KARNES CITY INDEPENDENT SCHOOL DISTRICT
REQUEST FOR COMPETITIVE SEALED PROPOSALS
SECURITY VESTIBULES PROJECT

ADDENDUM NO. 2

The following additions/clarifications are made to the RFP for **KARNES CITY INDEPENDENT SCHOOL DISTRICT SECURITY VESTIBULES PROJECT**

1. Attached Plans, Specifications and RFI Responses are included :

   PROPOSALS MUST BE RECEIVED NO LATER THAN 2:00 P.M., May 9, 2024.

   This change will be applicable as of the date of this Addendum No. 2.

Except with regard to the items set out above, the RFP remains unchanged.

Date of Addendum: May 03, 2024

Notice to Respondents –Please remember to submit your acknowledgement of Addendum to acknowledge receipt of Addendum No. 2 and any other subsequent addenda with your submission.

Addendum Number 02

(May 3, 2024)

To Drawings and Specifications dated 01/17/2023

(Safety & Security Upgrades)
(Karnes City ISD)

Prepared By: PBK Architects, Inc.
601 NW Loop 410, Suite 400
San Antonio, Texas 78216

PBK Project No.: P2104600AR

Notice to Proposers:

A. Receipt of this Addendum shall be acknowledged on the Proposal Form.

B. This Addendum forms part of the Contract documents for the above referenced project and shall be incorporated integrally therewith.

C. Each proposer shall make necessary adjustments and submit his proposal with full knowledge of all modifications, clarifications, and supplemental data included therein. Where provisions of the following supplemental data differ from those of the original Contract Documents, this Addendum shall govern.

GENERAL ITEMS

Item No. 01: SHEET A-101 SECURITY VESTIBULES

1. Door schedule is updated to reflect the additional door that was removed at the Junior High.
2. Receptionist area and vestibule at the Junior high has been modified to reduce the concrete floor area to be removed and replaced with new ramp.

Item No. 02: SHEET A-103 SECURITY VESTIBULES

1. Wall sections of partition types have been added to the drawings.
2. Primary School Vestibule has been removed from the scope.

Item No. 03: SHEET A-104 VESTIBULE UPGRADE CONCEPT PLANS

1. New door in Administration Suite has been assigned a door number and added to the door schedule.

SPECIFICATIONS

Item No. 06: The table of contents has been updated to include the following specification sections:

1. 03 35 00 – Concrete Finishing
2. 03 35 19 – Colored Concrete Finishing
3. 03 35 43 – Polished Concrete Finishing
4. 05 50 00 – Metal Fabrications
5. 08 71 00 – Door Hardware
6. 09 51 00 – Acoustical Ceilings
7. 09 65 13 – Resilient Base and Accessories
8. 09 72 00 – Wall Coverings
9. 27 10 00 – Structured Cabling System

END OF ADDENDUM NO. 02

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Addendum Number 02

May 3, 2024

(Safety & Security Upgrades)
(Karnes City ISD)

Prepared by: PBK Architects, Inc.
601 NW Loop 410, Suite 400
San Antonio, Texas 78216

PBK Project Name.: Karnes City ISD Secured Vestibules

Notice to Bidders:

A. The following answers are in response to RFI #1 and RFI #2 that have been submitted.

B. There is a forthcoming Addendum 2 that will give additional information.

C. Each proposer shall make necessary adjustments and submit his bid with full knowledge of all modifications, clarifications, and supplemental data included therein. Where provisions of the following supplemental data differ from those of the original Contract Documents, the forthcoming Addendum shall govern.

RFI 1

Question No. 1: **Please provide specification for stained concrete.**
Specifications for stained concrete will be a part of Addendum 2.

Question No. 2: **Please provide specification section for wood doors and hollow metal frames.**
Specifications for wood doors and hollow metal frames will be a part of Addendum 2.

Question No. 3: Please provide specification section for resilient base as shown on A-102/Detail 1 & 2.
Base should match existing. A specification for resilient base will be a part of Addendum 2.

Question No. 4: Please provide specification section for adhesive vinyl signage.
Specifications for vinyl signage will be a part of Addendum 2.

Question No. 5: Reference RFP, III. Information to be provided by offerors, B. Personnel Information. This differs from specification section 00 45 00, B. Personnel Information. Which is correct?
Instructions in the RFP take precedence over the project manual.

Question No. 6: Please confirm if the district has any structured cabling manufacturing standards in place.
Specifications for structured cabling will be a part of Addendum 2.

Question No. 7: Refer to selection criteria on page 2 of the RFP. This differs from the selection criteria in specification section 00 45 00. Which is correct?
Instructions in the RFP take precedence over the project manual.

Question No. 8: Refer to specification section 00216 – Instruction to proposers. 1.3 Proposal Documents, B. Please provide AIA A101 District-Contractor Agreement as modified by District.
A standard AIA A101 document will be included in Addendum 2.

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RFI 2

Question No. 1: **Refer to detail 1 on sheet a-101. Please provide section/detail for concrete slab infill and connection to existing slab.**

This is pending review by the structural engineer. The intent is to remove the entire portion of concrete slab (see revisions to slab in Addendum 2) and pour to the desired level.

Question No. 2: **Please provide specification for ceiling tiles and grid.**

Match existing.

Question No. 3: **Please provide door hardware specification for construction core replacement with permanent cores.**

Specifications for door hardware to be a part of Addendum 2.

Question No. 4: **Refer door schedule remarks 4. Please indicate location of receptionist desk.**

Location will be shown on A-101, detail 1, in Addendum 2.

Question No. 5: **Refer to detail 1 on sheet A-103. Please provide specification for steel or wood studs.**

Specifications for studs to be a part of Addendum 2.

Question No. 6: **Refer to detail 1 on sheet A-103. What will be happening to existing millwork/casework that is to plan left of wall to be demolished and rebuilt?**

Wall should be modified from the plan right side, or vestibule side of the wall. The plan left side, or side with casework should not be touched.

Question No. 7: **Please provide hardware specification of door on sheet A-104.**

Specifications for door hardware to be a part of Addendum 2.

Question No. 8: **Please provide wall section for new wall on sheet A-104.**

Section detail to be included in Addendum 2.

Question No. 9: **Please identify how ceiling at new wall on sheet A-104 will be modified.**

Partition will not go up to ceiling. It will be aligned to the height of the current storefront height at the receptionist desk.

Question No. 10: **Please identify power source of electrified hardware/access control.**

Coordinate with owner and owner's representative.

Question No. 11: **What type of base will be on new wall on sheet A-104?**

Match existing.

END OF RESPONSE

DRAFT

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

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)

«Karnes City Independent School District»«, Other»
«404 N. Hwy 123
Karnes City, Texas 78118»
«Telephone Number: 830-780-3821»
«Fax Number: 830-780-3823»

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

« »« »
« »
« »
« »

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

«Karnes City ISD - Bond Program»
«Karnes City, Texas 78118»
« »

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

«PBK Architects»«»
«601 NW Loop 410, Suite 400
San Antonio, TX 78216»
«»
«»

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.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

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 a Modification, 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:
(Check one of the following boxes.)

[« »] The date of this Agreement.

[« »] A date set forth in a notice to proceed issued by the Owner.

[« »] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

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 « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

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

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

§ 5.1.2 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 Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 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. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 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.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 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 Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

§ 5.3 Interest

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.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the 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 Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[« »] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[« »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

If the Owner and Contractor do not select a method of binding dispute resolution, 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.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

«Mr. Hector Madrigal»
«404 N. Hwy 123
Karnes City, Texas 78118»
«»
«»
«»
«»

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

« »
« »
« »
« »
« »
« »

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

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

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
«Mr. Hector Madrigal»«, Superintendent»	« »« »
(Printed name and title)	*(Printed name and title)*

SECTION 00 01 10 – TABLE OF CONTENTS

GENERAL

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 – GENERAL REQUIREMENTS

END OF SECTION 00 01 10

SECTION 03 35 00 – CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Deep penetrating concrete floor sealer.
   2. Water-based reactive stained concrete floor finish and sealer.
   3. Accessories necessary for a complete installation.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, application instructions, and recommendations. Include data substantiating product complies with requirements of the contract documents.

B. Samples for Initial Selection: Manufacturer’s color charts showing full range of available colors.

C. Qualification Data: Provide lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code: Comply with applicable requirements for the IBC for interior finishes.
   2. Accessibility Requirements: Comply with applicable requirements.
      a. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
      b. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.
      c. Texas Accessibility Standards (TAS) 2012.

B. Manufacturer Qualifications:
   1. Sealers: Provide products produced by a company specializing in production of concrete sealers for minimum of 5 years.
   2. Stains: Manufacturer of stain products shall have minimum 10 years experience in the production of chemical stains.

C. Installer Qualifications: Stain manufacturers approved applicator with minimum 5 years experience in staining applications who has successfully completed not less than 5 projects comparable in scale and complexity.

D. Source Limitations: Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

E. Mockups:
   1. Prepare temporary concrete slab for application of mock-up at location selected by Architect. Prepare mockup 4 feet by 4 feet for review and approval by Architect and Owner.

2. Construct mockup using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in mockup panels.
3. Mockup shall be stained and sealed by the individual workers who will actually be performing the work for the Project.
4. Obtain written approval of the mockup from Architect before start of work.
5. Retain approved mockup through completion of the Work for use as a quality standard for finished work.
6. Mock-up will not be allowed to be incorporated into final Work. Do not remove mock-up from site until after receiving final acceptance of Work by Architect at end of Project and when directed by Architect.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 “Sustainable Design Requirements” for requirements related to the following:
1. VOC limits of paints and coatings.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Do not proceed with installation until areas to receive work are enclosed and temperature and relative humidity are stabilized and maintained for optimum quality control.

B. Environmental Limitations: Comply with coating manufacturer's written instructions for substrate temperature, ambient temperature, humidity, ventilation, and conditions affecting floor treatment application. Do not apply coating until wet work in spaces is complete and dry; and overhead work, including installing mechanical systems, lighting, and athletic equipment, is complete.
1. Apply floor coatings when substrate temperature and surrounding air temperatures are between 50 degrees F and 95 degrees F (10 degrees F and 35 degrees C).
2. Do not apply floor coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver the specified products in original, unopened containers with legible manufacturer’s identification and information.

B. Store specified products in conditions recommended by the manufacturer.

1.8 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 “Project Management and Coordination”.

B. Location: To be held on Site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specifications are based on products of manufacturers named as the Basis of Design. Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years’ experience

manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.

1. Curecrete Chemical Company.
2. Evercrete Company.
3. Euclid Chemical Company.
4. Scofield, a Sika Brand.
5. PROSOCO, Inc.
6. WR Meadows.

2.2 MATERIAL

A. Concrete Sealer:
   1. Description: Deep-penetrating, water-based, clear, non-yellowing, non-toxic, VOC-compliant, concrete sealer, integral with concrete through chemical reaction forming non-soluble seal within pores and capillaries of concrete and sealing it against ingress of moisture while allowing concrete to breathe.
   2. Basis of Design: Products as manufactured by Scofield.

B. Concrete Stain:
   1. Description: Water-based, reactive stain.
   2. Basis of Design: “Lithochrome Tintura Stain” manufactured by Scofield.
   3. Color: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for conditions affecting performance and conditions of floor treatment.
   1. Verify compatibility with and suitability of substrates, including existing finishes or primers.
   2. Verify plasticizers in existing concrete substrate will not impair bond.
   3. Proceed with installation after correcting unsatisfactory conditions

3.2 PREPARATION

A. Scoring: Score decorative jointing in concrete surfaces 1/8-inch deep with diamond blades. Rinse until water is completely clean.

B. New Concrete:
   1. Newly placed concrete shall be sufficiently cured to allow concrete to become reactive, minimum 28 days. Prepare concrete as instructed by stain manufacturer.
   2. Do not use liquid curing materials. Cure concrete flatwork with new, unwrinkled, non-staining, high quality curing paper. Do not overlap curing paper.
   3. Immediately prior to chemically staining, thoroughly clean the concrete. Sweep surfaces, then pressure wash or scrub using a rotary floor machine. Use suitable, high-quality commercial detergents to facilitate cleaning. Rinse surfaces after cleaning until rinse water is completely clean. Allow floor to dry completely prior to application of floor stain.
   4. Concrete surfaces shall be uniformly slip-resistant and profiled to meet a Concrete Surface Preparation (CSP) profile of 1-2 per ICRI guidelines.
   5. As required and instructed by manufacturer, abrade concrete to allow sufficient penetration of stain materials.

C. Existing Concrete:

1. Clean substrate, removing projections and substances detrimental to the work; comply with recommendations of manufacturer of products to be installed for proper preparation procedures. Mask off or protect adjacent surfaces not scheduled to receive sealer.

3.3 APPLICATION OF WATER-BASED REACTIVE STAIN

A. Concrete surfaces shall be dry and properly prepared as described above. Protect surrounding areas from over-spray, run-off and tracking. Divide surfaces into small work sections using wall, joint lines, or other stationary breaks as natural stopping points.

B. Apply stain full strength (undiluted) at the coverage rate instructed by the manufacturer and use application equipment described in the manufacturer's printed technical literature. The color of the liquid chemical stain has no resemblance to the final color produced on the concrete substrate.

C. Reaction time depends on wind conditions, temperatures, and humidity levels.

D. Final dried color shall match the approved mock-up panel.

3.4 APPLICATION OF SEALER

A. Concrete substrate shall be completely dry.

B. After the final stain application has dried sufficiently, remove all contaminates from the surface by dry mopping if required.

C. Apply sealer according to manufacturer's written instructions. Two coats are required.

D. Maintain a wet edge at all times.

E. Allow sealer to completely dry before applying additional coats.

F. Apply second coat of sealer at 90 degrees to the direction of the first coat using the same application method and rates.

G. Seal horizontal joints in areas subject to pedestrian or vehicular traffic.

3.1 CLEANING

A. After completing application, clean spattered surfaces. Remove spattered sealer by washing or other appropriate methods for coating. Do not scratch or damage adjacent finished surfaces.

B. Clean Up: Remove rubbish, empty cans, rags, and discarded materials from site daily. Rinse and recycle or legally dispose of sealer and coating containers.

3.2 PROTECTION

A. Institute protective procedures and install protective materials as required to ensure that work of this section will be without damage or deterioration at substantial completion.

END OF SECTION 03 35 00

SECTION 03 35 19 - COLORED CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Water-based reactive stained concrete floor finish and sealer.

1.3 SUBMITTALS

A. Product Data: Manufacturer's technical data sheets and installation instructions for each product specified.

B. Samples for Initial Selection: Manufacturer's color charts showing full range of available colors.

C. Qualification Data: Provide lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of stain and sealer products shall have minimum 10 years' experience in the production of chemical stains.

B. Installer Qualifications: Stain manufacturers approved applicator with minimum 5 years' experience in staining applications who has successfully completed not less than 5 projects comparable in scale and complexity.

C. Source Limitations: Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

D. Mockups:
1. Prepare temporary concrete slab for application of mock-up at location selected by Architect. Prepare mockup 4 feet by 4 feet for review and approval by Architect and Owner.
2. Construct mockup using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in mockup panels.
3. Mockup shall be stained and sealed by the individual workers who will actually be performing the work for the Project.
4. Obtain written approval of the mockup from Architect before start of work.
5. Retain approved mockup through completion of the Work for use as a quality standard for finished work.
6. Mock-up will not be allowed to be incorporated into final Work. Do not remove mock-up from site until after receiving final acceptance of Work by Architect at end of Project and when directed by Architect.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 “Sustainable Design Requirements” for requirements related to the following:
   1. VOC limits of sealants.
   2. VOC limits of paints and coatings.
   3. Flooring material certifications.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver the specified products in original, unopened containers with legible manufacturer’s identification and information.

B. Store specified products in conditions recommended by the manufacturer.

1.7 PROJECT CONDITIONS

1. Environmental Conditions: Maintain an ambient temperature of between 50 and 90 degrees F during application and at least 48 hours after application.
2. Protection: Precautions shall be taken to avoid damage or contamination of any surfaces near the work zone. Protect completed stain work from moisture or contamination.

1.8 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 “Project Management and Coordination”.

PART 2 - PRODUCTS

A. Specifications are based on products of manufacturers named as the Basis of Design. Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years’ experience manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.
   1. Ameripolish.
   2. L.M. Scofield Company.

2.2 MATERIALS

A. Water-based Reactive Stain:
   1. Basis of Design: “SureLock Dye” as manufactured by AmeriPolish.
   2. Color: As selected by Architect from manufacturer’s available colors.

B. Sealer: One-component, clear, acrylic-polyurethane sealer resistant to staining, abrasion and ultraviolet (UV) radiation as instructed by manufacturer.

C. Sealants:
   1. Product: As recommended by stain manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which work will be performed and identify conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. New Concrete:
   1. Newly placed concrete shall be sufficiently cured to allow concrete to become reactive, minimum 28 days. Prepare concrete as instructed by stain manufacturer.
   2. Do not use liquid curing materials. Cure concrete flatwork with new, unwrinkled, non-staining, high quality curing paper. Do not overlap curing paper.
   3. Immediately prior to chemically staining, thoroughly clean the concrete. Sweep surfaces, then pressure wash or scrub using a rotary floor machine. Use suitable, high-quality commercial detergents to facilitate cleaning. Rinse surfaces after cleaning until rinse water is completely clean. Allow floor to dry completely prior to application of floor stain.
   4. Concrete surfaces shall be uniformly slip-resistant and profiled to meet a Concrete Surface Preparation (CSP) profile of 1-2 per ICRI guidelines.
   5. As required and instructed by manufacturer, abrade concrete to allow sufficient penetration of stain materials.

B. Scoring: Score decorative jointing in concrete surfaces 1/8-inch deep with diamond blades. Rinse until water is completely clean.

3.3 APPLICATION OF WATER-BASED REACTIVE STAIN

A. Concrete surfaces shall be dry and properly prepared as described above. Protect surrounding areas from over-spray, run-off and tracking. Divide surfaces into small work sections using wall, joint lines, or other stationary breaks as natural stopping points.

B. Apply stain full strength (undiluted) at the coverage rate instructed by the manufacturer and use application equipment described in the manufacturer's printed technical literature. The color of the liquid chemical stain has no resemblance to the final color produced on the concrete substrate.

C. Reaction time depends on wind conditions, temperatures, and humidity levels.

D. Final dried color shall match the approved mock-up panel.

3.4 APPLICATION OF SEALER

A. Concrete substrate shall be completely dry.

B. After the final stain application has dried sufficiently, remove all contaminates from the surface by dry mopping if required.

C. Apply sealer according to manufacturer's written instructions. Two coats are required.

D. Maintain a wet edge at all times.

E. Allow sealer to completely dry before applying additional coats.

F. Apply second coat of sealer at 90 degrees to the direction of the first coat using the same application method and rates.

G. Seal horizontal joints in areas subject to pedestrian or vehicular traffic.

3.5 PROTECTION

A. Protect floor from traffic for at least 72 hours after final application of sealer.

3.6 MAINTENANCE

A. Provide Owner with manufacturers written maintenance information.

END OF SECTION 03 35 19

SECTION 03 35 43 - POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Products and procedures for <colored and> bonded abrasive polished concrete floors using multi-step wet/dry mechanical process, and accessories indicated, specified, or required to complete polishing.

1.3 DEFINITIONS

A. Terminology: As defined by Concrete Polishing Council (CPC) glossary.

B. Polished Concrete: The act of changing a concrete floor surface, with or without surface exposure of aggregate, to achieve a specified level of appearance.

C. Bonded Abrasive Polished Concrete: The multi-step operation of mechanically grinding, honing, and polishing a concrete floor surface with bonded abrasives to cut a concrete floor surface and to refine each cut to the maximum potential to achieve a specified level of appearance as defined by the CPC.

1.4 SUBMITTALS

A. Product Data: Manufacturer’s technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.

B. Installer Qualifications: Data for company, principal personnel, experience, and training specified in PART 1 “Quality Assurance” Article.

C. Maintenance Data: For inclusion in maintenance manual required by Division 01.
   1. Include instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
   2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

A. Polisher Qualifications:
   1. Experience: Company that has successfully completed five projects similar in design, products, and extent to scope of this Project; with a record of successful in-service performance; and with sufficient production capability, facilities, and personnel to produce specified work.
   2. Supervision: Maintain a competent supervisor who is at Project during times specified work is in progress, and is currently certified as Craftsman - Level I or higher by CPAA, CPC Craftsman, or equivalent.
   3. Manufacturer Qualification: Approved by manufacturer to apply liquid applied products.

B. Coefficient of Friction: Achieve following coefficient of friction by field quality control testing in accordance with the following standards:
   1. Static Coefficient of Friction: Achieve a minimum of 0.42 for level floor surfaces when tested in accordance with ANSI B101.1.
   2. Dynamic Coefficient of Friction: Achieve a minimum of 0.35 for level floor surfaces when tested in accordance with ANSI B101.3.

