Contractor Responsibilities: Except where indicated as being the Owner's responsibility, quality control services are the Contractor's responsibility, including those specified to be performed by an independent agency and not by the Contractor. The Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm to perform quality control services specified.

1. The Owner will engage and pay for services of an independent agency to perform the inspections and tests that are specified as Owner's responsibilities.

B. Retest Responsibility: Where results of inspections or test do not indicate compliance with Contract Documents, retests are the Contractor's responsibility.

C. Responsibility for Associated Services: The Contractor shall cooperate with independent agencies performing inspections or test. Provide auxiliary services as are reasonable. Auxiliary services include:

1. Provide access to the Work.

2. Assist taking samples.

3. Deliver samples to test laboratory.

D. Coordination: The Contractor and independent test agency shall coordinate the sequence of their activities and shall avoid removing and replacing work to accommodate inspections and test. The Contractor is responsible for scheduling time for inspections and tests.

E. Qualifications for Service Agencies: Contractor shall engage only inspection and test service agencies which are pre-qualified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories.

F. Submittals: Contractor shall submit a certified written report of each test, Inspection

or similar service, in duplicate to the Construction Manager. Contractor shall submit additional copies of each report to any governing authority, when the authority so directs.

G. Report Data: Written inspection or test reports shall include:

1. Name of testing agency or test laboratory.

2. Dates and locations of samples, tests or inspections.

3. Names of individual present.

4. Complete inspection of test data.

5. Test results.

6. Interpretations.

7. Recommendations.

H. Repair and Protection: Upon completion of inspection or testing, Contractor shall repair damaged work and restore substrates and finishes. Contractor shall comply with requirements for "Cutting and Patching."

I The 2013 IBC code the following testing is code required:

1. Structural tests and special inspections must be conducted by an approved agency (an agency or firm regularly engaged in conducting tests or furnishing inspection services, approved by the authority having jurisdiction.) This means that contractors will no longer be allowed to cast their own test cylinders for example.

2. Continuous special inspection (the full-time observation of work by an approved special inspector who is present until completion of the work) is required for any steel welds and connections. Critical elements may include: all slip critical bolted connections, complete and partial groove welds, multi-pass fillet welds and single pass fillet welds greater than 5/16".

3. Continuous special inspection is required during the placement of all concrete and shotcrete for the proper application techniques with a few exceptions.

4. Periodic special inspection (the part-time observation by an approved special inspector) is required for any steel welds and connections. Critical elements may include: all slip critical bolted connections, complete and partial groove welds, multi-pass fillet welds and single pass fillet welds greater than 5/16".

5. Spray applied fireproofing requires periodic special inspection for the structural member surface conditions, application, thickness, density and bond strength.

6. Based on the classification, occupancy, and design of the structure, the code requires periodic special inspection for placement of masonry units and reinforcing steel and continuous special inspection of grout placement.

END OF SECTION

SECTION 015113 - TEMPORARY ELECTRICITY

1. GENERAL

A. RELATED WORK SPECIFIED ELSEWHERE

1. Electrical Basic Materials and Methods, Division 26.

B. DESCRIPTION OF SYSTEM

1. Power Source

a. Suppliers: Delaware Electric Cooperative

b. The Construction Manager shall provide 277/480 volt, three phase, 60 cycle power service to the site from the existing service.

c. The Construction Manager will make all arrangements for bringing the power supply to the site and for installation of appropriate temporary transformers to provide for the power supply in 1.B.1.b, above.

d. The source will be adequate to service temporary electrical needs of the proposed construction.

2. Electrical Service

a. Contractor will be responsible to pay for all costs associated with providing electrical service from the power source to their respective site office, temporary storage facilities or temporary construction buildings as appropriate.

b. Prior to issuance of the Notice to Proceed for the electrical contract, the Construction Manager will be responsible for providing temporary electrical service as provided in 1.B.2.c, below. After issuance of the Notice to Proceed for the electrical contract, the Electrical Contractor shall become responsible for maintaining all electrical power supply and service facilities installed by the Construction Manager. The Electrical Contractor shall also, from that date forward, be responsible for providing and maintaining temporary electrical service to the site as provided in 1.B.2.c, below.

c. The Construction Manager or Electrical Contractor, as provided in 1.B.2.b, above, shall install temporary electric service for items below, throughout the construction period, such that power can be secured at any desired point with no more than a 60 foot extension:

(1) Power Centers for miscellaneous tools and equipment used in the construction work shall be provided with a minimum of four 20-amp, 120 volt grounding type outlets. Each outlet shall be provided with ground fault detecting circuit breaker protection.

(2) Adequate lighting for safe working conditions shall be provided and maintained on a 24 hour per day basis throughout the building, tunnels, and stairways per OSHA requirements. Each lamp must be rated at least 100 watts. Voltage of each socket must be at least 110 volts.

(3) Power for testing and checking equipment must be supplied.

3. Capacity

a. All electrical power supply and service lines installed shall be of adequate capacity for construction use by all trades during the construction period at the locations necessary.

b. The Electrical Contractor shall notify the Power Company if unusually heavy loads, such as welding units, are anticipated.

4. Power Costs

a. The Construction Manager will pay all costs of temporary electrical power used during construction.

b. The Owner will pay all costs of power used in the permanent wiring.

C. REQUIREMENTS AND REGULATORY AGENCIES

1. The Electrical Contractor will obtain permits as required by local governmental authorities.

2. The temporary electrical service shall comply with National Electrical Code, Latest Edition and applicable local codes and utility regulations.

D. USE OF PERMANENT SYSTEM

1. The Electrical Contractor shall regulate any part of the permanent electrical system which is used for construction purposes to prevent interference with safety and orderly progress of the Work.

2. Contractors shall leave permanent electrical services in a condition as good as

new and clean.

2. PRODUCTS

A. MATERIALS

1. General

a. The materials may be new or used, but must be adequate in capacity for the purposes intended and must not create unsafe conditions or violate the requirements of applicable codes.

2. Conductors

a. Use wire, cable, or busses of appropriate type, sized in accordance with the National Electrical Code for the applied loads.

b. Use only UL labeled wire and devices.

B. EQUIPMENT

1. Provide appropriate enclosure for the environment in which used in compliance with NEMA standards.

3. EXECUTION

A. GENERAL

1. Install all work with a neat and orderly appearance.

2. Make structurally sound throughout.

3. Maintain to give continuous service and to provide safe working conditions.

4. Modify temporary power and light installation as job progress requires.

B. INSTALLATION

1. Locate so that interference with storage areas, traffic areas and work under other Contracts is avoided.

C. REMOVAL

1. Remove all temporary equipment and materials completely upon completion of construction.

2. Repair all damage caused by the installation and restore to satisfactory condition.

END OF SECTION

SECTION 015123 - TEMPORARY HEATING, COOLING AND VENTILATING

1. GENERAL

A. RELATED REQUIREMENTS SPECIFIED ELSEWHERE

1. Temporary Electric: Section 015113

2. Temporary Facilities: Section 015200

3. Heating Requirements for Cold Weather Installation and Protection of Materials: Respective specification section for each item of work.

B. DEFINITIONS

1. Temporary Enclosures: Sufficient preliminary enclosures of an area of structure, or of an entire building, to prevent entrance or infiltration of rain water, wind or other elements and which will prevent undue heat loss from within enclosed area.

2. Permanent Enclosure: Stage of construction at which all moisture and weather protection elements of construction have been installed in accordance with Contract Documents, either for a portion of structure, or for an entire building.

C. DESCRIPTION OF SYSTEM

1. Prior to the building or portion of building being permanently enclosed, the contractor shall provide temporary heat and ventilation and weather protection necessary for its work, as described below. After permanent enclosure, the Construction Manager will arrange for and coordinate temporary heat and ventilation in enclosed areas required to:

a. Facilitate progress of Work.

b. Protect Work and products against dampness and cold.

c. Prevent moisture condensation on surfaces.

d. Provide suitable ambient temperatures and humidity levels for installation and curing of materials.

e. Provide adequate ventilation to meet health regulations for safe working environment.

2. Temperatures Required

   a. Generally, 24 hours a day: Minimum of 40 degrees F.

   b. 24 hours a day during placing, setting and curing of cementitious materials: As required by specification section for each product.

   c. 24 hours a day, seven days prior to, and during, placing of interior finishes: woodwork, resilient floors, painting and finishing: As required by specification section for each product.

   d. 24 hours a day after application of finishes, and until Substantial Completion: Minimum of 50 degrees F.

3. Ventilation Required:

   a. Contractors shall prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction.

      (1) Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas.

      (2) Dispose of exhaust materials in manner that will not result in harmful dispersal of hazardous substances into atmosphere of occupied areas.

      (3) Continuously ventilate storage spaces containing hazardous or volatile materials.

      (4) Contractor must provide and use equipment which is furnished with Exhaust Purifiers/Scribbers or is electrically power driven when any such equipment produces airborne containments and will be used in an enclosed building.

      (5) The Contractor shall verify air quality by the use of air monitoring equipment and document the verified air quality on the daily report. The monitoring equipment shall, at a minimum, be designed with an auditory alarm and shall provide continuous monitoring of those four gasses, Oxygen, Hydrogen Sulfide, Carbon Monoxide and Combustible gasses.

4. Contractors shall provide adequate ventilation for:

   a. Curing installed materials.

   b. Dispersal of humidity.

c. Temporary sanitary facilities.

5. Duration of Operations:

a. For Personnel:

(1) At all times personnel occupy an area subject to hazardous accumulations of harmful elements.

(2) Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.

b. For curing installed materials: As required by specification section for respective materials.

c. For humidity dispersal: Continuously ventilate to provide suitable ambient conditions for work.

d. The Contractor shall maintain supervision and operation of temporary heating and ventilating equipment in order to:

(1) Enforce conformance with applicable codes and standards.

(2) Enforce safe practices.

(3) Prevent abuse of services.

D. COSTS OF INSTALLATION AND OPERATION

1. The Contractor shall be responsible for all installation and operating costs for any heat and ventilation as required in this section until the permanent HVAC system is in operation.

2. After the permanent HVAC system is operational, the Owner will pay the costs of fuel for temporary heat and ventilation. The Contractor will pay the costs for maintaining the system until final acceptance by the Owner.

3. The Contractor shall be responsible for all installation and operating costs for any heat required to supplement that which is to be supplied by the Construction Manager in 1.C.1, above.

E. REQUIREMENTS OF REGULATORY AGENCIES

1. The Construction Manager will obtain and pay for permits as required by

governing authorities for those activities required by this Section.

2. Contractor shall comply with Federal, State and local codes, and utility company regulations.

2. PRODUCTS

A. MATERIALS

1. General

a. Materials may be new or used, but must be adequate for purposes intended and must not create unsafe conditions nor violate requirements of applicable codes.

B. EQUIPMENT

1. Standard products, meeting code requirements.

2. Provide required facilities, including piping, wiring and controls.

3. Portable Heater: Standard Units, meeting code requirements.

a. Safety Controls against explosion, overheating, and carbon monoxide build up.

b. Vent direct-fired units to outside.

c. Provide adequate combustion air.

4. Oil-Fired heaters will not be allowed.

3. EXECUTION

A. GENERAL

1. Comply with applicable sections of Division 15 - Mechanical.

2. Install work in neat and orderly manner.

3. Make structurally, mechanically and electrically sound throughout.

4. Maintain to give safe, continuous service at required times and to provide safe working conditions.

5. Modify and extend system as work progress requires.

B. INSTALLATION

1. Locate units to provide equitable distribution of heat and air movements.

2. Locate to avoid interference with, or hazards to:

   a. Work or movement of personnel.

   b. Traffic areas.

   c. Materials handling.

   d. Storage areas.

   e. Work of other Contractors.

   f. Finishes.

C. OPERATION OF PERMANENT EQUIPMENT

1. The Construction Manager will coordinate with Contractor.

2. The Contractor will place permanent HVAC system in operation only upon written authorization by the Construction Manager.

3. Before operating the permanent HVAC equipment, the Contractor shall confirm to the Construction Manager that:

   a. Inspection has been made by proper authorities.

   b. Systems, equipment piping, strainers, filters and associated operating items are sufficiently complete, cleaned, and ready for operation.

   c. Controls and safety devices are complete and tested, or adequate temporary controls are provided.

   d. Before operating the permanent HVAC equipment, the Contractor shall install temporary filters:

      (1) For air handling units.

      (2) For permanent ducts.

D. REMOVAL

1. The Contractor shall completely remove temporary materials and equipment when no longer required, or on completion of construction.

2. The Contractor shall clean and repair damage caused by temporary installation, and restore equipment to specified or original condition.

3. The Contractor shall remove temporary filters and install new filters, or clean permanent filters, in the permanent HVAC system prior to final acceptance by the Owner.

END OF SECTION

SECTION 015200 - CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

1. GENERAL

A. DESCRIPTION

1. Construction Manager and Contractors shall provide all temporary facilities throughout the construction period unless otherwise indicated in the Contract Documents.

2. Construction Manager and Contractors shall pay all costs for providing, maintaining and removing of all temporary facilities unless otherwise indicated in the Contract Documents.

B. RELATED WORK SPECIFIED ELSEWHERE

1. Temporary Electric: Section 015113.

2. FACILITIES

A. TEMPORARY SANITATION FACILITIES

1. Construction Manager will provide and maintain sanitary facilities for all personnel on the project.

2. The number of sanitary facilities required shall be based on the total number or workers employed on the site and shall be in accordance with the provisions of the applicable code.

3. Construction Manager will maintain sanitary facilities in a sanitary and clean condition at all times.

B. TEMPORARY WATER

1. Drinking Water: Contractor shall provide potable water for drinking purposes for all his personnel on the site. He shall furnish disposable drinking cups at water stations. Each water station shall be equipped with a suitable trash container for disposal of the drinking cups.

2. Construction Water: Contractor will provide and maintain tap locations for construction water of sufficiently pure and potable quality to avoid deleterious effect on any materials used. Location of construction water tap locations will be determined by the Construction Manager. Contractor shall provide and maintain all hoses, piping and valves as required for obtaining construction water from taps provided by the Construction Manager.

C. TEMPORARY TELEPHONES

1. Construction Manager will not provide any telephones or fax machines for Contractor's personnel. Each Contractor is responsible for its own phones and fax machines.

D. FIELD OFFICE

1. During the period of the Work and until final acceptance of the project, the Construction Manager will provide a weatherproof building for the Construction Manager's Field Project Manager(s) and Superintendent(s). Contractor shall make provisions for its own field office, subject to approval by the Construction Manager.

E. FIRE PROTECTION

1. The Carpentry & General Work Contractor will provide and maintain portable fire extinguishers on each floor level and building area. Number to conform to applicable codes.

2. Contractor shall provide additional fire extinguishers as required by OSHA regulations for its work.

3. Fire extinguishers shall be 10lb, Multi-Purpose (ABC) dry chemical, UL labeled, with a rating of 3a:40bc.

F. ACCESS ROADS AND PARKING AREAS

1. The Utility & Sitework Contractor will provide and maintain access roads on the site.

2. Parking for Contractor's personnel on the project site will be at locations determined by the Owner and Construction Manager. Parking at locations other than designated areas is PROHIBITED.

G. STORAGE AREAS

1. The Construction Manager will assign storage areas on the site. Storage areas are extremely limited and will be assigned in a manner which will best facilitate the work.

2. Contractor shall provide all other storage space required for its work at off-site locations.

3. All combustible or flammable materials must be safely stored in a secured area in strict accordance with regulations, codes and laws enforced by local, State or

Federal agencies, whatsoever is the most stringent.

H. FIRST AID STATION

1. The Contractor's Superintendent or Safety Supervisor shall insure that adequate first aid supplies are available, and that personnel are qualified to administer first aid/CPR, as required by State and/or Federal regulations.

I. SECURITY

1. The Construction Manager will provide the following security measures at the site: security lighting will be provided.

2. All other safety and security measures shall be the responsibility of each Contractor. These measures shall include but are not limited to the provision of secured storage for tools, construction equipment, and materials and equipment scheduled for installation in the building.

J. BENCH MARKS AND BASELINE

1. The Construction Manager will lay out and establish and maintain bench marks and baselines.

2. The Contractor shall lay out his own work and shall be responsible for the accuracy of same.

3. Contractor shall check grades, lines, levels and dimensions as shown on the drawings and shall promptly report errors or inconsistencies in same to the Construction Manager before Work proceeds.

4. The Contractor is responsible for damaging or altering the bench marks and baselines established by the Construction Manager and shall bear the costs of replacing same.

K. FIELD OFFICE AND STORAGE TRAILERS

1. Contractor shall provide and maintain its own field office and storage trailers as required.

2. Contractor shall provide temporary heat and power for its field office and storage trailer.

3. Contractor’s field offices and storage trailers shall be located as directed by the Construction Manager.

L. PROJECT SIGN

1. The Construction Manager will provide a Project Sign naming the major participants, as determined by the Owner.

M. TRASH DISPOSAL

1. Each Contractor shall be responsible for daily clean up and depositing its common trash in the dumpsters provided by the Construction Manager.

2. The Construction Manager will not provide a trash chute.

3. The Construction Manager will provide dumpsters, and will arrange for disposal of common, non-hazardous, work-related trash deposited in these dumpsters. Contractors will not use the owner's dumpsters.

N. HOISTING

1. Contractor shall provide its own materials hoists and cranes. No personnel hoist will be provided.

O. SCAFFOLDING AND WORKING PLATFORMS

1. No scaffolding shall be provided by the Construction Manager. Each Contractor shall provide all scaffolding required to perform its Work.

P. SAFETY BARRICADES AND RAILINGS

1. The Contractor creating the hazard shall provide barricades **and protective barriers** around stairs, shafts and cut openings in floors and roofs, and edges of floors and roofs. The methods and materials used in barricading shall be in accordance with OSHA and local code regulations. Barricades and protective barriers will be installed immediately after the installation of the floor slab on any level or part of a level on the Building. When a warning barricade is used to prohibit employees from entering a restricted work area. The "warning barricade" shall meet the requirements of CFR 1926.502 (f)(2). The supported rope, wire, or chain shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material and maintain between 34 and 39 inches above the walking/working surface; Warning signs and tags shall be used in accordance with Subpart G of CFR OSHA Construction Industry Regulations.

2. After the barricades and protective barriers are no longer needed, the Structural Contractor will remove the barricades from the site. The Construction Manager will determine the location and scheduling of barriers to be removed.

3. Contractor shall provide for its own barricades at all other trenches, excavations, and locations not specifically identified in Paragraph 1 above.

4. Contractors who remove barricades shall be responsible for replacing them. If, after proper notification, in writing, from the Construction Manager the responsible Contractor does not correct his deficiencies in safety barricade placement, the Construction Manager reserves the right to undertake this work and backcharge the responsible Contractor(s).

5. During the execution of his work, Contractor will provide daily maintenance of, and upon completion of same, restore all barricades in a manner acceptable to prevailing safety standards enforced by local, State or Federal ordinance, whatsoever is most stringent. The intent is to leave no floor penetration or perimeter opening in an unsafe condition.

Q. PUMPING AND DRAINAGE

1. Contractor shall provide its own pumping and drainage.

2. When an area is released by one Contractor to another, the Contractor releasing an area shall be responsible for leaving it in a drained condition. The incoming Contractor shall assume responsibility for drainage on the day that he is scheduled to start work in the area. If the incoming Contractor is late in starting work, he shall assume responsibility for pumping and drainage arising as a result.

R. TEMPORARY BUILDING ENCLOSURES

1. The Construction Manager will equip all temporary exterior doors of the building with self-closing hardware and padlocks.

2. All other temporary enclosures and protection shall be provided by the Contractor requiring the protection.

3. Temporary enclosures required due to late delivery of materials or untimely installation of work shall be the responsibility of the Contractor responsible for the delay.

S. TEMPORARY POWER AND LIGHTING

1. Contractor shall provide all extension cords and outlets as required for obtaining electric power from power centers. Refer to Section 015113 - TEMPORARY ELECTRIC.

2. Contractor shall provide its own additional temporary lighting of sufficient lighting levels to properly install his work.

T. TEMPORARY HEAT

1. Contractor shall provide temporary heat as required for its operations. Once a building has reached the "Permanent Enclosure" stage, temporary heat will be provided as specified in Section 015123 - TEMPORARY HEAT AND VENTILATION.

2. Equipment and methods of temporary heating shall be reported to the Construction Manager.

U. PROTECTION OF ADJACENT MATERIALS

1. Contractor shall protect adjacent materials and finishes from damage as a result of its work.

V. CLEAN UP

1. Contractor shall arrange for clean up and removal of debris resulting from its operations, and shall dispose of debris in accordance with the provisions of Paragraph 2.M above. Clean up shall be on a continual basis to ensure that building, grounds and public properties are maintained free from accumulations of waste materials and trash.

2. The Contractor will limit use of and ensure that all materials, including waste, that are combustible or flammable will be removed from the building continually, as work progresses, **and at a minimum** at the end of each work day. All trash which is potentially edible or may attract rodents or insects will be disposed of in metal containers and removed by the end of the work day.

3. At completion of its Work, each Contractor shall remove waste materials, rubbish, tools, equipment, and clean up all exposed surfaces in preparation for final cleaning.

4. If, after notification in writing from the Construction Manager, the Contractor does not correct its deficiencies in housekeeping within twenty four (24) hours, the Construction Manager reserves the right to undertake the Work and to backcharge the Contractor.

5. Final clean up prior to Owner occupancy shall be arranged for by the Construction Manager.

W. DUST PROTECTION

1. Contractor shall erect and maintain dust proof protection whenever its operations will produce dust and dirt that might filter through the building into occupied or finished areas. Contractor shall be responsible for all cleaning required due to its failure to provide adequate dust protection.

X. PROTECTION OF EXISTING CONSTRUCTION

1. Contractor shall be responsible for all damage that it may cause to materials and equipment stored or installed by other Contractors.

Y. OTHER

1. Contractor shall provide any other Temporary Facilities and services that it requires and which are not specifically identified above.

3. PERMITS

3.1 The Construction Manager will obtain the Building Permit. All other permits are to be obtained and paid for by the Contractor requiring them.

4. EXECUTION

A. GENERAL

1. Contractor shall install all temporary facilities in accordance with applicable codes.

2. Contractor shall maintain temporary facilities for which it is responsible throughout the construction period.

3. Contractor shall remove all temporary facilities for which it is responsible when they are no longer required or when the Construction Manager directs the removal of same.

4. Contractor shall repair all damage to the Project Site caused by the installation of its temporary facilities.

END OF SECTION

SECTION 016200 - MATERIAL AND EQUIPMENT

1. GENERAL CONDITIONS

A. The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary and other Conditions, if any) and Division 1 as appropriate apply to the Work specified in this Section.

B. Where work is to be executed under Separate Prime Contracts, the provisions of this Section apply to each Contract.

2. REQUIREMENTS INCLUDED

A. All materials and equipment incorporated into the Work shall:

1. be new;

2. conform to applicable specifications and standards; and

3. comply with size, make, type and quality specified, or as specifically approved in writing by the Architect.

B. Manufactured and Fabricated Products shall conform to the following requirements:

1. Designed, fabricated and assembled in accord with the best engineering and shop practices.

2. Manufactured like parts of duplicate units to standard sizes and gauges, to be interchangeable.

3. Two or more items of the same kind shall be identical, by the same manufacturer.

4. Products shall be suitable for service conditions.

5. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

C. Contractor shall not use materials or equipment for any purpose other than that for which it is designated or is specified.

D. Materials removed form existing structures shall not be reused in the completed work unless specifically indicated or specified.

E. For materials and equipment specifically indicated or specified to be reused in the Work:

1. Contractor shall use special care on removal, handling storage and reinstallation, to assure proper function in the completed Work.

2. Arrange for transportation, storage and handling of products which require off-site storage, restoration or renovation. Pay all costs for such work.

3. MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, Contractor shall obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Construction Manager.

1. Maintain one set of complete instructions at the job site during installation and until completion.

B. Contractor shall handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, Contractor shall consult with Construction Manager for further instructions.

2. Contractor shall perform work in accord with manufacturer's instructions. Contractor shall not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

4. TRANSPORTATION AND HANDLING

A. Contractor shall arrange deliveries of Products in accord with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver Products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Contractor shall immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that Products are properly protected and undamaged.

B. Contractor shall provide equipment and personnel to handle Products by methods to prevent soiling or damage to Products or packaging.

5. STORAGE AND PROTECTION

A. Contractor shall store Products in accord with manufacturer's instructions, with seals and labels intact and legible.

1. Contractor shall store Products subject to damage by the elements in weathertight enclosures.

2. Contractor shall maintain temperature and humidity within the ranges required by manufacture's instructions.

B. Exterior Storage

1. Contractor shall store fabricated Products above the ground, on blocking or skids, to prevent soiling or staining. Cover Products which are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

2. Contractor shall store loose granular materials in a well-drained area on soiled surfaces to prevent mixing with foreign matter.

C. Contractor shall arrange storage in a manner to provide easy access for inspection. Contractor shall make periodic inspections of stored Products to assure that Products are maintained under specified conditions, and free from damage or deterioration.

D. Contractor shall store flammable materials so as to prevent contact with flames and fire. Conform with manufacturer's recommendations and local laws. Pay particular attention to storage of:

1. Roof insulation.

2. Roofing materials, including solvents.

3. Paint materials.

4. Cleaning and other solvents.

5. Fuels.

E. Protection after Installation:

1. Contractor shall provide substantial coverings as necessary to protect installed Products from damage from traffic and subsequent construction operations. Remove when no longer needed.

6. <u>SUBSTITUTIONS AND PRODUCT OPTIONS</u>

A. Product List.

1. Within 30 days after Contract Date, Contractor shall submit to Construction Manager a complete list of major products proposed to be used, with the name of the manufacturer and the installing Contractor.

B. Contractor's Options.

1. For Products specified only by reference standard, Contractor shall select any Product meeting that standard.

2. For Products specified by naming several Products or manufacturers, Contractor shall select any one of the Products or manufacturers named which complies with the specifications.

3. For Products specified by naming one or more Products or manufacturers and "or equal", Bidders must, during the bidding period, submit a request for substitutions for any Product or manufacturer not specifically named. See provisions in Paragraph 6.C, below.

4. For Products specified by naming only one Product and manufacturer, there is no option; and Contractor shall provide the precise Product specified.

C. Substitutions.

1. Until a date no later than seven (7) days before the date Bids are due, Architect will consider written requests from bidders for substitution of Products. **The contractor will submit any substitution requests to the Construction Manager for transmittal to the Architect. The** architect will review requests and will notify Bidders in an Addendum if the requested substitution is acceptable.

2. Should the Bidder desire a substitution, it shall submit a separate request for each Product, supported with complete data, with drawings and samples as appropriate, including:

a. Comparison of the qualities of the proposed substitution with that specified.

b. Changes required in other elements of the Work because of the substitution.

c. Effect on the construction schedule.

d. Cost data comparing the proposed substitution with the Product specified.

e. Any required license fees or royalties.

f. Availability of maintenance service, and source of replacement materials.

3. Architect, in its sole discretion, shall be the judge of the acceptability of the proposed substitution.

4. A request for a substitution constitutes a representation that Bidder:

a. has investigated the proposed Product and determined that it is equal to or superior in all respects to that specified;

b. will provide the same warranties or bonds for the substitution as for the Product specified;

c. will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the Work complete in all respects; and

d. waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

D. Architect will review requests for substitutions with reasonable promptness, and notify Bidders, in writing, through the Construction Manager, of the decision to accept or reject the requested substitution. Any decision to accept a substitution must be confirmed in an Addendum issued during the bidding period in order to be valid. Oral approvals will not be binding.

END OF SECTION

SECTION 017329 - CUTTING AND PATCHING

1. GENERAL

A. Definition: "Cutting and Patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

B. Refer to Other Sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

C. Structural Work: Do not cut and patch structural work in a manner resulting in a reduction of load carrying capacity or load deflection ratio. Submit proposal and request and obtain Architect's/Engineer's approval before proceeding with cut and patch of structural work.

D. Operational/Safety Limitations: Do not cut and patch operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance. Submit proposals and requests and obtain Architect's/Engineer's approval before proceeding with cut and patches of structural work.

E. Visual/Quality Limitations: Do not cut and patch work exposed to view (exterior and interior) in manner resulting in noticeable reduction of aesthetic qualities and similar qualities, as judged by Architect/Engineer.

1. Engage the original Installer/Fabricator, or (if not available) an acceptable equivalent entity, to cut and patch the following categories of exposed work but not limited to
2. Exterior wall materials, ie., curtain wall
3. Finish floor materials, ie., substrate, carpet, ceramic tile
4. Walls
5. Ceilings

F. Limitation on Approvals: Architect's/Engineer's approval to proceed with cutting and patching does not waive right to later acquire removal/replacement of work found to be cut and patched in an unsatisfactory manner, as judged by Architect/Engineer.

2. MATERIALS

A. General: Use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal or better

performance characteristics.

3. EXECUTION

A. Inspection: Before cutting, examine surfaces to be cut and patched and conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

B. Temporary Support: To prevent failure provide temporary support of work to be cut.

C. Protection: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

1. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

2. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

D. Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

1. Where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut and drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

E. Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

1. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and finishing.

END OF SECTION

SECTION 017700 – CONTRACT CLOSEOUT

1. DESCRIPTION OF REQUIREMENTS

A. Provisions of this section apply to the procedural requirements for the actual close out of the Work, not to the administrative matters such as final payment or the change over of insurance. Close out requirements relate to both substantial and final completion of the Work; they also apply to individual portions of completed work as well as the Total work. Specific requirements contained in other sections have precedence over the general requirements contained in this section.

2. PROCEDURES AT SUBSTANTIAL COMPLETION

A. Prerequisites: Contractor shall comply with the General Conditions and complete the following before requesting inspection of the Work, or a designated portion of the Work, for certification of substantial completion:

1. submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates, releases of liens, tax certification and similar required documentation for specific units of work, and documents needed to enable Owner's unrestricted occupancy and use;

2. submit record documentation, maintenance manuals, tools, spare parts, keys and similar operational items;

3. complete instructions of Owner's operating personnel, and start up of systems; and

4. complete final cleaning and remove temporary facilities and tools.

B. Inspection Procedures: Upon receipt of Contractor's request, Architect/Engineer will either proceed with inspection or advise Construction Manger of prerequisites not fulfilled. Following initial inspection, Architect/Engineer will either prepare certificate of substantial completion, or advise Construction Manager of work which must be performed prior to issuance of certificate. The Architect/Engineer will repeat the inspection when requested and assure that the work has been substantially completed. Results of the completed inspection will form the initial "punch list" for final acceptance.

C. Punch List Procedures: Each Contractor shall be given a copy of the punch list with its appropriate work identified. Each Contractor shall be given 9 (nine) calendar work days to complete their punch list work. On the 10th day or as determined by the Construction Manager the Construction Manager shall employ other Contractors, as required, to complete any incomplete punch list work and retain from the appropriate Contractors retainage all costs incurred.

3. PROCEDURES AT FINAL ACCEPTANCE

A. Reinspection Procedure: The Architect/Engineer will reinspect the Work upon receipt of the Contractor's notice that, except for those items whose completion has been delayed due to circumstances that are acceptable to the Architect/Engineer, the Work has been completed, including punch list items from earlier inspections. Upon completion of reinspection, the Architect/Engineer will either recommend final acceptance and final payment, or will advise the Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, this procedure will be repeated.

4. RECORD DOCUMENTATION

A. Record Drawings: Contractor shall maintain a complete set of either blue or black line prints of the contract documents and shop drawings for record mark up purposes throughout the Contract Time. Contractor shall mark up these drawings during the course of the Work to show both changes and the actual installation, in sufficient detail to form a complete record for Owner's purposes giving particular attention to work that will be concealed and difficult to measure and record at a later date, and Work which may require servicing or replacement during the life of the project. Require the entities marking prints to sign and date each mark up. Bind prints into manageable sets, with durable paper cover, appropriately labeled.

B. Installation, Operation and Maintenance Manual: Contractor shall provide 3-ring vinyl covered binders containing required maintenance manuals, properly identified and indexed and including operating and maintenance instructions extended to cover emergencies, spare parts, warranties, inspection procedures, diagrams, safety, security, and similar appropriate data for each system of equipment item.

C. State Tax Certification: Contractor shall provide recent Delaware State Tax Certification form as issued by State of Delaware, Department of Finance, Division of Revenue, Carvel State Office Building, 820 N. French Street, Wilmington, Delaware 19801.

D. AIA Documents: Contractors shall provide the following AIA documents with their final payment application submission:
- AIA G732, Application for Payment for 100% Complete
- AIA G732, Final Application for Payment for Retainage
- AIA G704-CMA, Certificate of Substantial Completion – 4 originals
- AIA G706, Affidavit of Payment of Debts & Claims
- AIA G706A, Affidavit of Release of Liens
- AIA G707, Consent of Surety

E. Release of Liens: Contractors shall provide the following release of liens with their final payment application submission:

- Prime Contractor's Release of Liens
- Subcontractors' & Suppliers' Release of Liens (major subs and suppliers)

5. GENERAL CLOSE OUT REQUIREMENTS

A. Operator Instruction: Contractor shall require each Installer of systems requiring continued operation and maintenance by Owner's operating personnel, to provide on location instruction to Owner's personnel, sufficient to ensure safe, secure, efficient, non-failing utilization and operation of systems. Contractor shall provide instructions for the following categories of work:

1. Mechanical/electrical/electronic systems (not limited to work of Division 15 and 16).
2. Roofing, flashing, joint sealers.
3. Floor finishes.
4. Door hardware

6. FINAL CLEANING

A. At the time of project close out Contractor shall clean or re-clean the Work to the condition expected from a normal, commercial building cleaning and maintenance program. Complete the following cleaning operations before requesting the Architect/Engineer's inspection for certification of substantial completion:

1. Remove non-permanent protections and labels.
2. Polish glass.
3. Clean exposed finishes.
4. Touch up minor finish damage.
5. Clean or replace mechanical systems filters.
6. Remove debris.
7. Broom clean unoccupied spaces.
8. Sanitize plumbing and food service facilities.
9. Clean light fixtures and replace burned out lamps.
10. Sweep and wash paved areas.
11. Police yards and grounds.

END OF SECTION

SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Cabinet hardware.

C. Preparation for site finishing.

1.02 RELATED REQUIREMENTS

A. Section 09 9123 - Interior Painting: Site finishing of cabinet exterior.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
2. Provide the information required by AWI/AWMAC/WI (AWS).

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.

E. Samples: Submit actual sample items of proposed hinges, shelf standards, and push latches, demonstrating hardware design, quality, and finish.

1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.07 MOCK-UP

A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware and finishes.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.09 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 CABINETS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI (AWS) for Premium Grade.

B. Wood Veneer Faced Cabinet:
   1. Exposed Surfaces: HPVA Grade A, White Oak, plain sliced, book-matched.
   2. Semi-Exposed Surfaces: HPVA Grade A, White Oak, plain sliced, pleasing-matched.
   3. Concealed Surfaces: HPVA Grade B, White Oak, plain sliced, random-matched.

C. Cabinets:
   1. Finish - Exposed Exterior Surfaces: Wood.
   2. Finish - Exposed Interior Surfaces: Wood.
   3. Finish - Concealed Surfaces: Wood.
   4. Grained Face Layout for Cabinet and Door Fronts: Style and Rail, all Grades.
      a. Drawer fronts run grain either vertically or horizontally at the manufacturer's option.
      b. Doors: Vertical grain.
   5. Cabinet Design Series: As indicated on drawings.
   6. Adjustable Shelf Loading: 50 lbs. per sq. ft..

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.03 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

2.04 HARDWARE

A. Catches: Touch type.
   1. Product: Magnetic Latch 20125LP manufactured by Saint Louis Design.

B. Hinges: Butt type, powder coated black.
   1. Products:
      a. Hafele America Co.; Five knuckle hinge, Grade 1.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 SITE FINISHING MATERIALS

A. Stain and Finishing Materials: As required by AWI/AWMAC/WI Architectural Woodwork Standards (AWS).

2.06 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
   1. Provide balance matchedpanels at each elevation.
   2. Provide sequence matching across each elevation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use concealed joint fasteners to align and secure adjoining cabinet units.

C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

D. Secure cabinets to floor using appropriate angles and anchorages.

E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 09 6429
HISTORIC WOOD STRIP FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood strip flooring, glued.
   1. Historic and non-historic areas.

B. Self-leveling underlayment.

1.02 ALTERNATES

A. Provide an alternate price for historic wood floor material described in Part 2.

1.03 REFERENCE STANDARDS

A. NWFA (IG) - Installation Guidelines; National Wood Flooring Association; current edition located at www.nwfa.org.

B. NWFA/NOFMA Certified Flooring: graded in accordance with the NWFA/NOFMA specifications set forth in the "Official Flooring Grading Rules."

C. SPIB (Southern Pine Inspection Bureau): Standard Grading Rules for Southern Pine Lumber.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for flooring and accessories and underlayment.

C. Samples: Submit two samples 24 by 24 inch in size illustrating floor finish, color, and sheen.

D. Submit manufacturer's certification of compatability of primer with existing asbestos encapsulation material.
   1. Existing encapsulation material: Fiberlock ABC Asbestos Binding Compound.

E. Installation Instructions: Indicate standard and special installation procedures, perimeter conditions requiring special attention, and manufacturer's recommendations for accessory products.

F. Maintenance Data: Include maintenance procedures.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with NWFA (IG).

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing work of this section with minimum five years experience.

1.06 FIELD CONDITIONS

A. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized at maximum moisture content of 40 percent.

B. Provide heat, light, and ventilation prior to installation.

C. Store materials in area of installation for minimum period of 24 hours prior to installation.

D. Maintain minimum room temperature of 65 degrees F for a period of two days prior to delivery of materials to installation space, during installation, and after installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wood Strip Flooring - Type Historic:
   1. Species: Southern Yellow Pine.
   2. Grade: B & B.
   3. Cut: Edge or Vertical grain.
   4. Moisture Content: 7 to 9 percent.
   5. Actual Thickness: 3/4 inch.
   6. Actual Width: 2-1/4 inches.
   7. Edge: Tongue and Groove.
   8. End: Square.
   9. Material Source:
      a. Longleaf Lumber Inc., 115 Fawcett Street, Cambridge, MA 02138.
      b. Derr Flooring Co., 525 Davisville Road, Willow Grove, PA 19090
   10. Alternate Material:
      a. Species: Southern Yellow Pine
      b. Grade: C.

B. Wood Strip Flooring - Type General:
   1. Species: White oak.
   2. Grade: Clear.
   3. Cut: Quarter sawn.
   4. Actual Thickness: 3/4 inch.
   5. Actual Width: 2-1/4 inches.
   6. Edge: Tongue and Groove.
   7. End: Square.

2.02 ACCESSORIES

A. Adhesive:
   1. Basis of Design: Ultra-Set Singlestep2 as manufactured by Bostik, Inc.

B. Self-Leveling Cementitious Underlayment:
   1. Basis of Design: Level 1 as manufactured by CMP Speciality Products (A Division of CGM, Inc.), 1445 Ford Road, Bensalem, PA 19020; www.cmpsp.com
      a. Primer: AS-100 as manufactured by CMP Speciality Products (A Division of CGM, Inc.)

C. Membrane Reinforcing:
   1. Basis of Design: Medimat as manufactured by CMP Speciality Products (A Division of CGM, Inc.).

D. Substitutions: Products submitted for substitution must be approved prior to final addendum.
   1. Products must prove compatability with existing substrates and asbestos encapsulation material, and between self-leveling underlayment and adhesive.

2.03 SOURCE QUALITY CONTROL

A. Inspect and stamp species and grade on underside of each piece of wood flooring at factory.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that required floor-mounted utilities are in correct location.

C. Verify testing of primer and existing asbestos encapsulation material has confirmed compatability.

3.02 PREPARATION

A. Prepare substrate to receive wood flooring in accordance with manufacturer's instructions.

B. Provide self-leveling underlayment over existing subfloor.
   1. Apply primer over existing subfloor. Follow manufacturer's instructions.
   2. Shot blast or mechanically abrade surface of self-leveling underlayment to create a concrete surface profile CSP1-3, (similar to a broom finish).

C. Broom clean substrate.

3.03 INSTALLATION

A. Wood Flooring:
   1. Install in accordance with manufacturer's instructions for adhesive attachment of wood flooring to cenemtitious self-leveling underlayment.
   2. Lay flooring in patterns indicated on drawings. Verify alignment as work progresses.
   3. Arrange flooring with square ends set flush and tight.
   4. Install edge strips at unprotected or exposed edges, and where flooring terminates.
   5. Install flooring tight to floor access covers.
   6. Provide 1/2 inch expansion space at fixed walls and other interruptions.

B. Finishing:
   1. Mask off adjacent surfaces before beginning sanding.
   2. Sand flooring to smooth even finish with no evidence of sander marks. Take precautions to contain dust. Remove dust by vacuum.
   3. Apply finish in accordance with floor finish manufacturer's instructions.
      a. Stain: DriFast Stain as manufactured by Bona.
         1) Custom Color: To be selected
      b. Finish: Bona Traffic HD as manufactured by Bona.
         1) Sheen: Extra Matte.

3.04 CLEANING

A. Clean floor surfaces in accordance with floor finish manufacturer's instructions.

B. Prepare floor surface to receive floor finish.

3.05 PROTECTION

A. Prohibit traffic on floor finish for 7 days after installation.

B. Place protective coverings over finished floors; do not remove coverings until Substantial Completion.

END OF SECTION

SECTION 12 3400
LAMINATE CLAD CASEWORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Refer to Scope Information Sheets for this contract bound in the Project Manual under Section 01 1000, Summary of Work. The Scope Information Sheets describe generally the work included in each contract, but the work is not necessarily limited to that described.

B. Fixed modular laminate clad casework and components.

1.02 RELATED SECTIONS

A. Section 06100: Blocking within walls where indicated.

B. Division 9: Base molding.

C. Section 12 3600: Countertops and backsplashes.

1.03 DEFINITIONS

A. Identification of casework components and related products by surface visibility.
   1. Open Interiors: Any open storage unit without solid door or drawer fronts, units with full glass insert doors and/or acrylic doors, and units with sliding solid doors.
   2. Closed Interiors: Any closed storage unit behind solid door or drawer fronts.
   3. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
   4. Other Exposed Surfaces: Faces of doors and drawers when closed, and tops of cabinets less than 72 inches above furnished floor.
   5. Semi-Exposed Surfaces: Interior surfaces which are visible, bottoms of wall cabinets and tops of cabinets 72 inches or more above finished floor.
   6. Concealed Surfaces: Any surface not visible after installation.

1.04 QUALITY ASSURANCE

A. Manufacturer: Minimum of 5 years experience in providing manufactured casework systems for similar types of projects, produce evidence of financial stability, bonding capacity, and adequate facilities and personnel required to perform on this project.

B. Manufacturer: Provide products certified as meeting or exceeding ANSI-A 161.1-2000 testing standards.

1.05 SUBMITTALS

A. Comply with Section 01 3000, unless otherwise indicated.

B. Product Data: Manufacturer's catalog with specifications and construction details.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.
   1. Include section drawings of typical and special casework, work surfaces and accessories.
   2. Indicate locations of plumbing and electrical service field connection by others.

D. Component samples: Two sets of samples for each of the following:
   1. Decorative laminate color charts.
   2. PVC edgings.

1.06 PRODUCT HANDLING

A. Deliver completed laminate clad casework, countertops, and related products only after wet operations in building are completed, store in ventilated place, protected from the weather, with relative humidity range of 25 percent to 55 percent.

B. Protect finished surfaces from soiling and damage during handling and installation with a protective covering.

1.07 JOB CONDITIONS

A. Environmental Requirements: Do not install casework until permanent HVAC systems are operating and temperature and humidity have been stabilized for at least 1 week.
   1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
   2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.

B. Conditions: Do not install casework until interior concrete work, masonry, plastering and other wet operations are complete.

1.08 WARRANTY

A. All materials and workmanship covered by this section will carry a five (5) year warranty from date of acceptance.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Approved Manufacturers:
   1. Basis of specification: TMI Systems Design Corporation.

B. Substitution: See Section 01600 . Other manufacturers shall comply with the minimum levels of material and detailing indicated on the drawings or as specified.
   1. Subject to compliance with the specifications, the following manufacturers are approved:
      a. Stevens Industries, Inc.
      b. Mastercraft, Inc.

2.02 MATERIALS

A. BASE BID : Core Materials:
   1. Certified Particleboard: SCS Certified 100% pre-consumer recycled wood fiber particleboard with no Urea Formaldehyde added during the manufacturing process.
      a. Up to 7/8 inch thick: Industrial Grade average 47-pound density meeting ANSI A 208.1-1999, M-3 requirements.
      b. 1 inch think: Industrial Grade average 45-pound density meeting ANSI A 208.1-1999, M-2 requirements.
      c. MR Moisture Resistant Particleboard: Average 47-pound density particleboard, ANSI A208.1 1-1999, M-3.
   2. Medium Density Fiberboard 1/4 inch thick: Average 54-pound density grade, ANSI A208.2.

B. Decorative Laminates: GREENGAURD Indoor Air Quality Certified
   1. High-pressure decorative laminate VGS (.028), NEMA Test LD 3-2005.
   2. High-pressure decorative laminate HGS (.048), NEMA Test LD 3-2005.
   3. High-pressure decorative laminate HGP (.039), NEMA Test LD 3-2005.
   4. High-pressure cabinet liner CLS (.020), NEMA Test LD 3-2005.

5. High-pressure backer BKH (.048), (.039), (.028), NEMA Test LD3-2005.
6. Thermally fused melamine laminate, NEMA Test LD 3-2005, color matched with White.

C. Laminate Color Selection: Maximum 1 color per unit face and 4 colors per project.
1. See Article 3.06: Color Selection.

D. Edging Materials:
1. 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius.

2.03 SPECIALTY ITEMS

A. ADA Sink Base:
1. Manufacturer's standard ADA compliant sink cabinet. See drawings for locations.

2.04 CABINET HARDWARE

A. Hinges:
1. Five knuckle, epoxy powder coated, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1.
a. Doors 48 inches and over in height have 3 hinges per door.
b. Magnetic door catch with maximum 5 pound pull provided, attached with screws and slotted for adjustment.

B. Pulls:
1. Stainless Steel Wire Pulls. Pull design shall comply with the Americans with Disability Act (ADA).

C. Drawer Slides:
1. Full extension: 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature.

D. Adjustable Shelf Supports:
1. Injection molded transparent polycarbonate shelf supports friction fit into cabinet end panels and vertical dividers, adjustable. Shelf support have minimum 2 integral support pins to interface pre-drilled holes, and to prevent accidental rotation of support. The support shall adapt to 3/4 inch or 1 inch thick shelving and provides non-tip feature for shelving. Supports may be field fixed if desired. Structural load to 1200 pounds (300 pounds per support) without failure.

E. Locks:
1. Removable core, disc tumbler, cam style lock with strike.
2. Elbow catch or chain bolt used to secure inactive door on all locked cabinets.

2.05 FABRICATION:

A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.

B. All casework panel components sized/cured to be precisely finished in size and squareness to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.

C. Cabinet Body Construction:
1. Tops and bottoms shall be glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals.
a. Tops, bottoms and sides of all cabinets are particleboard core.
b. Tops, bottoms and sides of sink base units are moisture resistant particleboard core.
2. Cabinet backs: 1/4 inch thick medium density fiberboard panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior. 3/4 inch x 4 inch

particleboard rails will be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels. A third intermediate rail will be included on all cabinets taller than 56 inches. Utilize hot melt glue to further secure back and increase overall strength.

3. Fixed base and tall cabinets shall have factory mounted bases of 3/4 inch thick exterior grade plywood. Base is nominal 4 inch high unless otherwise indicated on the drawings.
4. Base units, except sink base units: Full sub-top. Sink base units are provided with open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
5. Side panels and vertical dividers shall receive adjustable shelf hardware. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.
6. Exposed and semi exposed edges.
   a. Edging: 1mm PVC.
7. Adjustable shelf core: 3/4 inch thick particleboard up to 36 inches wide, 1 inch thick particleboard over 36 inches wide.
   a. Front edge: 1mm PVC.
8. Interior finish, units with open Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with VGS high-pressure decorative laminate.
9. Interior finish, units with closed Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate.
10. Exposed ends:
    a. Faced with VGS high-pressure decorative laminate.
11. Wall unit bottom:
    a. Faced with thermally fused melamine laminate.
12. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.

D. Drawers:
1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 3mm PVC.
2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.

E. Door/Drawer Fronts:
1. Core: 3/4 inch thick particleboard except at sink units which is 3/4 inch thick moisture resistant particleboard.
2. Provide double doors in opening in excess of 24 inches wide.
3. Faces:
   a. Exterior: VGS High-pressure decorative laminate.
   b. Interior: High-pressure cabinet liner CLS.
4. Door/drawer edges: 1mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

F. Miscellaneous Shelving:
1. Core material: 3/4 inch or 1 inch thick particleboard.
2. Exterior: VGS High-pressure decorative laminate.
3. Edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

PART 3- EXECUTION

3.01 INSPECTION:

A. The casework contractor must examine the job site and the conditions under which the work under this section is to be performed, and notify the building owner in writing of unsatisfactory conditions. Do not proceed with work under this Section until satisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 PREPARATION:

A. Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.03 KEYING:

A. Key alike by room, unless otherwise instructed.

B. Allow for 2 locked cabinets in each room, overhead and/or base (excluding teacher wardrobe)

3.04 INSTALLATION:

A. Erect casework, plumb, level, true and straight with no distortions. Shim as required. Where laminate clad casework abuts other finished work, scribe and cut for accurate fit.

B. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.
   1. Install drawer pulls horizontally.
   2. Install door pulls vertically.

C. Repair minor damage per plastic laminate manufacturer’s recommendations.

D. Install countertop and backsplash.
   1. Scribe and cut for accurate fit to wall and under window stools.
   2. Coordinate openings with grilles supplied in Section 06200.
   3. Provide 1 inch overhang at countertop over lockers.

3.05 CLEANING:

A. Remove and dispose of all packing materials and related construction debris.

B. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building owner.

3.06 COLOR SELECTION:

A. Laminate Color Selection: From Formica, Nevamar and Chem Metal stock colors.

B. Hinge and Pull Color Selection: From manufacturer's standard

C. Miscellaneous Hardware Color Selection (support brackets, table frames, rail): From manufacturer's standard.

D. 3mm PVC Edge Banding Color Selection: Match decorative laminate color selection.

END OF SECTION

SECTION 12 3600
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinetwork.

B. Sinks molded into countertops.

C. Custom surrounds for metal lockers.

1.02 RELATED REQUIREMENTS

A. Section 06 4100 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

B. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; International Surface Fabricators Association; 2013.

C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOP ASSEMBLIES

A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS).

B. Solid Surfacing: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 1/2 inch, minimum.

2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
   a. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
3. Other Components Thickness: 1/2 inch, minimum.
4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.

B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 270000

GENERAL COMMUNICATIONS PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

Scope of Work.

1. Intent of Drawings.
2. Pre-Bid Site Visit.
3. Definitions.
4. General Standards of Materials.
5. Products and Substitutions.
6. Applicable Codes.
7. Guarantees and Certificates.
8. Quiet Operation and Vibration Control.
9. Temporary Shutdown of Existing Systems.
10. Coordination.
11. Shop Drawings, Product Data, and Samples.
12. Owner Instruction.

1.3 SCOPE OF WORK

A. The scope of the work included under Division 27 of the specifications shall include complete systems as shown in the Contract Documents and specified herein. Any work reasonably inferable or required to result in a complete installation or the intended operation and performance of the systems, shall be included in the Base Bid except where there is specific reference to exclusion and incorporation in other quotations.

1.4 INTENT OF DRAWINGS

A. Provide complete and functional systems for the project. The systems shall conform to the details stated in the specifications and shown on the drawings. Items or work not shown or specified, but required for complete systems, shall be provided and conform with accepted trade practices. The drawings and specifications are presented to define specific system requirements and serve to expand on the primary contract requirements of providing complete systems. The drawings are diagrammatic and indicate the general arrangement and routing of the systems included in this contractors work.

B. Do not scale the drawings. Because of the scale of the drawings, it is not possible to indicate offsets, fittings, valves, or similar items which may be required to provide complete operating systems. Carefully investigate conditions affecting the work associated with this project. Check and verify dimensions and existing conditions at the site. Install systems in such a manner that interferences between pipes, conduit, ducts, equipment, architectural and structural features are avoided. Provide items required to meet the project conditions without additional cost to the owner.

C. These documents may not explicitly disclose final details required for a complete systems installation; however, contractors shall possess the expertise to include the necessary appointments of complete operating systems.

D. Contractors shall be “Experienced” (as defined in Division 1) in this type of construction and realize the extent of the work required.

E. BICSI Certification of Workers

1. The contractor will employ a minimum of one Registered Communications Distribution Designer (RCDD) certified by and in good standing with BICSI. This RCDD must be a direct full time employee of the contractor and the contractor will continue a minimum of one RCDD throughout the duration of the project. An RCDD shall remain assigned to the project from start to finish and be available to provide guidance to the installation team.

2. Ortronics/Berk-Tek must be able extend a NetClear 25-year Static, Dynamic and Applications Warranty to the end user once the Telecommunications contractor fulfills all requirements under Ortronics and Berk-Tek OASIS Program. At least 30 percent of the copper installation and termination crew must be certified by Berk-Tek and Ortronics or by BICSI with a Technician Level of training.

1.5 PRE-BID SITE VISIT

A. Bidders shall visit the site and become completely familiar with existing conditions prior to submitting their bid. No extra charges shall be allowed as a result of existing conditions

1.6 DEFINITIONS

A. Specific terminology, as used herein, shall have the following meanings:

1. “Finished Space” …Space other than mechanical rooms, electrical rooms, furred spaces, pipe chases, unheated spaces immediately below roof, space above ceilings, unexcavated spaces, crawl spaces, tunnels, and interstitial spaces.

2. "Conditioned"...Spaces directly provided with heating and cooling.

3. "Unconditioned"...Spaces without heating or cooling including ceiling plenums.

4. "Indoors"...Located inside the exterior walls and roof of the building.

5. "Outdoors"...Located outside the exterior walls and roof of the building.

1.7 GENERAL STANDARDS OF MATERIALS

A. Equipment and materials, unless otherwise noted, shall be new and of first quality, produced by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than five years.

B. Equipment of one type shall be the products of one manufacturer; similar items of the same classification shall be identical, including equipment, assemblies, parts and components.

C. Materials furnished shall be determined safe by a nationally recognized testing organization, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corporation, and materials shall be labeled, certified or listed by such organizations. Where third party certification is required for packaged equipment, the equipment shall bear the appropriate certification label.

D. With respect to custom made equipment or related installations which are constructed specially for this project, the manufacturer shall certify the safety of same on the basis of test data. The Owner shall be furnished copies of such certificates.

1.8 PRODUCTS AND SUBSTITUTIONS

A. Where a specific manufacturer's product is specified, the Contract Amount shall be based on that product only. Any substitutions from the specified product shall be offered as a Substitution Request. Refer to Division 1 for requirements. Substitutions shall not be permitted after the bidding phase without a Substitution Request Form included with the bid.

B. Where several manufacturer's products are specified, the Contract Amount shall be based upon the specified products only. Any substitutions from the specified products shall be offered as a Substitution Request. Refer to Division 1 for requirements. Substitutions shall not be permitted after the bidding phase without a Substitution Request Form included with the bid.

C. Where only one manufacturer's product is specified, the associated systems have been designed on the basis of that product. Where several manufacturer's products are specified, the associated systems have been designed on the basis of the first-named manufacturer's product. When products other than those used as the basis of design are provided, the contractor shall pay additional costs related to submissions review, redesign, and system and/or structure modifications required by the use of that product.

D. It is the intent of these specifications that service organizations follow the above substitution procedures.

1.9 APPLICABLE CODES

A. Materials furnished and work installed shall comply with applicable codes listed in Division 1, with the requirements of the local utility companies, and with the requirements of governmental departments or authorities having jurisdiction.

1.10 GUARANTEES AND CERTIFICATES

A. Defective equipment, materials or workmanship, including damage to the work provided under other divisions of this contract resulting from same, shall be replaced or repaired at no extra cost to the Owner for the duration of the stipulated guarantee periods.

1. Unless specifically indicated otherwise, the duration of the guarantee period shall be twoe (2) years following the date of Substantial Completion. Temporary operation of the equipment for temporary conditioning, testing, etc., prior to occupancy will not be considered part of the warranty period.

1.11 QUIET OPERATION AND VIBRATION CONTROL

A. Equipment and associated items shall operate under conditions of load without sound or vibration deemed objectionable by the Architect. In the case of moving equipment, sound or vibration noticeable outside of the room in which it is installed, or noticeable within the room in which it is installed, shall be deemed objectionable. Sound or vibration deemed objectionable shall be corrected in an approved manner at no extra cost to the Owner. Vibration control shall be provided by means of approved vibration isolators and installed in accordance with the isolator manufacturer's recommendations.

B. The sound pressure levels around mechanical and electrical equipment (fans, pumps, motors, etc.) in equipment spaces shall not exceed 85 dBA at any point three (3) feet from the equipment, with all equipment in the room operating. The sound criteria applies to the complete range of each piece of equipment.

1.12 TEMPORARY SHUTDOWN OF EXISTING SYSTEMS

A. Plan installation of new work and connections to existing work to insure minimum interference with regular operation of existing systems. Some temporary shutdown of existing systems may be required to complete the work.

B. Submit to the Owner in writing for approval, proposed date schedule, time, and duration of necessary temporary shutdowns of existing systems. Submit schedule at least fifteen (15) calendar days in advance of intended shutdown. Shutdowns shall be made at such times as shall not interfere with regular operation of existing facilities and only after written approval of Owner. The Owner reserves the right to cancel shutdowns at any time prior to the shutdowns. To insure continuous operation, make necessary temporary connections between new and existing work. Bear costs resulting from temporary shutdowns and temporary connections. No additional charges shall be allowed for Owner-canceled shutdowns that must be rescheduled.

C. Shutdowns must be performed by the Owner. Do not shut-down any system. The Owner reserves the right to require a walk-through of any shutdown prior to the shutdown. Following electrical shutdowns, verify that affected motors are rotating in the proper direction. Bear costs associated with reverse rotated motors.

1.13 COORDINATION

A. Coordinate and furnish in writing to the Architect information necessary to permit the work to be installed satisfactorily and with the least possible interference or delay.

B. Coordination drawings shall be prepared as defined in Division 1. No installation of permanent systems shall proceed until the coordination drawings are reviewed by the Architect. No extra charges shall be allowed for changes required to accommodate installation of systems provided under other divisions of this contract.

C. Coordination drawings shall be developed from individual system shop drawings and contractor fabrication drawings. Electronic or other reproduced engineering design drawings used as coordination drawings are not acceptable.

D. When work is installed without proper coordination, changes to this work deemed necessary by the Architect shall be made to correct the conditions without extra cost to the Owner.

E. The value of the coordination drawings shall be identified as a line item in the Schedule of Values. If the coordination drawings are not submitted as required, their value shall credited to Owner in accordance with the provisions of Article 7 of the General Conditions. The value of coordination drawings shall be a minimum of two (2.0) percent of this Contract Amount.

1.14 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop drawings, product data, and samples shall be submitted in accordance with the provisions of Division 1.

B. The following shall be submitted by the Contractor for review:

1. Scale shop drawings showing system components with sizing indicated, including but not limited to:

   a. equipment locations
   b. raceways
   c. insert and sleeve locations
   d. hangers, anchors and guides
   e. expansion joints
   f. access doors

2. Product data for system components and materials (including construction standards).

3. Samples of finishes and trim exposed to view, such as fixture trim, escutcheon plates and similar items.

C. The value of shop drawings, product data and samples shall be identified as a line item in the Schedule of Values. If the shop drawings, product data and samples are not submitted as required, their value shall credited to Owner in accordance with the provisions of Article 7 of the General Conditions. The value of these items shall be a minimum of one (1.0) percent of this Contract Amount.

1.15 OWNER INSTRUCTION

A. After final tests and adjustments have been completed, furnish the services of qualified personnel to instruct representatives of the Owner in the operation and maintenance procedures for equipment and systems installed as part of this project. Operation and maintenance instructions for major items of equipment shall be directly supervised by the equipment manufacturer's representative. Supply qualified personnel to operate equipment for sufficient

length of time as required to meet governing authorities' operation and performance tests and as required to assure that the Owner's representatives are properly qualified to take over operation and maintenance procedures. Minimum instruction period shall be 20 man hours. The instruction period shall be broken into segments at the discretion of the Owner.

1. Notify the Architect, the Owner's representative and equipment manufacturers' representatives, by letter, as to the time and date of operating and maintenance instruction periods approved by the Owner at least one (1) week prior to conducting same.
2. Forward to the Architect the signatures of all those present for the instruction periods.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 270500
COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Communications equipment coordination and installation.
2. Sleeves for pathways and cables.
3. Sleeve seals.
4. Grout.
5. Common communications installation requirements.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of communications equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting pathways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 2 - PRODUCTS

2.1 SLEEVES FOR PATHWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Basis-of-Design Product: Subject to compliance with requirements, product by one of the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using [steel] [cast-iron] pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

B. Provide Specified Technologies, Inc (STI) EZ Path Cable Pathway sleeves at all cable penetrations through walls in the telecommunications rooms (MDF and IDF rooms). Provide multiple Series 33 and Series 44 as needed to serve cabling being installed plus 100% spare capacity.

END OF SECTION

SECTION 270528

CONDUIT AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Provide all materials and labor for the installation of a pathway system for inside plant communications circuits. This section includes requirements for horizontal and building backbone raceways, fittings, and boxes specific to communications circuits (cabling) for voice and data.

B. Related Sections:

1. Division 26 Section — "Basic Electrical Materials and Methods"

2. Division 27 Section — "Voice Data Video"

1.3 REFERENCES

A. Incorporate by reference the applicable portions of the following specifications, standards, codes into this specification section.

1. General:
   a. National Electrical Code (NEC)
   b. National Electrical Safety Code (NESC)
   c. Occupational Safety and Health Act (OSHA)
2. Communications:
   a. ANSI/TIA/EIA - 568: *Commercial Building Telecommunications Cabling Standard*
   b. ANSI/TIA/EIA - 569: *Commercial Building Standard for Telecommunication Pathways and Spaces*
   c. ANSI/TIA/EIA - 606: *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*
   d. ANSI/TIA/EIA - 607: *Commercial Building Grounding and Bonding Requirements for Telecommunications*
   e. ISO/IEC IS 11801: *Generic Cabling for Customer Premises*
   f. BICSI: *BICSI Telecommunications Cabling Installation Manual*
   g. BICSI: *BICSI Telecommunications Distribution Methods Manual (TDMM)*

1.4 DEFINITIONS

A. “EMT” shall mean Electrical Metallic Tubing.

B. “RMC” shall mean Rigid Metal Conduit.

C. "SMR" shall mean Surface Metal Raceway.

D. "Raceway" shall mean any enclosed channel for routing wire, cable or busbars.

E. "TMGB" shall mean *Telecommunications Main Grounding Busbar.* There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.

F. "TGB" shall mean *Telecommunications Grounding Busbar.* There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.

G. "TBB" shall mean *Telecommunications Bonding Backbone.* The TBB is a conductor used to connect TMGBs to the TGBs.

H. "Pullbox" shall mean a metallic box with a removable cover, used to facilitate pulling cable through conduit runs longer than 100' or in which there are more than 180 degrees of bends.

I. "Junction box" shall mean a pullbox wherein a feeder conduit transitions to multiple distribution conduits.

1.5 SYSTEM DESCRIPTION

A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete Raceway system as hereinafter specified and/or shown on the Contract Documents. The Raceway system shall support an ANSI/TIA/EIA and lSO/IEC compliant communications Structured Cabling System (SCS) as specified in 271500 - Inside Plant Communications Systems

B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the Contract Documents but which are necessary to make a complete working Raceway system.

1.6 SUBMITTALS

A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.

1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.

2. For those items noted as allowing "or equal," and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.

3. Provide standard manufacturer's cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Closeout Submittals: Provide submittal information for review as follows:

1. O&M Manual for Communications - At the completion of the project, submit all O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to UMCP IT in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.

2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets, including maintenance hole/handhole butterfly drawings.
   a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.
   b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.
   c. Keep Record Drawings current throughout the course of construction. (“Current” is defined as not more than one week behind actual construction).
   d. Show identifiers for major infrastructure components on Record Drawings.

1.7 CONTRACTOR WARRANTY:

A. Provide a Contractor-endorsed one-year service warranty against defects in materials and workmanship.
   1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.
   2. The Contractor Warranty period shall commence upon Owner acceptance of the work.

1.8 QUALITY ASSURANCE

A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in NEC, Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

B. Comply with NECA's "Standard of Installation."

C. Comply with NEC.

1.9 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials shall consist of conduit, surface metal raceway, outlet boxes, fittings, enclosures, pull boxes, and other raceway incidentals and accessories as required for inside plant communications circuits.

B. As available; Virginia-based vendors, manufactured products, and/or contractors shall receive primary consideration over non-Virginia-based providers

2.2 MATERIALS

A. Conduit:

1. EMT. 1” minimum conduit size. Flexible metal conduit (FMC) is not acceptable.
   a. Conduit: Galvanized steel tubing meeting ANSI C80.3.
   b. Couplings: Steel, cast iron, or malleable iron compression type employing a split, corrugated ring and tightening nut, with integral bushings and locknuts. Indent-type and setscrew-type couplings are not permitted.
2. RMC. 1” minimum conduit size.
   a. Conduit: Hot dipped galvanized steel with threaded ends meeting ANSI C80.1.
   b. Couplings: Unsplit, NPT threaded steel cylinders with galvanizing equal to the conduit.
   c. Nipples: Same as conduit, factory-made up to 8 inches in diameter, no running threads.

B. Sleeves: EMT conduit, with insulated throat bushings for each end

C. Surface Raceway: Wiremold V2400 series or equivalent – Two piece, steel, single channel surface raceway.

D. Outlet boxes: Minimum 4”x4” size, 2 1/8” minimum depth, with extension rings (if needed) and single gang covers (i.e. mud rings), unless otherwise noted on the Contract Documents. Combined interior depth of outlet box, extension ring and cover shall be a minimum 2-1/2”. Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for 1” trade size conduit or connector entrance, meeting NEMA OS 1.

1. Acceptable manufacturers:
   a. Appleton, Raco, Steel City, or equal
2. Wiremold Extra Deep Switch and Receptacle Box: V5744-2 (two gang), or equal

E. Junction Boxes and Pull Boxes: Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for conduit or connector entrance. Boxes 6”x6”x4” or larger may be code gauge fabricated steel continuously welded at seams and painted after fabrication.
1. Dry locations: meeting NEMA OS 1.
2. Wet locations: NEMA OS 3R.

F. Miscellaneous Fittings:
1. Locknuts and conduit bushings: Malleable iron
   a. Appleton, Crouse Hinds, OZ Gedney, or equal
2. Through wall seals and floor seals shall be:
   a. OZ Gedney FS and WS series, or equal.

G. Pull Strings: Plastic or nylon with a minimum test rating of 200 lb.

2.3 FIRESTOPPING

A. Material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.

2.4 LABELING AND ADMINISTRATION

A. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, typed, and created by a hand-carried label maker or an approved equivalent software-based label making system. Handwritten labels are not acceptable.
   1. Hand-carried label maker:
      a. Brady: ID Pro Plus (or approved equal).
   2. Labels:
      a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal).

PART 3 EXECUTION

3.0 GENERAL

A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.

B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NESC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.

C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.

D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.

E. Install the raceway system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.

F. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.

G. Remove surplus material and debris from the job site and dispose of legally.

3.1 EXAMINATION

H. Examine surfaces and spaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2INSTALLATION

I. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions. Provide a raceway for each location indicated. Do not gang raceway into wireways, pullboxes, junction boxes, etc., without specific approval from the Designer.

J. Conduit:

1. Install EMT unless other conduit is shown on the Contract Documents or is required by Code.
2. Install conduit as a complete, continuous system without wires, mechanically secured and electrically connected to metal boxes, fittings and equipment. Blank-off unused openings using factory-made knockout seals.
3. Run conduit in the most direct route possible, parallel to building lines. Do not route conduit through areas in which flammable material may be stored.
4. Keep conduit at least 6 inches away from parallel runs of flues and steam or hot-water pipes or other heat sources operating at temperatures above one-hundred degrees Fahrenheit. Install horizontal conduit runs above water piping.
5. Keep conduit away from sources of electromagnetic interference as follows:
   a. 5 inches from fluorescent lighting
   b. 12 inches from conduit and cables used for electrical power distribution
   c. 48 inches from motors or transformers
6. Do not exceed 90 meters total length for a given conduit run to be used for distribution cabling (from outlet box to telecommunications room), including intermediate conduits and junction boxes.
7. Install conduit exposed, except in finished areas or unless shown otherwise on the drawings. Do not install conduit below grade/slab unless specifically shown on the Contract Documents as being installed below grade/slab.
8. Install exposed conduit in lines parallel or perpendicular to building lines or structural members except where the structure is not level. Follow the surface contours as much as practical. Do not install crossovers or offsets that can be avoided by installing the conduit in a different sequence or a uniform line.
   a. Run parallel or banked conduits together, on common supports where practical.
   b. Make bends in parallel or banked runs from same centerline to make bends parallel.
9. Conduits concealed above ceilings, furred spaces, etc., which are normally inaccessible may be run at angles not parallel to the building lines.
10. Wherever practical, route conduit with adjacent ductwork or piping and support on common racks. Base required strength of racks, hangers, and anchors on combined weights of conduit and piping.
11. Where conduits cross building expansion joints, use suitable sliding or offsetting expansion fittings. Unless specifically approved for bonding, use a suitable bonding jumper.
12. Support conduits as specified in Section 16050 "Basic Electrical Materials and Methods."
    a. Provide anchors, hangers, supports, clamps, etc. to support the conduits from the structures in or on which they are installed. Do not space supports farther apart than five feet.
    b. Provide sufficient clearance to allow conduit to be added to racks, hangers, etc. in the future.
    c. Support conduit within three feet of each outlet box, junction box, gutter, panel, fitting, etc.
13. Ream conduits to eliminate sharp edges and terminate with metallic insulated grounded throat bushings. Seal each conduit after installation (until cable is installed) with a removable mechanical-type seal to keep conduits clean, dry and prevent foreign matter from entering conduits.
14. Install a pull string in each conduit.
15. For conduits entering through the floor of a telecommunications room, terminate conduits 6” above the finished floor.

16. Do not install communications conduits in wet, hazardous or corrosive locations.
17. Where conduit is shown embedded in masonry, embed conduit in the hollow core of the masonry. Horizontal runs in the joint between masonry units are not permitted.
18. Where conduit is shown embedded in concrete, embed conduit a minimum of two inches from the exterior of the concrete. Do not place conduit in concrete less than 4 inches thick.
    a. One inch trade size conduit shall be used. Conduits sized smaller than one inch trade size conduit are not permitted embedded in concrete without approval from GMU-ITU.
    b. Run conduit parallel to main reinforcement.
    c. Conduit crossovers in concrete are not permitted.
19. Where conduit exits from grade or concrete, provide a rigid steel elbow and adapter.
20. Where conduit enters a space through the floor and terminates in that space, terminate the conduit at 6” above the finished floor.
21. Where conduits terminate at a cable tray, the conduits shall be consistently terminated no more than 8” from the cable tray, and have a visually uniform appearance.
22. Where several circuits follow a common route, stagger pullboxes or fittings.
23. Where several circuits are shown grouped in one box, individually fireproof each conduit.
24. Bend and offset metal conduit with standard factory sweeps or conduit fittings. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
    a. Conduit sweeps:
        1) Sweeps shall not exceed 90 degrees.
        2) Do not exceed 180 degrees for the sum total of conduit sweeps for a section of conduit (between conduit termination points).
        3) Sweep radius shall be at least 10 times the internal diameter of the conduit.
        4) 90-degree condulets (LB’s) and electrical elbows are not acceptable.
    b. Factory-manufactured sweeps are required for bends in conduit larger than 1-¼” trade size.
    c. For bends in 1 ¼” trade size conduit and larger, field-manufactured bends (using a hydraulic bender with a 1 ¼” boot) are permitted only when factory-manufactured sweeps are not suitable for the conditions. In all other cases, factory-manufactured sweeps are required. “Hickey-bender” use is prohibited.
25. Connect conduit to hubless enclosures, cabinets and boxes with double locknuts and with insulating type bushings. Use grounding type bushings where connecting to concentric or eccentric knockouts. Make conduit connections to enclosures at the nearest practicable point of entry to the enclosure area where the devices are located to which the circuits contained in the conduit will connect.
26. Penetrations for raceways:
    a. Do not bore holes in floor and ceiling joists outside center third of member depth or within two feet of bearing points. Holes shall be 1-¼” diameter maximum.
    b. Penetrate finished walls and finished surfaces with a PVC or sheet metal sleeve with an interior diameter (ID) at least 1/4" greater than the outer diameter (OD) of the conduit, set flush with walls, pack with fiberglass, seal with silicone sealant.
    c. Penetrate poured-in-place walls and free slabs with a cast iron sleeve (or Schedule 40 PVC black pipe sleeve for above-grade only) with retaining ring or washer. Set sleeves flush with forms or edges of slab. Pack around conduit with fiberglass and seal with silicone sealant.
27. Raceway terminations and connections:

a. Join conduits with fittings designed and approved for the purpose and make joints tight. Do not use set indent-type or screw-type couplings.
b. Make threaded connections waterproof and rustproof by applying a watertight, conductive thread compound. Clean threads of cutting oil before applying thread compound.
c. Make conduit terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
d. Cut ends of conduit square using a hand saw, power saw or pipe cutter. Ream cut ends to remove burrs and sharp ends. Where conduit threads are cut in the field, cut threads to have same effective length, same thread dimensions and same taper as specified for factory-cut threads.
e. Provide double locknuts and insulating bushings at conduit connections to boxes and cabinets. Align raceways to enter squarely and install locknuts with dished part against the box. Use grounding type bushings where connecting to concentric or eccentric knockouts.
f. Where conduits are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

28. Install conduit sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed conduits, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
    a. Where conduits pass from warm to cold locations, such as the boundaries of air conditioned or refrigerated spaces and where conduits enter or exit buildings from outdoor areas, including underground ducts or conduit runs.
    b. Where otherwise required by the NEC.
29. Conduit shall be clean and dry.

K. Sleeves:

1. Provide sleeves where required, sized as noted on the Contract Documents. Where not noted, sleeve sizing shall be determined by the type and quantity of cable to be routed through the sleeve per TIA/EIA 569A cable capacity standards, plus an additional 20% for future expansion.

2. Provide roto-hammering or core drilling where required for installation.

3. Seal between sleeve and wall or floor in which the sleeve is installed. Firestop all penetrations to restore wall or floor to pre-penetration fire-rating.

L. Surface Raceway:

1. Provide surface raceway for all surface mounted telecommunications outlet boxes and as shown on the Contract Documents.

2. Surface raceway shall be routed parallel to and perpendicular to surfaces or exposed structural members, and follow surface contours.

3. Surface raceway color shall match as closely as possible the existing wall finish. Do not paint Surface Raceway.

4. Surface raceway systems shall be completely installed, including insulating bushings and inserts as required by manufacturer's installation requirements. Unused openings in the surface raceway shall be closed using manufactured fittings.
5. Surface raceway shall have a minimum two inch radius control at all bend points.
6. Surface raceway shall be securely supported by screws or other anchor-type devices at intervals not exceeding 10 feet and with no less than two supports per straight raceway section. Surface raceway shall be securely supported in accordance with the manufacturer's requirements. Tape and glue are not acceptable support methods.
7. Mechanically and electrically continuous surface raceway shall be bonded and grounded to the Telecommunications Grounding system.