C. Field Mock-up: Before performing work of this Section, provide following field mock-up to verify selections made under submittals and to demonstrate aesthetic effects of polishing. Approval does not constitute approval of deviations from Contract Documents, unless Architect specifically approves deviations in writing.
   1. Form, reinforce, and cast concrete slab for 10 foot square field mock-up.
   2. Concrete shall be same mix design as scheduled for Project.
   3. Placement and finishing work shall be performed by same personnel as will place and finish concrete for Project.
   4. Mock-up shall be representative of work to be expected.
   5. Perform grinding, honing, and polishing work as scheduled for Project using same personnel as will perform work for Project.
   6. Approval is for following aesthetic qualities:
      a. Compliance with approved submittals.
      b. Compliance with specified aggregate exposure class.
      c. Compliance with specified appearance level.
      d. Compliance with specified color.
   7. Obtain Architect's approval before starting work on Project.
   8. Protect and maintain approved field mock-ups during construction in an undisturbed condition as a standard for judging completed work.

D. Pre-Installation of Concrete Conference: Prior to placing concrete for areas scheduled for polishing, conduct conference at Project to comply with requirements of applicable Division 01 Sections.
   1. Required Attendees:
      a. Owner.
      b. Architect.
      c. Contractor, including supervisor.
      d. Concrete producer.
      e. Concrete finisher, including supervisor.
      f. Concrete polisher, including supervisor.
      g. Technical representative of liquid applied product manufacturers.
   2. Minimum Agenda: Polisher shall demonstrate understanding of work required by reviewing and discussing procedures for, but not limited to, following:
      a. Tour field mock-up and representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of procedures, and other preparatory work performed by other installers.
      b. Review Contract Document requirements.
      c. Review approved submittals and field mock-up.
      d. Review procedures, including, but not limited to:
         1) Applicable Division 03 Section on cast-in-place concrete
            a) Specific mix design.
            b) Specified curing methods/procedures.
            c) Projected 3, 14, and 28 day compressive strength test for finished floor and project phasing.
            d) Protection of concrete substrate during construction and prior to polishing process.

e) Project phasing and scheduling for each step of grinding, honing and polishing operations including, but not limited to:
   I. Quality of qualified personnel committed to project.
   II. Quality and size of grinders committed to project.
   III. Proper disposal of concrete slurry and/or concrete dust.
f) Details of each step of grinding, honing, and polishing operations.
   I. Application of color.
   II. Application of liquid applied products.
   III. Protecting polished concrete floors after polishing work is complete.

3. Reports: Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 “Sustainable Design Requirements” for requirements related to the following:
   1. VOC limits of paints and coatings.

1.7 FIELD CONDITIONS

A. Damage and Stain Prevention: It is the responsibility of others to prevent damage and staining of concrete surfaces to be polished.
   1. Prohibit use of markers, spray paint, and soapstone.
   2. Prohibit improper application of liquid membrane film forming curing compounds.
   3. Prohibit vehicle parking over concrete surfaces.
   4. Require diapering of equipment and non-marking tires for which must be used in areas to receive polished concrete finish.
   5. Prohibit pipe-cutting operations over concrete surfaces.
   6. Prohibit storage of any items over concrete surfaces for not less than 28 days after concrete placement.
   7. Prohibit ferrous metals storage over concrete surfaces.
   8. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over concrete surfaces.
   9. Protect from acids and acidic detergents contacting concrete surfaces.
   10. Protect from painting activities over concrete surfaces.

B. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting liquid applied product application.

PART 2 - PRODUCTS

2.1 LIQUID APPLIED PRODUCTS

A. Manufacturers: Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years’ experience manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.
   1. Advanced Floor Products.
   2. AmeriPolish.
   3. Bomanite Co.
   4. Dayton Superior.
   5. Euclid Chemical Company (The), a RPM company.
   6. Increte Systems Inc.
   7. L&M Construction Chemicals, Inc., A division of Laticrete International, Inc.

8. Lythic Solutions, Inc.
9. Retroplate.
10. Scofield, L.M. Company.
11. Specialty Concrete Products, Inc.
12. Stampcrete International, Ltd.
13. SuperStone, Inc.
14. Vexcon Chemicals, Inc.
15. WR Meadows.

B. Liquid Densifier: An aqueous solution of silicon dioxide dissolved in one of the following hydroxides that penetrates into the concrete surface and reacts with the calcium hydroxide to provide a permanent chemical reaction that hardens and densifies the wear surface of the cementitious portion of the concrete.
1. Sodium Silicate.
2. Potassium Silicate.
3. Lithium Silicate.
4. Alkali solution of Colloidal Silicates or Silica.

C. Dye: Non-film forming soluble colorant dissolved in a carrier designed to penetrate and alter coloration of a concrete floor surface without a chemical reaction.

D. Pigmented Micro Stains: Fine pigment particles suspended in water- based silicate solution that penetrates concrete and reacts with calcium hydroxide to lock in color particles.

E. Acid Stain: Reactive solution of one or more metal salts stabilized by acid that produces coloration in a concrete substrate by neutralization of acid followed by precipitation of metal hydroxides or oxides.

F. Polished Concrete Schedule:
1. PC-1, Standard Color.
   a. Color: None.
   b. Aggregate Exposure Class: A.
   c. Appearance Level: 3.
2. PC-2, Medium Gray:
   a. Dye:
      1) Basis of Design: SureLock.
      2) Color: Gray.
   b. Aggregate Exposure Class: A.
   c. Appearance Level: 3.

2.2 ACCESSORIES

A. Repair Material: A product that is designed to repair cracks and surface imperfections. The specified material must have sufficient bonding capabilities to adhere after the polishing to the concrete surface and provide abrasion

B. Grout Material: A thin mortar used for filling spaces. Acceptable products shall be:
1. Epoxy, urethane, polyurea, or polyaspartic resins.
2. Latex or acrylic binders mixed with cement dust from previous grinding steps.
3. Silicate binders mixed with cement dust from previous grinding steps.

2.3 POLISHING EQUIPMENT

A. Field Grinding and Polishing Equipment:
   1. A multiple head, counter rotating, walk behind or ride on machine, of various size and weights, with diamond tooling affixed to the head for the purpose of grinding concrete. Excludes janitorial maintenance equipment.
   2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments to meet OSHA requirements.
   3. If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.

B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces the same results, without noticeable differences, as field grinding and polishing equipment.

C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.

D. Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resinous, ceramic, etc.) that are attached to rotating heads to refine the concrete substrate.
   1. Bonded Abrasive: Abrasive medium that is held within a bonding that erodes away to expose new abrasive medium as it is used.
   2. Metal Bond Tooling: Diamond tooling that contains industrial grade diamonds with a metallic bonded matrix that is attached to rotating heads to refine the concrete substrate. These tools are available in levels of soft, medium, and hard metallic matrices that are matched with contrasting concrete substrates (i.e. hard matrix/soft concrete, medium matrix/medium concrete, soft matrix/hard concrete) and are typically used in the grinding and early honing stages of the polishing process.
   3. Resin Bond Tooling: Diamond tooling that contains industrial grade diamonds within a resinous bonded matrix (poly-phenolic, ester-phenolic, and thermoplastic-phenolic) that is attached to rotating heads to refine the concrete substrate. Resin bond tooling does not have the soft/medium/hard characteristics of metal bond tooling and are typically used for the later honing and polishing stages of the polishing process.
   4. Hybrid Tooling: Diamond tooling that combines metal bond and resin bond that has the characteristics of both types of tooling. These types of tools are typically used as either transitional tooling from metal bond tools to resin bond tools or as a first cut tool on smooth concrete surfaces.
   5. Transitional Tooling: Diamond tooling that is used to refine the scratch pattern of metal bond tooling prior to the application of resin bond tooling in an effort to extend the life of resin bond tooling and to create a better foundation for the polishing process.
   6. Abrasive Pad: An abrasive pad, resembling a typical floor maintenance burnishing pad that has the capability of refining the concrete surface on a microscopic level that may or may not contain industrial grade diamonds. These pads are typically used for the maintenance and/or restoration of previously installed polished concrete flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions:
   1. Examine substrates to be polished for compliance with requirements and other conditions affecting performance.
      a. Concrete finished floor flatness according to applicable Division 03 Section on cast-in-place concrete.

b. Concrete curing methods according to applicable Division 03 Section on cast-in-place concrete.
c. Concrete compressive strength according to applicable Division 03 Section on cast-in-place concrete.

B. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.

C. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 VAPOR TESTING CONCRETE FLOORS

A. Alkalinity:
1. Test Method: Measure pH according to method indicated in ASTM F710.
2. Acceptable Results: pH between 8 and 10.

B. Moisture Vapor Transmission Rate:
1. Test Method: Perform anhydrous calcium chloride test according to ASTM F1869.
2. Acceptable Results: Not more than 5 pounds per 1000 square feet in 24 hours.

C. Relative Humidity:
1. Test Method: Perform relative humidity test using in-situ probes according to ASTM F2170.
2. Acceptable Results: Not more than 75 percent.

3.3 PREPARATION

A. Cleaning New Concrete Surfaces:
1. Prepare and clean concrete surfaces.
2. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.4 COLORING CONCRETE FLOORS

A. Dye or Pigmented Micro Stain Application:
1. Follow manufacturer’s recommendation.

3.5 POLISHING CONCRETE FLOORS

A. Perform all polishing procedures to ensure a consistent visual appearance from wall to wall.

B. Initial Grinding:
1. Use grinding equipment with metal or semi-metal bonded tooling.
2. Begin grinding in one direction using sufficient size equipment and diamond tooling to meet specified aggregate exposure class.
3. Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to 100 grit metal bonded tooling.
4. Achieve maximum refinement with each pass before proceeding to finer grit tools.
5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
6. Continue grinding until aggregate surface exposure matches approved field mock-up.

C. Treating Surface Imperfections:
   1. Mix patching compound or grout material with dust created by grinding operations, manufacturer's tint, or sand to match color of adjacent concrete surfaces.
   2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.
   3. Work compound and treatment until color differences between concrete surface and filled surface imperfections, compared to mockup, are not reasonably noticeable when viewed from 20 feet away under lighting conditions that will be present after construction.

D. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow curing according to manufacturer's instructions.

E. Grout Grinding:
   1. Use grinding equipment and appropriate grit and bond diamond tooling.
   2. Apply grout, forced into the pore structure of the concrete substrate, to fill surface imperfections.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

F. Honing:
   1. Use grinding equipment with hybrid or resin bonded tooling.
   2. Hone concrete in one direction starting with 100 grit tooling and make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit tooling reaching maximum refinement with each pass before proceeding to finer grit tooling.
   3. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

G. Polishing:
   1. Use polishing equipment with resin-bonded tooling.
   2. Begin polishing in one direction starting with 800 grit tooling.
   3. Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass until the specified level of appearance has been achieved.
   4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
   5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.
   6. Stain Protection: Uniformly apply and remove excessive liquid according to manufacturer's instructions. Final film thickness should be less than 0.05 mils after cure.
   7. Final Polish: Using burnishing equipment and finest grit abrasive pads, burnish to uniform reflective sheen matching approved field mock-up.

H. Final Polished Concrete Floor Finish:
   1. Aggregate Exposure Class A – Cement Fines: Surface exposure of 85 to 95% cement fines and 5 to 15% fine aggregate based on visual observation of the overall area of the polished floor.
   2. Appearance Level 3 – Polished:
      a. Procedure: Recommended not less than 4 steps with full refinement of each diamond tool with one application of densifier.
      b. Measurement: Determine the Image Clarity Value,%, and the Haze Index:
         1) Image Clarity Value, %: An average value of 40 to 69 measured in accordance with ASTM D5767 prior to the application of sealers.

2) Haze Index: An average value less than 10 measured in accordance with ASTM D4039 prior to the application of sealers.
3) The minimum number of tests distributed across the polished surface should be three, for areas up to 1000 ft^2 and one additional test for each 1000 ft^2 or fraction thereof. This applies to both the Image Clarity Value and Haze Index.

3.6 PROTECTION

A. After completion of polishing, protect polished floors from subsequent construction activities with protective covering.

3.7 TRAINING

A. Provide floor cleaning and maintenance training to Owner's maintenance staff.

END OF SECTION 03 35 43

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to:
1. Steel framing and supports for ceiling-hung toilet partitions.
2. Steel framing and supports for operable partitions.
3. Steel framing and supports for overhead doors and grilles.
4. Steel framing and supports for countertops.
5. CMU Partition Head Supports
6. Steel tube reinforcement for low partitions.
7. Steel framing and supports for mechanical and electrical equipment.
8. Steel framing and supports (outriggers) for window washing equipment.
9. Mounting brackets and anchorages for window washing equipment.
10. Support angles for elevator door sills.
11. Shelf angles.
12. Metal ladders.
13. Ladder safety cages.
14. Elevator pit sump covers.
15. Miscellaneous steel trim including steel angle corner guards, steel edgings, and loading dock edge angles.
16. Custom-fabricated sheet metal reveals.
17. Metal bollards, fixed
18. Door Device Mounting Post.
19. Pipe/downspout guards.
20. Cast metal nosings, treads, and thresholds .
21. Metal downspout boots.
22. Loose bearing and leveling plates.
23. Loose steel lintels.
24. Steel weld plates and angles for casting into concrete for applications.
25. Steel posts for traffic signage.
26. Folding gates
27. Accessories necessary for a coordinated and complete installation

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design ladders and countertop supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated

B. Structural Performance of Ladders: Provide ladders and landings capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3

C. Structural Performance:
1. Countertops and Vanities: Provide countertop and vanity framing capable of withstanding the following structural loads without exceeding the allowable design working stress of

the materials involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:
a. All deadloads.
b. 500 pound live load placed on the countertop and vanity.
c. Deflection at Midspan: L/1000 times span or 1/8 inch whichever is less.

D. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.

1.4 SUBMITTALS

A. Product Data: Submit data for miscellaneous metal fabrications and paint, coatings, and grout accessories.

B. Shop Drawings: Submit shop drawings detailing the fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
1. For installed products indicated to comply with design loads, include structural analysis data, for information only, signed and sealed by the qualified professional engineer responsible for their preparation.

C. Delegated Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Welding certificates.

E. Paint Compatibility Certificates: Submit manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Building Code: Comply with applicable requirements of the IBC for metal fabrications.
2. Welding: Qualify procedures and personnel according to the following:
a. AWS D1.1/D1.1M Structural Welding Code - Steel.
b. AWS D1.2/D1.2 M Structural Welding Code - Aluminum.
c. AWS D1.6/D1.6M Structural Welding Code - Sheet Steel.
d. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

B. Fabricator/Installer Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project for a minimum of 5 years, with a record of successful in service performance, with sufficient production capacity to produce required units without causing delay in the work.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal fabrications that are similar to those indicated in material, design, and extent.

1.6 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 “Sustainable Design Requirements” for requirements related to the following:
   1. Recycled content.
   2. VOC limits of paints and coatings.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.
   1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
   2. Provide allowance for trimming and fitting at site.

1.8 STORAGE, DELIVERY AND HANDLING

A. Store metal fabrications in a dry, well ventilated, weathertight place. Deliver and handle so as to prevent any type of damage to the fabricated work.

1.9 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.

D. Stainless Steel Bars and Shapes: ASTM A276, Type 304.

E. Rolled Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.

F. Rolled Stainless Steel Floor Plate: ASTM A793.

G. Abrasive Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallically bonded to steel.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. IKG Industries, a division of Harsco Corporation.
      b. SlipNOT Metal Safety Flooring; W.S. Molnar Company.

H. Steel Tubing: ASTM A500/A500M, cold formed steel tubing.

I. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

J. Zinc Coated Steel Wire Rope: ASTM A741.
   1. Wire Rope Fittings: Hot dip galvanized steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

K. Slotted Channel Framing: Cold formed metal box channels (struts) complying with MFMA-4.
   1. Size of Channels: 1-5/8 inches by 1-5/8 inches (41 mm by 41 mm).
   2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B. with G90 (Z275) coating; 0.108 inch (2.8 mm) nominal thickness.
   3. Cold Formed Metal Channels: Flange edges returned toward web and with 9/16 inch (14.3 mm) wide slotted holes in webs at 2 inches (51 mm) o.c.
   4. Width of Channels: 1-5/8 inches (41 mm).
   5. Depth of Channels: Indicated on Drawings.
   6. Metal and Thickness: Galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 33 (Grade 230), with G90 (Z275) coating; 0.108 inch (2.8 mm) nominal thickness.
   7. Finish: Hot dip galvanized after fabrication.

L. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

M. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M), Alloy 6061-T6.

N. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T6.

O. Aluminum Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.

P. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

Q. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).

R. Bronze Plate, Sheet, Strip, and Bars: ASTM B36/B36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).

S. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).

T. Nickel Silver Extrusions: ASTM B151/B151M, Alloy UNS No. C74500.

U. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

V. Fasteners: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc plated fasteners with coating complying with ASTM B633 or ASTM F1941/A1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
   1. Provide stainless steel fasteners for fastening aluminum.
   2. Provide stainless steel fasteners for fastening stainless steel.
   3. Provide stainless steel fasteners for fastening nickel silver.
   4. Provide bronze fasteners for fastening bronze.
   5. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A563/A563M; and, where indicated, flat washers.
   6. Steel Bolts and Nuts: Regular hexagon head bolts, ASTM A325/A325M, Type 3; with hex nuts, ASTM A563, Grade C3 (ASTM A563M, Class 8S3); and, where indicated, flat washers.
   7. Stainless Steel Bolts and Nuts: Regular hexagon head annealed stainless steel bolts, ASTM F593 (ASTM F738M); with hex nuts, ASTM F594 (ASTM F836M); and, where indicated, flat washers; Alloy.
   8. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563/A563M; and, where indicated, flat washers.
      a. Hot dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
   9. Anchors: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
   10. Cast in Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot dip galvanized per ASTM F 2329.
   11. Post Installed Anchors: Torque controlled expansion anchors.
      a. Material for Interior Locations: Carbon steel components zinc plated to comply with ASTM B 633 or ASTM F 1941/A1941M, Class Fe/Zn 5, unless otherwise indicated.
      b. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless steel bolts, ASTM F593 (ASTM F738M), and nuts, ASTM F594 (ASTM F836M).
   12. Slotted Channel Inserts: Cold-formed, hot-dip galvanized steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee head bolts, complete with washers and nuts, all zinc plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

W. Miscellaneous Materials:
   1. Shop Primer for Ferrous Metal: Universal primer, organic zinc rich primer, complying with SSPC-Paint 20 and compatible with topcoat. Provide 10-99 (red) or 10-09 (gray) by Tnemec Company.
   2. Universal Shop Primer: Fast curing, lead and chromate free, universal modified alkyd primer and compatible with topcoat. Use primer containing pigments that make it easily distinguishable from zinc rich primer.
   3. Water Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel and compatible with topcoat.
   4. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc coated metal and compatible with finish paint systems indicated.
   5. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20. Provide Tneme-Zinc 90-97 by Tnemec Company.

6. Bituminous Paint: Cold applied asphalt emulsion complying with SSPC-Paint 12, containing no asbestos fibers, or cold applied asphalt emulsion complying with ASTM D1187 ASTM D1187/D1187M.
7. Non-Shrink, Non-Metallic Grout: Factory packaged, non-staining, non-corrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
8. Concrete Materials and Properties: Composed of ASTM C150 Type I Portland cement, ASTM C33 sand and coarse aggregates and potable water to produce a low slump mix suitable for placement. Grade coarse aggregate from 1/8 inch with at least 95% passing a 3/8 inch sieve and not more than 10% passing a No. 8 sieve. Fill shall be proportioned to provide a minimum 28 day compressive strength of 3000 psi (20 MPa).

2.2 FABRICATION

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
2. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Form exposed work with accurate angles and surfaces and straight edges.
4. Weld corners and seams continuously to comply with the following:
    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.
    d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
6. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
7. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
8. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
9. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 inch by 1-1/2 inches (3.2 mm by 38 mm), with a minimum 6 inch (150 mm) embedment and 2 inch (50 mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

B. Miscellaneous Framing and Supports: Provide steel framing and supports necessary to complete the work and which are not a part of the structural framework, including but not limited to framing and supports for elevator hoistway beams, elevator sills, overhead lobby door frames, sliding doors, countertop and vanities, ceiling hung toilet compartments, and tube framing for partial height walls, CMU partition head supports, mechanical and electrical equipment.
1. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary

to receive adjacent construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.
   a. Fabricate units from slotted channel framing where indicated.
   b. Furnish inserts for units installed after concrete is placed.
2. Operable Partition Supports: Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
3. Framing for Ceiling Hung Toilet Compartments: Provide framing for ceiling hung toilet compartments, coordinated with the partitions and including provisions for partition anchorage as required to sustain imposed loads and to limit deflections to L/360 between hangers, fabricated from the following.
   a. Structural Steel Shapes, Plates and Bars: ASTM A36/A36M.
   b. Modular Structural Framing System: ASTM A569; modular, structural quality steel preformed U-channel framing system with continuous open slot prepared to receive attachment nuts, bolts, straps, threaded rods, beam clamps, hanger rods support brackets and other accessories. Provide corrosion resistant finish.
   c. Provide steel rods, 1/2 inch (13 mm) diameter, spaced at maximum 36 inches (900 mm) o.c. Thread rods to receive anchor and stop nuts. Fit hangers with wedge shape washers for full bearing on sloping flanges of support beam.
   d. Coordinate installation with toilet compartment manufacturer's written instructions and recommendations.
4. Countertop and Vanity Framing: Custom fabricate countertop and vanity framing, using steel shapes and plates, and cold finished mild steel bars at exposed conditions, for support framing and plywood, to the thicknesses, sizes and shapes shown, and as required to produce work of adequate strength and durability, without objectionable deflections. Use proven details of fabrication, as required, to achieve proper assembly and alignment of the various components of the work.
5. CMU Partition Head Supports: Fabricate supports from 4 inch x 4 inch x 1/4 inch by 36 inch (100 mm by 100 mm by 6 mm by 900 mm) long structural steel angles. Drill supports a maximum of 12 inches (300 mm) o.c. to receive expansion bolts.
6. Galvanize miscellaneous framing and supports at exterior locations; prime paint miscellaneous framing and supports at interior locations.

C. Shelf Angles: Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4 inch (19 mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
   1. Provide mitered and welded units at corners.
   2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.
   3. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
   4. Galvanize and prime shelf angles located in exterior walls.
   5. Prime shelf angles located in exterior walls with zinc rich primer.
   6. Furnish wedge type concrete inserts, complete with fasteners, to attach shelf angles to cast in place concrete.

D. Ladders: Comply with ANSI A14.3. For elevator pit ladders, comply with ASME A17.1/CSA B44
   1. Steel Ladders:
      a. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
      b. Siderails: Continuous, 1/2 inch by 2-1/2 inch (12.7 mm by 64 mm) steel flat bars, with eased edges.
      c. Rungs: 1 inch (25 mm) diameter steel bars.
      d. Fit rungs in centerline of siderails; plug weld and grind smooth on outer rail faces.

e. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum oxide granules set in epoxy resin adhesive or by using a type of manufactured rung filled with aluminum oxide grout.
f. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a) Harsco Industrial IKG, a division of Harsco Corporation.
b) SlipNOT Metal Safety Flooring; W.S. Molnar Company.
g. Provide platforms as indicated fabricated from welded or pressure locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 1/2 inch (12 mm) in least dimension.
h. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.
i. Galvanize ladders, including brackets and fasteners.

2. Aluminum Ladders:
a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1) ACL Industries, Inc.
2) Alco-Lite Industrial Products.
3) Halliday Products.
4) O'Keeffe's Inc.
5) Precision Ladders, LLC.
6) Royalite Manufacturing, Inc.
7) Thompson Fabricating, LLC.
b. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
c. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches (64 mm) deep, 3/4 inch (19 mm) wide, and 1/8 inch (3.2 mm) thick.
d. Rungs: Extruded aluminum tubes, not less than 3/4 inch (19 mm) deep and not less than 1/8 inch (3.2 mm) thick, with ribbed tread surfaces.
e. Fit rungs in centerline of siderails; fasten by welding or with stainless steel fasteners or brackets and aluminum rivets.
f. Provide platforms as indicated fabricated from pressure locked aluminum bar grating, supported by extruded aluminum framing. Limit openings in gratings to no more than 1/2 inch (12 mm) in least dimension.
g. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted aluminum brackets.
h. Provide minimum 72 inch (1830 mm) high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.

E. Ladder Safety Cages: Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless steel fasteners.
1. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet (6 m) o.c. Provide secondary intermediate hoops spaced not more than 48 inches (1200 mm) o.c. between primary hoops.
2. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless steel fasteners unless otherwise indicated.
3. Steel Ladder Safety Cages:
a. Primary Hoops: 1/4 inch by 4 inch (6.4 mm by 100 mm) flat bar hoops.
b. Secondary Intermediate Hoops: 1/4 inch by 2 inch (6.4 mm by 50 mm) flat bar hoops.
c. Vertical Bars: 3/16 inch by 1-1/2 inch (4.8 inch by 38 mm) flat bars secured to each hoop.
d. Galvanize ladder safety cages, including brackets and fasteners.
e. Prime ladder safety cages, including brackets and fasteners, with zinc rich primer.

4. Aluminum Ladder Safety Cages:
   a. Primary Hoops: 1/4 inch by 4 inch (6.4 mm by 100 mm) flat bar hoops.
   b. Secondary Intermediate Hoops: 1/4 inch by 2 inch (6.4 mm by 50 mm) flat bar hoops.
   c. Vertical Bars: 1/4 inch by 2 inch (6.4 mm by 50 mm) flat bars secured to each hoop.

2.3 ELEVATOR PIT SUMP COVERS

A. Elevator Pit Sump Covers: Fabricate from 3/16 inch (4.8 mm) plate with four 1 inch (25 mm) diameter holes for water drainage and for lifting.
   1. Fabricate from welded or pressure locked steel bar grating Limit openings in gratings to no more than 3/4 inch (19 mm) in least dimension.
   2. Provide steel angle supports as indicated.

2.4 MISCELLANEOUS STEEL TRIM

A. Miscellaneous Steel Trim: Unless otherwise indicated, fabricate units from structural steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
   1. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
      a. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction, spaced not more than 6 inches (150 mm) from each end, 6 inches (150 mm) from corners, and 24 inches (600 mm) o.c.
   2. Cast-in-Pit Angles and Edge Angles: Provide edge angles, and pit angles, fabricated from angles of size as shown, or required, with welded on stud anchors spaced 24 inches (600 mm) on center. Provide pit and edge angles in as long lengths as possible. Miter and weld corners and provide splice plates for alignment between sections.
   3. Galvanize miscellaneous steel trim.

2.5 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Custom fabricated sheet metal reveal:
   1. Material: 16 gauge (min) galvanized steel.
   2. Finish: PVDF finish to match Storefront and Curtainwall systems.

2.6 PIPE BOLLARDS

A. Pipe Bollards: Fabricate metal bollards from Schedule 40 steel pipe or 1/4 inch (6.4 mm) wall thickness rectangular steel tubing.
   1. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
   2. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.
   3. Where installation on structural slab or existing paving.
   4. Fabricate bollards with 3/8 inch (9.5 mm) thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4 inch (19 mm) anchor bolts.
      a. Where bollards are anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.
   5. Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4 inch (6.4 mm) thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.

2.7 MOUNTING POST

A. Door Device Mounting Post
   1. Mounting post for card reader:
      a. Basis of Design: “ADA-Stainless-Bollard-48x5RxP” as manufactured by Pedestal PRO.
         https://www.pedestalpro.com/product/ada-ss-bol-48x5rxp
      b. Finish: Brushed stainless steel.

B. Traffic Signage Mounting Post
   1. Post: 2-3/8 inch diameter galvanized steel.
   2. Height as indicated on Drawings.

2.8 PIPE / DOWNSPOUT GUARDS

A. Fabricate pipe/downspout guards from 3/8 inch (9.5 mm) thick by 12 inch (300 mm) wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2 inch (50 mm) clearance between pipe and pipe guard. Drill each end for two 3/4 inch (19 mm) anchor bolts.

B. Galvanize and prime pipe and downspout guards.

2.9 CAST METAL NOSINGS, TREADS, AND THRESHOLDS

A. Cast Metal Units: Cast aluminum with an integral abrasive, as cast finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in lengths necessary to accurately fit openings or conditions.
   1. Manufacturers: Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years’ experience manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.
      a. American Safety Tread Co., Inc.
      b. Barry Pattern & Foundry Co., Inc.
      c. Granite State Casting Co.
      d. Safe-T-Metal Company, Inc.
      e. Wooster Products Inc.
   2. Nosings: Cross hatched units, 4 inches (100 mm) wide with 1/4 inch (6 mm) lip, for casting into concrete.
   3. Treads:: Cross hatched units, full depth of tread with 3/4 inch by 3/4 inch (19 mm by19 mm) nosing, for application over bent plate treads or existing stairs.
   4. Thresholds: Fluted saddle type units, 5 inches (125 mm) wide by 1/2 inch (12 mm) high, with tapered edges.

B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

C. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches (100 mm) from ends and not more than 12 inches (300 mm) o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
   1. Provide two rows of holes for units more than 5 inches (125 mm) wide, with two holes aligned at ends and intermediate holes staggered.

D. Apply bituminous paint to concealed surfaces of cast metal units.

E. Apply clear lacquer to concealed surfaces of extruded units.

2.10 METAL DOWNSPOUT BOOTS

A. Downspout Boot: Provide downspout boots made from cast aluminum in heights indicated with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts.
   1. Outlet: Horizontal, to discharge into pipe.
   2. Prime cast iron downspout boots with zinc rich primer.

2.11 LOOSE BEARING AND LEVELING PLATES

A. Loose Bearing and Leveling Plate: Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
   1. Galvanize plates

2.12 LOOSE STEEL LINTELS

A. Loose Steel Lintels: Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
   1. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches (200 mm) unless otherwise indicated.
   2. Galvanize and prime loose steel lintels located in exterior walls.

2.13 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.14 FOLDING GATES

A. Description: Steel scissor-type gate.
   1. Type: Pair Scissor-Type.
   2. Finish: Galvanized Steel.
   3. Webbing: Heavy-duty, 14 gauge, U-channel riveted back-to-back with zinc-plated rivets.
   4. Frame: Heavy-Duty, 12 Gauge, 1-1/2 inch x 1-1/2 inch Vertical Angle Frame.
   5. Casters: Solid Steel.
   6. Locking:
      a. Paired Gate shall meet in middle and lock with 3/16 inch padlock hasp.
      b. Single Gate shall include heavy-duty 12 gauge zinc-plated angle locking bar with 3/16 inch padlock hasp. Lock shall be on right unless noted otherwise.
      c. Door Gate shall include heavy-duty 12 gauge zinc-plated angle locking bar with 3/16 inch padlock hasp which shall lock to right wall unless noted otherwise.
   7. Mounting: Can be mounted to wall, door frame, or attached to free standing.
   8. Size:
      a. Height: 8 feet, unless noted otherwise.
      b. Width: As required.

B. Basis of Design: “Heavy-Duty Folding Gates” as manufactured by Illinois Engineered Products.

2.15 FABRICATION TOLERANCES

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

2.16 FINISHES

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.17 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 09 96 00 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

F. Stainless Steel Finishes: Remove tool and die marks and stretch lines or blend into finish.
1. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
2. Bright, Directional Polish: No. 4 finish.
3. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.18 ALUMINUM FINISHES

A. As-Fabricated Finish: AA-M12.

B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.
1. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
   1. Cast Aluminum: Heavy coat of bituminous paint.
   2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for ceiling hung toilet partitions, operable partitions, overhead doors, and overhead grilles securely to, and rigidly brace from, building structure.
   1. Ceiling Hung Toilet Partitions: Anchor supports securely to, and rigidly brace from, overhead building structure.
   2. CMU Partition Head Supports: Unless otherwise indicated place partition head supports on alternate faces of CMU partitions every 6 feet o.c. and expansion bolt to underside of structure. Do not bolt to CMU partitions.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
   1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
   1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING METAL BOLLARDS

A. Fill metal capped bollards solidly with concrete and allow concrete to cure seven days before installing.
   1. Do not fill removable bollards with concrete.

3.4 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

A. Center nosings on tread widths unless otherwise indicated.

B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.

C. Seal thresholds exposed to exterior with elastomeric sealant complying with Section 07 92 00 "Joint Sealants" to provide a watertight installation.

3.5 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.1 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch (6 mm) per story, noncumulative.

B. Maximum Offset from True Alignment: 1/4 inch (6 mm).

C. Maximum Out of Position: 1/4 inch (6 mm).

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0 mil (0.05 mm) dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 90 00 “Painting and Coating”.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 50 00

Junior High School – Plan Sheets A101 & A102

Hardware Group No. 001
For use on Door #(s):
A100 A101 A102 A106
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
		EXISTING	TO BE RE-USED		

Hardware Group No. 714CR – ACCESS CONTROLLED-REMOTE RELEASE
For use on Door #(s):
A104
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY AP8-DOOR HEIGHT	628	IVE
1	EA	PANIC HARDWARE	RX-99-R-L-DT-06-SNB-CON	626	VON
1	EA	PANIC HARDWARE	QEL-RX-99-R-L-NL-06-SNB-CON	626	VON
2	EA	SFIC EVEREST CORE	80-037 KEYED AS DIRECTED BY DISTRICT	626	SCH
2	EA	SFIC RIM/MORT (AS REQD)	80-159/80-132 W/KEYED CONST. CORE	619	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH TBSRT	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	626	IVE
1	EA	MEETING STILE	8194AA-2 PCS DOOR HEIGHT	AA	ZER
1	EA	MULLION SEAL	8780N-MULLION HEIGHT	BLK	ZER
		REMOTE RELEASE	PROVIDED BY SECURITY CONTRACTOR		
		CARD READER	PROVIDED BY SECURITY CONTRACTOR		
		POWER SOURCE	PROVIDED BY SECURITY CONTRACTOR		

Hardware Group No. 714M – MONITORIED EGRESS
For use on Door #(s):
A105
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY AP8-DOOR HEIGHT	628	IVE
2	EA	PANIC HARDWARE	RX-99-R-L-DT-06-SNB-CON	626	VON
1	EA	SFIC EVEREST CORE	80-037 KEYED AS DIRECTED BY DISTRICT	626	SCH
1	EA	SFIC RIM/MORT (AS REQD)	80-159/80-132 W/KEYED CONST. CORE	619	SCH
2	EA	SURFACE CLOSER	4040XP SCUSH TBSRT	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	626	IVE
1	EA	MEETING STILE	8194AA-2 PCS DOOR HEIGHT	AA	ZER
1	EA	MULLION SEAL	8780N-MULLION HEIGHT	BLK	ZER
		MONITORIED EGRESS	PROVIDED BY SECURITY CONTRACTOR		

High/Primary School – Plan Sheet A104

Hardware Group No. 715CR – ACCESS CONTROLLED

For use on Door #(s):

A201

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 NRP	628	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8 CON	652	IVE
1	EA	PANIC HARDWARE	QEL-RX-99-R-L-NL-06-SNB-CON	626	VON
1	EA	SFIC EVEREST CORE	80-037 KEYED AS DIRECTED BY DISTRICT	626	SCH
1	EA	SFIC RIM/MORT (AS REQD)	80-159/80-132 W/KEYED CONST. CORE	619	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH TBSRT	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	626	IVE
3	EA	SILENCERS	SR64	GRY	IVE
		CARD READER	PROVIDED BY SECURITY CONTRACTOR		
		POWER SOURCE	PROVIDED BY SECURITY CONTRACTOR		

SECTION 09 51 00 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Acoustical panels.
   2. Concealed and exposed suspension systems for ceilings.
   3. Ceiling panel for food service area.
   4. Accessories necessary for a complete installation.

1.3 SUBMITTALS

A. Product Data: Technical data for each product including installation instructions.

B. Samples:
   1. Acoustic Panel: Set of 6 inch (150 mm) square samples of each type, color, pattern, and texture.
   2. Exposed Suspension System Members, Moldings, and Trim: Set of 12 inch (300 mm) long samples of each type, finish, and color.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Suspended ceiling components.
   2. Structural members to which suspension systems will be attached.
   3. Size and location of initial access modules for acoustical panels.
   4. Items penetrating finished ceiling including but not limited to the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Sprinklers.
      e. Access panels.
   5. Perimeter moldings.

D. Maintenance Data: Manufacturer data for finishes for inclusion in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code: Comply with applicable requirements of the IBC for interior finishes.
   2. Acoustical Panel Standard: ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance.
      a. Mounting Method for Measuring NRC: Plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.

3. Surface Burning Characteristics: Ceiling panels with surface burning characteristics complying with IBC Chapter 8 and ASTM E 1264 for Class A materials determined by testing identical products in accordance with ASTM E 84:
   a. Flame Spread Index : 25 or less
   b. Smoke Developed Index: 450 or less.
4. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
5. Fire Resistance Ratings: Comply with ASTM E 119; testing by qualified testing agency. Identify products with appropriate markings of applicable testing agency. Indicate design designations from UL *Fire Resistance Directory* or from the listings of another qualified testing agency.

B. Source Limitations:
1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

C. Comply with applicable regulations regarding toxic and hazardous materials.
1. Coating Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment; and showing no mold or mildew growth when tested in accordance with ASTM D 3273.
2. Panel Based Antimicrobial Treatment: Provide acoustical panels manufactured with antimicrobial treatment in the panels.

D. Pre-Installation Conference: Conduct conference at site

1.5 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 “Sustainable Design Requirements” for requirements related to the following:
1. Recycled content.
2. VOC limits of adhesives.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to site in original, unopened packages and store in a fully enclosed, conditioned space protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, allow panels to attain room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.8 WARRANTY

A. Standard ceiling Panels: warrant ceiling panels to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects for a period of one (1) year from the date of Substantial Completion.

B. Sag Resistant ceiling Panels: warrant products to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects for a period of ten (10) years from the date of Substantial Completion.

C. Standard Suspension System: Suspension systems shall be warranted to be free from defects in material or factory workmanship and shall not incur 50 percent red rust as defined by ASTM B117 test procedures for a period of ten (10) years from the date of Substantial Completion.

1.9 SUSPENSION SYSTEM / CEILING PANELS

A. Provide manufacturers standard 15 year warranty for suspension systems when used in combination with same manufacturers sag resistant ceiling panels. Ceiling panels to be free from sagging, warping, shrinking, buckling, or delaminating as a result of manufacturing defects. Suspension systems shall not incur 50 percent red rust as defined by ASTM B117 test during the period of the warranty.

1.10 EXTRA MATERIALS

A. Furnish extra materials matching products installed and packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Panels: Full size panels equal to 2 percent of quantity installed.
   2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
   3. Hold Down Clips: Equal to 2 percent of quantity installed.
   4. Impact Clips: Equal to 2 percent of quantity installed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Specifications are based on products of manufacturers named as the Basis of Design. Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years' experience manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.
   1. Concealed and Exposed Suspension Grid:
      a. Armstrong World Industries, Inc.
      b. CertainTeed Corporation.
      c. Chicago Metallic; Rockfon (Roxul Inc.)
      d. USG Interiors.
   2. Acoustic Ceiling Panel:
      a. Armstrong World Industries, Inc.
      b. CertainTeed Corporation.
      c. Rockfon (Roxul Inc.)
      d. Tectum Inc.
      e. USG Interiors.
   3. Molding and Edge Trim:
      a. Armstrong World Industries, Inc.
      b. CertainTeed Corp.

c. Chicago Metallic Corporation.
d. Fry Reglet Corporation.
e. Gordon, Inc.
f. USG Interiors, Inc.; Subsidiary of USG Corporation.

4. Acoustical Sealant for Exposed and Concealed Joints:
   a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
   b. USG Corporation; SHEETROCK Acoustical Sealant.
5. Acoustical Sealant for Concealed Joints:
   a. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
   b. Pecora Corporation; AIS-919.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
   1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.2 SUSPENSION SYSTEM

A. Suspension System: Direct hung suspension systems of types, structural classifications, and finishes indicated complying with applicable requirements in ASTM C 635/C 635M.
   1. High Humidity Finish: Comply with ASTM C 635/C 635M requirements for *Coating Classification for Severe Environment Performance* where high humidity finishes are indicated.
   2. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1 *Direct Hung*, unless otherwise indicated. Comply with seismic design requirements.
      a. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
         1) Type: Cast in place, post-installed expansion or post-installed bonded anchors.
         2) Corrosion Protection: Carbon steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
         3) Corrosion Protection: Stainless steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
         4) Corrosion Protection: Components fabricated from nickel copper alloy rods complying with ASTM B 164 for UNS No. N04400 alloy.
      b. Power Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
   3. Wire Hangers, Braces, and Ties:
      a. Zinc Coated, Carbon Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
      b. Stainless Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
      c. Nickel Copper Alloy Wire: ASTM B 164, nickel copper alloy UNS No. N04400.

d. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1 Direct Hung) will be less than yield stress of wire, but provide not less than 0.106 inch (2.69 mm) diameter wire.

4. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust inhibitive paint.
5. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04 inch (1 mm) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16 inch (8 mm) diameter bolts.
6. Hold Down Clips: Provide hold down clips spaced 24 inches (610 mm) o.c. on all cross tees in areas with exterior opening larger than 48 inch x 96 inch.
7. Impact Clips: Provide impact clip system designed to absorb impact forces against acoustical panels in Gymnasiums.
8. Aluminum cap for use over steel grid in kitchen areas or where shown on drawings or required.

B. Metal Suspension Systems:
1. Wide Face, Steel Capped, Double Web, Steel Suspension System: Main and cross runners roll formed from cold rolled steel sheet; pre-painted, electrolytically zinc coated, or hot dip galvanized according to ASTM A653/A653M, not less than G30 (Z90) coating designation; with prefinished 15/16 inch (24 mm) wide metal caps on flanges.
a. Structural Classification: Heavy duty system.
b. Face Design: Flat, flush.
c. Cap Finish: As indicated on Drawings.

C. Suspension System Pattern:
1. Standard: System as indicated on Drawings installed on standard module as needed for ceiling panel size(s) indicated.