M. Outlet Boxes:

1. Provide outlet boxes and covers as shown on the Contract Documents and as needed. Verify that the appropriate cover type and depth is provided for each type of wall and finish. Provide extension rings as needed.
2. Coordinate box locations with building surfaces and finishes to avoid bridging wainscots, joints, finish changes, etc.
3. Install boxes in dry locations (not wet, corrosive, or hazardous).
4. Attach boxes securely to building structure with a minimum of two fasteners. Provide attachments to withstand a force of one hundred pounds minimum, applied vertically or horizontally.
5. Install boxes at the following heights to the bottom of the box, except where noted otherwise:
   a. Wall mounted telephones: 48" above finished floor.
   b. Workstation outlets: 18" above finished floor.
   c. Place boxes for outlets on cabinets, countertops, shelves, and similar boxes located above countertops two inches above the finished surface or two inches above the back splash. Coordinate and verify size, style, and location with the supplier or installer of these items prior to outlet box installation.
6. Recessed mounted outlet boxes:
   a. Recess boxes in the wall, floor, and ceiling surfaces in finished areas. Set boxes plumb, level, square and flush with finished building surfaces within one-sixteenth inch for each condition. Set boxes so that box openings in building surfaces are within one-eighth inch of edge of material cut-out and fill tight to box with building materials. Single gang opening shall extend at least to the finished wall surface and extend not more than 1/8 inch beyond the finished wall surface. Provide backing for boxes using structural material to prevent rotation on studs or joists.
   b. Install floor boxes level and adjust to finished floor surface.
7. Surface-mounted outlet boxes:
   a. For boxes surface-mounted on finished walls, provide Wiremold outlet box or equivalent. Cut box as necessary to accept conduit.
   b. For boxes surface-mounted on unfinished walls (i.e. electrical rooms, mechanical rooms), provide 4"x4" (minimum) outlet box with single gang cover.

N. Floor Boxes:
1. Provide floor boxes as shown on the Contract Documents.

2. Set device boxes plumb, level, square and flush with floor, within 1/16” tolerance for each condition.

3. For floor boxes with combined power and telecommunications circuits, provide metal dividers to separate power from telecommunications circuits.

O. Junction Boxes:

1. Provide junction boxes as shown on the Contract Documents and as required.

a. Where sizing is not shown on the Contract Documents, size junction box length and depth according to the size of the feeder conduit in the following table:

Feeder Conduit Size	Box Length	Box Depth
1”	12”	4”
1-¼”	12”	4”
1-½”	12”	4”
2”	24”	4”
2-½”	24”	6”
3	36”	6”
3-½”	48”	6”
4”	60”	6”

b. Where sizing is not shown on the Contract Documents, size junction box width according to the following formula:

1) From the table below, select the width associated with the largest conduit on the distribution side of the box. For each additional distribution conduit, add the “Increase Width” value associated with the size of that distribution conduit to the box width for the largest distribution conduit.

a) For example, if the distribution side of the junction box has one 1-¼” distribution conduit and three 1” distribution conduits, the total distribution-side width would be 6”+2”+2”+2”=10”.

2) Repeat the above process for the feeder side of the junction box. Junction boxes are typically fed by a single conduit, therefore unless the box has more than one feeder conduit, the “Increase Width” part of the formula is unnecessary.

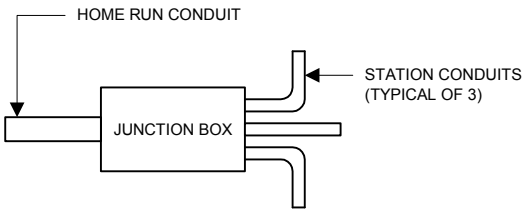
a) For example, if the feeder side of the junction box has two 2” feeder conduits the total feeder-side width would be 8”+5”=13”.

3) The larger of the two width calculations (distribution side vs. feeder side) shall be the width of the junction box to be provided.

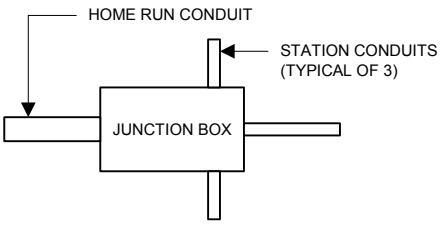
a) For example, if the distribution-side width were 10” and the feeder-side width were 13”, provide a 13” wide junction box.

Conduit Size	Box Width	For each additional conduit Increase Width
1”	4”	2”
1-¼”	6”	3”
1-½”	8”	4”
2”	8”	5”
2-½”	10”	6”
3	12”	6”
3-½”	12”	6”
4”	15”	8”

2. A junction box may not be substituted for a 90-degree bend. *90 degree condulets (LB’s) are not acceptable.*
3. Install junction boxes in a location readily accessible both at time of construction and after building occupation. Do not install junction boxes in inaccessible interstitial building spaces.
4. Where junction boxes are to be mounted on ceiling structure above ceiling grid, do not mount higher than 4’ above grid.
5. Install hinged-cover enclosures and cabinets plumb, and supported at each corner.
6. Install junction boxes so that the access door opens from the side where the cable installer will normally work – typically from the bottom (floor side) of the box.
   a. Where a junction box is installed in a ceiling space, coordinate with other trades to provide full access to the junction box door and adequate working room for both the installation personnel and for proper looping of cable during installation.
   b. Provide a lockable access cover (or junction box door if junction box is exposed) in hard lid ceilings.
7. Install junction boxes such that conduits enter and exit at opposite ends of the box as follows:



CORRECT INSTALLATION



INCORRECT INSTALLATION

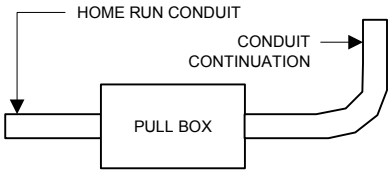
P. Pull Boxes:
   1. Provide pull boxes as shown on the Contract Documents and as required.

a. Where sizing is not shown on the Contract Documents, size pull boxes as follows:

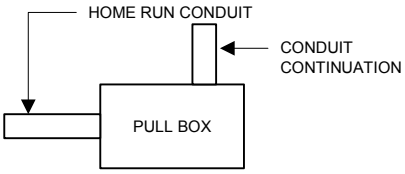
Size of Largest Conduit	Box Width	Box Length	Box Depth
1”	4”	12”	4”
1-¼”	6”	12”	4”
1-½”	8”	12”	4”
2”	8”	24”	4”
2-½”	10”	24”	6”
3	12”	36”	6”
3-½”	12”	48”	6”
4”	15”	60”	6”

b. Where a pull box is required with conduits 1” trade size or smaller, an outlet box may be used as a pull box. Where outlet boxes are used as pull boxes, the outlet boxes shall be dedicated for use as a pull box and shall not host cable termination hardware.

2. A pull box may not be substituted for a 90-degree bend. *90 degree condulets (LB’s) are not acceptable.*
3. Install pull boxes in an accessible location, readily accessible both at time of construction and after building occupation. Do not install pull boxes in inaccessible interstitial building space.
4. Where pull boxes are to be mounted on ceiling structure above ceiling grid, do not mount higher than 4’ above grid (mount on wall instead).
5. Install hinged-cover enclosures and cabinets plumb, and supported at each corner.
6. Install pull boxes so that the access door opens from the side where the cable installer will normally work (typically from the bottom, or floor side, of the box).
   a. Where a pull box is installed in a ceiling space, provide full access to the junction box door and adequate working room for both the installation personnel and for proper looping of cable during installation.
   b. Provide a lockable access cover (or pull box door if pull box is exposed) in hard lid ceilings.
7. Install pull boxes such that conduits enter and exit at opposite ends of the box as follows:



CORRECT INSTALLATION



INCORRECT INSTALLATION

Q. Firestopping:

1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.

2. Maintain fire rating of penetrated fire-rated walls. Firestop and seal each penetration made during construction.
    a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.
    b. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
    c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply all sealing material in a manner acceptable to the local fire and building authorities.

R. Grounding/Bonding: Grounding and bonding work shall comply with the Virginia Uniform Statewide Building Code, Uniform Fire Code, National Electrical Code, and UL 467, ANSI/TIA/EIA standards and the references listed in PART 1 – REFERENCES above, as well as local codes which may specify additional grounding and/or bonding requirements.

1. Bond metallic raceway together and to the nearest TGB (as provided under Division 27 Section — "Grounding and Bonding for Communications Systems"). Ensure that bonding breaks through paint to bare metallic surface of painted metallic hardware.

4.2 LABELS:

A. Conduits: For any conduit extending beyond the space or room in which it starts, label each such conduit end in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room name, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.). Indicate conduit length on the label.

1. Where a conduit is intended for future cabling use outside of the Contract, the conduit shall be labeled in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room name, pull box identifier, etc.) along with a sequential number for each spare conduit terminated into a single room. Indicate conduit length on the label.
    a. Suggestion: The second spare conduit (whether spare or in use) between Room 100 and telecommunications room 1A might be labeled in the telecommunications room as "Room 100 - #2, __ feet." In Room 100 the same conduit might be labeled "1A - #2, __ feet."

B. Pull Boxes: Label each pullbox with a unique identifier. Identifiers shall be of the form "RN-Y" where "RN" is the room name of the room closest to (or containing) the pull box, and "Y" is the sequential number of the pull box for each "RN".

1. Example: The second pull box in the vicinity of room "100" would have the label "100-2".

C. Pull Strings: For any conduit extending beyond the space or room in which it starts, label its pull string in a clear manner by designating the location of the other end of the pull string (i.e. room name, telecommunications room name, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.).

1. Where a pull string is installed in a conduit intended for future cabling use outside of the Contract, the pull string shall be labeled similar to the spare conduit in which it is installed.

4.3 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and in accordance with accepted industry practice, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.
   1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

4.4 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION

SECTION 270529
HANGERS AND SUPPORTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.2 REFERENCES

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2000.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2002.

1.3 DEFINITIONS

A. See Section 271500: Voice Data Video Systems.

1.4 CONTRACTOR REQUIREMENTS

A. Provide Erico CableCat Adjustable Cable Support (CAT425 series slings). The Contractor may provide other sling-style hangers, provided they have metal components to hold the sling closed and to secure the sling to the support structure. All plastic supports are not acceptable (e.g. Arlington Loops). Design slings to be spaced at 4 ft to 5 ft intervals. The interval must vary in a single run to prevent a standing wave induction on the cable.

B. Provide Erico CableCat Cable Supports (CAT64 series). The Contractor may provide other J-hook style hangers, provided they are metal. Design supports to be spaced at 4 ft to 5 ft intervals.

C. Provide appropriate hardware and parts to attach the supports to permanent building structure (concrete columns or deck, structural steel, or other immovable structures capable of supporting the cable supports). Parts shall be specifically designed and where possible UL-listed for their final installed configuration.

D. Provide for eight or fewer Category 6 cables to be supported with J-hooks. Support more than four Category 6 cables with slings or tray.

E. Provide cable supports above concealed ceilings using a rigid support to a structural element, or by attaching directly to a structural element.

F. Provide to “close” J-hook supports with manufacturer provided bars and not with cable ties.

G. Provide J-hook supports can be attached to suspended ceiling grid-type wire with manufacturer clamps, provided:

1. The wire is painted orange prior to installation, to differentiate it from ceiling grid support wires,
2. The wire is attached to the ceiling grid, as required by the NEC,
3. The wire is not used to support the ceiling grid, as required by the NEC, and
4. The local authority having jurisdiction understands they are not supports for the ceiling grid.

1.5 SUBMITTALS

A. See Division 1 - Submittal Procedures.

B. Product Data: Provide manufacturer’s catalog data for fastening systems.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. ERICO International Corporation: www.erico.com

1. CableCat Adjustable Cable Support (CAT425 series slings)
2. CableCat Cable Support (CAT32 or CAT64 series)

B. Substitutions: See Division 1 - Product Requirements.

2.2 MATERIALS

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Anchors and Fasteners:

1. Obtain permission from Architect before using powder-actuated anchors.

2. Concrete Structural Elements: Use precast inserts, expansion anchors, powder-actuated anchors, or preset inserts.
3. Steel Structural Elements: Use beam clamps, steel spring clips, steel ramset fasteners, or welded fasteners.
4. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
6. Solid Masonry Walls: Use expansion anchors or preset inserts.
7. Sheet Metal: Use sheet metal screws.
8. Wood Elements: Use wood screws.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The Contractor shall install cable supports above concealed ceilings using a rigid support to a structural element or by attaching directly to a structural element.

B. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
2. Contractors may use existing threaded rods for other utilities, if pre-approved by JH and capable of supporting the additional load. Clearances must be maintained.
3. Obtain permission from Architect before drilling or cutting structural members.

C. The Contractor may install J-hook type or sling-type supports by attaching to suspended ceiling grid-type wire with manufacturer clamps, provided:

1. The wire is painted orange prior to installation, to differentiate it from ceiling grid support wires,
2. The wire is attached to the ceiling grid, as required by the NEC,
3. The wire is not used to support the ceiling grid, as required by the NEC, and
4. The local authority having jurisdiction understands they are not supports for the ceiling grid.

D. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

E. The Contractor shall support Category 6 cables with J-hook type or sling-type supports in concealed ceiling spaces.

F. The Contractor shall support Category 6 cables with sling-type supports and not with J-hooks if supporting more than eight cables.

G. J-hook and sling-type supports must be installed every 4-5 feet at on irregular interval. Installation of supports at a repeating interval (i.e. every 4 feet exactly) will establish a standing wave induction of interference on the cable. Attaching supports to alternating sides of structural steel can accomplishment this as can a non-linear installation.

H. The Contractor shall "close" J-hook supports with manufacturer provided bars and not with cable ties. The Contractor shall not use cable ties to strap cables to J-hook supports. The Contractor shall not install cables under such strain as to require tying to supports.

END OF SECTION

SECTION 270530
CABLE TRAYS FOR COMMUNICATIONS

PART 1- GENERAL

1.1 SECTION INCLUDES

A. Cable trays and accessories.

1.2 REFERENCES

A. NEMA VE 1 - Metallic Cable Tray Systems; National Electrical Manufacturers Association; latest edition.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; latest edition.

1.3 DEFINITIONS

A. See Section 271500 – Voice Data Video Systems

1.4 CONTRACTOR REQUIREMENTS

A. Cable tray shall be single tiered and shall be installed to allow 12" of open space above and to one side of the tray. Actual dimensions of cable tray shall be determined by the volume of cable planned for installation at the time of construction, and account for future growth. The cable tray shall not be filled more than 50% of its capacity. Cable tray shall extend into the communications room providing access to racks and walls in a “T” design. Small rooms may use a single, straight cable tray in line with the rack, provided it extends parallel to the face of the rack.

B. Cable trays shall be installed only in corridors, hallways, and communications rooms, and not above individual offices, conference rooms, restrooms, etc.

C. A minimum of (2) 4" conduits shall be used in place of a cable tray when installation involves passing over inaccessible ceilings. Additional conduits may be required as cable volume dictates. Determination of conduit requirements shall be coordinated with appropriate Owner personnel.

D. Provide the cable tray products within network rooms for vertical strain relief as needed while maintaining 50% additional capacity within the support structure. Secure the cables with Velcro-type straps at a minimum of 36”, or as recommended by the manufacturer to relieve vertical weight strain.

E. Specify appropriate hardware and parts to attach the tray to permanent building structure (concrete columns or deck, structural steel, or other immovable

structures capable of supporting the cable tray). Parts shall be specifically designed and where possible UL-listed for their final installed configuration.

1.5 SUBMITTALS

A. See Division 1 - Submittal Procedures, for submittal procedures.

B. Product Data: Provide data for fittings and accessories.

C. Shop Drawings: Indicate tray type, dimensions, support points, and finishes.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Wiremold Company: www.wiremold.com.

1. FieldMate Wire Basket Cable Tray
2. SpecMate Center Spine Cable Tray
3. SpecMate Twin Spine Cable Tray
4. SpecMate L-Series Ladder Tray
5. SpecMate Solid Bottom Cable Tray

B. Cablofil, Inc: www.cablofil.com

1. Wire Cable Tray

C. Copper B-Line, Inc.: www.b-line.com.

1. Cent-R-Rail Systems
2. Cable Tray Systems
3. Wire Basket Cable Support

D. GS Metals Corp.: www.flextray.com

1. FLEXTRAY Cable Management System

E. Cable Management Solutions, Inc.

1. Floor and Overhead Snake Tray
2. Snake Canyon
3. Wall Snake

4. Ladder Snake

2.2 WIRE MESH/BASKET METAL CABLE TRAY

A. Description: NEMA VE 1, wire mesh/basket metal cable tray.

B. Material: Formed sheet steel, hot-dip galvanized after fabrication in accordance with ASTM A 123/A 123M, painted with gray epoxy.

C. Wire diameter: 0.175 inches minimum

D. Minimum of two horizontal (length-wise) wires on the vertical sides

2.3 ACCESSORIES

A. Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, and connectors.

B. Provide bushings or rubber edge trim as needed. All products shall be free of sharp edges or points that may damage cables.

C. Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, and connectors.

2.4 WARNING SIGNS

A. Engraved/Printed Nameplates: 1/2 inch (13 mm) black letters on yellow laminated plastic nameplate, engraved/printed with the following wording: "WARNING! DO NOT USE CABLE TRAY AS WALKWAY, LADDER, OR SUPPORT. USE ONLY AS MECHANICAL SUPPORT FOR CABLES AND TUBING!"

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cable tray securely, in a neat and workmanlike manner, as specified by NECA 1.

B. Install cable tray in accordance with manufacturer's instructions. Cut cable tray using manufacturer's equipment, if available from the manufacturer. Deburr all edges and points.

C. Arrange supports to prevent misalignment during wiring installation.

D. Fasten supports to building structure and surfaces.

E. Cable tray elements shall be supported with manufacturer's hardware to provide a minimal profile. Suspension shoes and brackets shall be used in place of trapeze struts. Sharp corners and threaded rod shall not extend below the basket creating a hazard.

F. Clearances: Install cable tray maintaining a minimum of:

1. 12 inches of unobstructed clearance above the cable tray's highest plane
2. 6 inches from any source of EMI
3. 12 inches from any heat source exceeding 104 degrees F

G. If cables rise to the ceiling space of the floor above a network room (a vertical rise of 12 feet or more), the Contractor shall install cable tray in such a way as to relieve the vertical weight from the cables on all floors. The Contractor shall secure the cables with Velcro-type straps as needed to relieve vertical weight strain.

H. Continuous support elements shall be bonded to ground to TMGB/TGB with a grounding wire. Sections may be bolted together or tied together with grounding jumpers, if the support structure is approved by the manufacturer as a grounding conductor.

I. Innerduct shall not be used in cable trays when extending horizontally from a network room.

J. Solid bottom cable tray must provide for the continual release of any trapped moisture within the cable tray.

K. Provide suitable pull strings in all cable trays.

L. Provide suitable fittings or gaps with bonding jumpers to accommodate expansion and deflection where cable tray crosses expansion joints.

M. Cable tray shall not penetrate fire-rated barriers. Cable tray shall end within 18 inches of fire-rated barriers. Cables shall use firestop assemblies or sleeves to penetrate fire-rated barriers.

N. Identify cable tray per specifications.

O. Install warning signs, specified above, on all overhead cable trays. Install a minimum of one sign per manufactured piece of cable tray. Install a minimum of one sign per visible segment of cable tray. Cable tray installed onto work areas furniture for the convenience of users shall not be labeled.

END OF SECTION

SECTION 270544
SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

F. Sleeves for Rectangular Openings:

1. Material: Galvanized-steel sheet.
2. Minimum Metal Thickness:

   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Advance Products & Systems, Inc.
   b. CALPICO, Inc.
   c. Metraflex Company (The).
   d. Pipeline Seal and Insulator, Inc.
   e. Proco Products, Inc.

2. Sealing Elements: Nitrile (Buna N) rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Presealed Systems.

2.4 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
2. Sealant shall have VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

   a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
   b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Section "Penetration Firestopping."

END OF SECTION

SECTION 27 11 00
COMMUNICATIONS EQUIPMENT ROOM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Telecommunications mounting elements.
2. Backboards.
3. Grounding.

B. Related Sections:

1. Division 27 Section "Data, Voice & Video" for voice and data cabling associated with system panels and devices.

1.03 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).

C. LAN: Local area network.

D. RCDD: Registered Communications Distribution Designer.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment racks and cabinets. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For communications equipment room fittings. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Equipment Racks and Cabinets: Include workspace requirements and access for cable connections.
3. Grounding: Indicate location of grounding bus bar and its mounting detail showing standoff insulators and wall mounting brackets.

C. Qualification Data: For **Installer,** qualified layout technician, installation supervisor, and field inspector.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings shall be under the direct supervision of RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
3. Field Inspector: Currently registered by BICSI as Commercial Installer, Level 2 to perform the on-site inspection.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

D. Grounding: Comply with ANSI-J-STD-607-A.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and work above ceilings is complete.

1.07 COORDINATION

A. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier.

1. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
2. Record agreements reached in meetings and distribute them to other participants.

3. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
4. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.

B. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

PART 2 - PRODUCTS

2.01 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A.

B. Cable Support: NRTL labeled. Cable support brackets shall be designed to prevent degradation of cable performance and pinch points that could damage cable. Cable tie slots fasten cable ties to brackets.

1. Comply with NFPA 70 and UL 2043 for fire-resistant and low-smoke-producing characteristics.
2. Support brackets with cable tie slots for fastening cable ties to brackets.
3. Lacing bars, spools, J-hooks, and D-rings.
4. Straps and other devices.

C. Cable Trays:

1. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Cable Management Solutions, Inc.
   b. Cablofil Inc.
   c. Cooper B-Line, Inc.
   d. Cope - Tyco/Allied Tube & Conduit.
   e. GS Metals Corp.

2. Cable Tray Materials: Metal, suitable for indoors and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick.
   a. Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).

D. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."

1. Outlet boxes shall be no smaller than 4 inches (100 mm) wide, 4 inches (100 mm) high, and 2-1/2 inches (64 mm) deep.

2.02 BACKBOARDS

A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry."

B. Paint all backboards “BLACK”.

2.03 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.

B. Telecommunications Main Bus Bar:

1. Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
2. Ground Bus Bar: Copper, minimum 1/4 inch thick by 4 inches wide (6 mm thick by 100 mm wide) with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart.
3. Stand-Off Insulators: Comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

C. Comply with ANSI-J-STD-607-A.

2.04 LABELING

A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1.

B. Comply with BICSI TDMM for layout and installation of communications equipment rooms.

C. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.

D. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.02 FIRESTOPPING

A. Comply with requirements in Division 07 Section "Penetration Firestopping."Comply with TIA/EIA-569-A, Annex A, "Firestopping."

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

C. Provide Specified Technologies, Inc (STI) EZ Path Cable Pathway sleeves at all cable penetrations through walls in the telecommunications rooms (MDF and IDF rooms). Provide multiple Series 33 and Series 44 as needed to serve cabling being installed plus 100% spare capacity.

3.03 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
   1. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

3.04 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.

B. See Division 27 Section "Data, Voice & Video" for additional identification requirements. See Evaluations for discussion of TIA/EIA standard as it applies to this Section. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 3 level of administration including optional identification requirements of this standard.

C. Labels shall be preprinted or computer-printed type.

END OF SECTION

SECTION 271500
VOICE DATA VIDEO SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Fiber Optic Cables and Equipment

B. UTP Cables and Equipment

C. Telephone Cables and Equipment

D. Modular Jacks and Mounting Hardware

E. Equipment Racks

F. Backboards

G. Wire Management
H. Lightning Protection
I. Labeling
J. Corrugated Communications Duct (Innerduct)

1.2 REFERENCES

A. NFPA 70 - National Electrical Code.

B. ANSI/TIA/EIA-568-B.1, ANSI/TIA/EIA-568-B.2, & ANSI/TIA/EIA-568-B: B.3 (Included all Addendums issued by TIA) – Commercial Building Telecommunications Cabling Standards

C. ANSI/TIA/ETIA-569-A (Addenda 1-7) - Commercial Building Standard for Tele-communications Pathways and Spaces

D. ANSI/TIA/EIA-606 –Labeling Standard for the Tele-communication Infrastructure

E. EIA/TIA-455A - Standard Test Procedure for Fiber Optic Components

F. BISCI – Telecommunications Distribution Methods Manual (Current Edition)

G. NEMA WD-6: Wiring Devices - Dimensional Requirements

H. ANSI/TIA/EIA-607 – Grounding and Protection of Telecommunication Cables and Equipment.

I. EIA 310-D: Cabinets, Racks, Panels and Associated Equipment.

J. EIA/TIA-604-3: Fiber Optic Connector Internoteability Standard.

K. ANSI/ICEA S-80-576: Industry Color codes

L. UL 910/NFPA 262: Test method for fire and smoke characteristics of electrical and optical-fiber cables used in air handling spaces.

M. UL 1666: Flame propagation height of electrical and optical-fiber cables installed vertically in shafts.

1.3 SYSTEM REQUIREMENT

A. All cables Specified are to be supplied in "plenum-rated" versions for this installation.

B. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum performance.

C. Contractor shall visit the site, verify all existing items specified, and be familiar with the working conditions, hazards, phasing and local requirements involved. Contractor shall take these existing conditions into consideration and the lack of specific information in these specifications shall not relieve the Contractor of any responsibility. Provide temporary cabling, supports, terminations, outlets, and all product required to keep existing system operational until new system is complete. Provide temporary cabling and provisions to maintain the system for each phase of construction. Contractor shall provide all field investigations to determine all conditions and circumstances and gather all data and information required for work. Contractor shall survey all equipment and cable routes and wiring devices. Contractor shall provide complete field investigations and coordination to determine and provide all temporary cabling and provisions to maintain systems operation. The contractor shall assume that all information shall be obtained from contractor field surveys and not from contract documents. Contractor shall remove temporary provisions when the need for its services has ended, when it has been replaced by the contractor provided permanent facility.

D. Contractor shall protect and maintain existing voice/data/video systems in school. Contractor shall trace, locate and identify all existing voice/data/video cabling. Provide relocation of existing and new supports for existing cabling. Provide temporary voice/data/video cabling to maintain operation of existing systems.

E. **Contractor shall provide CAT6 cabling for ALL systems on this project, including systems provided and specified under other specification sections. For example:**

1. Contractor shall provide CAT6 cabling to all security cameras (two CAT6 cables per camera location) refer to section 282300.

2. Contractor shall provide CAT6 cabling to all IP PoE devices , including PoE Clocks (one CAT6 cable per clock location) refer to section 275313

3. Contractor shall provide CAT6 cabling to all IP PoE devices , including PoE intercom stations (one CAT6 cable per intercom location) refer to section 275313 and to drawings.

1.4 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 260010.

B. Shop Drawings: The following items shall be submitted for review and approval:
   1. Submittal booklet to include the following;
      a. Reference to Specification Section
      b. A list of all equipment to be provided and installed.
      c. Data sheets to indicate dimensions, knockout sizes, material, fabrication details, finishes and accessories with specific item or model number highlighted.
      d. Data sheet to indicate each cable type including number of pairs, punch down block, outlet/connectors with the specific item or model number highlighted.
      e. Data sheets to indicate supply dimensions, ETL-verified electrical characteristics and parameters, upgrade/expansion data, and mounting methods for all hardware and materials with the specific item or model numbers highlighted.

C. Submit manufacturer warranty certificate stating length of warranty, other accepted component manufacturers and overall testing/replacement responsibility.

D. Submit product certificates signed by manufacturers of cables, connectors, and equipment certifying that products furnished comply with requirements and warranty is valid with equipment installed.

E. Submit evidence that all qualifications have been met.

F. Submit make/model numbers of testers to be used for all testing of cables.

G. Labeling Scheme: Submit labeling scheme for cabling, outlets and equipment for approval.
   1. Contractor to coordinate with Owner for final room designations utilized in applied labeling scheme. Labeling schemes applied without documented Owner coordination are subject to removal and re-application by Contractor.
   2. All labels are to be typed.

H. Submit a complete schedule of equipment and materials that are to be furnished for the work. Accompanying the schedule shall be manufacturer's specifications or cut sheets for each major component. Original specification sheets or clear copies of same shall be submitted on all items. Manufacturers name, make and model number shall appear on each sheet. Submittals shall be bound in booklet form with cover sheet and index, and presented in a neat and logical order in a binder. Submittals shall contain installation, operation and programming manuals of the system to provide the Owner and Engineer complete information as to system features, functions and capabilities.

I. Complete drawings detailing installation locations of equipment, cable quantities and types with terminal block or patch panel locations. Submit Shop Drawings of each proposed system indicating the proposed system configuration and all specified requirements. Shop Drawing shall indicate proposed cable routing, detail installation locations of equipment, cable quantities, cable types, and terminal block locations. All Shop Drawings shall be Contractor’s original drawings. Submission of Engineer’s

Contract Drawings as Shop Drawings is not permitted. Clear and detailed sets of floor plans for the complete building shall be furnished showing the locations of all equipment and devices and their required interconnections. The interconnections shown shall indicate the number, size, and type of wires as described in this Specification. The layout of all telecommunications system equipment, devices, and conduit routings shall closely follow that shown on the Drawings.

J. The Contractor shall submit a certificate with the RCDD signature, registration number, and seal verifying the completeness and accuracy of the design and installation. All distribution designs shall be submitted with the RCDD signature, registration number, and seal.

1.5 SUBMITTALS FOR CLOSEOUT

A. Submit under provisions of Section 270500.

B. As-Built Drawings: Provide a marked-up copy of original plans which reflect any changes or additions not shown on the plan. Identify all cable and jack numbering as identified on site and in System Final Test Report. Indicate routing of all IDF to MDF cabling.

C. Submit Test Report for each basic link from patch panel to jack/patch panel. Report to include test equipment type and calibration data, date and operator.

D. Submit electronic copy of final comprehensive schedules for project, in software and format selected by Owner.

E. Submit manuals indicating enclosures, accessories and spare parts.

F. Record actual locations of outlets and sizes of pathways.

G. Provide Operation and Maintenance Manuals, as specified in Division 1 and Division 26, for work specified in this Section. Include complete service information, including schematics, prints of the Special System Drawings, interconnecting diagrams for this particular project, and parts lists to permit quick and efficient maintenance and repair of the equipment by a qualified technician. Provide a separate binder with copies of all system test reports.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Supplier: Authorized or Franchised distributor of specified manufacturer with minimum three years documented experience.

C. Installer: Authorized or franchised installer of specified manufacturers with five years documented experience.

1. Provide two references of network installation which exceeded 200 drops and were completed within the last 12 months.
2. Installer must be able to identify and correct non-compliance in structured cabling systems. Provide the name of a fulltime RCDD employed by the installing company.
3. Provide satisfactory evidence of a fully equipped service organization, capable of furnishing adequate inspection and service to the system, including standard replacement parts within 50 miles of the project site.
4. Perform all terminations at device and headend locations using the hereby qualified installation firm.
5. Supervise and approve all cable pulls in accordance with warranty requirements of the certifying company.

1.7 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Provide products listed and classified by Underwriters Laboratories, Inc. or a testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.8 COORDINATION

A. Coordinate work of this section with public address intercom and telephone instruments provided in Section 275313.

1. Adjust arrangements and locations of equipment racks, cabinets, backboards, patch panels, and cross connects in IDF/MDF Rooms and consolidation points to accommodate and optimize arrangement and space requirements. Review revised layouts with Engineer before proceeding with work.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver products to project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer.

B. Store products in dry spaces protected from the weather. The storage temperature shall be 68ºF to 122ºF.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of complete data cabling system for one year from Date of Substantial Completion of project at no additional cost to Owner.

1.11 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Wall Data Outlets: Furnish 10 for every 100 of each type installed but not less than 10 of each type.
2. UTP Patch Cables of sufficient length to replace any similar cable installed in the project: Furnish 10 for every 100 of each type installed but not less than 10 of each type.
3. Fiber Optic Patch Cables of sufficient length to replace any similar cable installed in the project: Furnish 1 for every 10 of each type installed but not less than 10 of each type.
4. Wall Plates: Furnish 10 for every 100 of each type and rating installed but not less than 10 of each type.
5. Connector Module: Furnish 10 for every 100 of each type and rating installed but not less than 10 of each type.
6. Mounting Straps: Furnish 10 for every 100 of each type and rating installed but not less than 10 of each type.

1.12 SITE SURVEY

A. Provide examination of site as required by specifications.

B. Prior to placing any cable pathways or cable, the Contractor shall survey the site to determine job conditions will not impose any obstructions that would interfere with the safe and satisfactory placement of the cables, and to arrange the removal of any obstructions with the Project Manager accordingly.

C. The Drawings provided are diagrammatic and generally representative of the existing conditions, but not necessarily accurate in all aspects; therefore, verification of these drawings is solely the responsibility of the Contractor. The Contractor shall verify all field conditions and make field measurements as required.

D. Visit the site before submitting bid and check location of utilities, check conditions, verify dimensions and locations shown on the plans, and verify over-all costs and work herein described or shown.

E. Take measurements necessary for this work and be responsible for their accuracy. Necessary pullboxes and junction boxes as required to accomplish distribution shall be provided.

PART 2 – PRODUCTS

2.1 FIBER OPTIC PATCH PANELS

A. Manufacturers:

1. Siemon Model RIC or SWIC Series
2. Ortronics
3. Leviton Voice and Data
4. Comm-scope
5. Hubbell Premise Wiring
6. Panduit
7. Superior Modular Products
8. ADC/Krone

B. All fiber optic connectors shall be LC type or as required.

C. Provide sufficient quantity and size fiber optic rack mounted patch panel(s) to terminate all fibers specified for each rack with 20% spare capacity.

D. Patch Panel must contain sufficient quantity couplers, as well as wire management and strain relief for incoming building cables.

E. Patch Panel must rack-mount in a 19" width rack as required for intermediate and main closets.

F. Patch Panel must wall-mount for Utility.

G. Patch Panel must completely house the fibers; open back, plate type panels are unacceptable.

H. Patch Panel must include rack mounting screws, cable management rings, labeling and split tubing to protect incoming cable.

2.2 FIBER OPTIC CABLES

A. Manufacturers

1. Corning

B. Provide 12 strand 50-micron OM4 multimode optical fiber from main school MDF (in adjacent building across bridge) to each IDF

C. Provide 6 strand single mode optical fiber from main school MDF (in adjacent building across bridge) to each IDF

D. All Fiber must be installed following manufacturing specification.

F. Provide combination multimode/single mode cables when indicated.

G. All fibers shall be terminated in Fiber Connectors with LC connectors as required to match patch panels. Reterminate existing fiber optic cables as required to make compatible with new patch bays.

H. Fiber Optic Connectors: 2 part epoxy, crimp or hot melt type, ceramic tip, multi-mode and single mode as required. (Siemon #FC1/FC2 Series or equivalent)

I. Provide Manufacturer's Standard Fiber termination Break-Out Kit for all fibers.

J. Fiber Optic Patch Cables: (Siemon #FJ2 Series or equivalent)
   1. All fiber patch cords shall be shall meet or exceed standards as defined in ANSI/TIA/EIA-568-B.3 Commercial Building Cabling Standards.
   2. All multimode fiber patch cords shall consist of buffered, graded-index fiber for multimode.
   3. All single mode fiber patch cords shall have 0.5dB/km @ 1310nm wavelength or 0.5 dB/km @ 1550nm wavelength for single mode optical fiber.
   4. All dual fiber patch cords are to be minimum 2 meter in length.
   5. Provide with factory installed LC connectors as required to mate with patch panel connectors.
   6. Provide two patch cables for each connected patch panel port minimum.
   7. Provide 20% spare cables (minimum 5) – sufficient length to replace any similar cable installed in the project.

2.3 UTP RACK MOUNT PATCH PANELS FOR DATA AND VOICE

A. Manufacturers:

   1. ADC/Krone

B. All patch panels shall meet or exceed Category 6 requirements per ANSI/TIA/EIA-568-B-2.1 (Category 6).

C. All patch panels shall accommodate at least 24 ports for each rack mount space.

D. All patch panels shall have circuit boards tested in both directions as required by ANSI/TIA/EIA-568-B and ISO/IEC 11801.

E. All patch panels shall allow for a minimum of 200 re-terminations without signal degradation below standards compliance limit.

F. All patch panels shall have modular ports compliant with FCC CFR 47 part 68 subpart F and IEC 603-7 with 50 microinches of gold plating over nickel contacts.

G. All patch panels shall have cable tie eyelets and a rear cable management bar for strain relief.

H. All patch panels shall have port identification numbers on both the front and rear of the panel.

I. All patch panels shall provide self adhesive, clear label holders and white designation labels with the panel.

J. Patch Panels shall utilize type 110 punch down connections at the rear and RJ-45 modular jacks at front.

K. Provide sufficient quantity and size rack mounted patch panels as required to terminate all data outlets in their associated MDF/IDF rack and consolidation points with 20% spare capacity.

2.4 UTP CABLES FOR DATA AND VOICE

A. Manufacturers:

1. ADC/Krone

B. Category 6 Cable:

1. All category 6 cables shall conform to the requirements of ANSI/TIA/EIA-568-B.2-1 Commercial Building Telecommunications Cabling Standard.

2. All category 6 cables shall meet or exceed the performance specifications as outlined in ANSI/TIA/EIA-568-B.2.1 Transmission Performance Specifications for 4 pair 100Ω Category 6 Cabling.
3. All category 6 cables shall be Plenum or Riser Rated in accordance with NEC Article 770, UL Subject 1666 and UL Subject 910.

4. All cable must have a positive power sum attenuation crosstalk ratio up to 200 MHz.

5. COLOR CODING :
a. Provide BLUE jacket cables for all cabling serving & all outlets.

C. Provide outdoor rated cables for all exterior UTP cables.

D. UTP Patch Cables for Data: (Siemon #MCX-XX Series or equivalent)

1. All patch cords shall be round and consist of eight insulated 24 AWG, stranded copper conductors, arranged in four color-coded twisted pairs within a flame- retardant jacket.

2. All patch cords shall be equipped with modular 8-position modular plugs on both ends.

3. All patch cords shall be wired straight through with standards compliant wiring.

4. All patch cords shall use modular plugs that exceed FCC CFR 47 part 68 subpart F and IEC 603-7 specifications, and have 50 micro-inches of gold plating over nickel contacts.

5. All patch cords shall be modular cords should include a strain relief boot.

6. All patch cords are to be minimum 1 meter (3 foot) length.

7. Provide with factory installed connectors on each end to mate with patch panel connectors.

8. **Provide one patch cable (3 foot) for each connected patch panel port minimum.**

2.5 TELEPHONE EQUIPMENT TERMINAL BLOCKS

A. Manufacturers: ADC/Krone

B. All wall mount blocks shall be constructed of flame-retardant thermoplastic, with the base consisting of horizontal index strips for terminating up to 25-pairs of conductors.

C. All wall mount blocks shall have termination strips on the base to be notched and divided into 5-pair increments.

D. All wall mount blocks shall clear label holders with the appropriate colored inserts available for the wiring blocks.

E. All wall mount blocks shall have connecting blocks used for the termination of cross- connect (jumper) wire.

F. All wall mount blocks shall be able to withstand a minimum of 200 re-terminations without signal degradation below standards compliance limit.

G. All wall mount blocks shall accept wire sizes: Solid 22-26 AWG.

2.6 TELEPHONE CABLES

A. Service Cable: Provided by Utility Company unless otherwise noted.

2.7 TELEPHONE CABLE CONNECTIONS

A. Main Service Entrance: Provide Type '110'blocks, Category 6, mounted on stand-off brackets from backboard with all cross-connect cables.

B. Intermediate (Workstation) Connections: Provide UTP rack mount patch panels as listed in Paragraph 2.4. Provide 110 blocks for multi-pair cable patches to panels.

2.8 MODULAR JACKS AND MOUNTING HARDWARE

A. Manufacturers:

1. ADC/Krone

B. Mounting Hardware: Metal or plastic wall plates, device straps and patch panels pre- punched to accept field installed modular jacks and connectors.

1. Wall Plates:

a. Color and type to match wiring device wall plates in Section260140, one gang with 2, 4 or 6 punchouts and two gang with 8 or 12 punchouts. Overall dimensions and screw mounting holes per NEMA WD-6.

b. Wall plate designed to mount directly on a flush mounted standard one or two gang outlet box as indicated or required.
c. Angle Adapters: Adapter to allow modules to be mounted on a wall plate at an angle of 55°.
d. Straight Configurations: All BNC and F Connectors shall be mounted straight. Angle adapters are not acceptable for these connectors.

2. Mounting Strap:
   a. Plastic or metal strap with mounting holes per NEMA WD-6 to match standard outlet box mounting holes and punchouts to accept 2 and 4 modules.
   b. Provide mounting straps which match duplex receptacles standard device wall plates.
3. Custom Patch Panels:
   a. Metal panels dimensional to EIA 310-D requirements for 19" racks and punched to accept modules.
4. Modular Furniture Adapters:
   a. Flush and raised plastic or metal adapters to permit mounting of 2, 4 or 6 modules in the wireways knockouts of modular furniture and modular office partitions.
5. Floor Boxes and Poke-Thrus:
   a. Provide mounting straps and standard or special cover plates for all modules mounted in floorboxes and poke-thrus.
6. Surface Raceway:
   a. Provide mounting straps and standard or special cover plates for all modules mounted directly on surface raceway.

C. Modules: Plastic insert with molded in or installed connector suitable for field installation in any of the specified mounting hardware devices. Provide modules designed so that any combination of 2 jack types can be mounted in a mounting hardware device with 2 punchouts and any 4 different modules can be mounted in a mounting hardware device with 4 punchouts. Provide blank filler plates for all unused punchouts.
   1. RJ-45 Category 6 jack per ANSI/TIA/EIA-568-B.2-1
   2. ST fiber optic connector per EIA/TIA-604-3
   3. LC fiber optic connector per EIA/TIA-604-3
   4. HDMI Gold Jack
   5. RCA Gold Jack (color coded)
   6. BNC connector (straight mount)
   7. F connector (straight mount)
   8. SVGA (female)
   9. 3.5 Mini Stereo Jack
   10. Gold Speaker Post
   11. Blank filler plate

2.9 TELEPHONE TERMINATION CABINETS/PROTECTORS

A. Manufacturers:
   1. Hub Fabricating Co., (610-779-2200) Model 1LB Series
   2. Circa Model 1880 Series

B. Protective Devices: Refer to Lightning Protection in this specification.

C. Cabinet Boxes: Galvanized steel with removable endwalls, 24" wide, 24" high, 6" deep. Provide plywood backboard inside cabinet for mounting telephone termination devices.

D. Cabinet Fronts: Steel, surface type, concealed hinge, double doors and flush lock keyed to match branch circuit panelboard.

E. Finish: Gray baked enamel.

2.10 EQUIPMENT RACK/CABINET

A. Owner will furnish Telecom Equipment Cabinets for each of the four telecom rooms
   1. IDF Room 122
   2. IDF Room 142
   3. IDF Room M026
   4. IDF Room A001

B. Contractor shall install the owner furnished cabinets and install all owner furnished accessories for the cabinet (owner furnished horizontal and vertical wire management , grounding kits, etc)

C. Provide telecom grounding for all telecom cabinets.

2.11 BACKBOARDS

A. AC grade southern yellow pine or fir plywood with exterior glue, 3/4" thick, size as shown or required.

B. Paint with 1 coat of exterior wood primer both faces and all edges and 1 coat of light gray fire retardant semi-gloss enamel on the front face only.

2.12 WIRE MANAGEMENT

A. Manufacturers:
   1. Liebert
   2. Siemon
   3. Homaco

B. Floor Mounted Equipment Rack Wire Management – Owner furnished and contractor installed.

C. Backboards: Provide cable straps for backbone cables. Provide horizontal and vertical wire management on the backboard consisting of metal or plastic D-rings or nylon straps with Velcro connectors.

D. Provide cable management for all cables as required at all racks, backboards and equipment.

2.13 LIGHTNING PROTECTION

A. Manufacturers:
   1. Siecor Model 89XX
   2. Siemon “Pico Module”
   3. Circa

B. Provide protection for number of pair in service cable entering premises. Including all copper cabling installed to exterior vehicle gates.

C. Provide on each cable or pair entering or leaving the premises.

D. Provide protector with a maximum breakover voltage of 200 volts ±15%

2.14 LABELING

A. Identify system components complying with applicable requirements in Section 260195.

B. System: Use a unique, 3 syllable alphanumeric designation for each cable, and label cable and jacks, connectors, and terminals to which it connects with the same designation. Use logical and systematic designations for facility’s architectural arrangement.
   1. First syllable identifies and locates wiring closet or equipment room where cable originates.
   2. Second syllable identifies and locates cross-connect or patch-panel field in which cable terminates.
   3. Third syllable designates type of media (copper or fiber) and position occupied by cable pairs or fibers in the field.
   4. Example: A2-2-C46

C. Workstation: Label cables within outlet boxes.

D. Equipment Racks, cabinets and Backboards: Label each unit and field within that unit. E. Within Connector Fields, in IDF/MDF Rooms and Consolidation Points: Label each connector and each discrete unit of cable terminating and connecting hardware. Where similar jacks and plugs are used for both communication and data-processing equipment, use a different color for jacks and plugs of each service.

F. Cables, General: Label each cable within 4" of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.

G. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 100 feet.

H. Cable Schedule: Post in prominent location in each wiring closet and equipment room. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Provide electronic copy of final comprehensive schedules for project, in software and format selected by Owner.

I. Provide engraved nameplates on all equipment racks, cabinets and backboards to identify the service (telephone, video, data, etc.) and the unit name (IDF #6, Backboard #3, MC #2 etc.)

2.15 CORRUGATED COMMUNICATIONS DUCT (INNERDUCT)

A. All innerduct must meet or exceed requirements of NEC, Section 770 and 800.

B. All innerduct must be Plenum rated.

C. All innerduct must be UL listed.

D. All innerduct must have pre-installed pull line in all sizes.

E. All innerduct color shall be orange for Multimode fiber and yellow for single mode fiber.

F. All innerduct shall be available in ½" to 2" sizes. Use sizes as indicated or required for cables.

2.16 Uninterruptable Power Supply:

A. The Owner shall provide all Uninterruptable Power Supply units. Contractor shall make provisions for Owner furnished UPS in each rack/cabinet.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cable. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install all cables in accordance with equipment manufacturers instructions, and with recognized industry practices, to ensure the installation complies with requirements of the NEC, ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard and BICSI'S "Telecommunication Distribution Methods Manual" (current edition).

B. Install all cables only when the temperature is between 50ºF to 122ºF.

C. Wiring Method: Wiring shall be installed in EMT conduit within walls and above inaccessible ceilings. Wiring shall be installed in cable tray where it is present. Wiring installed above accessible ceilings between ceiling mounted devices or conduit stub-ups and the cable tray shall be exposed and supported by J-hooks, spaced a maximum of 5'- 0" on center, with minimum 1" flat bearing surface. Provide conduit sleeves, bushings and fireproofing through all wall penetrations. All wiring not in EMT conduit shall be kept a minimum of 6"" away from all

lighting fixtures, motors, and transformers. Cables cannot be ty-wrapped or stapled to ceiling or structural supports, conduit, or other items.

D. Test each cable as detailed in Paragraph 3.04. Include patch cord in test channel.

E. Identify all cables with a neatly typed label as detailed in Paragraph 2.17.

F. Provide horizontal and vertical cable management in all racks, on all backboards and any other location cabling is not routed in conduit or cable tray. Size cable management for 50% additional cables.

G. For buildings with floors in excess of two, provide a 2' diameter service loop (with 3 loops) in all between-floor fiber optic cables. Locate one service loop in ceiling cavities of each floor above the lowest floor for future changes/upgrades. Neatly cable tie service loop to structure or cable tray to prevent susceptibility to damage.

H. UTP Cable Length:

1. Maximum installed length of each UTP cable between closet and workstation outlet is to be 90 meters (295 feet). Ensure lengths are within specification prior to installation. Contact Engineer for procedure in the event of excessive distances prior to installation.
2. Minimum length shall be 15 meters (49 feet). Provide service loop as required to increase length on short runs.

I. Install cable without damaging conductors, shield or jacket, do not use unjacketed pairs for jumpers.

J. Do not bend cable in handling or in installing to smaller radii than minimums recommended by manufacturer.

K. No splicing is permitted for UTP and fiber optic cables. Cables must be continuous between termination points. Make splices, taps and terminations only at indicated outlets, terminals, cross-connect and patch panels.

L. Provide at least 10' of cable slack at MDF or IDF closet. This slack may be stored in the cable tray or a cable management device behind the MDF/IDF.

M. Provide 2' diameter in service loops or use figure-8 or serpentine.

N. Provide at least 1' of slack at each workstation outlet. This slack may be coiled within device box observing bend radius minimum or within accessible ceiling space using approved J-hook support.

O. Remove jacket of cable and untwist individual UTP conductors the minimum amounts required to terminate on jacks and patch panels.

P. Cable fill in conduit is 40% maximum as follows:
1. 3/4" - 4 UTP Cables
2. 1" - 7 UTP Cables
3. 1 1/4" - 12 UTP Cables

4. 1-1/2" - 16 UTP Cables
5. 2" - 22 UTP Cables
6. 2-1/2" - 36 UTP Cables
7. 3" - 50 UTP Cables
8. 3-1/2" - Not recommended
9. 4" - Not recommended
10. Provide larger conduits than recommended for cable fill if indicated on the Drawings.

Q. Pull cables without exceeding cable manufacturer's recommended pulling tensions.
1. Pull cables simultaneously if more than one is being installed in the same raceway.
2. Use pulling compound or lubricant if necessary. Use compounds that will not damage conductor or insulation.
3. Use pulling means, including fish tape, cable, rope and basket-weave wire/cable grips that will not damage media or raceway.

R. Install exposed cable parallel and perpendicular to surfaces or exposed structural members, and follow surface contours where possible.

S. Secure and support cable at intervals not exceeding 5'-0" and not more than 1'-0" from cabinets, boxes, fittings, outlets, racks, frames and terminals.

T. Wiring within IDF/MDF and Enclosures: Provide adequate length of conductors. Train conductors to terminal points with no excess. Use lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.

U. Separation of Wires: Comply with EIA/TIA-569 rules for separating unshielded copper telecommunications equipment cables from potential EMI sources, including electrical power lines and equipment.

V. Install a 1 rack unit blank filler plate between patch panels which contain more than 12 jacks.

W. Provide blank filler plates as required to fill rack.

X. Support raceways, cabinets and all other equipment in accordance with manufacturer's instructions.

Y. Install backboards and cabinets plumb, and attach securely to building wall at each corner and additional as necessary to obtain a firm mounting.

Z. Provide pullwire in each empty telecommunications conduit.

AA. Install fiber optic cables in innerduct when not installed in cable tray. Use armored fiber as an alternate to innerduct where equal protection is afforded.

BB. Install fiber optic cables in innerduct inside conduit. Provide multiple innerducts in larger conduits.

CC. Support innerduct at manufacturers recommended intervals using manufacturer approved methods.

DD. Provide Type 110 blocks for voice interconnections within the building.

EE. Provide full assembly of all racks, equipment enclosures, cabinets and file servers with all accessories installed.

3.3 GROUNDING

A. Comply with Section 260170 and applicable details on plans.

B. Provide connections to the main ground bus on all backboards, telephone line protectors, IDF Racks and MDF Racks in the project. Connect to ground buses with cables per Section 260170 and applicable details on plans.

3.4 SLACK

A. In the work area, a minimum of 300 mm (12 in) should be left at outlets, while 1 m (3 ft) be left at the backboard or rack, and 6 m (20 feet) in the closet area.

B. In telecommunications rooms a minimum of 6 m (20 ft) of slack should be left for all cable types. This slack must be neatly managed on trays or other support types. "All cable types" includes all voice/data/video backbone cables and fiber optic backbone cables.

C. All unused cables shall be properly terminated, as specified, with 10 m (33 feet) extra cable neatly coiled and tie-wrapped at the workstation end of cable in the ceiling space.

D. Where wireless access point devices are installed, provide a minimum of 3 m (10 feet) of cable coiled, tie-wrapped, and supported in the ceiling space.

3.5 FIRE STOP

A. Provide properly installed firestop systems to prevent or retard the spread of fire, smoke, water, and gases through the building. This requirement applies to openings designed for telecommunications use that may or may not be penetrated by cables, wires, or raceways. Contractor shall seal all floor, ceiling, and wall penetrations.

B. Provide fire and smoke stopping in accordance with all applicable codes.

C. Provide fire-rated seals for all penetrations through fire-rated floors and walls. Provide UL listed fire sealant, Dow Corning Silicon foam, or approved equal. Provide UL listed expanding fire barrier and expanding type grout.

D. Provide Cable pathwat firestopping devices for cables exiting/entering telecommunications rooms (MDF/IDF). Provide STI EZ Path or approved equal.

3.6 CABLE TIE WRAPS

A. Tie wraps shall be used a appropriate intervals to secure cable and to provide strain relief at termination points. These wraps shall not be over tightened to the point of deforming or crimping the cable sheath. Tie wraps shall be attached with screws to walls, backboards, and other structures. Tie wraps shall be spaced between 6" and 10" apart, 8" on the average.

B. Hook cable managers should be used in the IDF/MDF room where reconfiguration of cables and terminations may be frequent. Cable Managers shall be Polygon Softcinch Series, or approved equal.

C. No “stick-on” cable wraps, raceways, or terminal devices are acceptable.

3.7 IDENTIFICATION

A. Identify system components in compliance with the applicable requirements of Division 16 and the following specifications:

B. Follow EIA/TIA recommendations and Owner’s standards for identification of voice and data jacks, cables and terminations.

C. Workstation: Label cables within outlet boxes. Label each jack with a unique identifying nomenclature.

D. Distribution Racks and Frames: Label each unit and field within that unit.

E. Within Connector Fields, in Wiring Closets and Equipment Rooms: Label each connector and each discrete unit of cable-terminating and connecting hardware.

F. Cables, Generally: Label each cable within 4 inches (100 mm) of each termination and elsewhere as indicated.

G. Exposed Cables and Cables in Cable Trays: Label each cable at intervals not exceeding 15 feet (4.5 m).

H. Cable Schedule: Post at a prominent location in each IDF Room and equipment room. List incoming and outgoing cables and their designations, origins, and destinations. Protect with a rigid frame and clear plastic cover. Provide a diskette copy of final comprehensive schedules for the project in the software and format.

I. All Horizontal wiring shall be terminated into the enclosures marked “Wiring” using 48 port CAT6 patch panels, with cable management placed accordingly, in accordance with ANSI/TIA/EIA-568-B(.1, .2, .3), 568-3, 569-B, 598-C, and 758-A standards, using T568-B standard punch downs.

J. All cabling must be labeled properly at both the station end and the closet termination point. Labels shall be resistant to environmental conditions and fading.

3.8 FINAL TESTING AND INSPECTION

A. Provide testing in accordance with ANSI/TIA/EIA-568B.1.

B. Cable Test: Provide prior to substantial completion, a Performance Evaluation Report, which will contain the following:

1. Cable Test: List by cable number each UTP and Fiber Optic Cable in the project, which details:

   Fiber Optic Cables
   a. Cable ID Number
   b. Final measured attenuation in dB/Km
   c. List any discrepancies with the fiber installation (bad terminations, faulty labeling, etc.)

   UTP Cables
   a. Cable ID Number
   b. List continuity, reversal, open, shorts and miswires
   c. Category performance
   d. List other discrepancies with the UTP installation (bad terminations, faulty labeling, etc).
   e. Tester printout for each cable.

2. Test Method: All fiber cabling to be tested as follows:

   Fiber Testing: Cable to be factory pre-tested on a reel basis for all fiber on this project. The attenuation in dB/Km to be recorded in Final Test Report. Contractor must test each fiber after installation using Power Meter. A dB Printout, end to end with connectors attached to be made and provided as part of the "Performance Evaluation Report". Traces must depict actual fiber loss (dB/Km), fiber length (ft.) and any fiber irregularities. Runs over 1,000' must be tested using an optical time domain refractometer (OTDR). Test horizontal cables when installed and terminated as follows:
   a. Both Wavelengths b. One Direction
   c. Link Loss <8.5 dB, 200 meters

   Test centralized cables from utility entrances (typically single mode) as follows:
   a. One Wavelength
   b. One Direction
   c. Link Loss <3.3 dB for 300 meters.

3. UTP Cable Testing: Test each cable pair of each cable after installation for Specified Category performance. Conduct test with a tester designed for testing above cable (with RJ-45 jacks installed) from each data outlet to associated patch cord through +0 panel jack (Channel). Provide printout for each test as part of the Performance Evaluation Report. Minimum performance categories for report are to be as follows:
   a. Wire Map/Continuity b. Length
   c. Near End Crosstalk (pair to pair) NEXT
   d. Near End Crosstalk (power sum) PSNEXT
   e. Equal Level Far-End Crosstalk Loss (pair to pair) ELFEXT
   f. Equal Level Far-End Crosstalk Loss (power sum) PSELFEXT

   g. Return Loss

h. Attenuation
i. Propogation Delay
j. Delay Skew
k. PSACR (Powersum Attenuation – Crosstalk Ratio)

4. System Performance Report: Provide a narrative detailing the system as a whole, in regards to the quality of installation and any discrepancies affecting performance. This narrative to indicate a summary of the above Cable Test, as well as an accurate summary of specified Category performance as well as capability of the cabling system to perform at specified Category bandwidth. Indicate-steps necessary to correct all deficiencies in the cable installation to enable specified Category performance.

5. CATV System Acceptance Tests:

a. Coaxial Cable Plant Testing shall consist of a sweep test of the cable plant provided under this Contract to verify installed cable bandwidth and distortions.
b. A Cumulative Leakage Index (CLI) survey shall be made to verify system integrity. Section 76.605(a)(h) of the FCC states that signal leakage must not exceed 20 micro-volts/meter from 54 MHz to 216 MHz at 3 meters and 15 micro-volts/meter at all other frequencies.
c. The Contractor shall test and for the following:
1)Test all specialty video cables for open, short, and ground.
2) Test all specialty video cables for end to end signal performance.
Test picture quality at each specialty outlet.
3)Test cables for frequency response and insertion loss at 5-1000 MHZ.

3.9 WARRANTY

A. The installation shall be provided with a minimum 25 year warranty for strict compliance with the performance requirements of ANSI/TIA/EIA-568-B to support and conform to ANSI/TIA/EIA-568-B specifications covering any current or future application which supports transmission over a properly constructed horizontal cabling system premises network which meets the channel performance as described in ANSI/TIA/EIA-568-B.

3.10 CLEANING

A. On completion of system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions from all areas worked in.

3.11 DOCUMENTATION:

A. The conditions of the General Provisions (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.

B. A comprehensive installation, operation, programming and instruction manual shall be supplied as part of the system. The manual shall provide complete service information, including schematics, layout drawings, and interconnecting diagrams showing the location of all the outlets,

cable taps, cable routes, and other installed components. Include final revised one-line system drawings. Include for this particular project parts lists to permit quick and efficient maintenance and repair of the equipment by qualified technicians. Manuals shall include 8 2" x 11" device location/cabling route drawings provided in CADD format Autodesk -AutoCadd Release 2009 or later (.dwg/.dxf) on CD disk. Manuals shall include a copy of the operations manuals listed below. Manuals shall be indexed and placed in a hard-cover three ring binder. Three (3) copies of this manual shall be provided to the Owner upon project completion. Contractor shall retain a minimum of one (1) copy for their permanent records. Provide one copy of Manual and disk(s) in the Main Equipment Rack. Refer to "General Provisions" in the contract for additional or documentation requirements.

3.12 DRAWINGS

A. As-built drawing shall be provided by the Contractor, in compliance with EIA ANSI/TIA/EIA-606, showing the locations of and identifiers for all:
   1. Horizontal cable routing and terminations.
   2. Telecommunications outlets/connectors, Telco System interfaces.
   3. Backbone cable routing and terminations and outlets.
   4. Video cable routing and terminations and outlets.
   5. Data cable routing and terminations and outlets.
   6. Electrical power cable routing and terminations, power outlet locations.
   7. Network cabling plans identifying type, number, and location of equipment and outlet.
   8. Cable penetration details, schematic riser diagrams, and equipment closet layouts.

B. Provide as-built drawings to include cabling routing, details of station and hardware locations, etc. The Contractor shall provide as-built drawings on CD disk in AutoCAD (.dwg/.dxf) file format. Contractor will have access to drawings provided with this specification where they are in electronic form.

C. Provide a set of "As-Built" Drawings encased in a plastic sheet protector at backboard, in each wiring closet.

D. At the completion of the project, the Contractor shall bring the system wiring diagrams fully up to date with the actual field installation, showing all field-made changes for deviations from the approved shop drawings. Accurately record location of service entrance conduit, termination backboards and cabinets, outlet boxes, messenger cable raceways and cable trays, pull boxes and equipment. Room names and numbers shall be updated to indicate actual field-assigned room numbers. They may not necessarily be the room names and numbers shown on the Contract Drawings.

3.13 RECORDS

A. All records shall be created by the installation contractor and turned over at the completion of work. The format shall be computer based and both soft copies and hard copies shall be part of the As-built package. The minimum requirements include:

B. Cable records shall contain a complete listing of the identifier, cable type, length, pair status, pair assignment, termination positions at both ends, manufacturer, and part number.

C. Connecting hardware records shall contain the identifier, type of hardware and the amount of positions.

D. Connecting hardware positions records shall contain the identifier, type of position, and the cable identifier attached to it.

E. Test documentation on all cable types shall be included as part of the As-built package. Only signed copies of test reports shall be acceptable.

F. Outlet Records: Provide a database of outlet designations capable of being exported to a cable management software system (xls format). The Contractor shall provide a complete database indicating the location of each outlet and corresponding port on wire closet equipment.

G. Provide a complete Owner's Manual including full documentation of system paths and components to allow for plug and play operating cable management, cable maintenance, and cable modifications. Commercial off-the-shelf manuals shall be furnished for operation, installation, configuration, and maintenance for all products provided as a part of this section.

3.14 TRAINING:

A. The Contractor shall include (4) four-hour on-site training sessions, or as required, of startup and training assistance during cutover and Owner installation of equipment to ensure a fully functional system. This training may also be used for system configuration during initial system startup or other services as required at the Owner's request.

B. Training shall include a "walk-through" of the system for location and labeling orientation, a discussion of overall system concepts and configuration, specific instruction in system reconfiguration using patch cords in the wiring closets, a review of the as-built drawings, a review of the system testing and acceptance documentation, and guidelines for basic trouble-shooting of the structured cabling system. The contractor shall supply personnel who are thoroughly familiar with the installation to present the instruction in an organized and professional manner. The Owner shall supply personnel to physically inspect the installation to assure that all equipment and cable is installed in a neat and workmanlike manner as called for by the plans and specifications. Contractor to schedule the inspection and walk-through with the Owner at a mutually agreeable time.

C. The Contractor shall provide key personnel at each training session, as required by the Owner, at no additional cost to the Owner. Key personnel include Contractor's site-foreman, project manager and service manager.

END OF SECTION

SECTION 275200

GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this Section.

1.2 SUMMARY

A. Provide all materials and labor for the installation of a grounding and bonding system for communications infrastructure. This section includes requirements for providing a permanent grounding and bonding infrastructure for communications circuits, raceways, and cable tray.

B. Related Sections

1. Division 27 Section — "Conduit and Backboxes for Communications Systems"

1.3 REFERENCES

A. The applicable portions of the following specifications, standards, codes and regulations shall be incorporated by reference into these specifications.

1. General:

a. National Electrical Code (NEC)

b. National Electrical Safety Code (NESC)

c. Occupational Safety and Health Act (OSHA)

2. Communications:

a. TIA/EIA - 568: *Commercial Building Telecommunications Cabling Standard*

b. TIA/EIA - 569: *Commercial Building Standard for Telecommunication Pathways and Spaces*

c. TIA/EIA - 606: *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*

d. TIA/EIA - 607: *Commercial Building Grounding and Bonding Requirements for Telecommunications*

e. ISO/IEC IS 11801: *Generic Cabling for Customer Premises*

f. BICSI: *BICSI Telecommunications Cabling Installation Manual*

g. BICSI: *BICSI Telecommunications Distribution Methods Manual (TDMM)*

h. BICSI: *BICSI Customer-Owned Outside Plant Design Manual (CO-OSP)*

1.4 DEFINITIONS

A. "TMGB" shall mean *Telecommunications Main Grounding Busbar*. There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.

B. "TGB" shall mean *Telecommunications Grounding Busbar*. There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.

C. "TBB" shall mean *Telecommunications Bonding Backbone*. The TBB is a conductor used to connect TMGBs to TGBs.

1.5 SYSTEM DESCRIPTION

A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete, permanent Grounding and Bonding infrastructure for communications circuits, raceways, and cable trays as hereinafter specified and/or shown on the Contract Documents. The Grounding and Bonding system shall support an ANSI/TIA/EIA and lSO/IEC compliant communications Structured Cabling System (SCS).

B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the plans but which are necessary to make a complete working ANSI/TIA/EIA and ISO/IEC compliant Grounding and Bonding system.

1.6 SUBMITTAL INFORMATION

A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.

1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.

2. For those items noted as allowing "or equal," and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.

3. Provide standard manufacturer's cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Closeout Submittals: Provide submittal information for review as follows:

1. O&M Manual for Communications - At the completion of the project, submit O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the Designer in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.

2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets.

   a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.

   b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.

   c. Keep Record Drawings current throughout the course of construction. ("Current" is defined as not more than one week behind actual construction).

   d. Show identifiers for major infrastructure components on Record Drawings.

1.7 SEQUENCING

1.8 CONTRACTOR WARRANTY:

A. Provide a Contractor-endorsed two-year service warranty against defects in materials and workmanship.

   1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.

   2. The Contractor Warranty period shall commence upon Owner acceptance of the work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials shall consist of busbars, supports, bonding conductors and other incidentals and accessories as required..

2.2 MATERIALS

A. Grounding/Bonding:

   1. Telecommunications Main Grounding Bus Bar (TMGB):

      a. Large (20" x 4" x ¼"), Pre-drilled: CPI 10622-020, or equal

   2. Telecommunications Bonding Backbone: #4 AWG insulated (green in color) copper conductor.

   3. Grounding Conductor: #6 AWG insulated (green in color) copper conductor.

B. Firestopping material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.

C. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, and created by a hand-carried label maker or a computer/software-based label making system. Handwritten labels are not acceptable.

1. Hand-carried label maker:

a. Brady: ID Pro Plus (or approved equal).

2. Labels:

a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal)

b.

PART 3 - EXECUTION

2.3 GENERAL

A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.

B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NESC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.

C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.

D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.

E. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.

F. Install the grounding and bonding system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.

G. Remove surplus material and debris from the job site and dispose of legally.

2.4 INSTALLATION

A. The grounding and bonding infrastructure system shall not make use of the building plumbing system, unless required to do so by the NEC.

1. Coordinate the installation of the grounding and bonding system with the electrical power distribution system grounding infrastructure.

B. Ground/Bonding:

1. TMGB: Provide a minimum of one TMGB per telecommunications entrance room for each building and as shown on the Contract Documents. Install TMGB(s) and directly bond TMGB(s) to electrical service ground and to associated TBB(s). Group protector, busbar bonding, and approved building grounding conductors toward one end of the TMGB and leave space for equipment grounding conductors on the other end.

2. TBB(s) and Grounding Conductors: Provide TBB(s) and grounding conductors as shown on the Contract Documents and as required to bond all non-current carrying metal telecommunications equipment and materials to the nearest TGB. Use TBB(s) to connect the TMGB to each TGB. Route along the shortest and straightest path possible with minimal bends. Bends shall be sweeping. Insulate TBB(s) and conductors from their support. TBB(s) and grounding conductors shall be continuous (without splices).

    a. Ensure that bonding breaks through paint to bare metallic surface of all painted metallic hardware.

C. Firestopping

1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.

2. Maintain the fire rating of all penetrated fire barriers. Fire stop and seal all penetrations made during construction.

    a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.

    b. Install firestops in strict accordance with manufacturer's detailed installation procedures.

    c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply of sealing material in a manner acceptable to the local fire and building authorities.

    d. For demolition work, apply firestopping to open penetrations in fire rated barriers where cable is removed. Apply firestopping regardless of whether or not the penetrations are used for new cable or left empty after construction is complete.

    e. Firestopping material used to seal open penetrations through which cable passes shall be re-usable/re-enterable.

D. Labels:

1. Label TMGB(s) with "TMGB"

2. Label TBB(s) and bonding conductors "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

END OF SECTION

SECTION 275313
INTEGRATED TELECOMMUNICATIONS SYSTEM

PART 1 - GENERAL

1.1 GENERAL

A. General Notes:

1. Furnish and install all material, labor, equipment, permits, etc., to provide communications facilities as described herein for a complete operating system. Provide a new intercom system in the Telecom Room M122 of the 1927 Building and integrate with the existing Simplex intercom system in the main Howard High School Building. Contractor shall expand the existing Simplex 5120 intercom system currently installed in the Second Floor Data Room at Howard High School. The expansion cabinet shall integrate via a LAN connection which shall allow the new cabinet to become an integral part of the intercom and allow full functionality through any part of the complex. The Communication system shall provide distribution of intercom, overhead paging, emergency paging, class change time tones, emergency tone and program material.

2. Contractor shall visit the site, verify all existing items specified, and be familiar with the working conditions, hazards, phasing and local requirements involved. Contractor shall take these existing conditions into consideration and the lack of specific information in these specifications shall not relieve the Contractor of any responsibility.

3. All materials, unless otherwise specified, shall be new, free from any defects, and of the best quality of their respective kinds. All like materials used shall be of the same manufacture, model, and quality, unless otherwise specified.

4. 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.

5. All work shall be performed by competent workmen and executed in a neat and workmanlike manner providing a thorough and complete installation. Work shall be properly protected during construction, including the shielding of soft or fragile materials. At completion, the installation shall be thoroughly cleaned and all tools, equipment, obstructions, or debris present as a result of this portion of work shall be removed from the premises.

6. Contractor shall visit the site, verify all existing items specified, and be familiar with the working conditions, hazards, phasing and local requirements involved. Contractor shall take these existing conditions into consideration and the lack of specific information in these specifications shall not relieve the Contractor of any responsibility. Provide temporary cabling, supports, terminations, outlets, and all product required to keep existing system operational until new system is complete. Provide temporary cabling and provisions to maintain the system for each phase of construction. Contractor shall

provide all field investigations to determine all conditions and circumstances and gather all data and information required for work. Contractor shall survey all equipment and cable routes and wiring devices. Contractor shall provide complete field investigations and coordination to determine and provide all temporary cabling and provisions to maintain systems operation. The contractor shall assume that all information shall be obtained from contractor field surveys and not from contract documents. Contractor shall remove temporary provisions when the need for its services has ended, when it has been replaced by the contractor provided permanent facility.

B. Code Compliance: All work will conform with the National Electric Code and applicable local ordinances. In order to assure this conformance, all work is to be performed under the direction of an licensed electrician.

C. Raceways and Cables:

1. All 125 volt electrical conductors shall be installed in galvanized electrical metallic tubing with compression type fittings and couplings, minimum 3/4" size conduit.

2. In new construction, all low voltage wires and cables concealed in walls shall be run in EMT conduit from flush outlet boxes to above accessible ceilings. Provide conduit where cables penetrate fire walls above ceilings.

3. All EMT entering boxes shall be served with insulating throat connectors and locknuts.

4. No raceway shall be located in proximity of hot water lines or excessive heat.

5. Where raceways cannot be run concealed in walls, use surface mounted UL listed raceway complete with all fittings, box extension rings, and required accessories. Coordinate routing of surface raceways with the Owner. Provide Wiremold 4000 series or approved equal by Panduit.

6. Provide conduit and raceway systems as specified in Section 270528 for the Integrated Telecommunications System as indicated below.

   a. Accessible suspended ceilings: Provide conduit from each outlet to accessible space above ceiling.

   b. Non-Accessible ceilings: Provide conduit run from each outlet to cable tray.

   c. Exposed structure: Provide conduit run from each outlet to cable tray.

7. Minimum conduit size:

   a. Volume Controls: 3/4" conduit.

   b. Clocks/Speakers: 1/2" conduit.

8. Outlet Boxes: 2-1/8 inches deep, 2 gang with single gang device ring as required for

wall construction. Use deep masonry boxes at masonry construction.

D. Hangers and Supports:

1. Use Cast "C" clamps, "U" straps, or ring hangers attached to rods, and/or brackets fastened to structure.

2. No perforated straps or tie wires permitted for supporting raceways.

3. Use wire ties for supporting low voltage cables run concealed above ceilings. Do not run cables loose on ceiling tiles. Support from structure above. Group cables in bundles. Use care not to cut the outer jacket of the wiring.

4. Tie mounts, plates, and anchors shall be used.

E. Grounding: Ground all electrical apparatus in accordance with the National Electric Code.

F. Cutting and Patching, Schedule of Work:

1. Contractor shall do all necessary cutting and drilling of present walls, floors, ceilings, etc., for the installation of new work; but no structural work shall be cut, unless specifically shown on approved by the Owner. All exposed building surfaces damaged by installation or removal of electrical work shall be patched and finished in the same materials and manner as adjacent areas by this Contractor.

2. Remove all existing conduit, wire device, etc., being abandoned due to relocation.

3. Contractor shall coordinate his work with the Owner for times which changeover, removal of existing equipment, and new connections of existing systems can be completed.

4. Contractor shall visit the site, verify all existing items specified, and be familiar with the working conditions, hazards, phasing and local requirements involved. Contractor shall take these existing conditions into consideration and the lack of specific information in these specifications shall not relieve the Contractor of any responsibility. Contractor shall provide all field investigations to determine all conditions and circumstances and gather all data and information required for work. Contractor shall survey all equipment and cable routes and wiring devices. Contractor shall provide complete field investigations and coordination to determine and provide all temporary cabling and provisions to maintain systems operation. The contractor shall assume that all information shall be obtained from contractor field surveys and not from contract documents.

G. Quality Assurance:

1. Manufactures: Firms regularly engaged in manufacture of administrative communication systems and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than five years.

2. Installer's Qualifications: Firms with at least ten years of successful installation experience with projects utilizing integrated communications systems and equipment similar to that required for this project. This experience must be by the firm itself and not any individual employee. Installers shall include with their submittal proof from the manufacturer that they are certified to install the system.

3. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

4. The Contractor shall be an established communications and electronics Contractor that has had and currently maintains a locally run and operated business for at least five years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges. Contractor shall include proof in his submittal that he is an authorized distributor.

5. The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service and installation organization capable of furnishing installation and service to the system. The Contractor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

H. Service and Maintenance:

1. The Contractor shall provide a one year warranty of the installed system against defects in material and workmanship. All labor and materials shall be provided at no expense to the Owner during normal hours. The warranty period shall begin on the date of acceptance by the Owner.

2. The Contractor shall, at the request of the Owner, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

3. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

I. Sole Source Responsibility: Except where specifically noted otherwise, all equipment supplied shall be furnished by a single manufacturer of known reputation and experience in the industry. The Contractor shall have attended the manufacturer's installation and service school and upon request must show proof of attending such a school.

J. In-Service Training: The Contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided at the time of this training. Segments shall, as a minimum, consist of the following periods: Upon completion of the installation, after six weeks use of the system and during the last month of the warranty period.

1.2 SCOPE OF WORK:

A. Provide a complete fully integrated communication system capable of providing a complete operational integrated Public Address, Intercom, and Master Clock Systems, as indicated in these Specifications.

1.3 PAGING:

A. Emergency and All Call paging plus 8 zones of group paging. Paging zones shall not be shared with other zone groups in the system i.e. Time Tone and Program zones.

1.4 GENERAL ANNOUNCEMENTS:

A. In addition to paging, general announcements shall be made from a conventional microphone to facilitate reading a script and the participation of multiple announcers.

1.5 OPEN VOICE INTERCOM:

A. The system shall be capable of open voice intercom to speaker stations.

1.6 OWNER'S VOIP TELEPHONE SYSTEM:

A. The system shall be integrated with the Owner's supplied Voice over Internet Protocol (VoIP) Telephone System allowing any phone on the system, if so desired, to page and conduct hands-free open voice intercom with any speaker in the system, and handset to handset with any administrative control console and classroom telephone. The contractor shall provide multiple trunk lines (min 3) from the Public Address / Intercom System to the Owners VoIP Telephone System. All of the above connections must be capable of being accessed and used simultaneously. Any other type of interconnection between the intercom and the VoIP will not be accepted due to the risk of performance degradation in the Owner supplied VoIP Telephone System. The school's VoIP telephones shall be used to answer these calls.

1.12 TIME CONTROL:

A. Provide interface and cabling to connect intercom system to master clock system.

1.13 AUDIO PROGRAM DISTRIBUTION:

A. Eight (8) areas of the building shall be software programmable into zones for easy selection to receive audio programs. These zones shall be independent from the page and time tone zones. Individual rooms shall also be able to be programmed to receive audio programs.

B. Distribution of the audio program can be done by any of the administrative control consoles.

C. Program sources shall be capable of being located remote from the control electronics; i.e., office

credenza thus eliminating the need to go to the communications closet to set up the program.