2.3 ACOUSTICAL PANELS

A. Acoustic Ceiling Panel, Type 1 (ACP-1):
1. Basis of Design Product: “School Zone Fine Fissured No. 1713” by Armstrong World Industries.
2. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern:
a. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
b. Pattern: CE (perforated, small holes and lightly textured).
3. Color: As indicated on Drawings.
4. LR: Not less than 0.85.
5. NRC: Not less than 0.70.
6. CAC: Not less than 35.
7. Edge/Joint Detail: Square.
8. Thickness: 3/4 inch (19 mm).
9. Modular Size: 24 by 24 inches (610 by 610 mm).
10. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

B. Acoustic Ceiling Panel, Type 2 (ACP-2): Vinyl-Faced for Wet Areas
1. Basis of Design Product: “Clean Room VL No. 868” by Armstrong World Industries.
2. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern:
a. Type and Form: Type IV, mineral base with membrane faced overlay; washable vinyl film overlay.
b. Pattern: GH (smooth and printed).
c. Color: As indicated on Drawings.

3. LR: Not less than 0.80.
4. CAC: Not less than 40.
5. Edge/Joint Detail: Square.
6. Thickness: 5/8 inch (15 mm).
7. Modular Size: 24 by 24 inches (610 by 610 mm).
8. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

C. Acoustic Ceiling Panel, Type 3 (ACP-3):
1. Basis of Design Product: “Painted Nubby Open Plan No. 3102” by Armstrong World Industries.
2. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern:
   a. Type and Form: Type XII, glass fiber base with membrane faced overlay; Form 2, cloth.
   b. Pattern: E (lightly textured).
   c. Color: As indicated on Drawings.
3. LR: Not less than 0.84.
4. NRC: Not less than 0.95.
5. Edge/Joint Detail: Square.
6. Thickness: 1 inch (25 mm).
7. Modular Size: 24 by 24 inches (610 by 610 mm).
8. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 MOLDING, TRIM, AND ACCESSORIES

A. Shadow Molding: Where an acoustical lay in ceiling abuts a gypsum board ceiling in the same plane, provide a "W" shaped reveal or "shadow" molding similar to USG No. MS 174.

B. Light Fixture Protection:
1. Manufacturer: Thermafiber Light Protection Kit by USG or Type 5/8 or 3/4 P(S) by Armstrong World Industries.
2. Fire Resistance Rating: Same as ceiling assembly rating.
3. Locations: At fixtures reinstalled in fire rated ceiling assemblies.

C. Roll Formed, Sheet Metal Edge Moldings and Trim: Type and profile for standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color used for exposed flanges of suspension system runners.
1. Provide edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For lay in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

D. Extruded Aluminum Edge Moldings and Trim: Where indicated, provide extruded aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations,

including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:

1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B221 (ASTM B221M) for Alloy and Temper 6063-T5.
2. Finish:
   a. Baked Enamel or Powder Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
      1) Color: As indicated on Drawings.
3. Basis of Design:
   a. Floating Ceiling Trim: “FT6” as manufactured by CertainTeed Ceilings, size and orientation as indicated on Drawings.
   b. Flush Ceiling Transition Trim: “Axiom Ceiling Transition” as manufactured by Armstrong World Industries.

E. Acoustical Sealant: Comply with ASTM C834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
   1. Exposed and Concealed Joints: Non-sag, paintable, non-staining latex sealant.
   2. Concealed Joints: Nondrying, non-hardening, non-skinning, non-staining, gunnable, synthetic rubber sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut for compliance with requirements specified that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less than half width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA *Ceiling Systems Handbook*.
   1. Fire Rated Assembly: Install fire-rated ceiling systems according to tested fire rated design.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers where required and, if permitted with fire resistance rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast in place hanger inserts, postinstalled mechanical or adhesive anchors, or power actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast in place or post-installed anchors.

D. Panel Accessibility: Install panels downward accessible by disengaging hinge support rail on one side of panel from the T Bar Flange or optional A Mount rail flange without the use of tools, for access without removal of panel from the ceiling.

E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. Arrange directionally patterned acoustical panels with pattern running in one direction parallel to long axis of space.

2. For square edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
3. For reveal edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal edged panels on suspension system members with box shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install hold-down clips in areas indicated, in areas with exterior opening larger than 48 inches x 96 inches, where required by authorities having jurisdiction, and for fire resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
7. Install clean room gasket system in areas indicated, sealing each panel and fixture as recommended by panel manufacturer's written instructions.
8. Protect lighting fixtures and air ducts to comply with requirements indicated for fire resistance rated assembly.

3.4 FIRE RATING SCHEDULE

A. Refer to UL Assemblies Drawings for Fire Rating requirements of ceiling materials at rated floor and roof assemblies.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
   1. Compliance of seismic design.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.
   1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
      a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and post-installed anchors used to attach hangers to concrete and will test them for 200 lbf (890 N) of tension; it will also select one of every two post-installed anchors used to attach bracing wires to concrete and will test them for 440 lbf (1957 N) of tension.
      b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical panel ceiling hangers and anchors and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 00

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes
   1. Resilient base, adhesive attached, in locations shown on drawings.
   2. Resilient subfloor transitions.

1.3 REFERENCES

A. ASTM International (ASTM)
   1. F1861, Standard Specification for Resilient Wall Base

1.4 SUBMITTALS

A. Product Data:
   1. Manufacturer's specifications and other data needed to demonstrate compliance with specified requirements.
   2. Manufacturer's installation instructions.

B. Samples:
   1. Actual samples or color charts showing manufacturer's full range of colors, for Architect's selection (if selections are not already scheduled or otherwise indicated on the drawings).
   2. Actual 12-inch-long piece of base material in each color selected for approval.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 "Sustainable Design Requirements" for requirements related to the following:
   1. Recycled content.
   2. VOC limits of adhesives.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers listed, whose product meets or exceeds the specifications are approved for use on the Project with Architect's approval. Other manufacturers must have a minimum of five (5) years' experience manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.
   1. Burke Flooring.
   2. Flexco.
   3. Johnsonite.
   4. Mannington.
   5. Nora Rubber Products.
   6. Roppe Corp.
   7. Tarkett.

2.2 MATERIALS

A. Standard Rubber Base (typical except where extended toe or other type of base is specifically indicated on drawings, e.g., at athletic flooring or elsewhere) (RB-1):
   1. Quality Standard: ASTM F1861
   2. Material: Rubber, vulcanized, Type TS, Group I, Styles A and B. Vinyl base and Type TP are not acceptable.
   3. Manufacturing Method: Group I (solid, homogeneous)
   4. Style: Topset cove; rolls of greatest length available, cut to length required to minimize joints.
   5. Minimum Thickness: Full 1/8 inch (3.2 mm)
   6. Color: 129 Dolphin
   7. Height: 4 inches, unless indicated otherwise
   8. Corners: Job-Formed.
   9. Basis of Design: Products as manufactured by Burke Flooring, Flexco, Johnsonite, Nora Rubber Products, or Roppe Corp.

B. Joining and Edge Finish Moldings (TR-#):
   1. Usage: For use at flooring terminations with other flooring
   2. Type: Tapered or bullnose edge, as required to provide juncture at edge of adjacent floor surfaces
   3. Size: One (1) inch wide by 1/8 inch thick or as applicable to the type of flooring and condition
   4. Material: Rubber or vinyl as recommended by manufacturer to suit application
   5. Color(s): As selected by Architect from manufacturer's full line.
   6. Manufacturers: Burke Flooring, Flexco, Johnsonite, Roppe, Tarkett, or Architect approved equal.
   7. Transition Type:
      a. Snap Down "T" (TR-1): Snap-in "T" molding joining 1/4 or 5/16 inch material on each side.
         1) Basis of Design: "Transitional Moldings 930" as manufactured by Mannington.
         2) Accessories: 970, 980, or 990 track.
      b. Tile Carpet Joiner (TR-2): One-piece molding joining 1/4 inch carpet to 1/4 inch tile
         1) Basis of Design: "Transitional Moldings 150" as manufactured by Mannington.
      c. Underslung Reducer (TR-3): Binder bar edging for 1/16 inch to 1/8 inch resilient floors with dry back.
         1) Basis of Design: "Transitional Moldings 735" as manufactured by Mannington.

C. Stair Treads (RS-1):
   1. Usage: For use at interior stairs, as indicated on Drawings
   2. Type: Stair treads for the visually impaired..
   3. Thickness: 1/8 inch.
   4. Size: Largest sizes available as required for installation.
   5. Material: Rubber or vinyl as recommended by manufacturer to suit application.
   6. Color(s): As selected by Architect from manufacturer's full line.
   7. Manufacturers: Burke Flooring, Flexco, Johnsonite, Mohawk, Roppe, Tarkett, or Architect approved equal.
   8. Basis of Design: Mohawk "TRUE" Stair Treads

D. Resilient Nosing (RN-1):

https://mannington-assets.global.ssl.fastly.net/docs/literature/a7a9a5d75ccb4812a73b910365696add/pdf/linear_stair_nosing_product_pages_2015-20160824152621.pdfUsage: For use at interior stairs, as indicated on Drawings.
   2. Type: Linear Stair Nosing.
   3. Thickness: 1/8 inch at tread.

4. Material: Rubber or vinyl as recommended by manufacturer to suit application
5. Color(s): As selected by Architect.
6. Manufacturers: Burke Flooring, Flexco, Johnsonite, Mannington Commercial, Mohawk, Roppe, Tarkett, or Architect approved equal.
7. Basis of Design: Model 565 “Double Undercut Carpet Stair” as manufactured by Mannington Commercial.

E. Resilient Subfloor Transition (RST):
1. Usage: Subfloor Transition System.
2. Thickness: Varies, cut to length.
3. Material: Rubber or vinyl as recommended by manufacturer to suit application
4. Basis of Design: “The Equalizer Transition” as manufactured by Mannington Commercial.

F. Adhesive: Rubber-based type; same brand as base or as recommended and approved by base manufacturer to suit application.

G. Other Materials: Provide other materials, not specifically described but required for a complete and proper installation.

2.3 EXTRA STOCK

A. Deliver to the Owner:
1. 1.5 percent, or one (1) unopened carton of each color, type and size of base selected, whichever is greater.
2. One (1) gallon container of each type adhesive used for base.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which Work of this Section will be performed. Report unsatisfactory conditions to the Architect in writing. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Prepare substrates to receive base as recommended by base manufacturer.

B. Verify substrates are smooth and ready to receive resilient base. Grind high spots and fill low spots with latex cementitious filler as required.

C. Starting Work indicates acceptance of existing conditions.

3.3 INSTALLATION

A. General:
1. Install materials only after finishing operations, including painting, have been completed and after permanent heating and cooling system is operating.
2. Verify that moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturers of the materials used.

B. Installing Base:
1. Install base where shown on the Drawings in accordance with manufacturer’s instructions.
2. Use factory-preformed exterior corners, and factory preformed or job-mitered interior corners, as indicated on the drawings or directed by Architect.

3.4 CLEANING AND PROTECTING

A. Remove excess adhesive and other blemishes from exposed surfaces, using neutral cleaner recommended by the manufacturer of the resilient materials.

END OF SECTION 09 65 13

SECTION 09 72 00 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Magnetic, dry erase wall coverings.
   2. Accessories necessary for a complete installation.

1.3 SUBMITTALS

A. Product Data:
   1. Manufacturer's specifications and technical data.
   2. Manufacturer’s installation instructions.

B. Samples: 8 inch by 10 inch samples showing manufacturer's full range of colors, textures and patterns for Architect's selection.

1.4 QUALITY ASSURANCE

A. Wall covering must carry the maximum UL Fire Hazard classification when tested in accordance with ASTM E84.

B. Wall covering must meet Federal Specification (FS) CCC-W-408A.

C. Wall covering must meet CFFA-W-101A.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

A. Refer to Section 01 81 13 “Sustainable Design Requirements” for requirements related to the following:
   1. Recycled content.
   2. VOC limits of adhesives.

1.6 PRE-INSTALLATION CONFERENCE

A. Refer to Section 01 31 00 “Project Management and Coordination”.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specifications are based on products of manufacturers named as the Basis of Design. Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years’ experience manufacturing products meeting or exceeding the specifications and comply with Division 01 requirements regarding substitutions to be considered.
   1. Bolta Wallcoverings as manufactured J. Josephson.

2. Koroseal Wallcoverings as manufactured by Koroseal Interior Products, LLC.
3. National Wallcovering, Inc.
4. TRI-KES.
5. Visual Magnetics, LP.

2.2 VISUAL DISPLAY WALL COVERING

A. Magnetic Visual Display Wall Covering: Intended for use with dry-erase markers and magnetic aids and consisting of moderate-gloss plastic film bonded to ferrous-powdered fabric backing.
   1. WCV-1: Vinyl dry erase wall covering with a non-woven backing. Applied with commercial wall covering adhesive directly to a properly prepared drywall surface.
      a. Basis of Design: “Jot-a-Wall JOM-WC-50” as manufactured by Visual Magnetics, LP.
      b. Total Weight: 35 oz. per linear yard.
      c. Backing: Non-Woven.
      d. Roll Width: 49 inches / 50 inches.
      e. Roll Length: 50 feet.
      f. Total Thickness: 21 mil.
      g. Fire Rating: Class A.

B. Adhesive: Mildew-resistant, non-staining, adhesive, for use with specific wall covering and substrate application, as recommended in writing by wall covering manufacturer.

C. Primer/Sealer: Mildew-resistant primer/sealer complying with requirements in Section 09 90 00 "Painting and Coating" and recommended in writing by wall covering manufacturer for intended substrate.

PART 3 - EXECUTION

3.1 APPLICATION

A. Do not begin until all walls are smooth and free of surface imperfections.

B. Commencement of work will be an indication that the wall covering subcontractor accepts the scheduled walls as being free of imperfections.

C. Apply one (1) coat of primer in accordance with the printed instructions of manufacturer.

D. Before beginning application of vinyl wall covering, confirm products for uniform color, texture and quality.

E. Apply vinyl wall covering vertically in lot and roll number sequence.

F. Use butt joints only (no overlapping).

G. Trim vinyl wall covering to within 3/4 inch of top of scheduled base.

3.2 CLEANING

A. At completion of job, clean all paste residue and matter from surfaces.

B. Assure that all joints have achieved continuous lamination.

END OF SECTION 09 72 00

SECTION 27 10 00 – STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

Unless noted otherwise, “Contractor” refers to the Telecommunication Contractor

1.1 SCOPE

A. Provide a complete and tested Structured Cabling System (SCS) for the interconnections of the Local Area Network (LAN).

B. This section describes the products and execution requirements related to furnishing and installing Category 6A Telecommunications Cabling and Termination Components and related subsystems as part of a Structured Cabling System.

C. Indoor Backbone system comprising of copper and fiber optic cabling is covered under this document. Contractor shall provide fiber optic and copper cabling counts as specified on the drawings.

D. Others will provide the network electronics for the LAN within the MDF’s and IDF’s and will be responsible for connecting the new cabling infrastructure to the LAN. This Contractor, however, shall supply the Category 6A cabling and patch cords. The Contractor shall be available on site during the crossover to assist with any cabling issues that may occur during the transition.

E. The Electrical Contractor is responsible for installing the conduits, surface raceway, cable tray and sleeves for new technology cabling unless otherwise noted.

F. All cables and related termination support, and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the Contractor, as detailed in the following section(s).

G. The SCS shall include fully terminated unshielded twisted pair cables, fiber optic cabling, raceways, conduit, back boxes, copper/fiber optic termination components, station mounting hardware, fiber optic enclosures, patch panels, copper/fiber optic patch cables, relay racks/cabinets, and other incidental and miscellaneous premises wiring system hardware as required for a complete, tested, and usable system that is in compliance with the latest NEC, ANSI/EIA/TIA, BICSI, and Authorities Having Jurisdiction codes and standards. The installation shall comply with all applicable requirements, design guidelines, and standards in effect at the job site and as indicated in the Drawings and Specifications.

1.2 RELATED WORK AND CODE REQUIREMENTS

A. ALL WORK AND MATERIALS SHALL CONFORM IN EVERY DETAIL TO THE RULES AND REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION, THE TEXAS ELECTRICAL CODE, AND PRESENT MANUFACTURING STANDARDS.

B. All materials shall be listed by UL and shall bear the UL label. If UL has no published standards for a particular item, then other national independent testing standards shall apply, and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

C. Other applicable standards are as follows:

1. ANSI/IEEE C2 – National Electrical Safety Code
2. NFPA 70-1996/1999 – National Electrical Code
3. TIA/EIA 568-B-1, 2, 3 Standards
4. IEEE/ANSI 142-1982 – Recommended Practice for Grounding of Industrial and Commercial Power Systems
5. TIA/EIA-568-A Commercial Building Telecommunications Wiring Standard
6. EIA/TIA-569 Commercial Building Standard for Telecommunication Pathways and Spaces.
7. TIA/EIA-606 The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

8. TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.
9. EIA/TIA 455-A Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices and Other Fiber Optic Components.
10. TIA/EIA TSB 67 Transmission Performance Specification for Field Testing of Unshielded Twisted-Pair Cabling Systems.
11. TIA/EIA TSB 72 Centralized Optical Fiber Cabling Guidelines
12. ISO/IEC 11801Generic Cabling Standard
13. EN 50173 Generic Cabling Standards for Customer Premises
14. ANSI/EIA/TIA 526-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plan.

D. Governing Codes and Conflicts:

If the requirements of these specifications or the Project Drawings exceed those of the governing codes and regulations, then the requirements of these specifications and the Drawings shall govern. However, nothing in the Drawings or Specifications shall be construed to permit work not conforming to all governing codes and regulations.

1.3 QUALITY ASSURANCE

A. Acceptable manufacturers:

1. The equipment/products described herein and furnished per these specifications shall be the product of one manufacturer. All references to model numbers and other detailed descriptive data are intended to establish standards of design performance, and quality, as required.
2. Acceptable product shall be as follows:
   a. For any new MDF/IDF locations that are established during this project, the end-to-end SCS solution shall be a complete category 6 solution.
   b. Only products from the owner provided acceptable product list will be accepted.

B. Installer Qualifications:

1. The Data Cable System Installer shall be licensed and shall meet all applicable regulations of the State of Texas and Department of Labor insofar as they apply to this type of system. The proposer shall be a firm normally employed in the low voltage and data cabling industry and shall provide a reference list of ten (10) large-scale projects and contact names confirming successful Category 6A premises wiring system installations.
2. The SCS Installer shall be a manufacturer certified, local area, integrator of the manufacturer's product and must be able to provide the manufacturer's maximum available warranty on the entire SCS. The contractor's certification must have been obtained and held within 100 miles of the project's location.
3. The installing contractor must have a full-time employed RCDD (Registered Communications Distribution Designer) on staff. Current RCDD certification shall be provided in the product submittals.
4. All individuals installing the SCS must be employees of the certified installer and at least 25% of the installing staff shall have undergone a training class given by the manufacturer. Current certification indicating the successful completion of the training course shall be available upon request at the project and submitted in the contractor's product submittals.
5. No portion of the SCS scope of work shall be subcontracted to any individual or company that does not meet the above requirements.

C. Pre-Construction Meeting:

1. The successful Contractor shall attend a mandatory pre-construction meeting with the project's consultant and individuals deemed necessary by the Owner's representative prior to the start of the work. No SCS work shall begin prior to this meeting.

D. Acceptance:

1. The Owner's representative reserves the right to reject all or a portion of the work performed, either on technical or aesthetic grounds.

E. Warranty:

1. The selected system installer shall be a certified installing contractor of product and hold current certification. Contractor shall be shall provide an end-to-end performance warranty of not less than twenty (25) years on all products installed. The proposer shall provide current certification documentation. The performance warranty shall be issued by the manufacturer and shall warrant that ALL Enhanced Category 6A cable links have been tested bi-directionally (end to end) using a Level 2 tester, per TSB-67, and that all test results conform to the most current TIA/EIA-568-A and/or TSB-67 Link values.
2. The warranty will also cover all fiber optic cabling performance testing shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, method B.
   The warranty will stipulate that all products used in this installation meet the prescribed mechanical and transmission specifications for such products as described in ISO/IEC 11801, ANSI/TIA/EIA-568-A, or EN 50173. Quality and workmanship evaluation shall be solely by the Owner/Designer and designated representatives.

1.4 ALTERNATE AND ALTERNATIVE PROPOSALS

A. Alternates

1. N/A.

B. Alternatives
1. The Proposer may submit more than one Alternative or value-engineered proposal.
2. Alternative Proposals must be in accordance with specified procedures.
3. Alternatives must provide functionality, features, and dependability that are equivalent to or better than that of the system requirements described herein.
4. All Alternative Proposals must be clearly marked as Alternative Proposal and will only be accepted if accompanied by a proposal response based on the specified system

1.5 SUBMITTALS

A. Requirements
1. The Contractor will submit System Shop Drawings as described herein to the General Contractor and Consultant for review within (30) thirty days from the date of the contract. Failure to comply with this requirement may be cause for cancellation of the contract without penalty or cost to the Owner/ General Contractor.
2. Present submitted documents in a clear and thorough manner, include original drawings that illustrate diagrammatically Contractor's intent to assemble, construct, fabricate, build, and supply the systems and equipment as described by the collective specifications.
3. Title each drawing with the Project name, Drawing name, Consulting firm's name and Contractor's name.
4. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents. Identify field dimensions; show relation to adjacent or critical features of Work or products.
5. Product Data:
   a. Submit only pages that are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, capacities, wiring,
      system, control, and plate diagrams; component parts; finishes; dimensions; and required clearances. Modify manufacturer's standards schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

6. Contractor shall not consider the Consultant or Owner's review of submittals to be exhaustive or complete in every detail. Approval of shop drawings or submittals including substitutions indicates only the acceptance of the Contractor's apparent intent to comply with general design or method of construction and quality as specified. The finished product must meet functional requirements, operations, arrangements, and quantities and comply with the contract documents unless specifically approved to the contrary.
7. Contractor will be held responsible for delivery of systems as specified any errors or omissions in the submittals will not relieve said Contractor of responsibility to deliver complete systems as specified, that fully meets or exceeds the minimum requirements set forth by the specifications, drawings and contract documents.
8. The Contractor will be responsible for deviations in submittals from the requirements of Contract Documents, unless Consultant gives specific written acceptance specifically identifying such deviation. **The Contractor will provide a line by line specification review stating compliance or deviation.**
9. Submittals that, in the Consultant's opinion, are incomplete, deviate significantly from the requirements of the Contract Documents, or contain numerous errors will be returned, without review, for rework and are to be re-submitted.
10. Submittals of shop drawings and other items shall not be in more than two (2) partial submittals, or as allowed by the Consultant due to the complexity of the systems. If shop drawings are rejected for any reason, Contractor shall correct and resubmit within seven (7) working days. The Contractor shall always be required to obtain stamped approval of submittals prior to any fabrication or installation of equipment.
11. The submittals must be received and stamped reviewed by the Consultant prior to procurement of equipment or commencement of work. Any prior work performed is at the Contractor's own risk.
12. Failure to obtain shop-drawing approval within forty five (45) days of contract award, where the delay is due to the poor performance of the Contractor, may be cause for cancellation of the contract without penalty to Owner / General Contractor.
13. Do not fabricate products or begin work that requires submittals until return of stamped reviewed submittals with Consultant acceptance. If work does progress prior to this the contractor will have proceeded at his or her own risk.
14. Submittals at a minimum will include:
    a. Comprehensive system drawings with device locations overlaid on project floor plans, system schematic diagrams in block format, and detail of all custom fabrications including but not limited to device wall plates. Drawings shall be prepared and submitted on E Size 24” x 36” paper.
    b. Equipment list that identify equipment quantity, equipment manufacturer, equipment model, and equipment description, along with equipment list provide data cut-sheets. Submit on 8½” x 11” size, punched and inserted in a 3-ring binder.
15. Product Data Cut Sheets:
    a. Submit only pages that are pertinent
    b. Mark each copy of printed data to identify pertinent products
    c. Reference pertinent products to Specification Section and Article number
    d. Highlight reference standards, performance characteristics, capacities, component parts, finishes, and dimensions
    e. Modify manufacturer’s standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work
    f. Delete or mark through information not applicable
16. Prior to Work, corrections and additions, as necessary, shall be made to the design documents and submittals shall clearly show any such changes by a noted cloud around the change.
17. The Contractor will submit System Shop Drawings and other submittals as described herein, to Owner and Project Architect / Consultant for review within twenty (20) days from the notice to proceed or from the date of contract whichever is first.
18. Submittals must be received and stamped by Consultant “reviewed with no action required” prior to the procurement of material or the commencement of work. Any procurement or work performed prior to this approval is at the Contractor’s own risk.

19. The project timeline will not be altered due to lateness of submittals. Contractor shall remain bound to deliver a timely, complete, and finished project as stipulated in their contract.
20. Failure of Contractor to provide submittals as required herein may result in the withholding of payment for work and/or cancellation of the contract without penalty or cost to Owner.
21. Present submitted documents in a clear and thorough manner include original drawings and supplement as necessary to clearly illustrate diagrammatically Contractor's intent to assemble, construct, fabricate, build, and supply the systems and equipment as described by the collective specifications.
22. Title each drawing with the Project name, Drawing name, Consulting firm's name and Contractor's name.
23. Submittals of shop drawings and other items shall not be in more than two (2) partial submittals, or as allowed by Consultant due to the complexity of the systems. If shop drawings are rejected for any reason, Contractor shall correct and resubmit within seven (7) working days. Contractor shall always be required to obtain stamped approval of submittals prior to any fabrication or installation of equipment.
24. Do not fabricate products or begin work that requires submittals until return of stamped reviewed submittals with Consultant acceptance. If work does progress prior to this the contractor will have proceeded at his or her own risk.

B. Consultant's Review
1. Contractor shall not consider Consultant or Owner's review of submittals to be exhaustive or complete in every detail. Approval of shop drawings or submittals including substitutions indicates only the acceptance of the Contractor's apparent intent to comply with general design or method of construction and quality as specified. The finished product must meet functional requirements, operations, arrangements, and quantities and comply with the contract documents unless specifically approved to the contrary.
2. Consultant will review shop drawings, product data, and samples and return submittals generally within 14 days.
3. Contractor will notify Consultant if Consultant’s review time will create a delay to the project schedule.
4. Special review of product with long lead times will be arranged by the Contractor on case-by-case basis to avoid any delay of the project.
5. Submittals that, in Consultant's opinion, are incomplete, deviate significantly from the requirements of the Contract Documents, or contain numerous errors will be returned without review for rework and are to be re-submitted.
6. Consultant's review comments will be shown on sepia transparency when it is returned to Contractor. Only the sepia will be returned to Contractor who shall make and distribute all copies required for project or his own purposes.

C. Submittal Requirements
1. Submit the following:
2. **The Contractor will provide a line by line specification review stating compliance or deviation.**
3. Complete materials list with pricing to be used as schedule of values
4. Product data reference sheets (cut sheets)
5. Shop drawings that depict all devices and device locations to be installed
6. Shop drawings that depict all cabling infrastructure to be installed. Cabling shall be overlaid on floor plan drawings.
7. Comprehensive system schematic wiring diagrams showing detailed point-to-point connections to and between all equipment.
8. Elevation drawings showing intended equipment room layouts
9. Elevation drawings showing intended equipment rack layouts. The equipment rack layouts will show locations of all rack mounted equipment and identification of equipment as shown on the system schematic diagram
10. Detail drawings showing intended fabricated equipment, custom work, and wall plates, etc.
11. Examples of proposed nomenclature and labeling scheme intended for use in labeling plates, equipment, cables, etc.

12. Complete wire and cable riser diagram showing path and location of all cable to and between equipment; this cable shall be overlaid on facility floor plan. Include cable types, cable identification numbers and color codes
13. Plate or panel details
14. Consoles, enclosures or support tables.
15. The Contractor shall provide their intended Wire and Cable color code strategy for the premise cabling. The Contractor must receive approval of color code prior to ordering cabling. Example: Data Cat. 5-E (Blue), Data Fiber (orange), Telephone (Green), Audio (Gray), RF (Black), etc.
16. Contractor's proposed owner training plan for installed systems
17. Material List
    a. Provide complete project material list for each furnished device. The Materials List is required to include the following categories: Quantity provided, Manufacturer, Model number, Description and value.
18. Product Reference Sheets (cut sheets)
    a. Provide 8-1/2" by 11 product catalog specification sheets for each furnished device. The product specification sheets shall be neatly bound in a three-ring binder and divided by manufacturer with tab dividers. The front of the binder shall include a material list as described above. The products shall be organized in the binder such that they match the materials list order. Where more than one item appears on a page, the Contractor shall mark the appropriate item, for easy identification.
19. Shop Drawings requirements
    a. Provide complete shop drawings for all systems specified and / or furnished. Each drawing shall have a descriptive title with all parts of each drawing completely described. All drawings shall have the name of the project Architect, consultant, and installing contractor in the title block.
    b. The shop drawings shall include: Identification of equipment manufacturer, equipment model numbers, cable types, cable identification numbers, cable color codes, cable paths, plate and panel details, consoles and enclosures' details. Additionally, equipment rack layouts showing locations of all rack- mounted equipment, comprehensive system schematic block diagrams (one- line drawings showing device connectivity), equipment rack elevations and custom fabricated equipment.
    c. Provide complete wire and cable riser diagram showing pathways and locations of all wire and cables to and between equipment. The cabling infrastructure shall be overlaid on facility floor plan.
    d. Drawings shall be executed at an appropriate scale as the project would require to clearly read pertinent detail, but for equipment layouts not smaller than 1/4"
       = 1'- 0" and the Floor plans and reflected ceiling plans, not smaller than 1/16"
       = 1'-0".
20. Project Completion
    a. As a condition for project acceptance, the Contractor shall submit the following for review and approval:
    b. Samples: Complete manufacturer's product literature and samples for all pre-approved substitutions to the recommended products made during the course of the Project.
    c. Inspection and Test Reports: During the course of the project, the Contractor shall maintain an adequate inspection system to ensure that the materials supplied and the work performed conform to Contract requirements. The contractor shall provide written documentation that indicates that materials acceptance testing was conducted as specified. The Contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion.
    d. Operating and Maintenance Instructions: Operating and maintenance instructions for all devices within the system. These instructions shall reflect any changes made during the course of construction and shall be provided to the Owner for their use in a three-ring binder labeled with the project name and description.

e. As-Built Drawings: As-built drawings will include cable pathways, data outlet locations with correct labeling and MDF location. The as-built drawings will be prepared using AutoCAD version 2006 or later. Provide the Owner with one Mylar plot of each drawing and two blue line prints of each drawing. Provide the Owner with electronic versions of the as-built drawings on (2) CD Rom disk.

f. One (1) 30" x 42" laminated floor plan sheets illustrating technology drops and cable designation for each Floor. Two (2) 30" x 42" laminated floor plan sheets illustrating technology drops and cable designation for each telecommunications room (MDF or IDF) mounted on wall. Coordinate mounting locations with owner prior to installation

1.6 CERTIFICATES

A. Premises Distribution System: Written certification that the premises distribution system complies with the EIA ANSI/TIA/EIA-568B-1, 2, 3, EIA ANSI/TIA/EIA-569A, and EIA ANSI/TIA/EIA-606.

B. Materials and Equipment: Where materials or equipment are specified to conform, be constructed, or be tested to meet specific requirements, certification that the items provided conform to such requirements. Certification by a nationally recognized testing laboratory that a representative sample has been tested to meet the requirements, or a published catalog specification statement to the effect that the item meets the referenced standard, will be acceptable as evidence that the item conforms. Compliance with these requirements does not relieve the Contractor from compliance with other requirements of the specifications.

C. Installers

1. The Contractor shall have an RCDD (Register Communication Distribution Designer) on staff assigned to manage this project; documented proof shall accompany the proposal response.
2. All installing personnel must have completed certified manufacturer training or BICSI (Building Industry Consulting Service International) installation training for UTP infrastructure systems, or the Contractor must contract with manufacturer for installation of all proposed components. Company Certifications shall accompany the proposal response.
3. The Contractor's technicians shall be certified and trained in the connectivity hardware that is being installed.
4. The Contractor shall submit certification that all the installers are factory certified to install and test the provided products. No less than half of the crew to be used for the telecommunications installation must be trained by that manufacturer for the work.

1.7 DELIVERY STORAGE AND HANDLING

A. Vendor will be responsible for all materials until completion of project.

B. Cable shall be stored according to manufacturer's recommendations at minimum. In addition, cable must be stored in a location protected from vandalism and weather.

C. If cable is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. If air temperature at cable storage location will be below 40 degrees Fahrenheit, the cable shall be moved to a heated (minimum 50 degrees Fahrenheit) location. If necessary, cable shall be stored off site at the contractor's expense.

D. If the contractor wishes to have a trailer on site for storage of materials, arrangements shall be made with the Owner.

E. Commercial off-the-shelf manuals shall be furnished for operation, installation, configuration, and maintenance for all products provided as a part of the premises distribution system. Specification sheets for all cable, connectors, and other equipment shall be provided.

1.8 WARRANTY

A. The Contractor shall provide to the owner a manufacture 20-year warranty certificate for all materials, equipment, etc. Upon successful completion of the installation and subsequent inspection, the customer shall be provided with a numbered certificate, from the manufacturing a connectivity hardware (patch panels, jacks, patch cords 110 blocks, etc.) company, registering the installation. This warranty shall include all labor, materials, and travel time.

B. The warranty shall ensure against product defects, that all approved cabling components exceed the specifications of TIA/EIA-568B, and ISO/IEC IS 11801 for cabling links/channels, and that the installation will exceed the loss and bandwidth requirements of TIA/EIA 568B ISO/IEC IS 11801 for fiber links/channels, for a twenty (20) year period. The warranty shall apply to all passive structure cabling system components.

C. The warranty shall cover the failure of the wiring system to support the application that it was designed to support, as well as additional application(s) introduced in the future by recognized standards or user forums that use the TIA/EIA 568B or ISO/IEC IS 11801 component and link/channel specifications for cabling, for a twenty (20) year period.

D. The warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective products(s), labeling of the new components, and testing of the circuit(s) at no cost to the owner.

PART 2 - PRODUCTS

2.1 FIBER CABLING – BACKBONE

A. Singlemode Optical Fiber Cable:
   1. 12-fiber, Tight-Buffered, OS2 Singlemode, Premises Distribution Indoor/Outdoor Plenum Cable with Interlocking Armor
      a. Part Number: Berk-Tek PDPK012AB0707-I/O-C4C5(YEL).
      b. Coordinate strand count with Owner prior to installation
      c. Or Owner approved equal.
   2. There will be a total of two (2) 12-fiber runs for backbone cabling in this project.
      a. MDF B121 to IDF C102
      b. MDF B121 to IDF B222

2.2 COPPER CABLING – BACKBONE

A. 25-Pair Copper Cable:
   1. Copper Cable, Category 3, Plenum, 24 AWG, 25 Pairs
      a. Part Number: General 2131505.
      b. Or Owner approved equal.
   2. There will be a total of two (2) copper runs for backbone cabling in this project.
      a. MDF B121 to IDF C102
      b. MDF B121 to IDF B222

2.3 FIBER OPTIC TERMINATION ENCLOSURES and SPLICE TRAYS.

A. 1000i SDX 2RU Distribution and Splice Enclosure, empty, with sliding tray.
      a. Accepts up to (6) SDX adapter plates or (6) SDX MTP cassettes and accepts up to (6) splice trays.
      b. Part Number: Leviton 5R2UM-S06.
      c. Or Owner approved equal.

2.4 FIBER OPTIC ADAPTER PLATES

A. SDX Precision Molded Plate (BLUE), Use for OS2 Fiber Optic System.
      a. Single-mode OS1/2, Duplex LC, 12 fibers, Zirconia Ceramic Sleeve

b. Part Number: Leviton 5F100-2LL.
c. Or Owner approved equal.

B. SDX Precision Molded Plate (BLUE), Use for OS2 Fiber Optic System.
a. Single-mode OS1/2, Quad LC, 24 fibers, Zirconia Ceramic Sleeve
b. Part Number: Leviton 5F100-4LL.
c. Or Owner approved equal.

C. SDX Precision Molded Plate (BLACK)
a. Adapter Plate, blank
b. Part Number: Leviton 5F100-PLT
c. Blanking plates shall be installed in any unused fiber enclosure openings.
d. Or Owner approved equal.

2.5 FIBER OPTIC CONNECTORS

A. OS1/OS2 Single Mode Fiber Optic Connectors (blue): Use for OS2 Fiber Optic System.
a. FastCAM Pre-polished Connector, SC (Blue), OS2 (Single-mode)
b. Part Number: Leviton 49991-SLC
c. Or Owner approved equal.

2.6 PATCH CORDS/JUMPERS

A. OS1/OS2, yellow. Factory-terminated, double-ended, 2-strand multimode cordage, UPC polish. Use for OS2 Fiber Optic System
a. 9/125 µm Single-mode (OS2) OFNR
b. Duplex LC-Duplex LC:
1) Part Number: Leviton UPDLC-S01 (1 meter)
2) Part Number: Leviton UPDLC-S02 (2 meter)
3) Part Number: Leviton UPDLC-S03 (3 meter)
c. Or Owner approved equal.

2.7 STATION CABLING – WORK AREA OUTLETS (THIS ALSO APPLIES TO THE PA SPEAKERS AND CLOCKS CALLED OUT ON THE SPECIAL SYSTEMS PLAN.)

A. Category 6A Unshielded Twisted Pair:

1. 100 ohm, Category 6A, 23 AWG, 4-pair unshielded twisted pair, LANmark-10G2, CMP rated.
a. Color: Blue. Data applications.
b. Part Numbers: Reel: 10130484 Reel in Box: 11085339
c. Maximum Cable Diameter: 0.300 inch.
d. Berk-Tek LANmark-10G2 CMP
e. Or Owner approved equal.

B. Category 6A Unshielded Twisted Pair:

1. 100 ohm, Category 6A, 23 AWG, 4-pair unshielded twisted pair, LANmark-10G2, CMP rated.
a. Color: White. For Voice applications.
b. Part Numbers: Reel: 10137384 Reel in Box: 11089901
c. Maximum Cable Diameter: 0.300 inch.
d. Berk-Tek LANmark-10G2 CMP
e. Or Owner approved equal.

C. Category 6A Modular Jacks:

1. Leviton 8-position eXtreme QuickPort modular jack, Category 6A, IDC terminals, T568A/B wiring scheme.
a. Color: blue. For Data applications.
b. Each Connector: Identified on its face as CAT 6A.
c. Part Number: Leviton 6110G-RL6 (blue).

d. Or Owner approved equal.

2. Leviton 8-position eXtreme QuickPort modular jack, Category 6A, IDC terminals, T568A/B wiring scheme.
   a. Color: white. For Voice Applications
   b. Each Connector: Identified on its face as CAT 6A.
   c. Part Number: Leviton 6110G-RW6 (white).
   d. Or Owner approved equal.

D. Atlas-X1 Category 6A Modular Patch Cords:

1. Atlas-X1 Slim-Line style, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   a. Color: blue. For Data applications at device end.
   b. Part Numbers:
      1) Leviton 6AS10-03L (3 feet, Blue).
      2) Leviton 6AS10-05L (5 feet, Blue).
      3) Leviton 6AS10-07L (7 feet, Blue).
      4) Leviton 6AS10-10L (10 feet, Blue).
      5) Leviton 6AS10-15L (15 feet, Blue).
   c. Or Owner approved equal.

2. High-flex Small Diameter, 28-gauge, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   a. Color: Blue. For Data applications at patch panel end.
   b. Part Numbers:
      1) Leviton HF6AU-01L (1 feet, Blue).
      2) Leviton HF6AU-05L (5 feet, Blue).
      3) Leviton HF6AU-07L (7 feet, Blue).
      4) Leviton HF6AU-10L (10 feet, Blue).
      5) Leviton HF6AU-15L (15 feet, Blue).
   c. Or Owner approved equal.

   Note: When using 28-gauge patch cords, de-rate the total channel length according to the chart in Appendix 1 at the end of this section.

3. Atlas-X1 Slim-Line style, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   a. Color: White. For Voice applications at user end.
      Part Numbers:
      1) Leviton 6AS10-03W (3 feet, White).
      2) Leviton 6AS10-05W (5 feet, White).
      3) Leviton 6AS10-07W (7 feet, White).
      4) Leviton 6AS10-10W (10 feet, White).
      5) Leviton 6AS10-15W (15 feet, White).
   b. Or Owner approved equal.

4. High-flex Small Diameter, 28-gauge, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   a. Color: White. For Voice applications at patch panel end.
   b. Part Numbers:
      1) Leviton HF6AU-01W (1 feet, White).
      2) Leviton HF6AU-05W (5 feet, White).
      3) Leviton HF6AU-07W (7 feet, White).
      4) Leviton HF6AU-10W (10 feet, White).
      5) Leviton HF6AU-15W (15 feet, White).
   c. Or Owner approved equal.

   Note: When using 28-gauge patch cords, de-rate the total channel length according to the chart in Appendix 1 at the end of this section.

E. Cat 6A Patch Panels:

1. eXtreme Cat 6A Flat 110-Style Patch Panel, 1RU, 24-Port, with 1 cable management bar.
   a. Part Number: Leviton 6A586-U24.
2. eXtreme Cat 6A Flat 110-Style Patch Panel, 2RU, 48-Port, with 2 cable management bars.
   a. Part Number: Leviton 6A586-U48.
   b. Or Owner approved equal.

F. Cable Management Clip:

1. Cable management clip, gray.
   a. Part Number: Leviton 49005-CMC.
   b. For cable management on the rear of every patch panel.
   c. 1RU patch panels require 1 cable management clip.
   d. 2RU patch panels require 2 cable management clips.
   e. Or Owner approved equal.