1.14 SUBMITTALS

A. Original Specification Sheets shall be submitted on all items. Extensive use of photo copies shall not be acceptable. Manufacturers name, make and model number shall appear on each sheet. Submittals shall be indexed and presented in a neat and logical order. Submittals shall contain installation, operation and programming manuals as required to provide the Owner information as to system features, functions and capabilities. Data sheets shall be provided on all equipment being provided.

B. Submit outline drawing of system control cabinets showing relative position and size of all major components. Submittal shall contain quantities of all supplied components. Detail equipment assemblies, rack elevations, indicate dimensions, weights, required clearances, and locations of each field location.

C. Submit FCC registration number on separate documentation with the ringer equivalency of the proposed integrated telecommunication system. This documentation is mandatory: All submittals without FCC registration information will automatically be rejected. The entire telecommunication system shall be FCC listed. Partial listing of system shall be considered unacceptable.

D. Submit wiring diagrams showing typical connections for all equipment. Detail wiring for power, signal, and control systems and differentiate between manufacturer’s installed and field-installed wiring. Identify terminals to facility installation, operation, and maintenance. Include a single-line diagram showing cabling interconnection of components. Submit wiring diagrams showing typical connections for all equipment. Internal control cabinet drawings showing internal block diagram connections shall be provided. Wiring diagrams showing typical field wiring connections shall be provided.

E. Shop Drawings: Submit layout drawings of integrated Communication System, components, and accessories. List all rooms and areas connected to the system. Submit scaled floor plan shop drawings showing equipment locations, identification tags, and proposed cable routing. Provide scaled floor plan shop drawings including elevations showing major equipment, devices and conduit rough-in, and electrical connections.

F. Specification sheets shall be submitted on all items including cable types.

G. Submit a certificate of completion of installation and service training from the system manufacturer. The supplying contractor shall have attended the manufacturer's installation and service school. A certificate of this training shall be provided with the Contractor's submittal.

H. Submittals not containing these documents shall be automatically rejected.

I. Product Certificates: Signed by Manufacturers of equipment certifying that products furnished comply with specified requirements.
   1. Installer Certificates: Signed by Manufacturer certifying that installers comply with requirements.

2. Manufacturer Certificates: Signed by Manufacturers certifying that they comply with requirements.
3. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Include record of final matching transformer-tap settings, and signal ground-resistance measurement certified by the Installer.

J. Maintenance Data: For equipment to include in maintenance manuals specified in Division. Include record of Owner's equipment-programming option decisions.
1. Submit a copy of the UL listing card for the proposed system.

K. Specification sheets shall be submitted on all items including cable types.

L. Submit outline drawing of system control cabinet showing relative position of all major components.

M. FCC registration number shall be provided.

N. Submit a certificate of completion of installation and service training from the system manufacturer.

O. Submit a statement of assurance that the system will be compatible with any standard off the shelf DTMF telephone that the owner may wish to supply.

P. Submit a copy of the supervising electrician's license.

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1.15 SERVICE AND MAINTENANCE

A. Provide a two (2) year warranty of the entire installed system against defects in material and workmanship. All labor and materials shall be provided at no expense to the owner during normal working hours. The warranty period shall begin on the date of acceptance by the owner/engineer. If this project is to be completed in phases, the supplier shall document acceptance dates of each area and turn over at each stage a copy of the acceptance letter acknowledging the starting and ending date of the warranty of each area.

B. At the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

C. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

1.16 QUALITY ASSURANCE

A. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. The Contractor shall be an established Communications and Electronics Contractor that has had, and currently maintains, a locally run and operated business for at least five years. The

contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

C. Contractor: Show satisfactory evidence of maintaining a fully equipped service organization capable of furnishing adequate inspection and service to the system. Maintain at facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied. Provide a portable computer in order to record the programming required for the operation of the system. A separate disk shall be kept in the Contractor's file that includes all of the programming information for this particular school installation.

D. Installer Qualifications: An experienced installer who is an authorized representative of the equipment manufacturer for both installation and maintenance of equipment required for this Section. Firms with at least ten years of successful installation experience with projects utilizing integrated communications systems and equipment similar to that required for this project. This experience must be by the firm itself and not any individual employee. Installers shall include with their submittal proof from the manufacturer that they are certified to install the system.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
   1. Comply with NFPA 70, National Electrical Code.
   2. Comply with UL 50, Enclosures for Electrical Equipment.

F. Comply with EIA-160-51, Sound Systems

G. Comply with ANSI EIA-310-D-92 Cabinet, Racks, Panels, and Associated Equipment.

H. Comply with EIA-SE-101-A-49 Amplifiers for Sound Equipment.

I. Comply with EIA-SE-103-49 Speakers for Sound Equipment.

1.17 SINGLE SOURCE RESPONSIBILITY

A. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer of known reputation and experience in the industry. Integration of various Manufacturers' products in an attempt to meet the specifications shall be deemed in direct conflict with the specifications and shall be rejected. The Contractor shall have attended the Manufacturer's installation and service school and upon request must show proof of attending such a school.

1.18 SAFETY / COMPLIANCE TESTING

A. The communication system supplied shall be listed by Underwriter's Laboratories

B. All equipment normally used by staff or other personnel, either on a daily basis or for instructional needs, shall meet ADA accessibility requirements. This includes intercom and paging functions, master clock, and gymnasium sound system, public address systems, etc.

1.19 IN-SERVICE TRAINING

A. The Contractor shall provide a eight (8) hours of in-service training with this system. These sessions shall be broken into segments which will facilitate the training of individuals in the operation of this system. Operators' Manuals and Users' Guides shall be provided at the time of this training. Additional two (2) hour training segments shall, as a minimum, consist of the following periods:
   1. Upon completion of the installation.
   2. After six weeks of use of the system.
   3. During the last month of the warranty period.

B. Separate demonstrations shall be given to the office staff, administrative staff (Principal, etc.), and teaching staff; and each demonstration shall be oriented for their particular requirements. Demonstrations shall be scheduled at the Owner's preference with three days' minimum advance notification to the Contractor.

1.20 WIRING

A. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical codes. All wiring shall test free from all grounds and shorts.

1.21 PROTECTION

A. Provide all necessary transient protection on the AC power feed and on all station/central office lines leaving or entering the building.

B. Note in system drawings, the type and location of these protection devices as well as all wiring information.

1.22 SITE SURVEY

A. Provide examination of site as required by specifications.

B. Prior to placing any cable pathways or cable, the Contractor shall survey the site to determine job conditions will not impose any obstructions that would interfere with the safe and satisfactory placement of the cables, and to arrange the removal of any obstructions with the Project Manager accordingly.

C. The Drawings provided are diagrammatic and generally representative of the existing conditions, but not necessarily accurate in all aspects; therefore, verification of these drawings is solely the responsibility of the Contractor. The Contractor shall verify all field conditions and make field measurements as required.

D. Visit the site before submitting bid and check location of utilities, check conditions, verify dimensions and locations shown on the plans, and verify over-all costs and work herein described or shown.

E. Take measurements necessary for this work and be responsible for their accuracy. Necessary pullboxes and junction boxes as required to accomplish distribution shall be provided.

PART 2 PRODUCTS

2.1 SYSTEM

A. The system shall consist of the Central Control Unit, Administrative Control Consoles, Console Display Units, Staff Telephones, Speakers, Secondary Clocks, Master Clock, classroom call buttons and all other necessary auxiliary devices to provide the operation specified in the quantities shown as the core system. Only the SimplexGrinnell 5120 System, shall be acceptable for use on this project, and only if the submitted system exactly conforms to all specifications included in this document.

B. Local Manufacturer Sales Representative for SIMPLEX:
SimplexGrinnell, A Tyco International Company
Attn: Rodney Smith | Electronic Systems Sales Representative
Tel: +1-302-325-6300 | Direct: +1-302-419-2369 | Mobile: +1-302-218-5716
rodnsmith@simplexgrinnell.com

2.2 SYSTEM OPERATION

A. INTERCOM AND PUBLIC ADDRESS SYSTEM: The administrative communication system shall provide, at a minimum, the following features and functions:

1. Direct dialing, two-way communications between all locations equipped with Administrative Control Consoles, Administrative Telephones, Staff Telephones and any location equipped with a speaker.

2. Automatic gain control on intercom speech to assure constant speech level.

3. Facilities for automatically sounding a warning tone over any loudspeaker selected for two-way communication to alert the classroom teacher to the call and to prevent unauthorized monitoring. The tone will sound whenever the classroom is being monitored, and will repeat at regular intervals. Facilities shall also be provided to defeat the tone from the administrative console if it is not desired.

4. Facilities for the distribution of emergency announcements from the administrative control console to all locations equipped with administrative control consoles or speakers. Emergency announcements shall have the highest priority over any other system function.

5. Facilities for the distribution of paging announcements from any administrative control console, administrative telephone, attendant console and staff telephones to speaker and console locations on an all-call basis, or a pre-selected zone basis or multiple zone basis to any of the 8 paging zones. Speaker assignment to any of the 8 zones shall be user-programmable from the administrative control console. The paging zones shall be independent of the time tone and audio program distribution zones. Systems sharing zones for both paging and time tone shall not be acceptable.

6. Capability of distributing audio program sources from the administrative client software. Inputs shall be provided for low impedance microphones, tuner, tape player and auxiliary sources. Program distribution shall be accomplished on an ALL ROOMS basis, SELECTED ROOMS basis or an INDIVIDUAL ROOM as programmed from the administrative client software. The program source i.e. AM FM Tuner shall be capable of being located remotely from the central electronics so that the customer does not have to go to the communications closet to set up the program. Systems whose only method of distributing and audio program is by the use of mechanical switchbanks shall not be accepted.

7. Facilities for the automatic distribution of user programmable, class change time signals to all areas activated by a self contained, 512 event programmable clock. Time signals shall be user programmable to any of the 8 available time zones. All time signal programming shall be accomplished from the control console. Eight time schedules shall be provided. The time zones shall be independent of the paging and audio program zones. Systems sharing the same zone assignment for both paging and time zones shall not be acceptable.

8. Capabilities for user programming of architectural room numbers from the control console. The system shall be capable of using 2, 3 or 4 digit numbers or any combination of the three. Systems that require the system to be programmed with all 3 or 4 digit numbers and does not allow the flexibility of inter-mixing the digits used shall not be accepted. The number for both the classroom speaker and the telephone shall be the same.

9. All programmable functions shall be stored in a non-volatile memory and shall not be lost in event of a power failure.

10. Facilities for manually distributing a tone alert signal to all, a select group of speakers from a control console, remote push button or contact closure.

11. Ability to interface to the school master clock, in order to utilize the master clock to transmit class change tones to select areas of the school. The duration of the tone, as well as frequency, burst length and output level shall be software programmable from the console. Systems employing external tones generators with fixed and a limited number of tones not capable of being programmed from the console keypad shall not be acceptable.

12. Provisions for the automatic distribution of Emergency or General Paging Announcements from a remote microphone. Keying the microphone shall automatically mute all other audio programs at a lower priority in the system and transmit the microphone audio to All Rooms or specific speaker zones, as programmed into the system software. Systems which only employ a telephone handset or require the announcer to hold down a button while reading from a script or require the customer to go the communications closet to set-up the microphone shall not be acceptable.

13. Facilities for activating and controlling remote devices from the control console keypad. The system shall provide controlling the operation of external bells, utilizing the internal time clock within the Administrative Communications System.

14. Capabilities of interfacing with a local Gym Sound System, providing automatic bridging of the local system, whenever it is accessed from the console. The system shall automatically track the local system, controlling the audio program as programmed from the control console.

15. The system shall provide for the connection to the school's VoIP Telephone Switch or ELECTRONIC KEY telephone system. The System shall be capable of being accessed by the telephone system to:

    a. Initiate paging announcements from any telephone on the customer's system to all or 8 selective areas of the building.

    b. Establish 2 way hands-free open voice intercom communications between any intercom speaker .

16 Facilities for originating both "normal calls" and "emergency calls" from a single call switch. Emergency calls shall be initiated by merely depressing the call switch repetitively 3 times.

17. The system shall automatically alert all other control consoles if an emergency call is not answered within 2 minutes.

18. The system shall be initially capable of being equipped to accommodate a minimum of 200 intercom speaker locations, 4 Administrative Control Consoles and 125 telephones. The system shall be capable of being expanded to 1000 intercom speaker locations, 32 Administrative Control Consoles, 32 Wall-mounted Display Units and 500 telephones.

19. The central switch shall provide a LAN/WAN connection via a standard Ethernet RJ-45 jack to provide on or off site programming and or diagnostics. It shall be possible for the user with a computer connected to the LAN/WAN to access and change all system parameters as necessary and to save complete system architecture on its storage medium. It shall also be possible to run diagnostic software to isolate and correct faults in the system. These capabilities must also be provided thru a standard RS232 port for local access.

20. The system shall have the ability to be connected to a 10/100 switched, multicast enabled network. This connection shall be via a standard Ethernet RJ-45 jack and shall provide all system functionality across the LAN/WAN to remote cabinets eliminating the need for individual peripherals to be wired back to the main switch. All devices connected to these remote shelves shall provide the same capabilities as those connected directly to the MDF.

21. The system shall be provided with four (4) multifunction ports for connection of administrative phones, any loop start trunk (LST) port of a KEY or PBX telephone system. All communication between administrative phones shall be non-blocking. Provide a minimum of one LST port interface as part of this basic specification.

22.

2.03 DISTRIBUTION CHANNELS

A. The System shall provide an open voice speech path or a program distribution channel between Administrative Control Consoles and PROGRAM and Classroom loudspeakers.

B. The distribution of Program Material shall be controlled from the Administrative software client. Systems employing manual switchbanks which require staff members to return to the equipment cabinet at the communications closet to manually select room locations to receive audio program material shall be in direct conflict with the intent of the specification and shall automatically be rejected.

2.4 TELEPHONE COMMUNICATIONS

A. The System shall provide for full duplex, private telephone communications between staff VoIP telephones.

B. Provide at least 4 simultaneous, full duplex private telephone links per group of 25 staff telephones. The system shall be capable of modular expansion of 4 links per 25 staff telephones. Systems can be configured with linkage to accommodate anticipated traffic and be expanded as traffic increases. The system shall be expandable to 12 telephone links per group of 25 staff telephones. The system shall also be equipped with 4 global links in addition to the 4 links per group of 25 telephones. The system shall be expandable to 32 global links. Systems which restrict linkage to less than 4 links per 25 phones and 4 global links or are not expandable to minimum of 32 global links and provide a fixed non-expandable linkage format which may be too much linkage or not enough linkage for future traffic demands shall be unacceptable.

C. The system shall be capable of being expanded to accommodate 500 staff telephones and provide 270 duplex private telephone links, plus 100% trunkage for all administrative telephones.

D. The system shall provide for direct dialing, private, 2 way, duplex, telephone communications from all locations equipped with a VoIP telephone, to locations equipped with either a non dial or VoIP telephone, and associated speaker or an Administrative Control Console. Any control VoIP telephone in the system shall be capable of direct dialing any other VoIP telephone or non-dial phone in the system.

E. Room stations equipped with VoIP staff phones as described above shall be capable of:

1. Selectively calling intercom speakers and establishing open voice communications.

2. Selectively initiating Zone and All-Call paging announcements.

3. Selectively initiating calls to the KSU telephone system attendants console, and establish duplex telephone communications.

4. Make and receive outside calls.

5. Ability to group hunt for available interface lines.

6. These phones can be restricted from any of above features.

2.5 TIME CONTROL SYSTEM / SECONDARY CLOCK CORRECTION

A. Provide a Time Control System as an integral part of the Communications System. The time control system shall be capable of operating and correcting both digital and analog secondary clocks, as well as controlling class change signals to all speakers and/or bells.
B. Provide interface and cabling to connect intercom system to master clock system.

2.6 CENTRAL CONTROL UNIT

A. The Central Control Unit shall be specifically designed for use with the administrative control console. It shall be complete with circuitry for accomplishing all functions for signaling and communications for all stations. The central control unit initially shall have provisions for expanding the system to a minimum 200 stations, and 4 Administrative Consoles with the addition of plug in modules, as required. In addition it shall be capable of being expanded to 1000 stations and 32 administrative consoles and 32 wall-mounted display units.

B. The Central Control Unit shall be supplied with 4 global links with expansion capability of 32 global links and 500 telephones.

C. The Central Control Unit shall provide a 0 dBm signal for connections to an external amplifier for distribution of program audio, time signals and paging announcements.

D. The Central Control Unit shall enable the system to provide the following features and functions:

1. Instant direct dialing, two-way conversations between administrative consoles as well as to classroom speakers.

2. Visual display of all incoming calls in order of priority.

3. Ability to review all calls in the system.

4. Retention of last room number dialed until another room number is dialed or previous call is canceled.

5. Single button response to all call-ins.

6. Pre-announce tone alert to classroom to incoming calls.

7. Instantaneous selection and distribution of program material on ALL-CALL or SELECTED ROOM basis, without the need for additional Room Selector Panels or Program Control Panels.

8. Ability to program classroom priority at the Administrative control console.

9. Ability to program and control a built-in master clock with 512 events, 8 time zones and

8 schedules.

10. Choice of convenient handset or push-to-talk speaker/microphone communications.

11. Ability to produce 8 different tone signals for classroom time changes or emergency signals

12. Ability to program tone characteristics (frequency, burst length, number of bursts and tone level) from the administration client software of all system tones.

13. Ability to manually distribute tone signals on an all-call basis from the keypad of the Administrative Control Console cabinet.

14. The unit shall contain all required electronics on modular, plug-in type boards for ease of service and future expansion.

15. An RS232 Port may be provided giving the system the ability to monitor the operation of the system functions, with a standard printer and terminal screen. The RS232 also provides for connection to a computer for on-site or off-site diagnostics. Off-site connection must be via a modem connected to a telephone. It shall be possible to determine circuit and user software programming faults, as well as facilitate connections. The RS232 Port shall also allow for programming the system.

2.7 MAIN EQUIPMENT CABINET

A. The cabinet shall be either wall mounted or a metal upright type with louvers and locking rear door. The upright rack unit shall contain up to 77" of mounting space if necessary for accommodating all equipment specified. The cabinet shall have internal mounting rails and power strip. Proper size shall be determined by the manufacture to accommodate all of their equipment with 20 % expansion capability.

2.8 AM/FM TUNER AND CD

A. The AM/FM/CD Player shall be equipped with an LED tuning display, front panel indicators, internal clock, base, treble, and volume controls. The AM section shall be tunable over a range of 525 to 1620 kHz. The FM section shall be tunable over a range of 88 to 108 MHz. PROVIDE 3.5 MM STEREO MINI-PLUG TO ACCEPT INPUT FROM EXTERNAL SOURCES (IE MP3 PLAYER). Simplex 5120-9189 or approved equal.

B. Both units shall be capable of installation into the specified cabinet or remotely if desired.

2.9 POWER AMPLIFIERS

A. Power amplifiers shall be employ silicon transistors. The amplifiers shall be capable of producing an audio output of 60, 120 or 250 watts RMS at less than 1% distortion and shall have a peak power output of over full wattage. They shall be designed to operate on a line voltage of 115 AC. These amplifiers shall be industry standard and the customer shall be able to have them serviced or replaced by any vendor of their choice.

2.10 NOT USED.

2.11 TELEPHONES

B. The Owner will provide VoIP telephone handsets in each office and instructional space.

C. The contractor shall provide multiple trunk lines (min 3) from the Public Address / Intercom System to the Owners VoIP Telephone System.

2.12 DIGITAL SECONDARY CLOCKS

A. Provide a secure, cloud-based Wireless Clock System with Power-over-Ethernet (PoE) connection. The clocks shall receive clock correction signals using Network Time Protocol (NTP). Clocks shall be IP addressable digital or analog NTP synchronized clocks with automated monitoring and reporting firmware.

SNS5X155Q 12.5” Analog Clock, Black
SNS7A159Q 12.5” Analog Clock, White
SNS5X163Q 16” Analog Clock, Black (Gymnasium Only with wireguards)
SNS5X203Q 4” Digital Clock, 6-Digit, 4° slope bracket (Auditorium Only – outside control room)

B. System Description
   a. Systems that rely on low frequency AM or FM signals or power line frequency for synchronization or requires FCC licensing do not meet the requirements of this specification.
   b. System shall be licensed and delivered via a Software-as-a-Service (SaaS) model, in which the system is licensed on a subscription basis, hosted by Manufacturer, and is delivered to Owner as a cloud-based time synchronization system and the system clock devices.
   c. The system shall provide an online device configuration procedure. The manufacturer shall load the settings provided during the online procedure into each device and label each device prior to shipment.
   d. Manufacturer shall offer subscription pricing models, which are to be inclusive of software access, technical support, enhancements, and software maintenance.
   e. System software revisions and system device firmware revisions are provided under the manufacturer subscription agreement.
   f. System shall be cloud-based and built on and powered by Amazon Web Services (AWS).
   g. System shall not require the installation of any on-site system hardware or software, with the exception of the system clock devices that transmit data to and from the system.
   h. System shall maintain and store redundant, data backups.
   i. System can be scaled from a single building to a network of buildings, or an enterprise spread across many time zones, providing traceable of accuracy, data and performance.
   j. System software shall be accessed from a web browser and does not require the installation of software or other third-party plug-ins or applications.

k. System users shall be able to access the system software from a web browser on a mobile or tablet device or computer with an Internet connection.
l. System devices shall communicate over Owner's wired Ethernet or a wireless network.
m. System distributes device firmware upgrades, time zone offset and Daylight Savings Time change, at the time system devices connect and communicate diagnostic information to the system.
n. System device firmware performs diagnostics on battery life, time accuracy, and strength of the wireless connection, and transmits this data to system software.
o. The system receives and stores event logs showing time and date records from digital LED code blue and elapsed timers. These logs are available to authorized users from the system software.
p. Clock locations shall be as indicated and clocks shall be fully portable, capable of being relocated at any time.
q. Time signals originate from the system configured Network Time Protocol (NTP) time source and allows up to three designated NTP time sources.
r. The system logs clock NTP synchronization accuracy.
s. Clocks shall be networked Power over Ethernet network. **Provide CAT6 cable from each clock to nearest telecom cabinet.**
t. Clocks maintain and store locally an internal NTP reference so that failure of the NTP source will not cause clocks to fail. Clocks will continue indicating accurate time within plus or minus 0.35 seconds in 24-hours.
u. All user sessions between the web browser and the system software shall be encrypted by the HTTPS protocol.
v. All system device communication over the Owner's network shall be secure and encrypted using the Transport Layer Security (TLS) encryption protocol and Secure Hypertext Transfer Protocol (HTTPS) authentication.
w. System shall allow authorized system users to create system clock reports, view archived reports, and set the system to automate the delivery of reports to system users.
x. System software shall automatically monitor and display the operating status transmitted by system clocks to the system.
y. System software shall provide an automated method to notify system users of clock status conditions that may warrant corrective action
z. IP Wireless Master Clock System shall be OneVue Wireless Clock System (or approved equal) by PRIMEX WIRELESS INC. Primex Wireless, Inc., 965 Wells Street, Lake Geneva, WI 53147 Phone: (800) 537-0464 | Fax: (262) 248-0061 | Email: info@primexwireless.com | www.primexwireless.com
aa. .

2.13 MISCELLANEOUS

A. Connectors: Cabling shall be terminated neatly and logically on split 50 pair Type 66 termination blocks. All connectors shall be as recommended by the manufacturer or as indicated on the drawings. Provide a service access point in the form of bridging clips for all station, loudspeaker and systems' interface connections. Provide hinged covers on all connector blocks and label covers for circuits contained within. All blocks and cabling connections and terminations shall be installed on fire-treated plywood backboard, minimum of 3/4" thick and painted to match the surrounding wall finish, size and located shall be as shown on the drawings
1. Wall-mounted staff (classroom) telephone jacks shall be metal and suitable for secure mounting of staff telephones. Jack shall be rated for Category 3 applications and shall be

supplied with USOC RJ-11 type connectors. Cable pairs one and two shall be terminated on the jacks with pairs three and four left un-terminated and insulated.

B. Amplifiers: System audio amplifiers selected by the Contractor shall be loaded no more than 80% of rated capacity. Amplifiers shall be rated for continuous commercial duty operation and as recommended by the Manufacturer of the telecommunication system. System shall deliver a minimum of 93 dB at 1 meter at each and every indoor loudspeaker in the system.
   1. Equipment Rack: Equipment rack(s) shall be provided for the telecommunication system. The rack shall be upright, floor standing, steel, with a locking rear door. Finish shall be textured black. All unused rack space shall be blanked off with matching steel panels. All central switching equipment, amplifiers, program sources, etc., shall be mounted in a distribution/media retrieval rack.
   2. Power amplifiers shall be employ silicon transistors. The amplifiers shall be capable of producing an audio output of 60, 120 or 250 watts RMS at less than 1% distortion and shall have a peak power output of over full wattage . They shall be designed to operate on a line voltage of 115 AC. These amplifiers shall be industry standard and the customer shall be able to have them serviced or replaced by any vendor of their choice.
   3. Provide a one (1) watt amplifier circuit for each remote station to allow absolute flexibility for simultaneous paging, program distribution and time tone schedules. Equipment requiring a single power amp for these functions shall size such an amp as to deliver a minimum of (1.5) watt per station to compensate for inherent transformer losses. Additional power will be required for hallway speakers, outside horns and common areas.

C. Cabling:
   1. Cabling for all new loudspeaker circuits shall be two (2) conductor 18 AWG shielded with gray-colored overall jacket.
   2. All cable shall be listed for the intended purpose. Use CAT 5e/6, 24AWG, U.L. Listed cable. Home run all station wiring in individually jacketed cables. Number of pairs within the cable may vary due to specific field conditions.
   3. All interior staff station wiring shall be in accordance with current new construction wiring guidelines published by the manufacturer, including staff speaker and call switch.
   4. All amplified speaker circuits shall be connected using two (2) twisted pairs. One pair for line level audio and one pair for 24 VDC power. Refer to drawings for proper wire gauge. If unspecified, use CAT 5e/6, 24AWG, U.L. Listed cable.
   5. All constant voltage speaker circuits shall be connected using a separate twisted shielded pair. Provide suitable wire gauge for cable distance.
   6. Transient suppression is required on all wiring leaving the building.
   7. All cables run in underground conduits must be suited for wet locations. For example the cabling run to the exterior vehicle gate pedestal intercom stations.

D. Uninterruptable Power Supply (UPS)
   1. The Owner shall provide all Uninterruptable Power Supply units. Contractor shall make provisions for Owner furnished UPS in each rack/cabinet.

E. Antenna
   1. Provide Roof mounted FM Di-pole antenna and antenna mounting hardware and accessories. Simplex 5100-9181 Roof Mounted Antenna kit or approved equal.

F. Volume Control
   1. Provide AtlasSound / Soundolier AT10-PA volume control auto transformer with priority paging feature to by-pass level selection for emergency paging. Provide wiring for priority paging function to each volume control station.

G. Surge Suppressors
   1. Provide surge suppressors where AC power-operated devices are not protected against voltage transients by integral surge suppressors conforming to UL Standard 1449, install surge suppressors at the device power line terminals.

2.14 SPARE CAPACITY/SYSTEM EXPANSION

A. System amplifiers shall be loaded no more than 80% of rated capacity. System shall deliver a minimum of 93db at 1 meter at each and every loudspeaker in the system. Articulation shall be a minimum of 86% in all areas.

2.15 REMOTE SOUND SYSTEMS INTERLOCK

A. Provide circuits, as required, to include loudspeakers connected to remote sound systems in the telecommunication system. Remote loudspeakers shall be temporarily seized during paging, two-way intercom, any transmitted tonesets and program distribution which includes the remote system(s) area. After completion of the transmission, the remote sound system shall be returned to normal local operation.

2.16 LOUDSPEAKERS

A. Provide loudspeaker assemblies at locations indicated on the drawings. Ceiling loudspeakers shall be 8" diameter with a minimum 5 oz. magnet and industry standard 25 volt multi-tap transformer. Provide Rauland ACC1400 loudspeaker, or Simplex 5120-9416. Assembly to include a round white steel baffle, a steel backbox with an approved lining, conduit and connectors as required and an “H” or “T” type grid support mechanism. Provide Lowell LBS8-R1 support or approved equal. In no case shall loudspeakers be solely supported by the ceiling grid.

B. Provide outdoor loudspeaker assemblies at locations indicated on the drawings. Manufacturer and type of loudspeaker may vary depending on architectural considerations. Loudspeaker shall contain a high compression horn, 25 volt multi-tap transformer, and be water, dust, wind, vandal and insect resistant in design. Loudspeaker shall be capable of flush, semi-flush or surface mounting as required and indicated on the drawings. Loudspeaker shall be constructed of epoxy painted aluminum or zinc. Provide Soundolier SX15-T Series horn or approved equal.

C. Provide outdoor call-station and loudspeaker assembly at locations indicated on drawing. Assembly shall contain a waterproof 25 volt loudspeaker with multi-tap transformer, an integral call-in switch and be vandal resistant in design. Assembly shall be constructed of 11 gauge stainless steel and be capable of flush or surface mounting as indicated on the drawings.

D. Provide indoor horn type loudspeaker assemblies at locations indicated on the drawings. Loudspeaker shall contain a high efficiency 30 watt horn, 25 volt multi-tap transformer, and be water, dust, wind and insect resistant in design. Loudspeaker shall be capable of surface

mounting as required. Loudspeaker shall be constructed of painted aluminum, steel, or reinforced fiberglass. Provide Rauland 3601 horn or approved equal.

PART 3 EXECUTION

3.1 GENERAL

A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.

B. Install and connect all appliances and equipment as specified and shown on the contract drawings in accordance with the manufacturer's instructions and recommendations. Furnish and install complete electrical service and electrical connections as recommended by the manufacturer and as required for proper operation. Prior to roughing in outlets, verify locations, voltages, phase, current rating and type of outlet required from approved shop drawings.

C. Mark switches, connectors, jacks, receptacles, conduits, outlets, cables, and cable terminations, clearly, logically, and permanently.

D. Program system per instructions of the Owner.

E. Execute, without claim for payment, moderate moves or changes necessary to accommodate other equipment to assure symmetry and pleasing appearance.

F. The system must be matched. All major electronic equipment must be assembled, tested and furnished by one equipment supplier.

G. Final appearance and finishes are subject to the Owner's approval.

H. System amplifiers shall be loaded no more than 80% of rated capacity. System shall deliver a minimum of 93db at 1 meter at each and every loudspeaker in the system. Articulation shall be a minimum of 86% in all areas.

I. Cabling types shall be installed per manufacturer's recommendations in non-plenum, cable tray or conduit as required or as indicated on the drawings.

J. Cabling shall be marked and terminated neatly and logically as specified in 2.15.

3.2 INSTALLATION

A. Install equipment to comply with manufacturer's written instructions.

B. Wiring Method: Install wiring in raceway except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum-board partitions where cable wiring method may be used. Use plenum cable in environmental air spaces, including plenum ceilings. Conceal cable and raceway except in unfinished spaces.

C. Install exposed cables parallel and perpendicular to surfaces or exposed structural members, and follow surface contours. Secure and support cables by straps, staples, or similar fittings so designed and installed to avoid damage to cables. Secure cable at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, or fittings.

D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess. Use lacing bars in cabinets.

E. Control-Circuit Wiring: Install number and size of conductors as recommended by system manufacturer for control functions indicated.

F. Separation of Wires: Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches (300 mm) for speaker microphones and adjacent parallel power and telephone wiring. Separate other school intercom and program equipment conductors as recommended by equipment manufacturer.

G. Splices, Taps, and Terminations: Make splices, taps, and terminations on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.
   1. Splice, Taps and Terminations: Use numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures. Tighten connections to comply with tightening torques specified in UL Standard 486A.
   2. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors.
   3. Rack and terminal cabinet wiring shall be neatly routed or bundled in plastic wiring duct and routed along rack sides. All splices and connections shall be by plug, solder or screw terminal strips, etc. Splices shall not hang in racks or terminal cabinets.

H. Match input and output impedances and signal levels at signal interfaces. Provide matching networks where required.

I. Identification of Conductors and Cables: Color-code conductors and apply wire and cable marking tape to designate wires and cables to identify media in coordination with system wiring diagrams. After the systems have been completely tested, the cables between the sound system equipment cabinet conduit access boxes and the sound system equipment cabinets shall be neatly bundled and held with either nylon lacing cord or nylon cable clamping devices similar to Thomas & Betts "Ty-Rap". More than one bundle may be used if one bundle would be too large to be workable. Provide sufficient loop in the bundle to allow moving the equipment cabinets away from the wall for servicing. Cable bundle(s) shall be securely attached to the equipment.

J. Cut and patch walls, ceilings, floors, or other building finishes for installation. Repair, restore, and refinish surfaces to original appearance.

H. Label all front panel controls used in the normal operation of the system using plastic laminate engraved labels, or approved equal. Firmly affix to the panel or device. Dymo or Kroy tap adhesive backed lettering is not acceptable.

3.3 GROUNDING

A. Ground cable shields and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes as specified in Section "Grounding."

D. Provide a minimum #6 AWG insulated copper ground wire from the main equipment rack to the building main ground bus. Size and provide grounding as recommended by the manufacturer.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installations, including connections and initial system programming. Report results in writing. Check-out and final connections to the 5120 system shall be made by a factory trained technician in the employ of a manufacturer of the products installed. In addition, factory trained technicians shall demonstrate operation of the complete system and each major component to the Owner.

B. Programming: Fully brief Owner on available programming options. Record Owners decisions and set up initial system program. Prepare a written record of decisions, implementation methodology, and final results.

C. Operational Test: Test originating station-to-station, all-call, and page messages at each intercom station. Verify proper routing and volume levels and freedom from noise and distortion. Test each available message path from each station on system.

D. Frequency Response Test: Determine frequency response of two transmission paths, including all-call and paging by transmitting and recording audio tones. Minimum acceptable performance is within 3 dB from 150 to 2500 Hz.

E. Signal-to-Noise Ratio Test: Measure the ratio of signal to noise of complete system at normal gain settings, using the following procedure:
   1. Disconnect a speaker microphone and replace it in the circuit with a signal generator using a 1000-Hz signal. Measure the ratio of signal to noise at paging speakers.
   2. Repeat test for three speaker microphones, one master station microphone, and for each separately controlled zone of paging loudspeakers.
   3. Minimum acceptable ratio is 45 dB.

F. Distortion Test: Measure distortion at normal gain settings and rated power. Feed signals at frequencies of 150, 200, 400, 1000, and 2500 Hz into each intercom, paging, and all-call amplifier. For each frequency, measure the distortion in the paging and all-call amplifier outputs. Maximum acceptable distortion at any frequency is 5 percent total harmonics.

G. Acoustic Coverage Test: Feed pink noise into system using octaves centered at 500 and 4000 Hz. Use a sound-level meter with octave-band filters to measure level at five locations in each paging zone. Maximum permissible variation in level is plus or minus 3 dB, and in levels between adjacent zones is plus or minus 5 dB.

H. Power Output Test: Measure electrical power output of each paging amplifier at normal gain setting at 150, 1000, and 2500 Hz. Maximum variation in power output at these frequencies is plus or minus 3 dB.

I. Signal Ground Test: Measure and report ground resistance at system signal ground. Comply with testing requirements in Section "Grounding."

J. Retesting: Correct deficiencies and retest. Prepare written record of tests.

K. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Prepare a list of final tap settings of paging and independent room speaker-line matching transformers.

L. Schedule tests with at least seven days advance notice of test performance.

M. Contractor shall test all cables and equipment before any demonstrations to the Owner. Check out of the installation shall be made by the contractor. The system shall be free of short circuits, ground loops, parasitic oscillations, excessive system noise and hum, and instability. The Contractor shall, at his own expense, make any changes required to meet these performance requirements. Upon completion of the installation of the equipment, the contractor shall provide to the engineer a signed statement form the equipment supplier that the system has been wired, tested, and functions properly according to the specifications.

3.5 DEMONSTRATION

A. Following the installation and tests of the equipment and cables, the system shall be demonstrated to the Owner’s representative at a time acceptable to the Owner.

B. Training of the Owner’s personnel shall only start after the system has been accepted by the Owner’s representative.

C. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain equipment as specified below:
1. Train Owners maintenance personnel on programming equipment for starting up and shutting down, troubleshooting, servicing, and maintaining equipment.
2. Review data in maintenance manuals.
3. Schedule training with Owner, through Engineer, with at least seven days' advance notice.

D. Provide, without additional expense to the Owner, the services of a competent instructor who will give full instruction in the care, adjustment, and operation of all parts of the electronic equipment to the Owner’s representatives who are to be in charge of the equipment.

E. The Instructor shall be familiar with all parts of the system on which instruction is to be given, and shall be trained in operating theory as well as in practical operation and maintenance work.

F. Separate demonstrations shall be given to the office staff, administrative staff (principal, etc.), and teaching staff; and each demonstration shall be oriented for their particular requirements.

3.6 DOCUMENTATION

A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.

B. A comprehensive installation, operation, programming and instruction manual shall be supplied as part of the system. The manual shall provide complete service information, including schematics, layout drawings, interconnecting diagrams for this particular project and parts lists to permit quick and efficient maintenance and repair of the equipment by a qualified technician. Manuals shall include 8 2" x 11" device location drawings provided in CADD format (Autodesk - AutoCadd Release 12 or higher). Manuals shall be neatly bound and indexed. Three (3) copies of the manual shall be provided.

C. A simplified operation guide, suitable for use by the school staff, shall be provided. This guide shall provide step-by-step instructions for all available functions, an orderly directory for all system stations, telephone numbers and addresses for operational and service assistance from the telecommunications contractor. Provide one manual for each staff telephone; specific to staff telephone functions plus ten (10) spares. Provide fifteen (15) manuals, specific to applicable administrative (EKSU) telephone functions.

D. The Contractor shall furnish four (4) copies of all plans, drawings, and schematics to the Owner after the acceptance test. The drawings shall show all terminal designation, location of all Junction boxes, terminal cabinets, devices, wiring and conduit routings.

E. All tests are to be documented and a copy of these tests placed in the O & M Manuals. Prior to insertion in the O & M Manual, supplier shall submit test results to the Engineer for acceptance.

F. Provide record drawings and floor plans identifying all room outlet numbers and locations.

3. 7 OCCUPANCY ADJUSTMENTS

A. On-site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions. Provide up to three on-site assistance visits within one year of Substantial Completion.

3.8 LOOSE EQUIPMENT

A. Deliver to the Owner at the end of the project, all loose equipment including microphones, stands, etc. Obtain signed delivery receipt and include copy of receipt in O&M Manual for the system.

END OF SECTION 275313

SECTION 280500

COMMON WORK FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Communications equipment coordination and installation.
2. Common communications installation requirements.
3. Demolition
4. Waterproofing.
5. Weatherproofing locations.
6. Cutting and Patching.
7. Painting.
8. Equipment Foundations, Supports, Piers and Attachments.
9. Equipment Guards and Rails.
10. Cleaning, Protecting and Adjusting.
11. Welding.
12. Sleeves for raceways and cables.
13. Sleeve seals.
14. Grout.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

C. Wiring: Cable and/or wire installed in Raceway.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 WATERPROOFING

A. Where work pierces waterproofing, including waterproof concrete, the method of installation shall be approved by the Architect prior to performing the work. Furnish necessary sleeves, caulking and flashing required to make openings absolutely watertight.

1.6 WEATHERPROOFING LOCATIONS (WP)

A. Communication apparatus, such as outlet boxes, switches, connection panels, speakers, cameras, and other devices shall be weatherproof gasketed type, NEMA Types 3 or 4 in the following instances:

1. On surface of exterior face of building, including areas where not under canopies, cast boxes with threaded hubs must be used and under canopies steel boxes with gasket connections to devices.
2. In any areas where specifically noted "WP" or required by the NEC or Regulations mentioned herein.
3. Within air conditioning enclosures.
4. In underground splice boxes.
5. On building roof.
6. Within vivarium locations.
7. In unconditioned spaces subject to exterior ambient conditions such as loading docks and parking garages.

1.7 CUTTING AND PATCHING

A. Provide cutting and patching necessary to install the work specified herein. Patching shall match adjacent surfaces. Refer to Division 1, Cutting and Patching for specific directions.

B. No structural members shall be cut without prior approval of the Architect; such cutting shall be done in a manner directed by him.

C. Provide ceiling removal and replacement where work above ceilings is required. Replace ceiling components damaged in the process.

D. Provide patching where communications devices are removed from walls, ceilings or floors.

1.8 ACCESSIBILITY

A. Coordinate to ensure the sufficiency of the size of shafts, and chases, and the adequacy of clearances in hung ceilings and other areas required for the proper installation of this work.

B. Locate equipment which must be serviced, operated or maintained in fully accessible positions. Locations in ceilings requiring access shall be coordinated with, but not limited to lights, curtain tracks, and speakers. Equipment requiring access shall include, but is not necessarily limited to, motors, junction boxes, fire dampers, controllers, switchgear, etc.

C. Indicate the locations of access doors for each concealed device, concealed behind finished construction and requiring service on the coordination drawings. Equipment below floor slab or finished grade shall also be indicated on the coordination drawings.

D. Furnish access doors under this division for installation by General Contractor. Coordinate during bidding phase with General Contractor. Locations of access doors in finished construction shall be submitted in sufficient time to be installed in the normal course of the work.

1. Manufacturers: Subject to compliance with requirements, furnish access doors by one of the following:

   a. Bar-Co., Inc.
   b. J. L. Industries
   c. Karp Associates, Inc.
   d. Nystrom, Inc.

2. Materials and Fabrication:

   a. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
   b. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
   c. Frames: Fabricate from 16-gauge steel.

      1) Fabricate frame with exposed flange nominal 1 inch wide around perimeter of frame for units installed in the following construction:

         a) Exposed Masonry

      2) For gypsum drywall or veneer gypsum plaster, furnish perforated frames with drywall bead.
      3) For installation in masonry construction, furnish frames with adjustable metal masonry anchors.
      4) For full-bed plaster applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.

   d. Flush Panel Doors: Fabricate from not less than 14-gauge sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175°. Finish with manufacturer's factory-applied prime paint.

      1) For fire-rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

   e. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

1.9 PAINTING

A. Painting requirements of this section shall conform to Division 9.

B. Provide surface preparation, priming, and final coat application in strict accordance with manufacturer's recommendations.

C. Provide prime coat painting for the following:

1. Indoor miscellaneous steel and iron provided under this Division of the specifications.
2. Indoor hangers and supports provided under this Division of the specifications.

1.10 EQUIPMENT FOUNDATIONS, SUPPORTS, PIERS AND ATTACHMENTS

A. Provide necessary foundations, auxiliary steel, supports, pads, bases and piers required for equipment specified in this division; submit drawings in accordance with Shop Drawing Submittal requirements prior to the purchase, fabrication or construction of same.

B. Construction of foundations, supports, and pads where mounted on the floor, shall be of the same materials and same quality of finish as the adjacent and surrounding floor material.

C. Equipment shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and any attachments that are, in the opinion of the Architect, not strong enough shall be replaced as directed, with no additional cost to the Owner.

1.11 CLEANING, PROTECTING AND ADJUSTING

A. Cleaning

1. General cleaning requirements are specified in Division 1.
2. Upon completion of the work, clean the exterior surface of equipment, accessories, and trim installed. Clean, polish, and leave equipment, accessories, and trim in first-class condition.

B. Protection of Surfaces

1. Protect new and existing surfaces from damage during the construction period.
2. Provide plywood or similar material under equipment or materials stored on floors or roofs. Provide protection in areas where construction may damage surfaces.
3. Surfaces damaged during the construction shall be repaired or replaced at the cost of the Contractor at fault. The method or repairing or replacing the surface shall be approved by the Owner and Architect.

C. Protection of Services

1. Protect new and existing services from damage during the construction period.
2. Repair, replace, and maintain in service any new or existing utilities, facilities, or services (underground, overground, interior, or exterior) damaged, broken, or otherwise rendered inoperative during the course of construction.

3. Services damaged during the construction shall be replaced at the cost of the Contractor at fault. The method used in repairing, replacing, or maintain the services shall be approved by the Owner and Architect.

D. Protection of Equipment and Materials

1. Equipment and materials shall be stored in a manner that shall maintain an orderly, clean appearance. If stored on-site in open or unprotected areas, equipment and material shall be kept off the ground by means of pallets or racks, and covered with tarpaulins.
2. Equipment and material, if left unprotected and damaged, shall be repainted or otherwise refurbished at the discretion of the Owner. Equipment and material is subject to rejection and replacement if, in the opinion of the Architect or the manufacturer's engineering department, the equipment has deteriorated or been damaged to the extent that its immediate use or performance is questionable, or that its normal life expectancy has been curtailed.
3. During the construction period, protect equipment from damage and dirt.

E. Adjusting

1. After the entire installation has been completed, make required adjustments to all systems until performance requirements are met.

1.12 SPECIAL TOOLS

A. Provide the Owner's representative with two (2) sets of special tools required for operation and maintenance of equipment provided.

1.13 WELDING

A. General Requirements

1. This paragraph covers the welding of systems. Deviations from applicable codes, approved procedures and approved shop drawings shall not be permitted. Materials or components with welds made off the site shall not be accepted if the welding does not conform to the requirements of this specification. Develop and qualify procedures for welding metals included in the work. Certification testing shall be performed by an approved independent testing laboratory. Bear costs of such testing.
2. Certified welders, previously certified by test, may be accepted for the work without re-certification provided that all of the following conditions are fulfilled:

a. Submit copies of welder certification test records in accordance with this Division and Division 1 requirements.
b. Testing was performed by an independent testing laboratory.
c. The welding procedures and welders are certified in accordance with the "ASME Boiler and Pressure Vessel Code," and base materials, filler materials, electrodes, equipment, and processes conform to the applicable requirements of this specification.
d. Certification has been within a one (1) year period from the start of the project.

3. Filler metals, electrodes, fluxes and other welding materials shall be delivered to the site in manufacturers' original packages and stored in a dry space until used. Packages shall be properly labeled and designed to give maximum protection from moisture and to assure safe handling.
4. Submit welding certificates for review. Each welder assigned to work covered by this specification shall be certified by performance tests using equipment, positions, procedures, base metals, and electrodes or bare filler wires.
5. Before assigning welders to the work, provide the architect with their names, together with certification that each individual is certified as specified. No welding work shall start prior to submissions. The certification shall state the type of welding and positions for which each is certified, the code and procedure under which each is certified, date certified, and the firm and individual certifying the certified tests.
6. Each welder shall be assigned an identifying number, letter, or symbol that shall be used to identify his welds. A list of the welders' names and symbol for each shall be submitted. To identify welds, either written records indicating the location of welds made by each welder shall be submitted, or each welder shall apply his mark adjacent to his weld using an approved rubber stamp or felt-tipped marker with permanent, weatherproof ink or other approved methods that do not deform the metal. For seam welds, identification marks shall be placed adjacent to the welds at 3 foot intervals. Identification by die stamps or electric etchers shall be confined to the weld reinforcing crown, preferably in the finished crater.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Coordinate piping systems installed at a required slope.

F. Apply for detailed and specific information regarding the location of equipment as the final location may differ from that indicated on the drawings. Outlets, equipment or wiring improperly placed because of failure to obtain this information shall be relocated and re-installed without additional expense to the Owner. Determine the actual direction of door

swings, so that local switches and other controls shall be installed at the lockside of doors, unless otherwise noted. Improperly located switches shall be relocated without additional expense to the Owner.

G. The design shall be subject to such revisions as may be necessary to overcome building obstructions. No changes shall be made in location of outlets or equipment without written consent of the Architect and Owner.

H. Unless otherwise mentioned or indicated, mounting heights of outlets are shown on the drawings or in the specification. Dimensions given shall be considered to be from center of outlet to finished floor.

I. Coordinate the location and elevation of all communications devices and fixtures with the architectural interior elevation plan and reflective ceiling plan prior to installation.

J. Properly rough in for the communications raceways and equipment under this contract and modify as required for coordination during the construction period.

K. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

L. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

M. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

3.2 WELDING

A. Perform welding in accordance with qualified procedures using certified welders. Welding shall not be done when the quality of the completed weld could be impaired by the prevailing working or weather conditions. Welding of hangers, supports, and plates to structural members shall conform to AWS specifications.

B. Field bevels and shop bevels shall be by mechanical means or by flame cutting. Where beveling is by flame cutting, thoroughly clean surfaces of scale and oxidation just prior to welding. Beveling shall conform to ANSI B31.1 and AWS B3.0.

C. Replace and reinspect defective welds. Repairing defective welds by adding weld material over the defect or by peening shall not be permitted. Welders responsible for defective welds must be re-certified.

D. Store electrodes in a dry heated area, keep free of moisture and dampness during fabrication operations. Discard electrodes that have lost part of their coating.

3.3 SLEEVE INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS PENETRATIONS

A. Electronic Safety and Security Systems penetrations occur when raceways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, fire-rated floor, or wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

F. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."

I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

J. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel or cast iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

L. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 firestopping section.

3.6 DUST, DIRT AND NOISE

A. Carry out new work and make changes, relocations, and installations with a minimum of noise. Site areas and new equipment, floors and walls, shall be adequately protected from dust and dirt caused by the work. Protection shall include suitable temporary barriers or coverings. The exterior and interior premises of each building shall be kept clean as possible during construction. Damages to surfaces or equipment as a result of negligence shall be replaced or corrected as required.

B. School activities may be under way during much of the construction period. It is imperative that school functions and activities are given priority and the highest level of respect. Contractor functions which may be excessively noisy or disruptive shall be scheduled for times when school functions will not be interrupted or disturbed.

3.7 ENVIRONMENTAL AIR PLENUMS

A. In spaces over hung ceiling which are used for environmental air handling purposes as defined by Article 300.22C of the National Electric Code, power data and communications cable must be in conduit or of the type cable rated for air plenum use. Cable type and/or raceway is generally indicated on the drawings and specifications although the Contractor shall be responsible to clearly define ceiling space used for environmental air purposes.

3.8 SPECIAL ENGINEERING SERVICES

A. In the instance of complex or specialized telecommunications, security, and audiovisual systems that are included in Division 27; the installation, final connections, and testing of such systems shall be made under the direct supervision of competent authorized service engineers who shall be in the employ of the respective equipment manufacturer. Provide the Owner with copies of instruction manuals and booklets for each system and piece of equipment installed. Provide any additional instruction to the Owner over and above the listed above in the care, adjustment, and operation of all parts of the communications systems.

END OF SECTION

SECTION 280544
SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.
2. penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

F. Sleeves for Rectangular Openings:

1. Material: Galvanized-steel sheet.
2. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.
b. CALPICO, Inc.
c. Metraflex Company (The).
d. Pipeline Seal and Insulator, Inc.
e. Proco Products, Inc.

2. Sealing Elements: Nitrile (Buna N) rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Presealed Systems.

2.4 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
2. Sealant shall have VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Silicone Foams: Multicomponent, silicone-based, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

   a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
   b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION

SECTION 28 1300
ACCESS CONTROL & DATABASE MANAGEMENT SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Security and Database Management System (SMS) requirements include:
   1. Monitor and control door access.
   2. Monitor alarm, camera, video, communication loss and temperature.
   3. Maintain a database of system activity including:
      a. Personnel access control information.
      b. System user passwords.
      c. User role permissions.
   4. System shall be managed by Owner's selected client software and/or as listed in specifications

B. Access control system equipment includes:
   1. Supply and install electronic door hardware.
   2. Computer hardware.
   3. Monitoring equipment.
   4. Recording equipment.
   5. Managing electronic access control system.
   6. Managing data and functionality of integrated systems.

C. Access control units and software includes.
   1. Operating Systems software and firmware.
   2. Application Software.
   3. Database Software.

D. Access control point peripherals, including readers.

E. Accessories.

F. Project Requirements and Background: Owner will require planning and programming assistance to ensure that system design for Phase 1 can be implemented in the future on all campuses.
   1. Background: Owner has 5 campuses. Howard is the first location for keyless access control. Access control for this project will be implemented in 3 phases. Selected system will need to be capable of implementaion across all campuses, if/when required.
   2. Phases at Howard Campus: .
      a. Phase 1 - Annex - includes set up of system, along with new doors and new hardware
      b. Phase 2 - Main Building 1927.- includes expansion of system to addtional new and historical doors with new hardware
      c. Phase 3 - 1972 Building - includes expansionof system to additional existing doors with mortise keyed locks requiring conversion to keyless system.
   3. Software will be installed in a District-owned Virtual Server.
   4. Owner requires software to have full range of school lock-down options available.
   5. Owner will procure and manage integration of video management system.
   6. Bidder shall provide detailed server specification, as the proposed system will be required to run on District-provided virtual server hosts. The District shall be notified in a timely manner, of the amount of servers, the processor, memory, disk specifications and any

other requirements. District will build the servers and provide temporary credentials to the integrator for use with installs, setup, software and licensing for the system.

1.02 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware: Electrically operated door hardware, for interface with access control system.
   1. Includes door hardware with integral request to exit devices.
   2. Includes parking gates, for interface with access control system

B. Division 26

C. Division 27

D. Division 28

E. Division 1 -

F. Drawings
   1. Drawings for Phase 1 (Annex) along with Door & Hardware schedule are available as part of BP A.
      a. Phase 1 - Architectural drawings for Access Control reference (Drawings G-213 through 217; G 230 -231are issued with this bid package for door count, swing & location.
      b. Phase 2 - Main Building floor plans (G- 213, 215,217,230) are for access control bidding purposes only. Hard-wired locations are identified. All other locations shall be wire-free. Main Building Door schedules as required for Div 8 will be provided after bid award.
      c. Phase 3 - 1972 Building floor plans (G-240 & G-241) are for access control bidding purposes only. Hard-wired locations are identified. All other locations shall be wire-free. Existing keyed mortise locksets shall be replaced with keyless locksets

G. Electronic lockset requirements
   1. All exterior doors shall be hardwired.
   2. Interior - rated and egress doors shall be hardwired.
   3. Doors with actuators (ADA) shall be hardwired
   4. Interior room doors shall be wire-free.
   5. Closets/cabinets shall be wire -free at locations selected by Owner.

H. System shall be capable of interfacing with the following: Interface may be required at set up or at a future date.
   1. Parking Control Equipment - Parking Gates
   2. Paasenger Elevators
   3. Intrusion Detection
   4. Fire Alarm
   5. Video Surveillance

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NFPA 101 - Life Safety Code; National Fire Protection Association; 2015.

D. UL 294 - Access Control System Units; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-programming Meetings
   1. Review Owner requirements and propose options and alternates

B. Coordination:
   1. Coordinate the work with other installers to provide suitable door hardware as required for both access control functionality and code compliance.
   2. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.
   3. Coordinate the work with other installers to provide power for equipment at required locations.
   4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

C. Preinstallation Meetings:
   1. Conduct meeting with facility representative and other related equipment manufacturers to discuss access control system interface requirements.

D. Phase Completion meetings
   1. Upon completion of each Phase, work with Owner to confirm program requirements and update as required for future phases.

E. Owner Training and Support
   1. Provide up to 3 days training for up to 7 Owner representatives, after completion of each phase.
   2. Provide hardware and software support for 3 years on integrated system; including option to add 3 additional years.

1.05 DEFINITIONS

A. Controller: An intelligent peripheral control unit that uses a computer for controlling its operation. Where this term is presented with an initial capital letter, this definition applies.

B. CPU: Central processing unit.

C. Credential: Data assigned to an entity and used to identify that entity, also called a Token or ID Card

D. CU: Control Unit, Control unit either stand alone or hardwired

E. I/O: Input/Output.

F. LAN: Local area network.

G. LED: Light-emitting diode.

H. Mantrap: A man-trap in physical security protocols refers to a space having two sets of interlocking doors such that the first set of doors must close before the second set opens.

I. PC: Personal computer. This acronym applies to the workstations Computers, and file Servers Computers.

J. USB: Universal Serial Bus - The most widely used hardware interface for attaching peripherals to a computer.

K. SQL: Database engine, a Microsoft product

L. WiFi: Wireless Communication (802.15.4 - ZigBee)

M. RS-232: A TIA/EIA standard for asynchronous serial data communications between terminal devices. This standard defines a 25-pin connector and certain signal characteristics for interfacing computer equipment.

N. RS-485: A TIA/EIA standard for multi-point communications.

O. TCP/IP: Transport Control Protocol/Internet protocol incorporated into Microsoft Windows.

P. Smart Card: ID Token or Credential that can retain or store data and information and transmit the data upon request. (read & write of data)

Q. Contactless Smart Card: ID Token or Credential that can retain or store data and information and transmit the data without contact with a reading device (read & write of data).

R. NFC: Near Field Communication

S. RFID: Radio Frequency Identification Device

T. Black List: A list of invalid tokens/cards stored in the door unit

U. UPS: Uninterruptible Power Supply

V. WAN: Wide area network.

W. LAN: Local area network

X. POE: Power Over Ethernet

Y. PIN: Personal Identification Number

Z. MTBF: Mean Time Between Failures

AA. Wiegand: Patented magnetic principle that uses specially treated wires embedded in the credential card.

AB. Windows: Operating System by Microsoft Corporation

AC. Workstation: A PC with software that is configured for specific limited security system functions.

AD. API: Application Programming Interface

AE. EAC: Electronic Access Control

AF. SHIP: Salto Host Interface Protocol

AG. SALLIS: Salto wireless interface

AH. SVN: Salto Virtual Network

1.06 SYSTEM DESCRIPTION

A. Summary:
   1. The Physical Access Control System has two primary component areas, door control hardware and the management application software.
   2. The system shall provide for a combination of wireless (wire-free) and online (hardwired) wall readers to secure perimeter doors as well as battery powered electronic locks to secure all interior doors, all produced and supported by the same manufacturer.
      a. Owner may choose to utilize off-line option if available
   3. The system shall be centrally managed by one single database/software and one single credential system for all doors in the System.
   4. NOTE: System description is based on SALTO.

B. Token, Credentials, and RFID Contact-less Smart Card Features and Technical Requirements
   1. Secured RFID Contactless Smart Cards

a. Contactless smart card technology provides high-speed, reliable communications with data integrity.
b. Ensures high security with mutual authentication, encrypted data transfer.

2. Read/write capability is mandatory; any system that does not use a two way encrypted Smart Card (RFID) communication format will be considered Unacceptable by the Owner.
3. Multi-application cards: have to be capable of storing information for future applications and integration.

C. RFID Contact-less Smart Card Technology supported:
1. Compatible with a wide range of Smart Card (RFID) Technologies, operating on the industry standard frequency of 13.56MHz
2. To meet the owners needs, the read & write credentials may be any one of the following type products:
   a. HID iClass: Memory capacity: 32K bit with 2 application area configurations. HID-IClass credential shall have a minimum of 16 kb, 32kb preferred, of available memory and allow the possibility for use with multiple vendors across multiple applications.
   b. MIFARE: 4k Bytes
   c. DESFire: 4k Bytes
   d. Desfire EVI: 4K Bytes
   e. NFC: Near Field Communication at 13.56 MHz
3. Access profile for the individual user, encoded on to the card, shall be encrypted and in such a format as to negate the potential for cloning.
4. Standard 16 kb, 32kb preferred memory on each credential shall be secured with a unique set of Keys- A&B for the Electronic Access Control (EAC) system and to enable, as and when required, the collection and transfer of information pertaining to audit trails, lost and stolen cards etc via a data on card functionality
5. Tokens or credentials shall be available in multiple form factors. They are, but not limited to: Standard ID card format, printable ID card format, key fob format, wrist watch format, rubber wrist band format.

D. Features and technical requirements:
1. Online CU (Control Unit) and wall readers will be manufactured and supported by the same manufacturer of the Electronic door locks and System Software. The following is a minimum list of features, that the online unit must contain:
   a. Provide real time door access monitoring
      1) with the on-line hot-spots, if available.
   b. Continue operating and store historical data (audit trail) in the event of a network or server failure. System door Units will provide a Minimum of 1000 transactions.
   c. Ethernet connectivity of all on-line devices via IP4 or IP6 addressing, either hardwired WiFi Connection (802.15.4).
   d. Provide automatic card updating to all Contactless Smart Cards regardless of brand.
   e. Provide the ability to Support 2 Readers and 2 locking devices with on board auxiliary programmable on-board outputs (relays).
   f. Provide for up to 16 Auxiliary output boards with a total of not less then 128 outputs available for end-user programming.
   g. Provide the flexibility for either online wireless (or offline battery operated locks, if available) allowing for the 2 types of system integrated into the same facility.

E. Battery Powered Wireless Networked Locks:

1. RFID Keycard operated: unlocking by means of contact-less smart carriers, which most include the following formats; card, key-fob, wrist watch, RFID stickers and wrist band. All devices will perform at the same level.
2. The EAC Locking Unit shall have typical access control features and be able to mimic traditional door hardware functions. The following is a minimum of the required door operational features:
   a. Standard
   b. Office
   c. Automatic Changes
   d. Automatic Opening
   e. Automatic Opening Plus Office
   f. Automatic Opening Plus Toggle
   g. Key Card Plus Pin Number (Keypad)
   h. Pin Number Only (Keypad)
   i. Timed Key Card Plus Pin Number (Keypad)
   j. Timed Pin Number (Keypad)
   k. Timed Office
   l. Timed Toggle
   m. Toggle Only
   n. Emergency Lockdown (AMOK Crisis)
   o. Anti Passback - Soft/Timed
3. Internal door lock audit trail memory shall be at minimum, 1,000 transactions. This shall include valid, invalid attempts, request to exit, door status, door ajar and mechanical override key used.
4. Automatic Unlocking, all locks shall be able to be programmed to remain unlocked during certain hours and days, automatically changing to a locked down mode outside of these times i.e.- go into office, card only, card plus PIN mode, etc. Each lock shall have a minimum of 8 different automatic locking and unlock schedules. This feature shall be able to be manipulated by day of the week and by system holidays for each door lock.
5. Automatic Locking (lockdown mode), all locks shall be able to lock down from the inside in an emergency. While the lock is in lockdown mode, one designated token will be able to enter the locked down door unit. Once the unit is returned to normal programming mode, it will operate as previously programmed. Activation and resetting of the lockdown mode (AMOK) shall be done with a card holders token. This privilege will be given to the desired card holder on a person by person basis. Blanket lockdown setting or lockdown by a lock thumb turn will be unacceptable.
6. Lost cards shall be able to be deleted from the system without waiting for card expiration or having to visit the locks with a handheld programmer.
7. Water resistance application lock units, must be an option for outdoor and wet environments.
8. Batteries:
   a. Battery life benchmarked to 48,000 Operations or 2.5- 3.0 years.
   b. Shall be powered by standard off the shelf batteries (AAA).
   c. Proprietary batteries or proprietary battery packs are not acceptable.
9. Low battery warning shall be at minimum via visual LEDs and should also automatically report through the system software. This will happen without the need to visiting the door lock with a programming device. For wireless lock units, they will also report via a link

through the RFID Cards through a hotspot for direct communications back to the software to report current battery status.

10. Shall automatically adjust for daylight saving time. This feature will be flexible enough to provide changeable dates from year to year. This feature shall not require a visit to the lock with a programming device.
11. A door lockset shall be deemed to include all of the components necessary for the EAC to function as per manufacturer's specification; namely UL approved and listed internal and external lock parts. The following locking hardware types shall be available:
    a. UL Listed, ANSI Grade 1 American Mortise Lock
    b. UL Listed, ANSI Grade 1 American Mortise Lock, with deadbolt
    c. UL Listed, ANSI Grade 1 Glass Door Lock
    d. UL Listed, ANSI Grade 1 American Cylindrical Lock
    e. UL Listed, ANSI Grade 2 American Cylindrical Lock
    f. UL Listed Locker Lock, Pad Lock
    g. UL Listed, ANSI Grade 1 Exit Device
    h. UL Listed, European Mortise Lock
    i. Mortise Cylinder (Salto GEO)
    j. Rim Cylinder (Salto GEO)
    k. Keypad and Card Lock- XS4
12. External and internal lever handles shall comply with ADA requirements and specifications, and shall also be available with antibacterial Salto BioCote® finishes.
13. The length of time that is allowed to open the door after a valid credential is presented shall be variable and managed by the software, allowing for users with physical disabilities additional time when needed to access their quarters.
14. At all times the internal lever shall be free to operate and retract all latches and deadbolts, allowing free egress by way of a single action.
15. A mechanical master key override shall be provided where necessary and shall operate in conjunction with the lever clutching mechanism, rather than directly on the door latch. Operation of the key override will be recorded in the lock unit audit trail memory to provide increased security and to track key usage. A standard American mortise cylinder shall provide the key override function.

F. Off-line Reader and Battery Powered SVN Lock Operations
1. The smart card will transfer data to/from both off-line locksets to the on-line hot-spots. Tokens may be card, wrist watch or band, key fob formats. All formats shall have the same system performance.
2. A door lockset shall be deemed to include all of the components necessary for the EAC to function as per manufacturer's specification; namely UL approved and listed internal and external lock parts. The following locking hardware types shall be available:
    a. UL Listed, ANSI Grade 1 American Mortise Lock
    b. UL Listed, ANSI Grade 1 American Mortise Lock, with deadbolt
    c. UL Listed, ANSI Grade 1 Glass Door Lock
    d. UL Listed, ANSI Grade 1 American Cylindrical Lock
    e. UL Listed, ANSI Grade 2 American Cylindrical Lock
    f. UL Listed Locker Lock, Pad Lock
    g. UL Listed, European Mortise Lock
    h. UL Listed, ANSI Grade 1 Exit Device
    i. Mortise Cylinder (Salto GEO)
    j. Rim Cylinder (Salto GEO)

k. Keypad and Card Units (XS4)
l. Cam Lock- GxCL (Salto GEO)
m. Heavy Duty Deadbolt- GxB3 (Salto GEO)
n. Locker 9000 (XS4)

3. Retrofit Locks, wherever possible and as needed, the manufacturer will have an option to reuse existing locks that are in good working order and can support the new Salto trim and controls.
4. External & Internal Lever handles shall comply with ADA requirements and specifications. Lever and trim shall also be available with antibacterial finishes. Traditional door hardware finishes and a choice of lever styles to as closely as possible match existing door hardware.
5. At all times the internal lever shall be free to operate and retract all latches and deadbolts, allowing free egress by way of a single action.
6. A mechanical key override shall be provided where necessary and shall operate in conjunction with the lever clutching mechanism, rather than directly on the door latch. To provide increased security the key operation will leave an audit in the lock memory that the mechanical key was used to open the door. This shall be available on mortise or cylindrical type locks.
7. The unit shall initially be delivered with 3 standard alkaline AA batteries, sufficient for up to 48,000 transactions or approximately 2.5 - 3.0 years operational life. No proprietary or rechargeable battery packs shall be accepted.
8. Low battery status shall be, by default, recorded on the user's credential and transferred to the management system when the credential is used at an on-line wall reader or update point (Hotspot). No handheld Device will be needed to retrieve battery status.
9. In the event of a battery failure, the door shall be able to be opened with a small portable handheld device in conjunction with a valid credential (smart card or token).
10. Networked and non-networked locks of all hardware styles shall always allow free egress if the batteries fail.
11. An audit trail of the last 1,000 events (including failed attempts at access by unauthorized key holders) shall be stored on the networked lock's memory for collection using the portable handheld device at anytime and without requiring access to the inside component of the door lock.
12. The networked lock shall hold its designation, the zones that it belongs to, operational configuration, audit trail and "black list" of cancelled keys in non-volatile memory.
13. Current date and time shall be synchronized with the server on a [Time] basis, and/or when collecting audit trails with the portable handheld device or replacing batteries.
14. The networked lock shall incorporate such measures as hardened high resistance steel drill plates, floating axes and steel ball bearings to prevent unauthorized access or tampering by physical means.
15. The external lever mechanism shall incorporate a clutching system to minimize the potential for vandal damage by allowing free travel up and down until a valid credential is presented for the door to be opened.
16. The length of time allowed to open the door after a valid credential is presented shall be variable and managed by the software, allowing for users with physical disabilities additional time when needed to access their quarters.
17. When the lever returns to the zero position, no matter the time elapsed since the valid credential was presented, the clutch shall automatically disengage, limiting the potential for an unauthorized person to enter after the authorized entry.

18. Internal covers may be secured with tamper resistant screws to restrict access to authorized personnel only.
19. Where appropriate the internal clock of the networked lock shall be programmed to allow for the start and finish of Daylight Saving Time.
20. In an office, meeting room or services environment (where applicable) the networked lock shall be able to either automatically or manually be set into “free passage” mode by authorized key holders, reverting to standard operating mode at a prescribed time.
21. In the event a user key is lost, an authorized operator shall be able to cancel and re-issue a new key for the User. Information regarding cancelled keys shall be transmitted to all off line doors via the “black list”, placed on credentials when passing through an on-line “hotspot” or by visiting the doors with the portable programming device.
22. When the system is being operated using the hotel functionality, if a room key is reported lost or stolen (or the key holder is AWOL), simply presenting a “Guest cancel key” shall cancel access for that key without providing access to the room.
23. The EAC Locking Unit shall have typical access control features and be able to mimic traditional door hardware functions. The following is a Minimum of the required door operational features:
    a. Standard
    b. Office
    c. Automatic Changes
    d. Automatic Opening
    e. Automatic Opening Plus Office
    f. Automatic Opening Plus Toggle
    g. Key Card Plus Pin Number (Keypad)
    h. Pin Number Only (Keypad)
    i. Timed Key Card Plus Pin Number (Keypad)
    j. Timed Pin Number (Keypad)
    k. Timed Office
    l. Timed Toggle
    m. Toggle Only
    n. Emergency Lockdown (AMOK Crisis)
    o. Anti Passback - Soft/Timed

G. HOT SPOT - Wall Reader Operations
1. A Wall Reader Device includes support for one (1) or two (2) wall readers. These readers may be; Mifare, Pico Pass, Iclass and NFC. Reader Plus PIN will also be available if needed. The Unit will control access and egress, where applicable, secured to the wall with a vandal resistant frame and tamper-proof fixings; plus a Control Unit (CU) housed with 12V DC power supply, ready for connection to 110V AC outlet. Additionally the power supply shall be prepared to interface with the local fire alarm system to cut power to the door locks, if required, and have connections for 12V DC battery back-up supply (provided by others).
2. Shall be ISO 15.93 and FCC Part 15 compliant.
3. The Wall reader Control Unit set shall have the capability to operate both as an off-line stand-alone door controller or, be easily upgraded with additional (not replacement) hardware to function as an integrated part of the on-line EAC system.
4. Connection between the Wall Reader and Control Unit shall be via UTP CAT5 cable.
5. If required for security or logistical reasons the CU shall be able to be placed up to 100 metres or 328 feet remotely from the wall reader(s).

6. The CU shall hold its designation, the zones that it belongs to, operational configuration, audit trail and "black list" of cancelled keys in non-volatile memory.
7. The on-line CU shall connect directly to the EAC application and be capable of making changes to the individual user access profile when a credential is presented. At the same time the CU shall pass the "black list" of recent cancelled cards on to the key and upload any stored "on key" audits of attempts to access doors and "low battery warnings" from the stand-alone locks.
8. The EAC system shall synchronize the server clock with the on-line CU approximately every 30 seconds.
9. The (off-line and on-line) CU shall be capable of integrating with the elevator management system to control access to individual floors for individual users. Connection to the CU shall be via RS485 serial BUS to Extension Relay Boards (ERB) consisting of 8 NO/NC 12VDC dry contact switches. The EAC system shall allow for up to 16 ERB to be connected in series to each control unit.
10. For the Off-line reader the date and time shall synchronize with the hand held programming unit any time an audit is retrieved.

1.07 SYSTEM OPERATIONAL PREFORMANCE FEATURES

A. Basic System Performance requirements:
   1. Shall provide central management of user rights, access policies, and credentialing.
   2. The application shall be capable of implementing access policies through the assignment of entry permission based on door groupings and time schedules.
   3. The system shall allow for schedules to be applied at doors, governing their remaining open or locked condition.
   4. The application shall permit flexible assignment of user rights and privileges.
   5. The application shall allow for creation and editing of cardholder credentials, including system wide card formats.
   6. The application shall provide views of events and alarms throughout the installation and shall be capable of triggering hardware and communicative actions, based on system configuration.
   7. The application shall be capable of generating standard and custom reports, and provide a detailed and complete log of all system events, as defined by the system operator.

B. System Software Features:
   1. The system shall incorporate 128 bit AES encrypted data.
   2. Supported operating systems shall be Microsoft Windows 7 and/or later.
   3. The database engine shall be SQL 2003, 2008, 2012 or SQL Express.
   4. The system shall have an operating temperature of 0°C to 50°C, ambient, a storage temperature of -40°C to +85°C, ambient, a relative humidity ability of 0% to 95% (non-condensing) at 50°C, and a MTBF of > 100,000 hours.
   5. The system-radiated emissions shall be compliant with FCC Part 15, Class A, and EN55022 specifications.
   6. The system must be capable of managing 4 million users, 64,000 doors, 256 calendars, 1024 zones, and 256 time zones, 1024 time periods, both with 8 intervals each.
   7. Integration with other software systems through dynamic database synchronization; Microsoft SQL Server is recommended.
   8. Able to store all historical data on the system server without having to individually use a handheld device to download audit trail data from individual locks.

9. System capable of being expanded throughout the site. Each area (department) shall be able to manage their own doors and users without a chance of accidentally interfering with other areas (departments).
10. Capable of dynamic master-keying: each credential can change access privileges transparently "on the fly" without the need to visit the access control administrator to reprogram keycards and without the need to reprogram the electronic locks with a handheld programmer.
11. No predefined profiles are necessary to issue keycards. Each and every keycard can be individually enabled to access any combination of doors.
12. Lost keycard cancellation: "blacklist". Contactless smart cards shall be capable of conveying lists of cancelled keys to avoid having to reprogram locks with a handheld device each time a keycard is lost.
13. No WI-FI or Radio infrastructure shall be required.
14. The locks shall have built-in anti- passback functionality. The EAC locks shall have the ability to prevent card holders from reentering without presenting their token to the out reader. This feature shall be incorporated in both On Line/Wireless, or in the off-line EAC lock units.

C. System Software:
1. Develop, install, program and test software and databases for the complete and proper operation of systems involved. Assign software license to Owner. The following is required of the EAC Software:
   a. The software shall be supplied ready to support any number and configuration of off-line and on-line stand-alone locks and wall readers, with the capacity to manage multiple or single sites including up to 64,000 doors and individual users.
   b. A Portable Programming Device (PPD) for transferring information to and from the database for all off-line locks and wall readers shall also be included.
   c. 1024 Time Periods that determine the time intervals at which a lock shall operate in a special mode, timed office mode, automatic opening mode etc.
   d. 256 Time Zones that determine the interval of time in which a user has access to a particular door or zone
   e. 256 Calendars, for user access or used by the electronic locks when they operate in a timed mode.
   f. 1024+ Zones to group doors into sets making programming user access simpler and more efficient.
   g. User Groups shall enable the system manager to group users according to their privileges of access.
   h. Operator Groups shall be defined hierarchically and be password protected to allow only authorized staff to make amendments to sections of the database for which they have responsibility.
   i. Allow multiple simultaneous access, which allows multiple authorized operators to make dynamic changes to the database at any one time.
   j. Must have a proven API for interfacing with existing and well established traditional access control systems.
   k. Must have a proven API for interfacing with third party access control panels.
   l. Must have a maps feature that will allow indicate to the operator where a system produced alarm is located.

m. Shall support an “Out of Site” feature which shall work in conjunction with IN and OUT hot spot readers to disable user access when leaving a facility and enabling user access when entering it.
n. Shall support a “Limited User Access” feature which can be set to allow a maximum number of users assigned to a door.
o. Shall support a “Limited User Occupancy” monitor which can be set to disallow access after the desired number is reached.
p. Shall support setting encryption type for Desfire cards.
q. Shall incorporate auto assignment when using Legic Prime cards.
r. Shall incorporate an activation date and time setting for user cards.
s. Shall allow multiple operator groups to be created with software features able to be individually allowed or denied to the group.
t. Shall feature a Department tab, allowing departments to share users and also add external (users not in a group) access to the department.
u. Shall permit specifying Wiegand codes in decimal, hexadecimal, or binary formats, and bit order.