G. Flush-Mounted Stainless Steel Faceplates:
1. 1-port QuickPort single-gang stainless steel wallplate, with ID windows
   a. Part Number: Leviton 43080-1L1.
2. 2-port QuickPort single-gang stainless steel wallplate, with ID windows
   a. Part Number: Leviton 43080-1L2.
3. 4-port QuickPort single-gang stainless steel wallplate, with ID windows
   a. Part Number: Leviton 43080-1L4.
4. 6-port QuickPort single-gang stainless steel wallplate, with ID windows
   a. Part Number: Leviton 43080-1L6.
5. 4-port QuickPort dual-gang stainless steel wallplate, with ID windows
   a. Part Number: Leviton 43080-2L4.
6. 8-port QuickPort dual-gang stainless steel wallplate, with ID windows
   a. Part Number: Leviton 43080-2L8.

2.8 STATION CABLING – WIRELESS ACCESS POINTS (TWO DROPS PER DEVICE)

A. Category 6A Unshielded Twisted Pair:

1. 100 ohm, Category 6A, 23 AWG, 4-pair unshielded twisted pair, LANmark-10G2, CMP rated.
   a. Color: Green. For wireless applications.
   b. Part Numbers: Reel: 10137694 Reel in Box: 11085826
   c. Maximum Cable Diameter: 0.300 inch.
   d. Berk-Tek LANmark-10G2 CMP
   e. Or Owner approved equal.

B. Category 6A Modular Jacks:

1. Leviton 8-position eXtreme QuickPort modular jack, Category 6A, IDC terminals, T568A/B wiring scheme.
   a. Color: green.
   b. Each Connector: Identified on its face as CAT 6A.
   c. Part Number: Leviton 6110G-RV6 (green). For wireless applications.
   d. Or Owner approved equal.

C. Category 6A Modular Patch Cords:

1. Atlas-X1 Slim-Line style, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   a. Color: White. For wireless applications at AP end.
   b. Part Numbers:
      1) Leviton 6AS10-03G (3 feet, Green).

2) Leviton 6AS10-05G (5 feet, Green).
3) Leviton 6AS10-07G (7 feet, Green).
4) Leviton 6AS10-10G (10 feet, Green).
5) Leviton 6AS10-15G (15 feet, Green).

c. Or Owner approved equal.

2. High-flex Small Diameter, 28-gauge, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   a. Color: White. For wireless applications at patch panel end.
   b. Part Numbers:
      1) Leviton HF6AU-01G (1 feet, Green).
      2) Leviton HF6AU-05G (5 feet, Green).
      3) Leviton HF6AU-07G (7 feet, Green).
      4) Leviton HF6AU-10G (10 feet, Green).
      5) Leviton HF6AU-15G (15 feet, Green).
   c. Or Owner approved equal.

   Note: When using 28-gauge patch cords, derate the total channel length according to the chart in Appendix 1 at the end of this section.

D. In-Ceiling Bracket:

1. In-Ceiling Bracket, with clip for drop wire/rod mounting.
   a. Part Number: Leviton 49223-CBC. For wireless applications.
   b. Brackets must be installed on a dedicated drop wire/rod per NEC® 300.11
   c. Compatible with QuickPort Surface-Mount Boxes (fasteners included with bracket; boxes sold separately)
   d. Or Owner approved equal.

E. Surface Mount Box:

1. Surface Mount Box, 2-port, standard depth.
   a. Color: white. For wireless applications.
   b. Part Number: Leviton 41089-2WP.
   c. Brackets must be installed on a dedicated drop wire/rod per NEC® 300.11
   d. Compatible with QuickPort Surface-Mount Boxes (fasteners included with bracket; boxes sold separately)
   e. Or Owner approved equal.

F. Cat 6A Patch Panels:

1. eXtreme Cat 6A Flat 110-Style Patch Panel, 1RU, 24-Port, with 1 cable management bar.
   a. Part Number: Leviton 6A586-U24.
2. eXtreme Cat 6A Flat 110-Style Patch Panel, 2RU, 48-Port, with 2 cable management bars.
   a. Part Number: Leviton 6A586-U48.
   b. Or Owner approved equal.

G. Cable Management Clip:

2. Cable management clip, gray.
   a. Part Number: Leviton 49005-CMC.
   b. For cable management on the rear of every patch panel.
   c. 1RU patch panels require 1 cable management clip.
   d. 2RU patch panels require 2 cable management clips.
   e. Or Owner approved equal.

2.9 STATION CABLING – CAMERA LOCATIONS (SEE SPECIAL SYSTEMS DRAWINGS FOR LOCATIONS)

A. Category 6A Unshielded Twisted Pair:

1. 100 ohm, Category 6A, 23 AWG, 4-pair unshielded twisted pair, LANmark-10G2, CMP rated.
   a. Color: Yellow. For camera locations.
   b. Part Numbers: Reel: 10137694 Reel in Box: 11085826
   c. Maximum Cable Diameter: 0.300 inch.
   d. Berk-Tek LANmark-10G2 CMP
   e. Or Owner approved equal.

B. Category 6A Modular Jacks:

1. Leviton 8-position eXtreme QuickPort modular jack, Category 6A, IDC terminals, T568A/B wiring scheme.
   a. Color: Yellow.
   b. Each Connector: Identified on its face as CAT 6A.
   c. Part Number: Leviton 6110G-RV6 (Yellow). For Camera Locations.
   d. Or Owner approved equal.

C. Category 6A Modular Patch Cords:

1. Atlas-X1 Slim-Line style, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   d. Color: Yellow. For camera locations at the camera.
   e. Part Numbers:
      1) Leviton 6AS10-03G (3 feet, Yellow).
      2) Leviton 6AS10-05G (5 feet, Yellow).
      3) Leviton 6AS10-07G (7 feet, Yellow).
      4) Leviton 6AS10-10G (10 feet, Yellow).
      5) Leviton 6AS10-15G (15 feet, Yellow).
   f. Or Owner approved equal.
2. High-flex Small Diameter, 28-gauge, Category 6A, shielded cord (use same cord for shielded or unshielded systems) 4-pair, stranded wire construction.
   d. Color: Yellow. For cameras at patch panel end.
   e. Part Numbers:
      1) Leviton HF6AU-01G (1 feet, Yellow).
      2) Leviton HF6AU-05G (5 feet, Yellow).
      3) Leviton HF6AU-07G (7 feet, Yellow).
      4) Leviton HF6AU-10G (10 feet, Yellow).
      5) Leviton HF6AU-15G (15 feet, Yellow).
   f. Or Owner approved equal.

   Note: When using 28-gauge patch cords, derate the total channel length according to the chart in Appendix 1 at the end of this section.

D. In-Ceiling Bracket:

1. In-Ceiling Bracket, with clip for drop wire/rod mounting.
   f. Part Number: Leviton 49223-CBC. For Camera Locations.
   g. Brackets must be installed on a dedicated drop wire/rod per NEC® 300.11
   h. Compatible with QuickPort Surface-Mount Boxes (fasteners included with bracket; boxes sold separately)
   i. Or Owner approved equal.

E. Surface Mount Box:

1. Surface Mount Box, 2-port, standard depth.
   a. Color: white. For Camera Locations.
   b. Part Number: Leviton 41089-2WP.
   c. Brackets must be installed on a dedicated drop wire/rod per NEC® 300.11
   d. Compatible with QuickPort Surface-Mount Boxes (fasteners included with bracket; boxes sold separately)
   e. Or Owner approved equal.

F. Cat 6A Patch Panels:

1. eXtreme Cat 6A Flat 110-Style Patch Panel, 1RU, 24-Port, with 1 cable management bar.
   b. Part Number: Leviton 6A586-U24.
2. eXtreme Cat 6A Flat 110-Style Patch Panel, 2RU, 48-Port, with 2 cable management bars.
   c. Part Number: Leviton 6A586-U48.
   d. Or Owner approved equal.

G. Cable Management Clip:

3. Cable management clip, gray.
   a. Part Number: Leviton 49005-CMC.
   b. For cable management on the rear of every patch panel.
   c. 1RU patch panels require 1 cable management clip.
   d. 2RU patch panels require 2 cable management clips.
   e. Or Owner approved equal.

2.10 CABLE MANAGEMENT SYSTEM

A. The cable management system shall be used to provide a neat and efficient means for routing and protecting fiber and copper cables and patch cords on telecommunication racks and enclosures. The system shall be a complete cable management system comprising 4-post and 2-post floor mount racks, wall mount racks, and vertical cable managers to manage cables on both the front and rear of the rack. The system shall protect network investment by maintaining system performance, controlling cable bend radius, and providing cable strain relief.

1. MDF and IDF 4-Post Equipment Racks

   a. At the MDF and IDF rooms, the Contractor shall provide and install 4 post adjustable equipment racks per drawings to house cable termination components (e.g., copper data and fiber optic) and network electronics or severs (by others). Prior to installation, the Contractor shall coordinate exact placement with Owner.
   b. The 4-post rack shall conform to the following requirements:
      1) Rack shall be 84" in height and shall be self-supporting.
      2) Channel uprights shall be spaced to accommodate industry standard 19" mounting.
      3) Rack must be constructed of aluminum.
      4) Rack shall be double side drilled and tapped to accept 12-24 screws. Uprights shall also be drilled on back to accept cable brackets, clamps, power strip(s), etc. Hole pattern on rack front shall be per EIA/TIA specifications (5/8"-5/8"-1/2"). Hole pattern on the rear shall be at 3" intervals to accept cable brackets.
      5) Rack should be supplied with at least 24 spare screws.
      6) Rack should be supplied with a ground bar and #6 AWG ground Terminal Block CPI part# 40167-001.
   c. Equipment rack shall be CPI part # 50120-X03.

2. IDF 2-Post Equipment Racks

    a. At the MDF and IDF rooms the Contractor shall provide and install 2-post adjustable equipment racks per drawings to house cable termination components (e.g., copper data and fiber optic). Prior to installation, the Contractor shall coordinate exact placement with Owner.
    b. The rack shall conform to the following requirements:
        1) Rack shall be 84" in height and shall be self-supporting.
        2) Channel uprights shall be spaced to accommodate industry standard 19" mounting and have pass-through holes with smooth edges to protect cables.
        3) Rack must be constructed of aluminum.
        4) Rack shall be double side drilled and tapped to accept 12-24 screws. Uprights shall also be drilled on back to accept cable brackets, clamps, power strip(s), etc. Hole pattern on rack front shall be per EIA/TIA specifications (5/8"-5/8"-1/2"). Hole pattern on the rear shall be at 3" intervals to accept cable brackets.
        5) Rack should be supplied with at least 24 spare screws.
        6) Rack should be supplied with a ground bar and #6 AWG ground Terminal Block CPI part# 40167-001.
        7) Equipment rack shall be CPI part # 55053-X03.

B. Horizontal and Vertical Ladder Rack

1. At each MDF and IDF room, the Contractor shall provide and install sufficient ladder rack to support cable bundles from corridor to equipment racks or cabinet. Ladder rack shall be grounded, supported and installed per manufactures specifications. See project drawings for ladder rack layout.

    a. Ladder rack shall be:
        1) Straight sections CPI part # 10250-712.
        2) Radii and bends CPI part # 10822-712
    b. Grounding Hardware.
        1) Grounding Strap CPI part # 40164-001
    c. Support Hardware.
        1) Runway Elevation 4”, CPI part # 10506-706
        2) Wall Support CPI part # 11421-712
        3) Triangular Support CPI part# 11312-712
    d. Cable Management.
        1) Radius Drops CPI part # 12100-712.

C. Vertical Cable Management

1. At the telecommunication rooms, vertical cable management shall be furnished and installed to adjacent racks to organize cables on front and rear of telecommunication racks.
2. Vertical cable managers shall include components that aid in routing, managing, and organizing cable to and from equipment. Panels shall protect network equipment by controlling cable bend radius and providing cable strain relief. Panels shall be a universal design mounting to EIA 19" or 23" racks.
3. Vertical cable management system shall feature the following:

    a. Open cabling section on the rear that provides easy access and routes cable bundles feeding into the back of patch panels and 1 RMU cable guide on the front designed for fanning and managing patch cords.
    b. Edge-protected pass-through ports designed for easy routing of cable from front

channel to back.

c. Vertical slots along the center separator to allow securing cable bundles neatly with management straps.
d. Door/cover (front only) that is easily opened from the right or left and still easily removed to allow for quick moves, adds, and changes.
e. Movable wire retainers to retain the cables during cover removal.

4. Vertical cable management shall be CPI part # 30162-703 & 30163-703.

2.11 TELECOMMUNICATION GROUNDING

A. Racks, trays, and telecommunications equipment installed by this contractor.

1. Grounding lugs shall be Chatsworth part # 40162-XXX

2.12 FIRESTOPPING MATERIAL

A. All penetrations of firewalls must be approved by the General Contractor before any penetrations are made. Should the Contractor find it necessary to penetrate any walls extending to the slab, it will be the responsibility of that Contractor to provide satisfactory sleeving and fire caulking both inside and outside of that sleeving. If existing sleeving is to be utilized, it will be the responsibility of the Contractor to fire caulk inside the sleeving.

B. The Contractor is responsible for adhering to the following standards:

1. Conduit penetrations through fire-rated or smoke walls: Completely seal around the conduit penetration with Hilti FS 601 fire-rated sealant Tremco or 3M or equal.
2. Conduit sleeves through fire-rated or smoke wall: Completely seal around the conduit penetration with Hilti FS 601 fire-rated sealant Tremco or 3M or equal. Completely seal inner opening of the conduit sleeve with fire wool packing and Hilti FS 611A intumescent fire stop sealant.
3. Cable bundles through fire-rated or smoke walls (without sleeves): Completely seal openings with Hilti FS 611A intumescent fire stop sealant, Tremco or 3M or equal.
4. Cable tray penetrations through fire-rated or smoke walls: Completely seal openings with Hilti FS 635 (trowelable type) Tremco or 3M or equal.

C. A submitted response to this specification assumes that all firestopping will be provided as specified. The firestop manufacturer's specifications and instructions shall be submitted with the final documentation.

2.13 CABLE HOOK SYSTEM

A. In the areas where the cables are required to be run in a "free-air" plenum, a cable hook system shall be used.
B. Cable hooks shall be capable of supporting a minimum of 30 lbs with a safety factor of 3.
C. Spring steel cable hooks shall be capable of supporting a minimum of 100 lbs with a safety factor of 3 where extra strength is required.
D. Follow manufacturer's recommendations for allowable fill capacity for each size of cable hook.
E. Installation and configuration shall conform to the requirements of the ANSI/ EIA/TIA Standards 568A & 569, NFPA 70 (National Electrical Code), and applicable local codes.
F. Cable hooks shall:

1. Have a flat bottom and provide a minimum of 1 5/8" cable bearing surface.
2. Have 90-degree radiused edges to prevent damage while installing cables.
3. Be designed so the mounting hardware is recessed to prevent cable damage.
4. Have a stainless-steel cable latch retainer to provide containment of cables within the hook.
5. Have a retainer that shall be removable and reusable.
6. Be factory assembled for direct attachment to walls, hanger rods, beam flanges, purlins,

strut, and floor posts, to meet job conditions.

G. Factory assembled multi-tiered cable hooks shall be used where required to provide separate cabling compartments, or where additional capacity is needed.
H. Cable hooks for non-corrosive areas shall be pre-galvanized steel, ASTM A653 G90. Where additional strength is required, cable hooks shall be spring steel with a zinc-plated finish, ASTM B633, SC3.
I. Cable hooks for corrosive areas shall be stainless steel, AISI type 304.
J. Cable hooks shall be B-Line series BCH21, BCH32 or other manufacturer that meets these specifications.

2.14 TWISTED PAIR TEST EQUIPMENT

A. Test equipment used under this contract shall be from a manufacturer who has a minimum of five years' experience in producing field test equipment. Manufacturers must be ISO 9001 certified.
B. All test tools of a given type shall be from the same manufacturer and have compatible electronic results output. Test adapter cable must be approved by the manufacturer of the test equipment. Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.
C. Test equipment must:

1. Be capable of certifying Category 5E, 6, and 6A permanent links.
2. Have a dynamic range of at least 100dB to minimized measurement uncertainty.
3. Be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.
4. Include S-band time domain diagnostics for NEXT and return loss.
5. Be capable of running individual NEXT, return loss, etc., measurements in addition to AutoText.
6. Include a library of cable types, stored by major manufacturer.
7. Store at least 1000 Category 6A auto tests in internal memory.

D. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurements.
E. The approved manufacturer of the test equipment is Fluke/Micro test.

2.15 WALL MOUNT EQUIPMENT RACK

A. Where indicated on Project Drawings, the Contractor shall provide and install one (1) wall mount cabinet to house cable termination panels and network electronics. The Contractor shall also provide and install one (1) ¾" plywood backboard for support when mounting cabinet.
B. The Contractor shall coordinate with Electrical Contractor to install a power outlet into cabinet.
C. Cabinets shall come with two (2) fans and one (1) 8-outlet 20 amp rack mount power strip.
D. Fans shall be Chatsworth 12804-701.
E. Power Strip shall be Chatsworth 12820-707.
F. 36"H x 30"D Cabinet shall be Chatsworth 12419-736.

2.17 LABELS

A. All labels shall be permanent and be machine generated (e.g., Brady or Panduit). No handwritten or non-permanent labels shall be allowed. Labels shall be Brady "I.D. Pro" or XC- Plus or equivalent. Labeling on backboards and/or equipment racks may be pre-cut adhesive type.
B. Characters on all labels shall be black printed on a white background.
C. Label size should be appropriate to the cable size(s), outlet faceplate layout, patch panel design, or other related equipment sizes and layouts.

D. All labels to be used on cables shall be self-laminating, white/transparent vinyl, and be wrapped around the cable sheath. The labels shall be of adequate size to accommodate the circumference of the cable being labeled and properly self-laminated over the full extent of the printed area of the label.
E. Labels used to identify innerduct carrying fiber optic cable shall be labeled with a durable yellow polyethylene tag that reads “CAUTION Fiber Optic Cable” and includes blank spaces for adding (1) fiber count and (2) destination information. An example of a compliant product is VIP Products’ “Caution Write-On Coverall Tag.”

PART 3 - EXECUTION & INSTALLATION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper and timely completion.
B. Verify cable lengths comply with published standards.

1. Notify Owner of installation that would exceed maximum lengths prior to installation of cable.

C. Contactor shall consult with Owner regarding alternative routing or location of cable.
D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION REQUIREMENTS

A. Contractor shall furnish and install all cables, connectors, and equipment as shown on drawings and as specified above.
B. It is the Contractor’s responsibility to survey the site and include all necessary costs to perform the installation as specified. This includes any modifications required to route and conceal horizontal distribution wiring.
C. Beginning installation means contractor accepts existing conditions.
D. Contractor shall furnish all required installation tools to facilitate cable pulling without damage to the cable jacket. Such equipment is to include, but not be limited to, sheaves, winches, cable reels, cable reel jacks, duct entrance tunnels, pulling tension gauge, and similar devices. All equipment shall be of substantial construction to allow steady progress once pulling has begun. Makeshift devices that may move or wear in a manner to pose a hazard to the cable shall not be used.
E. All cable shall be pulled by hand unless installation conditions require mechanical assistance. Where mechanical assistance is used, care shall be taken to ensure that the maximum tensile load for the cable as defined by the manufacturer is not exceeded. This may be in the form of continuous monitoring of pulling tension, use of a “break-away,” or other approved method.
F. The contractor will be responsible for identifying and reporting to the General Contractor any existing damage to walls, flooring, tiles, and furnishings in the work area prior to start of work. All damage to interior spaces caused by the installation of cable, raceway, or other hardware must be repaired by the Contractor.
G. Repairs must match preexisting color and finish of walls, floors, and ceilings. Any Contractor- damaged ceiling tiles, floor, and carpet are to be replaced to match color, size, style, and texture.
H. Where unacceptable conditions are found, the Contractor shall bring this to the attention of the construction supervisor immediately. A written resolution will follow to determine the appropriate action to be taken.
I. Qualified personnel utilizing state-of-the-art equipment and techniques shall complete all installation work. During pulling operation, an adequate number of workers shall be present to allow cable observation at all points of duct entry and exit as well as to feed cable and operate pulling machinery.
J. Cable pulling shall be done in accordance with cable manufacturer’s recommendations and

ANSI/IEEE C2 standards. Manufacturer's recommendations shall be a part of the cable submittal. Recommended pulling tensions and pulling bending radius shall not be exceeded. Any cable bent or kinked to radius less than recommended dimension shall not be installed.

K. All wiring shall be run "free-air," in conduit, in a secured plastic raceway or in modular furniture as designated on the drawings. All cable shall be free of tension at both ends. PLENUM rated cable MUST be used in areas used for air handling.

L. Avoid abrasion and other damage to cables during installation.

M. Pulling lubricant may be used to ease pulling tensions. Lubricant shall be of a type that is non- injurious to the cable jacket and other materials used. Lubricant shall not harden or become adhesive with age.

N. The cable system will be tested and documented upon completion of the installation as defined in the section below.

O. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit or surface mount raceway. Should it be found by the Consultant that the materials or any portion thereof furnished and installed under this contract fail to comply with the specifications and drawings with the respect or regard to the quality, amount of value of materials, appliances, or labor used in the work, it shall be rejected, removed, and replaced by the Contractor and all work distributed by changes necessitated in consequence of said defects or imperfections shall be corrected at the Contractor's expense.

3.3 CABLE SUPPORT

A. J-hooks fabricated to contain data/voice and video cables may be used to support 25 or fewer cables in each hook. J-hooks are to be fastened to building steel with beam clamps, suspended from ceiling slab with threaded rod, or anchored to the wall. All J-hooks are to be hung straight and level. No other installation technique will be authorized unless pre-approved.

B. Three tiered double-sided J-hook configurations shall contain a maximum of 25 cables per hook or 150 cables. Smaller configurations may be used as bundles decrease in size, maintaining no more than 25 cables per hook.

C. Bundles surpassing 150 cables must be supported by hangers, fabricated of 3/8" threaded rod and 24" Unistrut. Hangers must also be installed where the installation of a three-tiered J-hook system is not appropriate for the ceiling space, or where blocked by other trades' work.

D. Cable bundles consisting of fewer than 10 cables may be supported by bridle rings or D-rings.

E. All cable support in the main cable path must be installed every four feet. Small cable bundles (under 25) not in the main path may be supported every five feet.

F. A sag must be maintained between supports of 6", to reduce cable strain. Tie wraps are appropriate methods of securing cables, when properly used and not over tightened. Over tight tie wraps dent and pinch the cable jackets and will not be allowed.

G. Proper cable support is extremely important to the Owner, and care shall be taken by the Contractor to provide and install the appropriate supports. Supports found to be inadequate will be replaced.

3.4 FIBER OPTIC CABLE INSTALLATION REQUIREMENTS

A. Cable slack shall be provided in each backbone fiber optic cable. This slack is exclusive of the length of fiber that is required to accommodate termination requirements and is intended to provide for cable repair and/or equipment relocation. The cable slack shall be stored in a fashion as to protect it from damage and be secured in the termination enclosure or a separate enclosure designed for this purpose. Multiple cables may share a common enclosure.

B. A minimum of five meters (approximately 15 feet) of slack cable (each cable, if applicable) shall be coiled and secured at one (1) end—preferably at the entrance room and/or main equipment room.

C. Exact cable termination locations shall be field verified with Owner.

D. Where exposed, all backbone fiber optic cable shall be installed in protective inner duct. This includes areas where the cable is routed in cable tray and where making a transition between

paths (e.g., between conduit & cable tray or into equipment racks). The inner duct should extend into the termination and/or storage enclosure(s) at system endpoints.

3.5 STATION CABLING

A. Information outlet cables with copper media (voice & data UTP and "TV" coax) shall be located as detailed on the project drawings.
B. The Contractor should utilize these documents in determining materials quantities and routing.
C. Station cables shall be run to the information outlet from the MER/TR serving each area in conduit, free-air above drop ceiling, in cable tray, and/or in modular furniture.
D. The maximum station cable drop length for UTP cables shall not exceed 295 feet (90 meters) in order to meet data communications performance specifications. This length is measured from the termination panel in the wiring closet to the outlet and must include any slack required for the installation and termination. The Contractor is responsible for installing station cabling in a fashion as to avoid unnecessarily long runs. Any area that cannot be reached within the above constraints should be identified and reported to the Consultant prior to installation. The Consultant should approve changes to the plan.
E. The minimum station cable drop length for UTP cables shall be no less than 60 feet. The Contractor is responsible for installing station cabling in a fashion as to avoid runs less than 60 feet. If cable slack is required to accommodate the minimum length requirements, the Contractor is responsible for storing the slack in a fashion as to protect the cable from damage. The cable slack shall be secure above the ceiling tiles in a figure 8 form by means of J-hooks or D rings anchored to the building structure. The cable slack shall be coiled to maintain from 100% to 200% of the cable recommended minimum bend radius. Multiple cables may share a common support.
F. All cables shall be installed splice-free unless otherwise specified.
G. During pulling operation, an adequate number of workers shall be present to allow cable observation at all points of duct entry and exit as well as the feed cable and operate pulling machinery.
H. Avoid abrasion and other damage to cables during installation.
I. All cable shall be free of tension at both ends. In cases where the cable must bear some stress, K-basket type grips may be used to spread the strain over a longer length of cable.
J. Where installed free-air, installation shall consider the following:

    1. Cable shall run at right angles and be kept clear of other trades' work.
    2. Cables shall be supported according to code, using "J" or "Bridal-type" mounting rings anchored to ceiling concrete, walls, piping supports, or structural steel beams.
    3. Rings shall be designed to maintain cable bend to larger than the minimum bend radius (typically 4 x cable diameter).
    4. Supports should be spaced at a maximum 4-foot interval unless limited by building construction. If cable "sag" at mid-span exceeds 6 inches, another support shall be used.

K. Cable shall never be laid directly on the ceiling grid.
L. Cables shall not be attached to existing cabling, plumbing, or steam piping, ductwork, ceiling supports, or electrical or communications conduit.
M. Manufacturers' minimum bend radius specifications shall be observed in all instances. Care should be taken in the use of cable ties to secure and anchor the station cabling. Ties should not be over tightened as to compress the cable jacket. No sharp burrs should remain where excess length of the cable tie has been cut.
N. Cable sheaths shall be protected from damage from sharp edges. Where a cable passes over a sharp edge, a bushing or grommet shall be used to protect the cable.
O. A coil of one foot in each cable shall be placed in the ceiling at the last support (e.g., J-hook, Bridal Ring) before the cables enter a fishable wall, conduit, surface raceway, or box. At any location where cables are installed into movable partition walls or modular furniture via a service pole, approximately 15 feet of slack shall be left in each station cable under 250 feet in length to allow for change in the office layout without re-cabling. These "service loops" shall be secured

at the last cable support before the cable leaves the ceiling and shall be coiled from 100% to 200% of the cable recommended minimum bend radius.

P. To reduce or eliminate EMI, the following minimum separation distances from □480V power lines shall be adhered to:

1. Twelve (12) inches from power lines of 5-kVa
2. Eighteen (18) inches from high voltage lighting (including fluorescent)
3. Thirty-nine (39) inches from power lines of 5-kVa or greater
4. Thirty-nine (39) inches from transformers and motors

Q. All openings shall be sleeved and fire stopped per prevailing code requirements upon completion of cable installation.

3.6 INFORMATION OUTLET

A. Information outlets shall be flush mounted on wall-mounted boxes, in floor-mounted boxes, on surface raceway, or on modular furniture.

B. Any outlets to be added where these conditions are not met shall be positioned at a height matching that of existing services or as directed otherwise by the Site Coordinator and the Consultant. Nominal height (from finished floor to center line of outlet) in new installation shall be as follows:

1. Standard Voice & Data Outlet (SIO) shall match adjacent electrical outlets.
2. Wall-Mounted Telephone Outlet (Standard Voice only) shall meet ADA requirements.

C. The Contractor is to coordinate the style of the telecommunication outlets to be installed in the floor mount boxes and surface mount raceways with the Owner.

3.7 CABLE TERMINATION

A. At the telecommunication closet, all data cables shall be positioned on termination hardware in sequence of the outlet ID, starting with the lowest number.

B. Termination hardware (blocks and patch panels) positioning and layout must be reviewed and approved by the Consultant prior to construction. The review does not exempt the Contractor from meeting any of the requirements stated in this document.

C. Cable Termination – Data UTP

1. Data patch panels shall be designed and installed in a fashion as to allow future station cabling to be terminated on the panel without disruption to existing connections.
2. Data patch panels shall be sized to accommodate a minimum of 20% growth in the quantity of stations relative to the initial installation.
3. At information outlets and data patch panels, the installer shall ensure that the twists in each cable pair are preserved to within 0.5 inch of the termination for data cables. The cable jacket shall be removed only to the extent required to make the termination.

D. Cable Termination – Fiber Optic

1. All fibers shall be terminated using the specified connector type.
2. All terminated fibers at the telecommunications closets shall be mated to couplings mounted on patch panels. Couplings shall be mounted on a panel that, in turn, snaps into the housing assembly. Any unused panel positions shall be fitted with a blank panel inhibiting access to the fiber optic cable from the front of the housing.
3. All couplings shall be fitted with a dust cap.
4. Fibers from multiple locations may share a common enclosure, but they must be segregated on the connector panels and clearly identified. Fibers from multiple destinations may be secured in a common enclosure, provided they are clearly identified as such. Fibers from different locations shall not share a common connector panel (e.g.,

"insert").

5. Slack in each fiber shall be provided as to allow for future re-termination in the event of connector or fiber end-face damage. Adequate slack shall be retained to allow termination at a 30" high workbench positioned adjacent to the termination enclosure(s). A minimum of one meter (~39") of slack shall be retained regardless of panel position relative to the potential work area.
6. Contractor shall install a plastic twist-on bushing on each end of interlocking armored fiber to protect cable from sharp edges of the armor.

3.8 SURFACE RACEWAY SYSTEM

A. In areas where surface raceway will be used as a cable path, no exposed cable shall be permitted.
B. With the agreement of the Consultant and Owner, if a telecommunications outlet is required in an area where the walls cannot be fished, the station cable serving these outlets shall be covered with raceway. No exposed cable shall be permitted within offices, laboratories, and conference rooms, or like facilities. Contractor shall attempt to fish hollow walls, use existing conduit, or exhaust all other options to conceal cabling prior to installing surface raceway.
C. The raceway shall originate from a surface mounted box located off the floor and be attached to the wall and terminate above the ceiling. The outlet box height shall match existing electrical receptacle height. Raceway for a wall-mounted location shall originate from a surface mounted box with the top of the box located 48" off the floor.
D. Minimum bend radius shall be adhered to for UTP and fiber optic cable.
E. Where raceway is to be installed on painted, smooth, finished surfaces, the contractor shall clean surface prior to installing raceway.
F. Where non-metallic raceway is to be installed on non-smooth surfaces such as wallpaper, unpainted brick, concrete, etc., the Contractor shall use flat head screws in addition to the adhesive backing to fasten channel to surfaces.
G. Where contractor is required to install metallic raceway, the raceway base shall be installed using flat head screws and following all manufacturer's recommendations.
H. Where new outlet locations are indicated on project drawings as having existing Wiremold™ type raceway, the Contractor shall remove existing raceway from wall and install new specified raceway to cover any damage or markings caused from removing existing raceway product.
I. All surface raceway shall be mounted level and plumb. Where the Owner considers raceway channels to be installed unsatisfactorily, the Contractor shall remove and replace necessary channels at no additional cost to the Owner.
J. Suitable insulating bushings and inserts must be used at connections to outlets and corner fittings. Dropped ceiling end fittings shall be utilized where raceway channel connects to dropped accessible ceiling tile. In rooms with drywall ceilings, open ceilings, or non-accessible ceilings, the Contractor shall extend raceway to the nearest location, hallway, or corridor that has accessible ceiling cavity. All cables shall be concealed.

3.9 EQUIPMENT RACK

A. Prior to permanently securing racks or cabinets, the Contractor shall coordinate a walk through with the Owner to determine exact placement of racks.
B. The Contractor shall bolt the rack to the floor as recommended by the manufacturer. Multiple racks shall be joined and the ground made common on each. Rack shall also be stabilized by extending a brace extending to the wall. Alternately, overhead cable tray over which the cabling accesses the equipment rack(s) shall provide this function.
C. Where possible, a space between the rack upright and the wall (~4") should be planned to allow for cabling in that area. The rear of the rack should be ~40" from the wall to allow for access by maintenance personnel. In all cases, a minimum of 40" workspace in front of the rack is also required. Locations where these guidelines cannot be followed should be brought to the attention of the Consultant for resolution prior to installation.

D. All hardware and equipment is to be mounted at least 18" above floor level. This is to afford easy access and, in the case of the lower limit, prevent damage to the components. Positioning of hardware should be reviewed and approved by the Consultant and Site Coordinator(s) prior to installation.

E. Equipment rack shall be equipped with cable management hardware to allow an orderly and secure routing of twisted pair cabling to the data patch panels. At minimum, one such horizontal jumper management panel shall be placed below each fiber optic patch panel installed by the Contractor. Additional jumper management panels may be required pending installation of other cable types on the rack. The rack shall be grounded to the telecommunications ground (TGB) using a #6 AWG (or larger) insulated stranded copper conductor (GREEN jacket).

3.10 COOPERATION

A. The Contractor shall cooperate with other trades and General Contractor's personnel in locating work in a proper manner.

B. Should it be necessary to raise, lower, or move longitudinally any part of the work to better fit the general installation, such work shall be done at no extra cost to the Owner, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.

3.11 TESTING AND ACCEPTANCE

A. The Contractor is responsible for performing acceptance tests as indicated below for each subsystem (backbone, station, etc.) as it is completed.

B. The Contractor is responsible for supplying all equipment and personnel necessary to conduct the acceptance tests. Prior to testing, the Contractor should provide a summary of the proposed test plan for each cable type, including equipment to use, setup, test frequencies or wavelengths, results format, etc. The Consultant shall approve the method of testing.

C. The Contractor shall visually inspect all cabling and termination points to ensure that they are complete and conform to the wiring pattern defined herein. The Contractor shall provide the Consultant with a written certification that this inspection has been made.

D. The Contractor shall conduct acceptance testing according to a schedule coordinated with the Consultant. Representatives of the Owner may be in attendance to witness the test procedures. The Contractor shall provide a minimum of one (1) week advance notice to the Consultant and Owner as to allow for such participation. The notification shall include a written description of the proposed conduct of the tests, including copies of blank test result sheets to be used.

E. All documentation, including hard copy and electronic forms, shall become the property of the Owner.

F. The Consultant may request that a 10% random field re-test be conducted on the cable system—at no additional cost—to verify documented findings.

G. Tests related to connected equipment of others should be done only with the permission and presence of Contractor involved. The Contractor shall ascertain that testing only as required to prove the wiring connections are correct.

H. The Contractor shall provide test results and describe the conduct of the tests, including the date of the tests, the equipment used, and the procedures followed. At the request of the Consultant, the Contractor shall provide copies of the original test results.

I. All cabling shall be 100% fault free unless noted otherwise. If any cable is found to be outside the specification defined herein, that cable and the associated termination(s) shall be replaced at the Contractor's expense. The applicable tests shall then be repeated.

J. Backbone copper cables shall be free of shorts within the pairs and be verified for continuity, pair validity and polarity, and conductor position on the termination blocks (e.g., 110). Any mispositioned pairs must be identified and corrected. The percentage of "bad" pairs shall not exceed 1% in any backbone (riser or tie) cable based on total pair count. All bad pairs must be identified and documented.

3.12 COPPER STATION CABLES

A. Station cabling testing shall be from the jack at the outlet in the work area to the termination block on which the cables are terminated at the MDF or IDF.
B. Testing shall be of the permanent link. Contractor shall warrant performance, however, based on channel performance and provide patch cords that meet channel performance criteria. All cabling not tested strictly in accordance with these procedures shall be retested at no cost to the Owner.
C. Testing shall be from the jack at the SIO to the patch panel on which the cables are terminated at the wiring hub.
D. Horizontal “station” cables shall be free of shorts within the pairs and shall be verified for continuity, pair validity and polarity, and wire map (conductor position on the modular jack). Any defective, split, or mispositioned pairs must be identified and corrected.
E. Testing of the cabling systems rated at TIA Category 6 and above shall be performed to confirm proper functioning and performance.
F. Testing of the transmission performance of station cables (Category 6A) shall include the following:

1. Length
2. Attenuation
3. Pair to Pair NEXT
4. ACR
5. PSNEXT Loss
6. Return Loss
7. Pair to Pair ELFEXT Loss (Equal Level Far End Cross-Talk)
8. PSEFEXT Loss
9. Propagation Delay
10. Delay Skew
11. Return Loss

G. The maximum length of station cable shall not exceed 90 meters, which allows 10 meters for equipment and patch cables.
H. In the event results of the tests are not satisfactory, the Contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests that disclosed faulty or defective material, equipment, or installation method. The Contractor shall make additional tests as the Engineer deems necessary at no additional expense to the Owner or Consultant.
I. All data shall indicate the worst-case result, the frequency at which it occurs, the limit at that point, and the margin. These tests shall be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information shall be provided for all pairs or pair combination and in both directions when required by the appropriate standards.
J. Cables shall be tested to the maximum frequency defined by the standards covering that performance category. Transmission Performance Testing shall be performed using a test instrument designed for testing to the specified frequencies. Test records shall verify “PASS” on each cable and display the specified parameters—comparing test values with standards-based “templates” integral to the unit.

3.13 FIELD TEST REQUIREMENTS FOR FIBER OPTIC CABLING SYSTEM

A. The fibers utilized in the installed cable shall be traceable to the manufacturer. Upon request by the Owner, the Contractor shall provide cable manufacturer’s test report for each reel of cable provided. These test reports shall include the manufacturer’s on reel attenuation test results at 850-nm and 1300-nm for each optical fiber of each reel prior to shipment from the manufacturer.
B. Factory data shall be provided upon request, showing on-the-reel bandwidth performance

results as tested at the factory.

C. Every fiber optic backbone link in the installation shall be tested in accordance with the field test specifications defined by the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-B or by the appropriate network application standard(s), whichever is more demanding. See Section 3.15.

D. The test shall include the representative connector performance at the connecting hardware associated with the mating of patch cords. The test does not, however, include the performance of the connector at the interface with the test equipment.

E. 100% of the installed cabling links must be tested and must pass the requirements of the standards mentioned above and as further detailed in this document. Any failing link must be diagnosed and corrected at no additional cost to the Owner. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with RFP.

F. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:

1. The manufacturer of the fiber optic cable and/or the fiber optic connectors
2. The manufacturer of the test equipment used for the field certification
3. Training organizations authorized by BICSI

G. Field test instruments for multimode fiber cabling shall meet the requirements of ANSI/TIA/EIA- 526-14A. The light source shall meet the launch requirements of ANSI/EIA/TIA-455-50B, Method A. This launch condition can be achieved either within the field test equipment or by use of an external mandrel wrap (as described in clause 11 of ANSI/TIA/EIA-568-B.1) with a Category 1 light source.

H. Field test instruments for single mode fiber cabling shall meet the requirements of ANSI/EIA/TIA-526-7.

I. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.

J. The fiber optic launch cables and adapters must be of high quality and the cables shall not show excessive wear resulting from repetitive coiling and storing of the tester interface adapters.

K. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests.

L. Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter.

M. A representative of the Owner shall be invited to witness field testing. The representative shall be notified of the start date of the testing phase five business days before testing begins.

N. A representative of the Owner will select a random sample of 5% of the installed links. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the Pass/Fail determination, the installation contractor, under supervision of the Owner representative, shall repeat 100% of the testing. The cost of retesting shall be borne by the installation contractor.

3.14 FIBER PERFORMANCE TEST MATERIALS

A. The link attenuation shall be calculated by the following formulas specified in ANSI/TIA/EIA standard 568-B.

1. Link Attenuation = Cable_Attn + Connector_Attn + Splice_Attn
2. Cable_Attn (dB) = Attenuation Coefficient (dB/km) * Length (Km)

3. Connector_Attn (dB) = number_of_connector_pairs * connector loss (dB)
4. Maximum allowable mated connectors loss = 0.50 dB
5. Splice_Attn (dB) = number of splices (S) * splice loss (dB)
6. Maximum allowable splice loss = 0.1 dB

Type of Optical Fiber	Wavelength (nm)	Attenuation Coefficient (dB/km)
Multimode 62.5/125 µm	850	3.5
	1300	1.5
Multimode 50/125 µm	850	3.5
Singlemode (Inside plant)	1300	1.5
	1310	0.5
	1550	0.4
Singlemode (Outside plant)	1310	0.4
	1550	0.5

B. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices—i.e., it does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

C. Test equipment that measures the link length and automatically calculates the link loss based on the above formulas is preferred.

D. The above link test limits attenuation are based on the use of the One Reference Jumper Method specified by ANSI/TIA/EIA-526-14A, Method B and ANSI/TIA/EIA-526-7, Method A.1. The user shall follow the procedures established by these standards or application notes to accurately conduct performance testing.

E. The backbone link (multimode/single mode) shall be tested in two directions at both operating wavelengths to account for attenuation deltas associated with wavelength.

F. Multimode backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A.

G. Because backbone length and the potential number of splices vary depending upon site conditions, the link attenuation equation shall be used to determine limit (acceptance) values.

H. Multimode backbone links are designed to be used with network applications that use laser light sources (underfilled launch conditions). However, the link attenuation equation has been based upon the use of a light source categorized as Category 1, Overfilled.

I. Single mode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1. All single mode links shall be certified with test tools using laser light sources at 1310 nm and 1550 nm.

3.15 FIRESTOPPING

A. Fire rated walls. Sealing material and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work.

B. Creation of such openings as are necessary for cable passage between locations as shown on the drawings shall be the responsibility of the Contractor. Any openings created by or for the Contractor and left unused shall also be sealed as part of this work.

3.18 LABELING OF CABLING AND TERMINATION COMPONENTS

A. Backboard and Equipment Racks
   1. Backboards and equipment racks shall be labeled by the Contractor identifying the telecommunication room. Additionally, equipment racks shall have an alpha character after the room number unique to that particular communications closet. For example, MDF-A would be the first rack in the MDF.
   2. Character height shall be 1-inch (minimum).