D. On line Hotspot for Virtual Network
1. The system Virtual Network (SVN) shall provide the capacity to combine the efficiencies of on-line access control with the (cost) advantages of off-line hardware, using data on card functionality.
2. With SVN is enabled all on-line readers shall update access protocols on valid staff and user keys when they are presented to a desktop updater or on-line wall reader can also be used at a security entry check point to update any changes to the users access rights as they enter and leave during the day.
3. If a cardholder has been cancelled an on-line wall reader or elevator reader shall remove all access privileges from the card and shall deny access to anyone presenting the invalid card.
4. The current list of cancelled cards is placed onto every card when it is presented to an on-line reader (hot-spot), and the updated card shall then transfer that list to the off-line readers each time they are used, allowing for the upgraded list to be transmitted throughout the facilities by the users as they go about accessing doors.
5. Data on card functionality shall also allow for the collection of audit trails and low battery warnings from staff and user cards.

E. Emergency
1. In the event of an emergency the System Manager has the ability to either lock down or unlock all or some doors/locks connected via the Salto Wireless Network. These doors shall then remain locked or unlocked until the emergency is designated as over by the System Security Manager.

F. CCTV Invalid Card Interface
1. If an invalid card is presented to an on-line reader an entry is placed immediately in the audit trail and the control unit can trigger a CCTV camera or an alarm (local or remote). This operation can be modified at anytime by changing the dipswitch configuration in the control unit.

1.08 ACTION SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables.
2. Include elevations and details of proposed equipment arrangements.
3. Include system interconnection schematic diagrams.
4. Include requirements for interface with other systems.
   a. Network IP and or MAC addresses of field device.
5. Include wiring diagrams for power and signal wiring.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, dimensions, finishes, service condition requirements, and installed features.

D. Design Data: Standby battery/UPS calculations.
   1. Provide heat load calculations for all hardware.

1.09 INFORMATIONAL SUBMITTALS

A. Certify that proposed system design and components meet or exceed Owner's stated requirements during Programming meeting/s.

B. Evidence of qualifications for installer.

C. Evidence of qualifications for maintenance contractor (if different entity from installer).

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

E. Manufacturer’s detailed field testing procedures.

F. Field quality control test reports.
   1. The final test report shall indicate that every device was tested successfully in a system test.

G. Maintenance contracts.

1.10 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.

B. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
   1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.

C. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

D. Software: One copy of software not resident in read-only memory.
   1. Operating system, database and application software, including installation, system configuration backup and recovery data on CD or DVD media.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Deliver blank credentials to Owner as directed.

1.11 QUALITY ASSURANCE

A. Comply with the following:

1. NFPA 70
2. NFPA 101 (Life Safety Code).
3. The requirements of the local authorities having jurisdiction.
4. Applicable TIA/EIA standards.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Software integration between the SMS and other integrated system components shall be tested and certified for interoperability by the manufacturers of each system.

D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

E. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience with access control systems of similar size, type, and complexity and providing contract maintenance service as a regular part of their business; authorized manufacturer's representative.
   1. Contract maintenance office located within 100 miles of project site.

F. Maintenance Contractor Qualifications: Same entity as installer.

G. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Ordering: The manufacturer’s ordering instructions and lead-time requirements shall be followed to avoid installation delays.

B. Delivery, storage, and handling of the Access control hardware shall be in accordance with the manufacturer’s recommendations.

C. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

D. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.
   1. The Physical Access Control System shall be stored and protected from exposure to harmful weather conditions and at the environmental conditions recommended by the manufacturer.

1.13 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.14 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. All equipment and systems will be warranted by the Contractor for a period of two (2) years commencing with the filing date of the Notice of Completion after Phase 3, provided the system has been inspected and signed off by the Manufacturer and at the conclusion of satisfactory acceptance of the entire system by the Owner.

C. The period of occupancy of Phase 1 shall also be covered by this warranty.

D. The warranty will cover all costs for Warranty Service, including parts.

E. The contract for service will cover the period starting with the first expected activation of each system for installation and test and will continue for an initial period of two years. A

partial-year extension will be acquired to cover the period to the end of the two-year guarantee and will be handled such that a smooth transition to a Customer maintenance agreement can be achieved with no lapse in coverage.

F. Service response will be within 2 hours of the initial request for service; the response may be by phone or remote VPN access into system. This service should be provided during the warranty period at no added cost. This service shall be provided 24 hours per day, 7 days per week, and inclusive of all holidays.

G. Service requests will be reported via phone call to a designated service number provided by Security Contractor, or via a service web site or e-mail account as designated by the security contractor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Salto SVN/SHIP/SALLIS compliant Systems.
   Salto Systems, Inc.
   1. Lockset body - Mortise lock, unles otherwise required
   2. Electroninc Escutcheon - as required by Owner's program
   3. Lever style - REF G
   4. Finish - Antique Brass

B. Software for system
   1. Software systems approved and certified by approved lockset manufactuere as compliant.
      a. Installer shall be certified by manufacturer/provider of locksets and compliant software..

C. Substitutions: See Section 01 6000 - Product Requirements.

D. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

E. Source Limitations: Where possible, furnish system components and accessories produced by a single manufacturer and obtained from a single supplier. Basis of Design: Salto
   1. Module include
      a. Card Readers Units with and without Keypad
      b. Door Locks SVN and Wireless Versions
      c. Control Units Relay and Expansion Boards
      d. UPS Network for Lock
      e. Power Reader Switches
      f. Card Encoders or Enrollment Reader
      g. Portable Programmer Devices

2.02 ACCESS CONTROL SYSTEM REQUIREMENTS

A. Provide new access control system consisting of all required equipment, conduit (if not provided under other contracts), boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.

B. Interface with Other Systems:
   1. Provide products compatible with other systems requiring interface with access control system.

2. Interface with electrically operated door hardware as specified in Section 08 7100.
   a. Capable of locking/unlocking/releasing controlled doors.
   b. Capable of receiving input from integral door hardware switches.
3. Interface with elevators as specified in Section 14 2010.
   a. Capable of controlling access to elevator.
   b. Capable of controlling elevator access to designated floors.
4. Interface with parking control gates as specified in Section 11 1200.
   a. Capable of controlling gate access.
5. Interface with intrusion detection system as specified in Section 28 1600. if requested by Owner
   a. Capable of affecting access for controlled doors for selected intrusion detection system events.
   b. Capable of affecting intrusion detection system status for selected access control system events.
6. Interface with video surveillance system as specified in Section 28 2300. if requested by Owner
   a. Capable of affecting camera/video operation for selected access control system events.
7. Interface with fire alarm system as specified in Section 28 3100. if requested by Owner
   a. Capable of affecting access for designated doors for selected fire alarm system events.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.
   1. Access Control Units and Readers: Listed and labeled as complying with UL 294.

2.03 ACCESS CONTROL UNITS AND SOFTWARE

A. Provide access control units and associated software compatible with readers to be connected.

2.04 ACCESS CONTROL POINT PERIPHERALS

A. Provide devices compatible with control units.

B. Provide devices suitable for operation under the service conditions at the installed location.

C. Provide readers compatible with credentials to be used.

D. Reader Color: To be selected by Architect from manufacturer's available standard colors.

E. Door Locking Devices (Electric Strikes and Magnetic Locks): Comply with Section 08 7100.

2.05 ACCESSORIES

A. Provide components as indicated or as required for connection of access control system to devices and other systems indicated.

B. Unless otherwise indicated, credentials to be provided by Contractor.
   1. Provide credentials compatible with readers and control units/software to be used.

C. Provide cables as indicated or as required for connections between system components.

D. Provide accessory racks/cabinets as indicated or as required for equipment mounting.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify the dimensions that are shown on the drawings with field measurements.

B. Verify that ratings and configurations of the network and infrastructure components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive system components.

D. Verify space allocations, installation tolerance, hazards to safe system operation and other conditions affecting installation are in compliance with system requirements.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.

F. Verify rough-in for LAN, WAN and IP network before device installation.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install access control system in accordance with NECA 1 (general workmanship).

B. Comply with SIA CP-01 Control Panel Standard.

C. Comply with ANSI/TIA-606-B Labelling Standard.

D. Install products in accordance with manufacturer's instructions.

E. Provide grounding and bonding in accordance with Division 26.
   1. Comply with IEEE 1100, "Power and Grounding Sensitive Electronic Equipment."
   2. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
   3. Bond shields and drain conductors to ground at only one point in each circuit.
   4. Signal Ground:
      a. Terminal: Locate in each equipment room and wiring closet; isolate from power system and equipment grounding.
      b. Bus: Mount on wall of main equipment room with standoff insulators.
      c. Backbone Cable: Extend from signal ground bus to signal ground terminal in each equipment room and wiring closet.

F. Identify system wiring and components in accordance with Division 26.
   1. Cabling:
      a. Comply with NECA 1, "Good Workmanship in Electrical Contracting."
      b. Install cables and wiring according to requirements in Division 28.
      c. Access control system wiring color to be distinct and specific to the system. Contractor to coordinate cable colors with all other vendors to ensure color is not duplicated.
      d. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use NRTL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.
      e. Install LAN cables using techniques, practices, and methods that are consistent with Category 5E rating of components and that ensure Category 5E performance of completed and linked signal paths, end to end.
      f. Install cables without damaging conductors, shield, or jacket.
      g. Boxes and enclosures containing security system components or cabling, and which are easily accessible to employees or to the public, shall be provided with a lock. Boxes above ceiling level in occupied areas of the building will not be considered to be accessible. Junction boxes and small device enclosures below ceiling level and

easily accessible to employees or the public will be covered with a suitable cover plate and secured with tamperproof screws.

h. Install end-of-line resistors at the field device location and not at the controller or panel location.

2. Cable Application:
   a. Comply with EIA/TIA-569, "Commercial Building Standard for Telecommunications Pathways and Spaces."
   b. Cable application requirements are minimum requirements and will be exceeded if recommended or required by manufacturer of system hardware.
   c. RS-232 Cabling: Install at a maximum distance of 50 feet (15 m).
   d. RS-485 Cabling: Install at a maximum distance of 4000 feet (1220 m).
3. Configuration:
   a. The configuration of the Physical Access Control System shall be accomplished in accordance with the overall network plan with regard to the following:
      1) Network addressing
      2) User access
      3) Network security

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.

C. Prepare and start system in accordance with manufacturer's instructions.

D. Factory Commissioning: Provide on-site inspection by manufacturer's personnel to test and assess system programming, functionality and performance.

E. Program system parameters according to requirements of Owner.

F. Testing Agency: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
   1. Test for proper interface with other systems.
   2. Perform the following field tests and inspections and prepare test reports:
      a. LAN Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class 2, bidirectional, Category 6 tester. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA-568-1, "Commercial Building Telecommunications Cabling Standards - Part 1 General Requirements." Link performance for UTP cables must comply with minimum criteria in TIA/EIA-568-B.
      b. Test each circuit and component of each system. Tests will include, but are not limited to, measurements of power supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup will be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.
      c. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

H. The Physical Access Control System shall be tested in accordance with the following:
   1. The Contractor shall conduct a complete inspection and test of all installed Physical Access Control System equipment. This process includes testing and verifying operation with connected equipment and network infrastructure.
   2. The Contractor shall provide staff to test all devices and all operational features of the system for witness by the Owner's representative and the Authority having jurisdiction if need be.
   3. The Owner's representative, prior to acceptance, shall witness all testing.

I. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.04 STARTUP SERVICE

A. Prepare and start system in accordance with manufacturer's instructions.

B. Engage a factory-authorized service representative to supervise and assist with startup service. Complete installation and startup checks according to approved procedures that were developed in the Preparation article and with manufacturer's written instructions. Engage a factory-authorized service representative to supervise and assist with startup service.
   1. Enroll and prepare badges and access cards for Owner's operators, management, and security personnel.

3.05 ADJUSTING

A. Provide on-site assistance in adjusting system to suit actual occupied conditions.

B. Provide up to two visits to project site.

C. Tasks include, but are not limited to the following:
   1. Check cable connections.
   2. Check proper operation of card readers, intrusion sensors, integrated systems and database configuration. Verify SMS configuration and adjust as required.
   3. Recommend changes to SMS configuration and settings to improve operation.
   4. Provide written report of adjustments and recommendations.

3.06 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.07 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
   1. The Contractor shall demonstrate the functionality of the Physical Access Control System upon completion of installation, documenting the result of all tests and providing these results to the Owner.

C. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of one day of training for up to 7 Owner's staff.
   3. Instructor: Manufacturer's authorized representative.
   4. Location: At project site.

5. Provide separate training modules for the following:
   a. Computer system administration personnel to manage and repair the LAN and databases and to update and maintain software.
   b. Operators who prepare and input credentials, monitor the SMS and enroll personnel.
   c. Security personnel.
   d. Hardware maintenance personnel.
   e. Facility management.
6. Video tape training sessions. Provide on DVD or other media as requested by Owner for future reference and training.

3.08 PROTECTION

A. Protect installed system components from subsequent construction operations.

3.09 MAINTENANCE

A.

B. Provide to Owner, a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of access control system for two years from date of Substantial Completion of Phase 3; Include a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

C. Provide one year of trouble call-back service upon notification by Owner:
   1. Include allowance for one call-back service call per month during normal working hours at no extra cost to Owner.
   2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

END OF SECTION

SECTION 28 16 00
INTRUSION DETECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Burglary/access control/CCTV intrusion detection system.

B. Intrusion detection cables.

1.2 RELATED SECTIONS

A. Refer to section 271500 Voice Data Video Systems for network cabling.

1.3 REFERENCES

A. Reference Standards: Provide systems which meet or exceed the requirements of the following publications and organizations as applicable to the Work of this Section:
   1. Underwriters Laboratories Inc. (UL):
      a. UL 365: Police Station Connected Burglar Alarm Units and Systems.
      b. UL 636: Holdup Alarm Units and Systems.
      c. UL 684: Local, Central Station, and Remote Station.
      d. UL 985: Household Fire-Warning System Units
      e. UL 1037: Antitheft Alarms and Devices
      f. UL 1610: Central-Station Burglar-Alarm Units.
      g. UL 1635: Installation and Classification of Residential Burglar Alarm Systems.
   2. Federal Communications Commission (FCC):
      a. Code of Federal Regulations Title 47: Part 15: Radio Frequency Devices.
      b. Code of Federal Regulations Title 47: Part 68: Connection of Terminal Equipment to the Telephone Network.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Manufacturer's Product Data: Submit manufacturer's data sheets indicating systems and components proposed for use, including instruction manuals.

C. Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components.

D. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings not later than Substantial Completion of the project.

E. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, customized to the system installed. Include system and operator manuals.

F. Field Tests: Submit results of field testing of every device including date, testing personnel, retesting date if applicable, and confirmation that every device passed field testing.

G. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a one year period for Owner's review. Maintenance shall include, but not be limited to, labor and materials to repair the system, provide test and adjustments, and regular inspections.

1.5 QUALITY ASSURANCE

A. Manufacturer: Minimum 15 years' of experience in manufacturing and maintaining similar systems. Alarm manufacturer shall be certified compliant with ISO 9001.

B. Installer: Minimum 15 years of experience installing similar systems, and acceptable to the manufacturer.
1. REQUIRED additional Installer Certifications – All certifications must be achieved prior to the project bid date – certifications obtained after the bid date will not be accepted:
a. Platinum Pro-Watch Certification – REQUIRED FOR INTEGRATION
b. Salto Inspired Business Partner (IBP)
c. Indusoft Certified Programmer
2. Qualified Regional Installer: Advantech Incorporated, 4092 N.DuPont Highway, Dover, DE 19901 – www.advantechsecurity.net , Contact: David Sweeney (302) 674-8405, Daves@advantechsecurity.net

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's labeled packages. Store and handle in accordance with manufacturer's requirements, in a facility with environmental conditions within recommended limits.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Honeywell Security and Fire, which is located at: 2700 Blankenbaker Pkwy. Suite 150; Louisville, KY 40299; Toll Free Tel: 800-323-4576; Tel: 502-297-5700; Fax: 502-666-7021

2.2 INTRUSION DETECTION CONTROL PANELS

A. Environmental Conditions: System shall be designed to function in the following environmental conditions:
1. Storage Temperature: Designed for a storage temperature of -10 degree C to 70 degree C.
2. Operating Temperature: System shall be designed for an operating temperature of 0 degree C to 50 degree C (32 degree F to 120 degree F).
3. Humidity: System shall be designed for normal operation in an 85% relative humidity environment.
4. Electromagnetic Interference: System shall meet or exceed the requirements of FCC Part 15, Class B devices, FCC Part 68, IEC EMC directive.

B. Power Requirements: Components shall have the following electrical specifications. The system shall operate using standard 120 VAC, 50 Hz/60 Hz power.
1. Control Primary Power: Transformer power shall be 16.5 VAC, 40 VA.
2. Backup Battery: Rechargeable 12 VDC, gel type, lead acid backup battery shall be provided. The battery shall be rated between 12 and 34-ampere hours (AH).
3. Alarm Power: 12 VDC, 1.7 amps for each bell output
4. Auxiliary Standby Power: 12 VDC, 0.75 amp maximum.
5. Total Power: Combined auxiliary standby and alarm currents shall be 2.3 amps.

6. Fusing: The battery input, auxiliary, and bell outputs shall be protected using PTC circuit breakers. All outputs shall be power limited.

C. Control Panel Enclosure: A metal cabinet, suitable for wall mounting. Dimensions shall not exceed 14.5 inches (36.8 cm) in height, 12.5 inches (31.8 cm) in width or 3 inches (7.6 cm) in depth.

D. Control Panel: The control panel shall be an 8-partition, UL commercial and burglary control panel that supports zones using basic hardwired, polling loop, and wireless zones, RF receivers, and relay modules. The control shall provide the ability to schedule time-driven events, and allow certain operations to be automated by pressing a single button. The system shall be capable of interfacing with an ECP long range radio (LRR) unit that can send Contact ID messages. The control shall provide integrated access control and CCTV-switching capability with the use of a single downloader and database.

1. Basic Hardwired Zones: Control shall provide 8 style-B hardwire zones with the following characteristics:
   a. EOLR supervision (if required for zones 2-8) shall support N.O. or N.C. sensors (EOLR supervision required for UL installations).
   b. Zones/Points shall be individually assignable to any partition.
   c. Supports up to 16 two-wire smoke detectors on zone 1.
   d. Supports four-wire smoke or heat detectors on any zone (power to four-wire smoke detectors must be supervised with an EOL device).
2. Expansion Zones:
   a. Polling Loop Expansion: Control shall support up to 120 additional hardwire zones using a built-in two-wire polling (multiplex) loop interface. The polling loop shall provide power and data to remote point modules, and constantly monitor the status of all zones on the loop. Maximum current draw shall not exceed 128 mA. The polling loop zones shall have the following characteristics:
      1) Interface with RPM (Remote Point Module) devices that provide Class B, Style Y (e.g., 4208U/4208SN) or a combination of Class B, Style Y, and Class A, Style Z (e.g., 4208SNF) zones.
      2) Individually assignable to one of 8 partitions.
      3) Supervised by the control panel.
      4) A 12,000 feet (3658 m) wire runs capability without using shielded cable.
      5) Each RPM (Remote Point Module) enclosure shall be tamper protected.
   b. Wireless Expansion Zone: Control shall support wireless zones using a 5800 series RF receiver (fewer if using hardwire and/or polling loop zones). Wireless zones shall have the following characteristics:
      1) Supervised by control panel for check-in signals (except certain non-supervised transmitters).
      2) Tamper-protection for supervised zones.
      3) Individually assignable to one of 8 partitions.
      4) Individually assignable to bell outputs and/or auxiliary relays.
      5) Support wireless devices listed for Commercial Burglary using the 5881ENHC RF Receiver.
3. Partitions: Control shall provide the ability to operate e8 separate areas, each functioning as if it had its own control. Partitioning features shall include:
   a. A Common Lobby partition (1-8), which can be programmed to perform the following functions:
      1) Arm automatically when the last partition that shares the common lobby is armed.
      2) Disarm when the first partition that shares the common lobby is disarmed.
   b. A Master partition (9), used strictly to assign keypads for the purpose of viewing the status of all 8 partitions at the same time (master keypads).
   c. Assignable by zone.
   d. Assignable by keypad/annunciator.
   e. Assignable by relay to one or all 8 partitions.

f. Ability to display burglary and panic and/or trouble conditions at all other partitions' keypads (as a selectable choice).
g. Certain system features selectable by partition, such as entry/exit delay and subscriber account number.

4. User Codes: Control shall accommodate user codes, all of which can operate any or all partitions. Certain characteristics must be assigned to each user code, as follows:
   a. Authority level (Master, Manager, or several other Operator levels). Each User Code (other than the installer code) shall be capable of being assigned the same or a different level of authority for each partition that it will operate.
   b. Specific partitions that the code can operate.
   c. Global arming capability (ability to arm all partitions the code has access to in one command).
   d. Use of an RF (button) to arm and disarm the system (RF key must first be enrolled into the system).
5. Peripheral Devices: Control shall support up to 30 addressable ECP devices, which can be any combination of keypads, RF receivers, relay modules, and interactive phone module. Peripheral devices have the following characteristics:
   a. Each device set to an individual address according to the device's instructions.
   b. Each device enabled in system programming.
   c. Each device's address shall be supervisable (via programming).
6. Keypad/Annunciator: Control shall accommodate up to 16 keypads or six (6) touch-screen (i.e.; advanced user interface) keypads. The keypads shall be capable of the following
   a. Performing all system arming functions.
   b. Being assigned to any partition.
   c. Providing four programmable single-button function keys, which can be used for:
      1) Panic Functions: activated by wired and wireless keypads; reported separately by partition.
      2) Keypad Macros: 32 keypad macro commands per system (each macro is a series of keypad commands). Assignable to the A, B, C, and D keys by partition.
7. Output Relays: A total of 96 relay outputs shall be accommodated using relay modules. Each relay module shall provide four (4) Form C (normally open and normally closed) relays for general-purpose use. The relays shall be capable of being:
   a. Programmed to activate in response to system events.
   b. Programmed to activate using time intervals.
   c. Activated manually.

8. Commercial Wireless Equipment: Control shall be compatible with UL Listed Commercial Wireless Security equipment including:
   a. ADEMCO 5881ENHC Commercial Wireless Receiver: The receiver shall be capable of receiving as many points as the control panel is rated for. Up to two (2) Receivers may be used on any system. Receivers may be remotely located anywhere on the system Keypad/Annunciator bus.
   b. ADEMCO 5817CB Wireless Universal Contact Monitoring Transmitter: This device shall be capable of making any conventional UL listed contact device a wireless device. The device shall be UL listed for commercial burglary applications as follows: UL 365, 609, 1023, 1076 and 1610 for security and nurse call.
   c. ADEMCO 5869 Wireless Hold Up Switch/Transmitter: This device shall be UL 636 listed for commercial burglary applications.
9. Voltage Triggers: System shall provide voltage triggers, which change state for different conditions. Used with devices such as a remote keypad sounder or keyswitch ARMED and READY LEDs.
10. Event Log: System shall maintain a log of different event types (enabled in programming). The event log shall provide the following characteristics:
    a. Stories events.
    b. Viewable at the keypad or through the use of Compass software.
    c. Printable on a serial printer, including zone alpha descriptors.

11. Scheduling: Provides the following scheduling capabilities:
    a. Open/close schedules (for control of arming/disarming and reporting).
    b. Holiday schedules (allows different time windows for open/close schedules).
    c. Timed events (for activation of relays, auto-bypassing and un-bypassing, auto-arming and disarming, etc.).
    d. Access schedules (for limiting system access to users by time).
    e. End User Output Programming Mode (provides 20 timers for relay control).
    f. The system shall automatically adjust for daylight savings time.
12. Communication Features: Supports the following formats and features for the primary and secondary central station receivers:
    a. Formats: ADEMCO Express; ADEMCO Contact ID 4 and 10 Digit Acct number.
    b. Backup reporting: The system shall support backup reporting via the following: Secondary phone number; ECP long-range radio (LRR) interface; with ability to select long range radio (LRR) or dialup as the primary reporting method (dynamic signaling feature).
    c. Internet reporting: The system shall be capable of communicating with the central station via the internet using Alarmnet-i. It shall provide the user with the ability to control the system via a browser interface (i.e., AOL, Netscape, Internet Explorer). All packet data transmitted to the monitoring station shall be encrypted with a minimum of 1024 bits of encryption.
13. Cross-Zoning Capability: Helps prevent false alarms by preventing a zone from going into alarm unless its cross-zone is also faulted within 5 minutes.
    a. Alarm notification appliances, including but not limited to sirens horns, bells and strobes.
    b. Auxiliary devices capable of operating using full-wave rectified unfiltered voltage.
14. Exit Error False Alarm Prevention Feature: System shall be capable of differentiating between an actual alarm and an alarm caused by leaving an entry/exit door open. If not subsequently disarmed, the control panel shall:
    a. Bypass the faulted E/E zone(s) and/or interior zones and arm the system.
    b. Generate an Exit Error report by user and by zone so the central station knows it was an exit alarm and who caused it.
15. Built-in User's Manual and Descriptor Review: For end-user convenience, the control panel shall contain a built-in User's Manual. It shall include the following capabilities:
    a. By depressing any of the function keys on the keypad for five (5) seconds, a brief explanation of that function shall scroll across the alphanumeric display.
    b. By depressing the READY key for five (5) seconds, all programmed zone descriptors shall be displayed (one at a time). This feature shall provide a check for installers and ensure all descriptors have been entered properly.
16. Programming: Control shall be capable of being programmed locally or remotely using the ADEMCO Compass Downloader and shall be capable of:
    a. Uploading and downloading all programming information at 300 baud.
    b. Uploading and displaying firmware revision levels from the control.
17. Automation Software: The Control shall be capable of interfacing with automation software via an RS232 input on a single partition.

E. Communications Options
1. REQUIRED: The system shall use Honeywell's AlarmNet iGSMHS4G communicator or equivalent. The communication service shall employ a high-security two-way Internet connection through AlarmNet Communication Service as the primary method of communication, and then the high-security two-way GPRS (General Packet Radio Service) as the secondary means of communication and shall use SMS (Short Message Service) as a tertiary means of communication. The equipment shall be UL listed for use in this application. The installer shall follow manufacturer's instructions when installing the AlarmNet unit.

F. User Interfaces
1. Keypad, Alpha Display: The system keypad shall include a two-line, alphanumeric LCD

display. Use the Honeywell Vista 6160 keypad or equivalent. The installer shall follow manufacturer's installation instructions when installing system equipment.

G. VPLEX Addressable Detection Devices. System shall integrate with facility doors, windows, and departments. The system shall also integrate with external systems, such as building appliances and building alert systems for remote control and central collection of external system alerts. When integrated with external systems, the system shall connect to the external system to receive status changes by way of a dry contact output from the external system. The system shall use its user interface to provide local status messages from external systems, providing for the initiation of local building policies. The system may transmit information to an off-site monitoring service to provide initiation of remote policies when appropriate. The installer shall follow manufacturer's instructions when installing and programming system equipment.

1. VPLEX Bus Extensions: Extended system VPLEX bus branch circuits shall be scale able to increase the total size of the bus in larger installations. Branch circuits leading from different buildings or from different floors in multi-story buildings shall be isolated from one another so that a shorted or grounded branch circuit is isolated away from other near-side branch circuits, allowing other VPLEX devices to be isolated so that they can continue to operate. The installer shall furnish Honeywell Model 4297 VPLEX Bus Extender modules for each 128 mA of current required on the VPLEX bus.
2. VSI Bus Isolation and Integrity: System VPLEX bus branch circuits shall be isolated from one another so that a shorted, overloaded, or grounded branch circuit is isolated away from other near-side branch circuits, allowing undamaged VPLEX bus circuits to continue to operate. VSI Isolation modules shall be installed at near-side connections to cable runs leading to additional buildings, at cable runs leading to additional floors in multi-story buildings, and at junction boxes leading to multiple VPLEX branch circuits within the system. The installer shall use the Honeywell VSI module or equivalent.
3. Individual Zone Input: When zone inputs shall be located next to individual detection devices, system zone inputs allow the system to sense the change in state of an output from an external device, such as a door/window position sensor, a motion detector, a relay output from an appliance, the output of an external alert system, or other devices that provide a dry closure output. The installer shall furnish Honeywell Model 4193SN zone input modules for each detection device that will be connected to the VPLEX Bus.
4. Wood Frame Doors, VPLEX, concealed: Monitor the opened and closed position of doors in the facility. The installer shall install a Honeywell Model 4191SN-WH Recessed 1/2" sensor or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.
5. Hollow Steel Frame Doors, VPLEX, Concealed: Monitor the opened and closed position of doors in the facility. The installer shall install a Honeywell Model 4191SN-WH Recessed 1/2" sensor, equipped with the steel door adapter or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.
6. Filled Steel Frame Doors, VPLEX, Exposed, Armored: Monitor the opened and closed position of doors in the facility. The installer shall install a Honeywell Model 960 Door sensor, and a 4193SN or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.
7. Overhead Doors: Monitor the opened and closed position of overhead bay doors in the facility. The installer shall install a Honeywell Model 4959SN Overhead Door sensor, or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.
8. Dual-Tec Motion Detector, Wall-Mounted, VPLEX: Selected areas in the protected site will use motion detectors to sense motion in rooms or areas of rooms. Where designated in the plans, install a Honeywell Model DT7500SN VPLEX Dual-Tec Motion Detector or equivalent.
9. Dual-Tec Motion Detector, Anti-Mask, Wall-Mounted, VPLEX: Selected areas in the protected site will use motion detectors to sense motion in rooms or areas of rooms. Where designated in the plans, install a Honeywell Model DT-906 Dual-Tec Motion Detector or equivalent with anti-mask detection capabilities.

10. Panic Buttons: Include manual panic buttons under desks, in storage rooms, in walk-in refrigeration units and other designated locations. The panic button shall be the Honeywell Model 269SN or equivalent.

H. Wireless Detection Devices. The system shall integrate with facility doors, windows, and departments. The system shall also integrate with external systems, such as building appliances and building alert systems for remote control and central collection of external system alerts. When integrated with external systems, the system shall connect to the external system to receive status changes by way of a dry contact output from the external system. The system shall use its user interface to provide local status messages from external systems, providing for the initiation of local building policies. The system may transmit information to an off-site monitoring service to provide initiation of remote policies when appropriate.

1. Wireless Receivers for Commercial Applications - The system shall include up to two Commercial Wireless Receivers where designated. The wireless receiver shall be UL Listed, Factory Mutual Approved, MEA Listed, and CSFM Listed for the application. The wireless receiver shall receive messages from wireless devices indicating device detection loop open, normal, shorted, tamper alarm, and low battery status when sent from transmitters associated with the system. Each wireless transmitter shall send periodic check-in signals to its associated control panel. The transmitter's associated control panel shall report any missing transmitter within four and one-half hours. Each transmitter shall report any low battery condition a minimum of seven days before its battery becomes too discharged to power the transmitter. The transmitter's associated control panel shall report any low battery condition by providing a local indication at system keypads, and shall send a trouble report to the central monitoring station. The model number of the receiver is Honeywell 5881ENHC or equivalent. The installer shall follow manufacturer's instructions when installing and programming system equipment.
2. Wireless Repeaters for Commercial Applications - The system shall include Commercial Wireless Repeaters where designated. The wireless repeater shall be UL Listed for the application. The wireless repeater shall receive and forward messages from wireless devices indicating device detection loop open, normal, shorted, tamper alarm, and low battery status when sent from transmitters associated with the system. Each wireless transmitter shall send periodic check-in signals to its associated control panel. The transmitter's associated control panel shall report any missing transmitter within four and one-half hours. Each transmitter shall report any low battery condition a minimum of seven days before its battery becomes too discharged to power the transmitter. The transmitter's associated control panel shall report any low battery condition by providing a local indication at system keypads, and shall send a trouble report to the central monitoring station. The model number of the repeater is Honeywell 5800RP or equivalent. The installer shall follow manufacturer's instructions when installing and programming system equipment.
3. 5817CB Universal Transmitter for zone inputs. The system shall include Wireless transmitters where designated. When the device is triggered and normal, the wireless transmitter shall send messages indicating the state of the device to the control panel. Each wireless transmitter shall send periodic check-in signals to its associated control panel. The transmitter's associated control panel shall report any missing transmitter within four and one-half hours. Each transmitter shall report any low battery condition a minimum of seven days before its battery becomes too discharged to power the transmitter. Each transmitter shall include an internal tamper switch, and shall send a tamper alert to the control panel when removed from its installed location. The transmitter's associated control panel shall report any low battery condition by providing a local indication at system keypads, and shall send a trouble report to the central monitoring station. The transmitter shall be model number 5817CB or equivalent. The installer shall follow manufacturer's instructions when installing and programming system equipment.
4. Wireless Door Sensors for Wood Jambs, concealed - The system shall include Wireless Door Sensors for Wood Jamb Doors where designated. When the door is opened and closed, the wireless door sensor shall send messages indicating the state of the door to the control panel. Each wireless transmitter shall send periodic check-in signals to its associated control panel.

The door sensor's associated control panel shall report any missing door sensor within four and one-half hours. Each transmitter shall report any low battery condition a minimum of seven days before its battery becomes too discharged to power the transmitter. Each door sensor shall include an internal tamper switch, and shall send a tamper alert to the control panel when removed from its installed location. The transmitter's associated control panel shall report any low battery condition by providing a local indication at system keypads, and shall send a trouble report to the central monitoring station. The model number of the wireless door sensor is the 5818MN or equivalent. The installer shall follow manufacturer's instructions when installing and programming system equipment.

5. Wireless Door Sensors for Hollow Metal Door Frames, concealed - The system shall include Wireless Door Sensors for Hollow Metal Jamb Doors where designated. The when the door is opened and closed, the wireless door sensor shall send messages indicating the state of the door to the control panel. Each wireless transmitter shall send periodic check-in signals to its associated control panel. The door sensor's associated control panel shall report any missing door sensor within four and one-half hours. Each transmitter shall report any low battery condition a minimum of seven days before its battery becomes too discharged to power the transmitter. Each door sensor shall include an internal tamper switch, and shall send a tamper alert to the control panel when removed from its installed location. The transmitter's associated control panel shall report any low battery condition by providing a local indication at system keypads, and shall send a trouble report to the central monitoring station. The model number of the door sensor is the 947-75T and the 5817CB Wireless transmitter or equivalent. The installer shall follow manufacturer's instructions when installing and programming system equipment.
6. Filled Metal Frame Doors and Windows, Exposed, Armored, Wireless- The system shall monitor the opened and closed position of doors and windows in the facility. The installer shall install a Honeywell Model 960 Exposed sensor, and the 5817CB Wireless transmitter or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.

I. Sirens, Sounders and Indicators
1. Siren Indoor/Outdoor: Monitor the status of protected openings and areas in the armed and disarmed state. When an audible alarm occurs, the system shall sound a Honeywell Model 748LC Siren or equivalent. The installer shall install the siren as directed by manufacturer instructions.
2. Siren Indoor: Monitor the status of protected openings and areas in the armed and disarmed state. When an audible alarm occurs, the system shall sound a Honeywell Model Wave2 Siren or equivalent. The installer shall install the siren as directed by manufacturer instructions.

2.3 INTRUSION DETECTION CABLES

A. Intrusion Detection System components shall be connected using the following Honeywell Genesis Series Cables:
1. Keypads use four conductor, 18AWG with 22AWG, non-shielded cable:
   a. Element 1: 18AWG:
      1) General Purpose applications: Part #: 1119.
      2) Riser applications: Part #: 2115.
      3) Plenum applications: Part #: 3115.
   b. Element 2: 22AWG:
      1) General Purpose applications: Part #: 1104.
      2) Riser applications: Part #: 2104.
      3) Plenum applications: Part #: 3104.
2. VPLEX Zone Expanders shall connect to a VPLEX data bus using two conductor, 18AWG, non-shielded cable.
   a. General Purpose applications: Part #: 1118.
   b. Riser applications: Part #: 2114.
   c. Plenum applications: Part #: 3114.

d. Direct burial applications: Part #: 4156.

3. Unpowered detection devices connect to zone inputs using two conductor, 22AWG, non-shielded cable.
   a. General Purpose applications: Part #: 1102.
   b. Riser applications: Part #: 2102.
   c. Plenum applications: Part #: 3102.
4. Powered detection devices connect to zone inputs using four conductor, 18AWG, non-shielded cable.
   a. General Purpose applications: Part #: 1119.
   b. Riser applications: Part #: 2115.
   c. Plenum applications: Part #: 3115.
   d. Direct burial applications: Part #: 4157.
5. The Bell output shall use two conductor, 16AWG, non-shielded cable.
   a. General Purpose applications: Part #: 1125.
   b. Riser applications: Part #: 2121.
   c. Plenum applications: Part #: 3121.
6. Power connections for control panels shall be made using two conductor, 16AWG, non-shielded cable.
   a. General Purpose applications: Part #: 1125.
   b. Riser applications: Part #: 2121.
   c. Plenum applications: Part #: 3121.
7. Ground connections to control panels shall be made using 14AWG solid insulated copper ground wire.
   a. General Purpose applications: Part #: 1131.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

3.2 INSTALLATION

A. Intrusion detection and fire alarm control panel system shall be installed and tested in accordance with manufacturer's installation instructions.
   1. Coordinate interfaces with Owner's representative where appropriate.
   2. Provide backboxes, pullboxes, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.
   3. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
   4. Coordinate with other trades to provide proper sequencing of installation.

3.3 FIELD COMMISSIONING AND CERTIFICATION

A. Field Commissioning: Test system as recommended by manufacturer, including the following:
   1. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
   2. Test devices and demonstrate operational features for Owner's representative and authorities having jurisdiction as applicable.
   3. Correct deficiencies until satisfactory results are obtained.
   4. Submit written copies of test results.

B. Pretesting:

1. After installation, adjust the system and perform complete pretesting.
2. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications.
3. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved.
4. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.

D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.

E. Provide all testing to certify the system is complete and fully operable.
1. Provide written statement of successful test results.
2. Submit letter to Owner and Architect.
3. Perform tests in presence of Owner or Authorized Representative.
4. Manufacturer's technician shall be present to make adjustments related to the testing.