B. Cabling
   1. Horizontal cables shall have a machine generated wrap around cable label within 4" of each end of the cable. Label shall be clearly legible and meet TIA-EIA 606 standards. Character height shall be .25" (minimum).
   2. Voice/Data/Video backbone cables shall have a machine generated wrap around cable label within 12" of each end of the cable. Label shall be clearly legible and meet TIA-EIA 606 standard. Character height shall be .5" (minimum).

3.19 FIBER OPTIC BACKBONE, RISER CABLES, AND TERMINATION COMPONENTS

A. All fiber optic backbone and copper (inter-building, riser, and tie) cables shall be identified AT BOTH ENDS with a designation that identifies where the opposite end of the same cable terminates (e.g., equipment room or telecommunications room I.D.). In addition, labeling of all fiber optic cables shall include the number of fibers in the cable.
B. Each fiber optic termination panel shall be clearly labeled indicating the destination of the cable(s) and the fiber number of each fiber position. The cable identifiers are to be secured to (1) the side and (2) the front cover of the panel enclosure.

3.20 STANDARD INFORMATION OUTLET (SIO) FACEPLATES

A. All faceplates shall be clearly labeled indicating the destination of the cable(s) (telecommunication room number), the data patch panel(s) letter designation, the data port number(s) on the data patch panel(s).
B. Telecommunications outlets are to be labeled (1) on the cover of the assembly and (2) on each cable terminated at that location.
C. Station cables shall be labeled within two inches of the cable end.

3.21 DATA PATCH PANELS

A. All data patch panels shall be clearly labeled indicating the telecommunication room number, the data patch panel letter designation, and the data port number on the data patch panel (ports 1 through 48). Each telecommunication room shall start with data patch panel 'A' and continue through the alphabet.
B. A data port schedule for each telecommunication room shall be created in spreadsheet format (Excel) with the telecommunication room number, data patch panel letter designations, data port numbers, and room numbers identified in the spreadsheet. In addition, for each data patch panel port, a field shall be provided in the spreadsheet for the Owner to manage the cabling infrastructure by recording the device and any special notes pertaining to the room utilizing the data cable terminated to the port.
C. Refer to Telecommunication "T" Series project drawings for standard information outlet faceplate and data & voice patch panel labeling scheme requirements. A sample of the data and voice port schedules is to be provided to the Owner, in the cable record book and in electronic format (Excel spreadsheet), with final documents provided on the Project Drawings.

3.22 FIBER OPTIC CABLES AND TERMINATION COMPONENTS

A. All fiber optic cables, termination enclosures and connector panels, and splice closures shall be clearly labeled.

B. In addition, labeling of all fiber optic cables shall include the number of fibers in the cable.

C. Each fiber optic termination panel shall be clearly labeled indicating (1) the destination(s) of the cable(s) and (2) fiber number of each fiber position. The cable identifiers are to be secured to (1) the side and (2) the front cover of the panel enclosure.

3.23 GROUND SYSTEM LABELING

A. All grounds should be labeled as close as practical to the point of termination (for ease of access to read the label). Labels shall be nonmetallic and include the following statement: “WARNING: If this connector or cable is loose or must be removed, please call the building telecommunications manger.” Refer to ANSI/TIA/EIA 606 for additional labeling requirements.

END OF SECTION 27 10 00

SECURITY VESTIBULES

A-101

FOR BLUEBEAM LABELING OR:

0"

1"

DOOR SCHEDULE

DOOR MARK	N/E	DOOR WIDTH	DOOR HEIGHT	TYPE	THK	PANEL MATL	PANEL FINISH	FRAME MATL	FRAME FINISH	GENERAL FIRE RATING	GENERAL REMARKS
LEVEL 1											
A100	EXIST	6'-0"	7'-0"		-	-	-	-	-	-	2 , 3
A101	EXIST	6'-0"	7'-0"		-	-	-	-	-	-	1 , 2 , 3
A104	NEW	6'-0"	7'-0"	A	0' 1 3/4"	ALUMINUM	PAINT	HM	PNT	NONE	4
A105	NEW	6'-0"	7'-0"	A	0' 1 3/4"	ALUMINUM	PAINT	HM	PNT	NONE	5
A106	EXIST	3'-0"	7'-0"		-	-	-	-	-	-	-
A201	NEW	3'-0"	7'-0"	B	0' 1 3/4"	WOOD	<By Category>	HM	PAINT	NONE	4

DOOR SCHEDULE REMARKS

1. REPLACE TWO CONSTRUCTION CORE CYLINDERS WITH PERMANENT CORE CYLINDERS, KEYED TO MATCH DOOR A100
2. APPLY ADHESIVE VINYL SIGHANGE TO EXTERIOR AND INTERIOR SIDE OF DOOR TO DISPLAY DOOR NUMBER. COORDINATE NUMBER AND LOCATION ON DOOR WITH OWNER
3. APPLY SF-1 SECURITY FILM TO GLAZED PORTIONS OF DOOR.
4. ACCESS CONTROLLED DOORS TO INCLUDE PATHWAY AND WIRING TO PUSH BUTTON IN RECEPTIONIST OFFICE. COORDINATE LOCATION OF PUSH BUTTON WITH OWNER.
5. MONITORED EGRESS PROVIDED BY SECURITY CONTRACTOR.

GENERAL ARCH PLAN NOTES

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7. DIMENSIONS NOTED AS "CLEAR" OR "CLEAR INSIDE" REQUIRE SPECIFIC COORDINATION AMONG DISCIPLINES AND OR MANUFACTURERS
8. REFER TO PARTITION TYPES ON A-800 SERIES SHEETS
9. ALL INTERIOR PARTITIONS THIS SHEET, EXCEPT FOR FURR-OUT PARTITIONS, SHALL BE PARTITION TYPE _____ U.N.O.
10. ALL INTERIOR FURR-OUT PARTITIONS THIS SHEET SHALL BE PARTITION TYPE _____ U.N.O.
11. ALIGN FINISHED FACE OF WALLS WHERE WALL PARTITIONS OF DIFFERING THICKNESS ABUT AND OR ADJOIN IN THE SAME PLANE
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13. ALL INTERIOR CMU OUTSIDE CORNERS SHALL HAVE BULLNOSE U.N.O.
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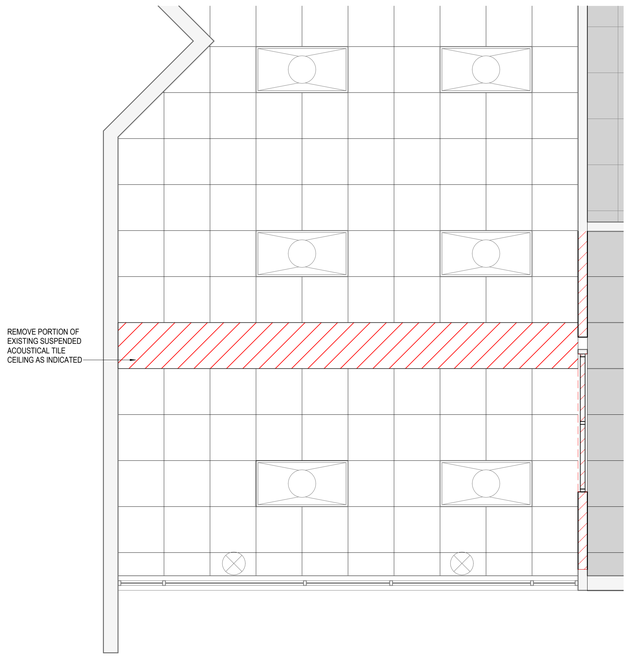
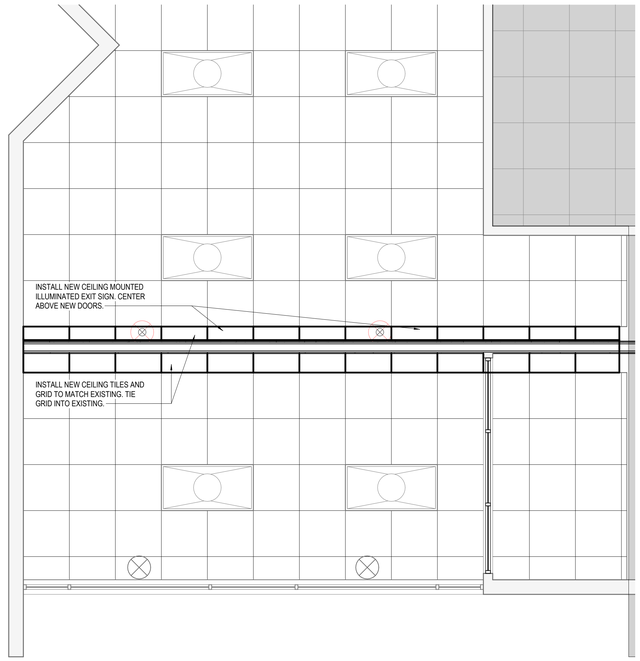
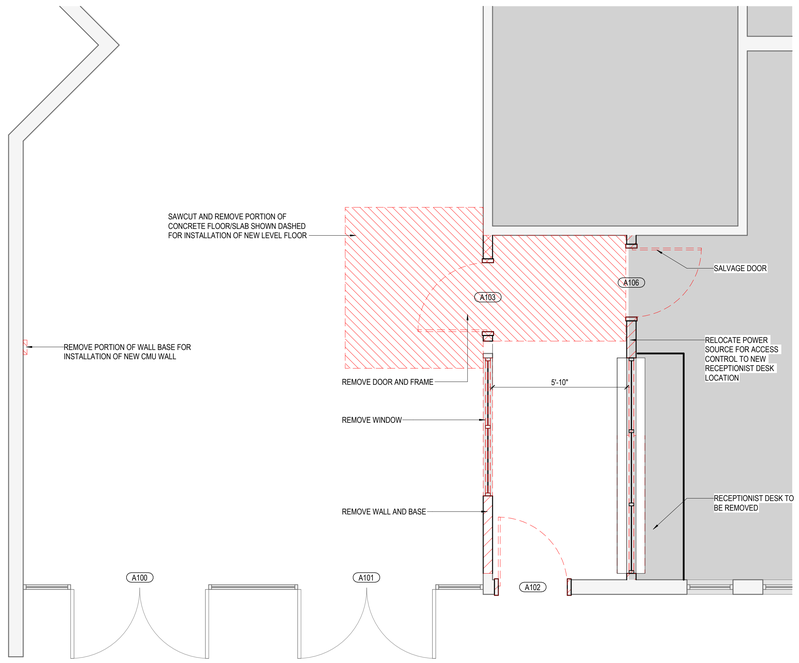
15. ALL DOOR THRESHOLDS AT ALL EXTERIOR DOORS SHALL BE SET IN FULL BED OF SEALANT
16. COORD. ALL ROOF DRAIN LEADER LOCATIONS WITH FLOOR PLAN PRIOR TO FLOOR SLAB CONSTRUCTION
17. ALL FLOOR SLOPES TO FLOOR DRAINS SHALL NOT EXCEED 1:48
18. PROVIDE AND INSTALL SELF-LEVELING UNDERLAYMENT WHERE UNEVEN FLOOR SLAB EXISTS PRIOR TO INSTALLATION OF FLOOR FINISHES
19. COORD. HOUSEKEEPING PAD LOCATIONS AND DIMENSIONS WITH EQUIPMENT TO BE INSTALLED
20. ALL FLOOR FINISH CHANGES SHALL OCCUR AT THE CENTERLINE OF DOORS U.N.O.
21. ALL FLOOR FINISH MATERIAL CHANGES SHALL HAVE REDUCER STRIPS
22. ALL REQUIRED ACCESSIBLE CLEARANCES FOR ALL ITEMS, INCLUDING BUT NOT LIMITED TO ALL COUNTER TOPS, ALL PLUMBING FIXTURES, ALL DRINKING FOUNTAINS, ALL ELECTRIC WATER COOLERS, ALL LAVATORIES, ALL URINALS, ALL TOILETS SHALL BE STRICTLY ENFORCED
23. APPLY BITUMINOUS COATING TO ALL CONCEALED STRUCTURAL STEEL MEMBERS AT ALL EXTERIOR CANOPY LOCATIONS
24. REFER TO OTHER DISCIPLINE DOCUMENTS FOR ADDITIONAL SCOPE OF WORK



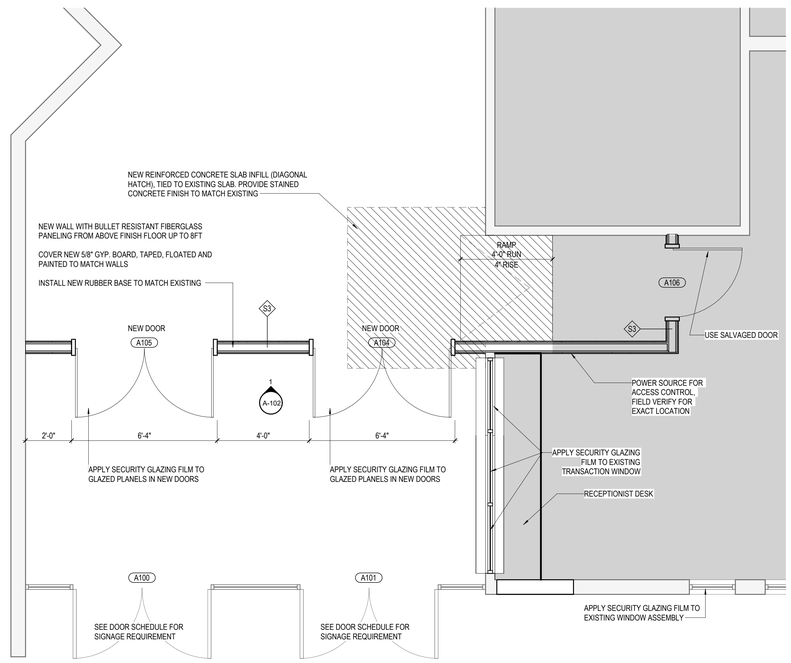
4 DEMO RCP
3/8" = 1'-0"



3 RCP
3/8" = 1'-0"



2 DEMO FLOOR PLAN
3/8" = 1'-0"



1 FLOOR PLAN
3/8" = 1'-0"

19 GENERAL ARCH PLAN NOTES

PBK

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LANDSCAPE
CONSULTANT NAME
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MEP
CONSULTANT NAME
T.000-000-0000
ACOUSTIC
CONSULTANT NAME
T.000-000-0000
THEATER
CONSULTANT NAME
T.000-000-0000
FOOD SERVICE
CONSULTANT NAME
T.000-000-0000
OTHER
CONSULTANT NAME
T.000-000-0000

KARNES CITY ISD - JR HIGH

400 North Highway 123
Karnes City, Texas 78118

KEY PLAN
NORTH: PLAN TRUE

REGISTERED ARCHITECT
STATE OF TEXAS
CHRISTOPHER WHITTINGTON
18585

CLIENT
KARNES JUNOR HIGH

DATE	PROJECT NUMBER
2023/01/17	P2104600AR

DRAWING HISTORY

No.	Description	Date
1	ADDENDUM 2	2024/05/03

BUILDING NUMBER

SECURITY VESTIBULES

A-101

RFP

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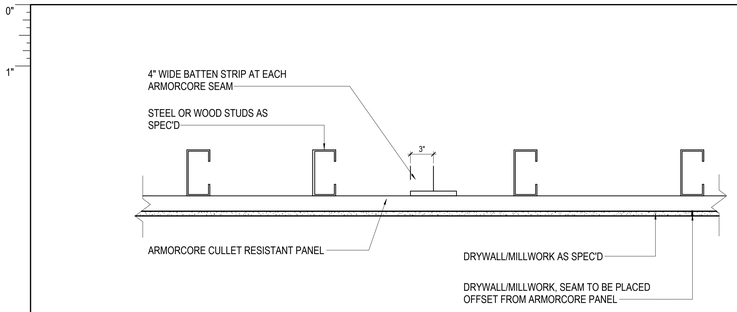
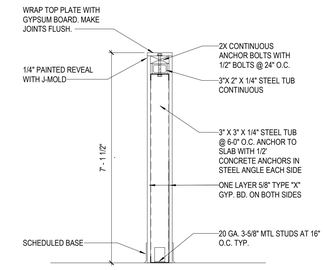
DRAWN BY:
Author
Plot Stamp:
5/2/2024 4:58:09 PM

SECURITY VESTIBULES
A-103
FOR BLUEBEAM LABELING OR:

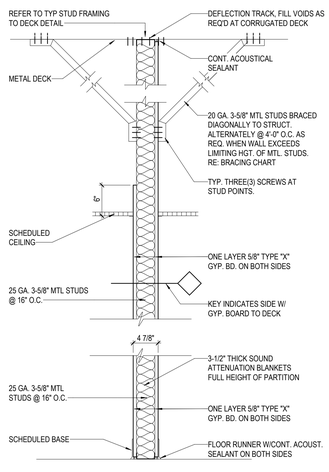


1 ARMORCORE FIBERGLASS PANEL - PLAN VIEW
1 1/2" = 1'-0"



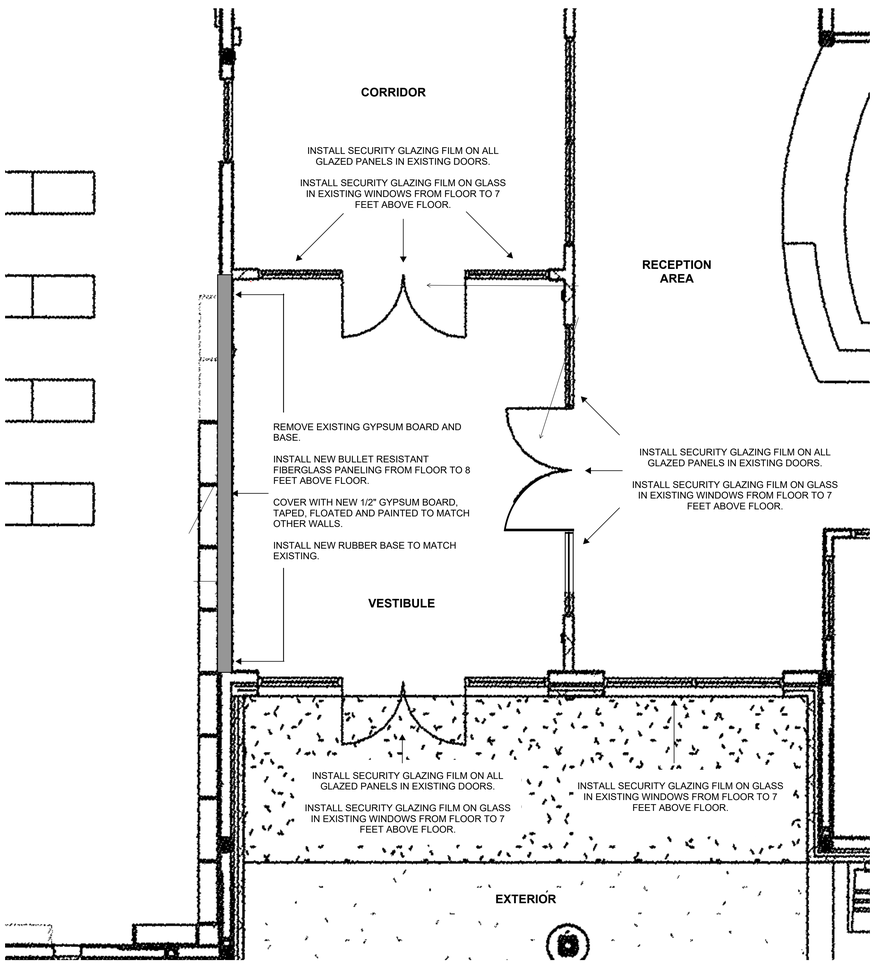
TYPE	FIRE RAT'G	DESCRIPTION
S16	NONE	3-5/8" MTL STUD PARTIAL HEIGHT WITH GYP WRAP AT CAP

2 PARTITION TYPE S16
1" = 1'-0"



TYPE	FIRE RAT'G	DESCRIPTION
S3	NONE	3-5/8" METAL STUDS TO DECK
S3A	ONE HOUR	3-5/8" METAL STUDS TO DECK WITH FIRE-RATED CEILING

4 PARTITION TYPE S3
1" = 1'-0"



3 KARNES ISD - HIGH SCHOOL - VESTIBULE CONCEPT PLAN
3/8" = 1'-0"

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19 GENERAL ARCH PLAN NOTES

PBK
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SAN ANTONIO PBK.com
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San Antonio, TX 78216
210-829-0123 P
210-829-0578 F
TX Firm: BR 1608
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LANDSCAPE CONSULTANT NAME T.000-000-0000
STRUCTURAL CONSULTANT NAME T.000-000-0000
MEP/FP CONSULTANT NAME T.000-000-0000
ACOUSTIC CONSULTANT NAME T.000-000-0000
THEATER CONSULTANT NAME T.000-000-0000
FOOD SERVICE CONSULTANT NAME T.000-000-0000
OTHER CONSULTANT NAME T.000-000-0000

KARNES CITY ISD - PRIMARY SCHOOL / HIGH
400 North Highway 123
Karnes City, Texas 78118

KEY