F. Minimum System Tests: Test the system according to the manufacturer’s recommended procedures. Minimum required tests are as follows:

1. Absences of grounded, shorted or open circuits.
2. Each initiating device functions as specified.
3. Abnormal conditions on any supervised circuit or device provided specified trouble signals.
4. Batteries can operate the system, as specified.
5. Automatic battery operation upon loss of AC power.
6. All auxiliary functions are executed correctly, completely and as required.
7. Communicator successfully transmits to UL Central Station, for each type of condition.
8. Verify the absence of unwanted voltages between circuit conductors and ground.
9. Test all conductors for short circuits using an insulation-testing device.
10. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
11. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
12. Test each detection device for alarm operation and proper response at the control unit.
13. Test each device for tamper alarm, where applicable, by actually opening the device to trigger the tamper switch.
14. Perform a walk test of all system motion detectors to prove proper detection throughout the entire area. Verify that no blind or dead spots exist. Make required adjustments to coverage pattern or aiming, to correct deficiencies.
    a. Test every magnetic contact switch by opening the associated door and verifying control system sensing.
    b. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the

manner specified.

G. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

H. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.

3.4 TRAINING

A. Conduct on-site system training, with the number of sessions and length of sessions as recommended by the manufacturer. Training shall include administration, provisioning, configuration, operation and diagnostics.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 DRAWINGS

A. The contractor shall furnish three (3) copies of all plans, drawings and schematics to the owner after the acceptance test. The drawings shall show all terminal designation, location of all junction boxes, terminal cabinets, devices, wiring and conduit routings.

3.7 WARRANTY SERVICE

A. Warrant the equipment and wiring free from electrical and mechanical defects for a period of two (2) years from the date of Owner's acceptance of system.

B. The Contractor shall employ a factory-trained service organization within 35 miles of the job site. This organization shall have a minimum of seven (7) years experience in servicing integrated Intrusion Alarm Systems and equipment.

C. Fully qualified repair and maintenance personnel shall be available on a twenty-four (24) hour a day basis, three hundred and sixty-five (365) days a year, with four (4) hour maximum response time for service.

D. Normal service shall be defined as minor repairs and/or adjustments. Service of this nature shall be provided at no cost to the Customer during normal business hours, which are between 8:00AM and 5:00PM, Monday through Friday. For service calls requested by phone before 11:00 AM on a weekday, service shall occur on a same-day basis.

E. Emergency service shall be required for emergencies defined as critical equipment not being functional, and shall be furnished at no cost to the Customer during the warranty period. Emergency service shall respond within a four (4) hour period, twenty-four (24) hours per day, three hundred and sixty-five (365) days a year. A list of critical equipment shall be developed and coordinated by the Customer and the Contractor.

END OF SECTION

SECTION 28 23 00
VIDEO SECURITY SURVEILLANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Video surveillance system.
1. Video Management System (VMS).- Owner furnished and installed
2. Network Video Recorders (NVR).- Owner furnished and installed
3. Cameras. - Owner furnished and **Contractor installed**
4. Network & IP Cables. – Telecom Contractor furnished and installed. Refer to spec 271500.

1.2 RELATED SECTIONS

A. Section 27 15 00 Voice Data Video Systems – All CAT6 cabling shall be provided by the project telecom contractor.

1.3 REFERENCES.

A. Consultative Committee for International Radio (CCIR).

B. Conformity for Europe (CE).

C. Electronic Industry Association (EIA).

D. Federal Communications Commission (FCC).

E. Joint Photographic Experts Group (JPEG).

F. National Television Systems Committee (NTSC).

G. Phase Alternating Line (PAL).

H. Underwriters Laboratories Inc. (UL).

1.4 SUBMITTALS

A. General: Submittals shall be made in accordance with the Conditions of the Contract and Submittal Procedure Section 01 30 00 - Administrative Requirements.

B. Manufacturer's Product Data: Submit manufacturer's data sheets indicating systems and components proposed for use, including instruction manuals.

C. Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components. Scaled Floor Plans- provide complete scaled floor plans showing locations of all cameras (new and existing) and all equipment.

D. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings not later than Substantial Completion of the project.

E. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, customized to the system installed. Include system and operator manuals.

F. Field Tests: Submit results of field testing of every device including date, testing personnel, retesting

date (if applicable), and confirmation that every device passed field testing.

G. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a one year period for Owner's review. Maintenance shall include, but not be limited to, labor and materials to repair the system, tests and adjustments, and regular inspections.

H. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer: Minimum 15 years' experience in manufacturing and maintaining video management systems. Manufacturer shall provide toll-free technical assistance and support available 24/7.
   1. Manufacturer shall provide customer service, pre-sales applications assistance, after-sales technical assistance, access to online technical support, and online training using Web conferencing.
   2. Manufacturer shall provide 24/7 technical assistance and support by means of a toll-free telephone number at no extra charge.

B. Manufacturing Location: Provide equipment assembled in the United States.

C. Installer: Minimum 15 years' experience installing similar systems, and acceptable to the manufacturer of the video management system. The Owner will furnish security cameras by AXIS. The contractor shall be certified by the equipment manufacturer as an authorized installer.

D. Power Requirements: Components shall have the following electrical specifications: 100-240 V AC (50 Hz/60 Hz) or as specified for individual products within part 2 of the specification.

E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship is approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

A. Manufacturer's Warranty: Submit manufacturer's standard one-year warranty for the video surveillance system.

PART 2 PRODUCTS

2.1 VIDEO MANAGEMENT SYSTEM (VMS)

A. Owner furnished and Owner installed.

2.2 NETWORK VIDEO RECORDERS

A. Owner furnished and Owner installed.

2.3 CAMERAS

A. Owner furnished and **Contractor installed**.

B. The Owner will furnish security cameras by AXIS Communications. The contractor shall be certified by the equipment manufacturer as an authorized installer.

2.4 NETWORK & IP CABLES

A. Category 6 Cables shall be provided by the project telecom contractor. Refer to specification section 271500.

B. Coordinate exact routing and location for termination.

C. Coordinate all rough in and conduit and back box requirements with electrician and telecom contractor.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 INSTALLATION

A. All components of the video management system shall be thoroughly tested before shipping to the project location.

B. Video management software shall be provided by the Owner.
1. Coordinate interfaces with Owner's representative where appropriate.
2. Install Owner furnished cameras.
3. Provide backboxes, racks, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.
4. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent (40%) fill in conduits. Gather wires and tie to create an orderly installation.
5. Coordinate with other trades to provide proper sequencing of installation.

3.3 FIELD COMMISSIONING AND CERTIFICATION

A. Field Commissioning: Test video management system as recommended by manufacturer, including the following:
   1. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
   2. Test devices and demonstrate operational features for Owner's representative and authorities having jurisdiction, as applicable.
   3. Correct deficiencies until satisfactory results are obtained.
   4. Submit written copies of test results.

B. Pretesting:

   1. After installation, align, adjust, and operate the system to assure proper operation of all features and controls.
   2. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications.
   3. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved.
   4. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.

D. Minimum System Tests: Test the system according to the manufacturer's recommended procedures. Minimum required tests are as follows:

   1. System is free from grounded or open circuits.
   2. System has no interference or anomalies that affect picture quality.
   3. Each camera functions properly under all conditions encountered at the location including, daylight, artificial light, weather, etc.
   4. Camera displays indicate titling as directed by owner for each view.
   5. All video monitors display camera views properly and are fine tuned for picture quality.
   6. Video recording and playback equipment functions properly.
   7. Camera controls and video display controls function properly for image scanning, split screen, etc.
   8. Video devices function as specified and produce picture quality in compliance with specification.
   9. Any test such as loss of power supplies, will initiate the proper system response in compliance with specification.

E. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch up, repair or replace damaged products before Substantial Completion.

3.5 DRAWINGS:

A. The contractor shall furnish three (3) copies of all plans, drawings and schematics to the owner after the acceptance test. The drawings shall show all terminal designation, location of all cameras, control equipment, junction boxes, terminal cabinets, devices, wiring and conduit routings.

3.6 WARRANTY AND SERVICE

A. Warrant the equipment and wiring free from electrical and mechanical defects for a period of one year from the date of Owner's acceptance of system.

B. The Contractor shall employ a factory-trained service organization within 35 miles of the job site. This organization shall have a minimum of seven (7) years experience in servicing Integrated CCTV Surveillance Systems and equipment.

C. Fully qualified repair and maintenance personnel shall be available on a twenty-four (24) hour a day basis, three hundred and sixty-five (365) days a year, with four (4) hour maximum response time for service.

D. Normal service shall be defined as minor repairs and/or adjustments. Service of this nature shall be provided at no cost to the Customer during normal business hours, which are between 8:00AM and 5:00PM, Monday through Friday. For service calls requested by phone before 11:00 AM on a weekday, service shall occur on a same-day basis.

E. Emergency service shall be required for emergencies defined as critical equipment not being functional, and shall be furnished at no cost to the Customer during the warranty period. Emergency service shall respond within a four (4) hour period, twenty-four (24) hours per day, three hundred and sixty-five (365) days a year. A list of critical equipment shall be developed and coordinated by the Customer and the Contractor.

END OF SECTION

SECTION 285200
GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this Section.

1.2 SUMMARY

A. Provide all materials and labor for the installation of a grounding and bonding system for communications infrastructure. This section includes requirements for providing a permanent grounding and bonding infrastructure for communications circuits, raceways, and cable tray.

B. Related Sections

1. Division 27 Section — "Conduit and Backboxes for Communications Systems"

1.3 REFERENCES

A. The applicable portions of the following specifications, standards, codes and regulations shall be incorporated by reference into these specifications.

1. General:

a. National Electrical Code (NEC)

b. National Electrical Safety Code (NESC)

c. Occupational Safety and Health Act (OSHA)

2. Communications:

a. TIA/EIA - 568: *Commercial Building Telecommunications Cabling Standard*

b. TIA/EIA - 569: *Commercial Building Standard for Telecommunication Pathways and Spaces*

c. TIA/EIA - 606: *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*

d. TIA/EIA - 607: *Commercial Building Grounding and Bonding Requirements for Telecommunications*

e. ISO/IEC IS 11801: *Generic Cabling for Customer Premises*

f. BICSI: *BICSI Telecommunications Cabling Installation Manual*

g. BICSI: *BICSI Telecommunications Distribution Methods Manual (TDMM)*

h. BICSI: *BICSI Customer-Owned Outside Plant Design Manual (CO-OSP)*

1.4 DEFINITIONS

A. "TMGB" shall mean *Telecommunications Main Grounding Busbar.* There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.

B. "TGB" shall mean *Telecommunications Grounding Busbar.* There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.

C. "TBB" shall mean *Telecommunications Bonding Backbone.* The TBB is a conductor used to connect TMGBs to TGBs.

1.5 SYSTEM DESCRIPTION

A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete, permanent Grounding and Bonding infrastructure for communications circuits, raceways, and cable trays as hereinafter specified and/or shown on the Contract Documents. The Grounding and Bonding system shall support an ANSI/TIA/EIA and lSO/IEC compliant communications Structured Cabling System (SCS).

B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the plans but which are necessary to make a complete working ANSI/TIA/EIA and ISO/IEC compliant Grounding and Bonding system.

1.6 SUBMITTAL INFORMATION

A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.

1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.

2. For those items noted as allowing "or equal," and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.

3. Provide standard manufacturer's cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Closeout Submittals: Provide submittal information for review as follows:

1. O&M Manual for Communications - At the completion of the project, submit O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the Designer in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.

2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets.

   a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.

   b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.

   c. Keep Record Drawings current throughout the course of construction. ("Current" is defined as not more than one week behind actual construction).

   d. Show identifiers for major infrastructure components on Record Drawings.

1.7 SEQUENCING

1.8 CONTRACTOR WARRANTY:

A. Provide a Contractor-endorsed two-year service warranty against defects in materials and workmanship.

   1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.

   2. The Contractor Warranty period shall commence upon Owner acceptance of the work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials shall consist of busbars, supports, bonding conductors and other incidentals and accessories as required.

2.2 MATERIALS

A. Grounding/Bonding:

   1. Telecommunications Main Grounding Bus Bar (TMGB):

      a. Large (20" x 4" x ¼"), Pre-drilled: CPI 10622-020, or equal

      b. Small (10" x 4" x ¼"), Pre-drilled: CPI 10622-010, or equal

   2. Telecommunications Grounding Bus Bar (TGB):

      a. Large (20" x 4" x ¼"), Pre-drilled: CPI 10622-020, or equal

      b. Small (10" x 4" x ¼"), Pre-drilled: CPI 10622-010, or equal

   3. Telecommunications Bonding Backbone: #6 AWG insulated (green in color) copper conductor.

4. Grounding Conductor: #6 AWG insulated (green in color) copper conductor.

B. Firestopping Material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.

C. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, and created by a hand-carried label maker or a computer/software-based label making system. Handwritten labels are not acceptable.

1. Hand-carried label maker:

a. Brady: ID Pro Plus (or approved equal).

2. Labels:

a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal)

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.

B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NESC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.

C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.

D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.

E. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.

F. Install the grounding and bonding system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.

G. Remove surplus material and debris from the job site and dispose of legally.

3.2 INSTALLATION

A. The grounding and bonding infrastructure system shall not make use of the building plumbing system, unless required to do so by the NEC.

1. Coordinate the installation of the grounding and bonding system with the electrical power distribution system grounding infrastructure.

B. Ground/Bonding:

1. TMGB: Provide a minimum of one TMGB per telecommunications entrance room for each building and as shown on the Contract Documents. Install TMGB(s) and directly bond TMGB(s) to electrical service ground and to associated TBB(s). Group protector, busbar bonding, and approved building grounding conductors toward one end of the TMGB and leave space for equipment grounding conductors on the other end.

2. TGB: Provide a minimum of one TGB per telecommunications room for each building and as shown on the Contract Documents and as required by the standards, references and codes listed in PART 1 -- REFERENCES above. Directly bond each TGB to its associated TBB and to the nearest building structural steel or other permanent metallic system. Group protector, busbar bonding, and approved building grounding conductors toward one end and leave space for equipment grounding conductors on the opposite end.

3. TBB(s) and Grounding Conductors: Provide TBB(s) and grounding conductors as shown on the Contract Documents and as required to bond all non-current carrying metal telecommunications equipment and materials to the nearest TGB. Use TBB(s) to connect the TMGB to each TGB. Route along the shortest and straightest path possible with minimal bends. Bends shall be sweeping. Insulate TBB(s) and conductors from their support. TBB(s) and grounding conductors shall be continuous (without splices).

a. Ensure that bonding breaks through paint to bare metallic surface of all painted metallic hardware.

C. Firestopping

1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.

2. Maintain the fire rating of all penetrated fire barriers. Fire stop and seal all penetrations made during construction.

a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.

b. Install firestops in strict accordance with manufacturer's detailed installation procedures.

c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply of sealing material in a manner acceptable to the local fire and building authorities.

d. For demolition work, apply firestopping to open penetrations in fire rated barriers where cable is removed. Apply firestopping regardless of whether or not the penetrations are used for new cable or left empty after construction is complete.

e. Firestopping material used to seal open penetrations through which cable passes shall be re-usable/re-enterable.

D. Labels:

1. Label TMGB(s) with "TMGB"

2. Label TGB(s) with "TGB".

3. Label TBB(s) and bonding conductors "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

END OF SECTION

SECTION 285800

CONDUIT AND BACKBOXES FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Provide all materials and labor for the installation of a pathway system for inside plant communications circuits. This section includes requirements for horizontal and building backbone raceways, fittings, and boxes specific to communications circuits (cabling) for voice and data.

B. Related Sections:

1. Division 27 Section — "Grounding and Bonding for Communications Systems"

1.3 REFERENCES

A. Incorporate by reference the applicable portions of the following specifications, standards, codes into this specification section.

1. General:

a. National Electrical Code (NEC)

b. National Electrical Safety Code (NESC)

c. Occupational Safety and Health Act (OSHA)

2. Communications:

a. ANSI/TIA/EIA - 568: *Commercial Building Telecommunications Cabling Standard*

b. ANSI/TIA/EIA - 569: *Commercial Building Standard for Telecommunication Pathways and Spaces*

c. ANSI/TIA/EIA - 606: *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*

d. ANSI/TIA/EIA - 607: *Commercial Building Grounding and Bonding Requirements for Telecommunications*

e. ISO/IEC IS 11801: *Generic Cabling for Customer Premises*

f. BICSI: *BICSI Telecommunications Cabling Installation Manual*

g. BICSI: *BICSI Telecommunications Distribution Methods Manual (TDMM)*

1.4 DEFINITIONS

A. "EMT" shall mean Electrical Metallic Tubing.

B. "RMC" shall mean Rigid Metal Conduit.

C. "SMR" shall mean Surface Metal Raceway.

D. "Raceway" shall mean any enclosed channel for routing wire, cable or busbars.

E. "TMGB" shall mean *Telecommunications Main Grounding Busbar.* There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.

F. "TGB" shall mean *Telecommunications Grounding Busbar.* There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.

G. "TBB" shall mean *Telecommunications Bonding Backbone.* The TBB is a conductor used to connect TMGBs to the TGBs.

H. "Pullbox" shall mean a metallic box with a removable cover, used to facilitate pulling cable through conduit runs longer than 100' or in which there are more than 180 degrees of bends.

I. "Junction box" shall mean a pullbox wherein a feeder conduit transitions to multiple distribution conduits.

1.5 SYSTEM DESCRIPTION

A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete Raceway system as hereinafter specified and/or shown on the Contract Documents. The Raceway system shall support an ANSI/TIA/EIA and lSO/IEC compliant communications Structured Cabling System (SCS) as specified in 2715 00 - Inside Plant Communications Systems

B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the Contract Documents but which are necessary to make a complete working Raceway system.

1.6 SUBMITTALS

A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.

1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.

2. For those items noted as allowing "or equal," and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.

3. Provide standard manufacturer's cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Closeout Submittals: Provide submittal information for review as follows:

1. O&M Manual for Communications - At the completion of the project, submit all O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the College in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.

2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets, including maintenance hole/handhole butterfly drawings.

a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.

b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.

c. Keep Record Drawings current throughout the course of construction. ("Current" is defined as not more than one week behind actual construction).

d. Show identifiers for major infrastructure components on Record Drawings.

1.7 CONTRACTOR WARRANTY:

A. Provide a Contractor-endorsed one-year service warranty against defects in materials and workmanship.

1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.

2. The Contractor Warranty period shall commence upon Owner acceptance of the work.

1.8 QUALITY ASSURANCE

A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NEC, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

B. Comply with NECA's "Standard of Installation."

C. Comply with NEC.

1.9 COORDINATION

A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials shall consist of conduit, surface metal raceway, outlet boxes, fittings, enclosures, pull boxes, and other raceway incidentals and accessories as required for inside plant communications circuits.

2.2 MATERIALS

A. Conduit:

1. EMT. 1” minimum conduit size. Flexible metal conduit (FMC) is not acceptable.

a. Conduit: Galvanized steel tubing meeting ANSI C80.3.

b. Couplings: Steel, cast iron, or malleable iron compression type employing a split, corrugated ring and tightening nut, with integral bushings and locknuts. Indent-type and setscrew-type couplings are not permitted.

2. RMC. 1” minimum conduit size.

a. Conduit: Hot dipped galvanized steel with threaded ends meeting ANSI C80.1.

b. Couplings: Unsplit, NPT threaded steel cylinders with galvanizing equal to the conduit.

c. Nipples: Same as conduit, factory-made up to 8 inches in diameter, no running threads.

B. Sleeves: EMT conduit, with insulated throat bushings for each end

C. Surface Raceway: Wiremold V2400 series or equivalent – Two piece, steel, single channel surface raceway.

D. Outlet boxes: Minimum 4”x4” size, 2 1/8” minimum depth, with extension rings (if needed) and single gang covers (i.e.; mud rings), unless otherwise noted on the Contract Documents. Combined interior depth of outlet box, extension ring and cover shall be a minimum 2-1/2”. Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for 1” trade size conduit or connector entrance, meeting NEMA OS 1.

1. Acceptable manufacturers:

a. Appleton, Raco, Steel City, or equal

2. Wiremold Extra Deep Switch and Receptacle Box: V5744-2 (two gang), or equal

E. Junction Boxes and Pull Boxes: Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for conduit or connector entrance. Boxes 6”x6”x4” or larger may be code gauge fabricated steel continuously welded at seams and painted after fabrication.

1. Dry locations: meeting NEMA OS 1.

2. Wet locations: NEMA OS 3R.

F. Miscellaneous Fittings:

1. Locknuts and conduit bushings: Malleable iron

a. Appleton, Crouse Hinds, OZ Gedney, or equal

2. Through wall seals and floor seals shall be:

a. OZ Gedney FS and WS series, or equal.

G. Pull Strings: Plastic or nylon with a minimum test rating of 200 lb.

2.3 FIRESTOPPING

A. Material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.

2.4 LABELING AND ADMINISTRATION

A. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, typed, and created by a hand-carried label maker or an approved equivalent software-based label making system. Handwritten labels are not acceptable.

1. Hand-carried label maker:

a. Brady: ID Pro Plus (or approved equal).

2. Labels:

a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal).

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.

B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NESC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.

C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.

D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.

E. Install the raceway system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.

F. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.

G. Remove surplus material and debris from the job site and dispose of legally.

3.2 EXAMINATION

A. Examine surfaces and spaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions. Provide a raceway for each location indicated. Do not gang raceway into wireways, pullboxes, junction boxes, etc., without specific approval from the Designer.

B. Conduit:

1. Install EMT unless other conduit is shown on the Contract Documents or is required by Code.

2. Install conduit as a complete, continuous system without wires, mechanically secured and electrically connected to metal boxes, fittings and equipment. Blank-off unused openings using factory-made knockout seals.

3. Run conduit in the most direct route possible, parallel to building lines. Do not route conduit through areas in which flammable material may be stored.

4. Keep conduit at least 6 inches away from parallel runs of flues and steam or hot-water pipes or other heat sources operating at temperatures above one-hundred degrees Fahrenheit. Install horizontal conduit runs above water piping.

5. Keep conduit away from sources of electromagnetic interference as follows:

a. 5 inches from fluorescent lighting

b. 12 inches from conduit and cables used for electrical power distribution

c. 48 inches from motors or transformers

6. Do not exceed 90 meters total length for a given conduit run to be used for distribution cabling (from outlet box to telecommunications room), including intermediate conduits and junction boxes.

7. Install conduit exposed, except in finished areas or unless shown otherwise on the drawings. Do not install conduit below grade/slab unless specifically shown on the Contract Documents as being installed below grade/slab.

8. Install exposed conduit in lines parallel or perpendicular to building lines or structural members except where the structure is not level. Follow the surface contours as much as practical. Do not install crossovers or offsets that can be avoided by installing the conduit in a different sequence or a uniform line.

    a. Run parallel or banked conduits together, on common supports where practical.

    b. Make bends in parallel or banked runs from same centerline to make bends parallel.

9. Conduits concealed above ceilings, furred spaces, etc., which are normally inaccessible may be run at angles not parallel to the building lines.

10. Wherever practical, route conduit with adjacent ductwork or piping and support on common racks. Base required strength of racks, hangers, and anchors on combined weights of conduit and piping.

11. Where conduits cross building expansion joints, use suitable sliding or offsetting expansion fittings. Unless specifically approved for bonding, use a suitable bonding jumper.

12. Support conduits as specified in Section "Basic Electrical Materials and Methods."

    a. Provide anchors, hangers, supports, clamps, etc. to support the conduits from the structures in or on which they are installed. Do not space supports farther apart than five feet.

    b. Provide sufficient clearance to allow conduit to be added to racks, hangers, etc. in the future.

    c. Support conduit within three feet of each outlet box, junction box, gutter, panel, fitting, etc.

13. Ream conduits to eliminate sharp edges and terminate with metallic insulated grounded throat bushings. Seal each conduit after installation (until cable is installed) with a removable mechanical-type seal to keep conduits clean, dry and prevent foreign matter from entering conduits.

14. Install a pull string in each conduit.

15. For conduits entering through the floor of a telecommunications room, terminate conduits 6” above the finished floor.

16. Do not install communications conduits in wet, hazardous or corrosive locations.

17. Where conduit is shown embedded in masonry, embed conduit in the hollow core of the masonry. Horizontal runs in the joint between masonry units are not permitted.

18. Where conduit is shown embedded in concrete, embed conduit a minimum of two inches from the exterior of the concrete. Do not place conduit in concrete less than 4 inches thick.

    a. One inch trade size conduit shall be used. Conduits sized smaller than one inch trade size conduit are not permitted embedded in concrete without approval from the College.

    b. Run conduit parallel to main reinforcement.

    c. Conduit crossovers in concrete are not permitted.

19. Where conduit exits from grade or concrete, provide a rigid steel elbow and adapter.

20. Where conduit enters a space through the floor and terminates in that space, terminate the conduit at 6” above the finished floor.

21. Where conduits terminate at a cable tray, the conduits shall be consistently terminated no more than 8” from the cable tray, and have a visually uniform appearance.

22. Where several circuits follow a common route, stagger pullboxes or fittings.

23. Where several circuits are shown grouped in one box, individually fireproof each conduit.

24. Bend and offset metal conduit with standard factory sweeps or conduit fittings. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

    a. Conduit sweeps:

        1) Sweeps shall not exceed 90 degrees.

        2) Do not exceed 180 degrees for the sum total of conduit sweeps for a section of conduit (between conduit termination points).

        3) Sweep radius shall be at least 10 times the internal diameter of the conduit.

        4) 90-degree condulets (LB’s) and electrical elbows are not acceptable.

    b. Factory-manufactured sweeps are required for bends in conduit larger than 1-¼” trade size.

    c. For bends in 1 ¼” trade size conduit and larger, field-manufactured bends (using a hydraulic bender with a 1 ¼” boot) are permitted only when factory-manufactured sweeps are not suitable for the conditions. In all other cases, factory-manufactured sweeps are required. “Hickey-bender” use is prohibited.

25. Connect conduit to hubless enclosures, cabinets and boxes with double locknuts and with insulating type bushings. Use grounding type bushings where connecting to concentric or eccentric knockouts. Make conduit connections to enclosures at the nearest practicable point of entry to the enclosure area where the devices are located to which the circuits contained in the conduit will connect.

26. Penetrations for raceways:

a. Do not bore holes in floor and ceiling joists outside center third of member depth or within two feet of bearing points. Holes shall be 1-¼” diameter maximum.

b. Penetrate finished walls and finished surfaces with a PVC or sheet metal sleeve with an interior diameter (ID) at least 1/4" greater than the outer diameter (OD) of the conduit, set flush with walls, pack with fiberglass, seal with silicone sealant.

c. Penetrate poured-in-place walls and free slabs with a cast iron sleeve (or Schedule 40 PVC black pipe sleeve for above-grade only) with retaining ring or washer. Set sleeves flush with forms or edges of slab. Pack around conduit with fiberglass and seal with silicone sealant.

27. Raceway terminations and connections:

a. Join conduits with fittings designed and approved for the purpose and make joints tight. Do not use set indent-type or screw-type couplings.

b. Make threaded connections waterproof and rustproof by applying a watertight, conductive thread compound. Clean threads of cutting oil before applying thread compound.

c. Make conduit terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

d. Cut ends of conduit square using a hand saw, power saw or pipe cutter. Ream cut ends to remove burrs and sharp ends. Where conduit threads are cut in the field, cut threads to have same effective length, same thread dimensions and same taper as specified for factory-cut threads.

e. Provide double locknuts and insulating bushings at conduit connections to boxes and cabinets. Align raceways to enter squarely and install locknuts with dished part against the box. Use grounding type bushings where connecting to concentric or eccentric knockouts.

f. Where conduits are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

28. Install conduit sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed conduits, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

a. Where conduits pass from warm to cold locations, such as the boundaries of air conditioned or refrigerated spaces and where conduits enter or exit buildings from outdoor areas, including underground ducts or conduit runs.

b. Where otherwise required by the NEC.

29. Conduit shall be clean and dry.

C. Sleeves:

1. Provide sleeves where required, sized as noted on the Contract Documents. Where not noted, sleeve sizing shall be determined by the type and quantity of cable to be routed through the sleeve per TIA/EIA 569A cable capacity standards, plus an additional 20% for future expansion.

2. Provide roto-hammering or core drilling where required for installation.

3. Seal between sleeve and wall or floor in which the sleeve is installed. Firestop all penetrations to restore wall or floor to pre-penetration fire-rating.

D. Surface Raceway:

1. Provide surface raceway for all surface mounted telecommunications outlet boxes and as shown on the Contract Documents.

2. Surface raceway shall be routed parallel to and perpendicular to surfaces or exposed structural members, and follow surface contours.

3. Surface raceway color shall match as closely as possible the existing wall finish. Do not paint Surface Raceway.

4. Surface raceway systems shall be completely installed, including insulating bushings and inserts as required by manufacturer's installation requirements. Unused openings in the surface raceway shall be closed using manufactured fittings.

5. Surface raceway shall have a minimum two inch radius control at all bend points.

6. Surface raceway shall be securely supported by screws or other anchor-type devices at intervals not exceeding 10 feet and with no less than two supports per straight raceway section. Surface raceway shall be securely supported in accordance with the manufacturer's requirements. Tape and glue are not acceptable support methods.

7. Mechanically and electrically continuous surface raceway shall be bonded and grounded to the Telecommunications Grounding system.

E. Outlet Boxes:

1. Provide outlet boxes and covers as shown on the Contract Documents and as needed. Verify that the appropriate cover type and depth is provided for each type of wall and finish. Provide extension rings as needed.

2. Coordinate box locations with building surfaces and finishes to avoid bridging wainscots, joints, finish changes, etc.

3. Install boxes in dry locations (not wet, corrosive, or hazardous).

4. Attach boxes securely to building structure with a minimum of two fasteners. Provide attachments to withstand a force of one hundred pounds minimum, applied vertically or horizontally.

5. Install boxes at the following heights to the bottom of the box, except where noted otherwise:

a. Wall mounted telephones: 48” above finished floor.

b. Workstation outlets: 18” above finished floor.

c. Place boxes for outlets on cabinets, countertops, shelves, and similar boxes located above countertops two inches above the finished surface or two inches above the back splash. Coordinate and verify size, style, and location with the supplier or installer of these items prior to outlet box installation.

6. Recessed mounted outlet boxes:

a. Recess boxes in the wall, floor, and ceiling surfaces in finished areas. Set boxes plumb, level, square and flush with finished building surfaces within one-sixteenth inch for each condition. Set boxes so that box openings in building surfaces are within one-eighth inch of edge of material cut-out and fill tight to box with building materials. Single gang opening shall extend at least to the finished wall surface and extend not more than 1/8 inch beyond the finished wall surface. Provide backing for boxes using structural material to prevent rotation on studs or joists.

b. Install floor boxes level and adjust to finished floor surface.

7. Surface-mounted outlet boxes:

a. For boxes surface-mounted on finished walls, provide Wiremold outlet box or equivalent. Cut box as necessary to accept conduit.

b. For boxes surface-mounted on unfinished walls (i.e. electrical rooms, mechanical rooms), provide 4”x4” (minimum) outlet box with single gang cover.

F. Floor Boxes:

1. Provide floor boxes as shown on the Contract Documents.

2. Set device boxes plumb, level, square and flush with floor, within 1/16” tolerance for each condition.

3. For floor boxes with combined power and telecommunications circuits, provide metal dividers to separate power from telecommunications circuits.

G. Junction Boxes:

1. Provide junction boxes as shown on the Contract Documents and as required.

a. Where sizing is not shown on the Contract Documents, size junction box length and depth according to the size of the feeder conduit in the following table:

Feeder Conduit Size	Box Length	Box Depth
1”	12”	4”
1-¼”	12”	4”
1-½”	12”	4”
2”	24”	4”
2-½”	24”	6”
3	36”	6”
3-½”	48”	6”
4”	60”	6”

b. Where sizing is not shown on the Contract Documents, size junction box width according to the following formula:

1) From the table below, select the width associated with the largest conduit on the distribution side of the box. For each additional distribution conduit, add the “Increase Width” value associated with the size of that distribution conduit to the box width for the largest distribution conduit.

a) For example, if the distribution side of the junction box has one 1-¼” distribution conduit and three 1” distribution conduits, the total distribution-side width would be 6”+2”+2”+2”=10”.

2) Repeat the above process for the feeder side of the junction box. Junction boxes are typically fed by a single conduit, therefore unless the box has more than one feeder conduit, the “Increase Width” part of the formula is unnecessary.

a) For example, if the feeder side of the junction box has two 2” feeder conduits the total feeder-side width would be 8”+5”=13”.

3) The larger of the two width calculations (distribution side vs. feeder side) shall be the width of the junction box to be provided.

a) For example, if the distribution-side width were 10” and the feeder-side width were 13”, provide a 13” wide junction box.

Conduit Size	Box Width	For each additional conduit Increase Width
1”	4”	2”
1-¼”	6”	3”
1-½”	8”	4”
2”	8”	5”
2-½”	10”	6”
3	12”	6”
3-½”	12”	6”
4”	15”	8”

2. A junction box may not be substituted for a 90-degree bend. *90 degree condulets (LB’s) are not acceptable.*

3. Install junction boxes in a location readily accessible both at time of construction and after building occupation. Do not install junction boxes in inaccessible interstitial building spaces.

4. Where junction boxes are to be mounted on ceiling structure above ceiling grid, do not mount higher than 4’ above grid.

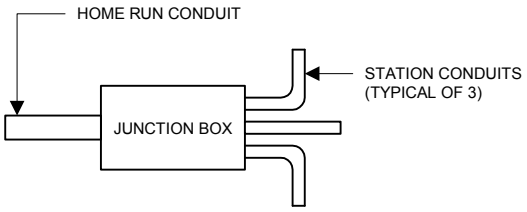
5. Install hinged-cover enclosures and cabinets plumb, and supported at each corner.

6. Install junction boxes so that the access door opens from the side where the cable installer will normally work – typically from the bottom (floor side) of the box.

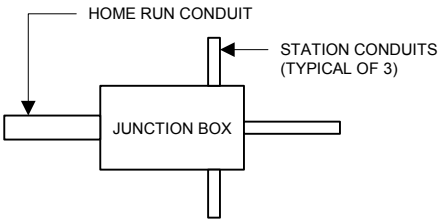
   a. Where a junction box is installed in a ceiling space, coordinate with other trades to provide full access to the junction box door and adequate working room for both the installation personnel and for proper looping of cable during installation.

   b. Provide a lockable access cover (or junction box door if junction box is exposed) in hard lid ceilings.

7. Install junction boxes such that conduits enter and exit at opposite ends of the box as follows:



CORRECT INSTALLATION



INCORRECT INSTALLATION

H. Pull Boxes:

1. Provide pull boxes as shown on the Contract Documents and as required.

   a. Where sizing is not shown on the Contract Documents, size pull boxes as follows:

Size of Largest Conduit	Box Width	Box Length	Box Depth
1”	4”	12”	4”
1-¼”	6”	12”	4”
1-½”	8”	12”	4”
2”	8”	24”	4”
2-½”	10”	24”	6”
3	12”	36”	6”
3-½”	12”	48”	6”
4”	15”	60”	6”

   b. Where a pull box is required with conduits 1” trade size or smaller, an outlet box may be used as a pull box. Where outlet boxes are used as pull boxes, the outlet boxes shall be dedicated for use as a pull box and shall not host cable termination hardware.

2. A pull box may not be substituted for a 90-degree bend. *90 degree condulets (LB’s) are not acceptable.*

3. Install pull boxes in an accessible location, readily accessible both at time of construction and after building occupation. Do not install pull boxes in inaccessible interstitial building space.

4. Where pull boxes are to be mounted on ceiling structure above ceiling grid, do not mount higher than 4’ above grid (mount on wall instead).

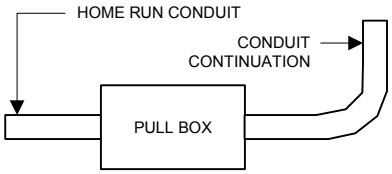
5. Install hinged-cover enclosures and cabinets plumb, and supported at each corner.

6. Install pull boxes so that the access door opens from the side where the cable installer will normally work (typically from the bottom, or floor side, of the box).

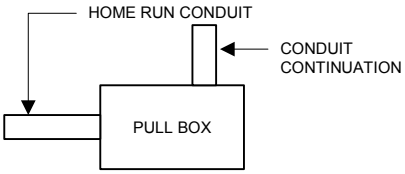
   a. Where a pull box is installed in a ceiling space, provide full access to the junction box door and adequate working room for both the installation personnel and for proper looping of cable during installation.

   b. Provide a lockable access cover (or pull box door if pull box is exposed) in hard lid ceilings.

7. Install pull boxes such that conduits enter and exit at opposite ends of the box as follows:



CORRECT INSTALLATION



INCORRECT INSTALLATION

I. Firestopping:

1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.

2. Maintain fire rating of penetrated fire-rated walls. Firestop and seal each penetration made during construction.

a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.

b. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.

c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply all sealing material in a manner acceptable to the local fire and building authorities.

J. Grounding/Bonding: Grounding and bonding work shall comply with the Virginia Uniform Statewide Building Code, Uniform Fire Code, National Electrical Code, and UL 467, ANSI/TIA/EIA standards and the references listed in PART 1 – REFERENCES above, as well as local codes which may specify additional grounding and/or bonding requirements.

1. Bond metallic raceway together and to the nearest TGB (as provided under Division 27 Section — "Grounding and Bonding for Communications Systems"). Ensure that bonding breaks through paint to bare metallic surface of painted metallic hardware.

3.4 LABELS:

A. Conduits: For any conduit extending beyond the space or room in which it starts, label each such conduit end in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room name, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.). Indicate conduit length on the label.

1. Where a conduit is intended for future cabling use outside of the Contract, the conduit shall be labeled in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room name, pull box identifier, etc.) along with a sequential number for each spare conduit terminated into a single room. Indicate conduit length on the label.

a. Suggestion: The second spare conduit (whether spare or in use) between Room 100 and telecommunications room 1A might be labeled in the telecommunications room as "Room 100 - #2, __ feet." In Room 100 the same conduit might be labeled "1A - #2, __ feet."

B. Pull Boxes: Label each pullbox with a unique identifier. Identifiers shall be of the form "RN-Y" where "RN" is the room name of the room closest to (or containing) the pull box, and "Y" is the sequential number of the pull box for each "RN".

1. Example: The second pull box in the vicinity of room "100" would have the label "100-2".

C. Pull Strings: For any conduit extending beyond the space or room in which it starts, label its pull string in a clear manner by designating the location of the other end of the pull string (i.e. room name, telecommunications room name, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.).

1. Where a pull string is installed in a conduit intended for future cabling use outside of the Contract, the pull string shall be labeled similar to the spare conduit in which it is installed.

3.5 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and in accordance with accepted industry practice, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.6 CLEANING

1. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION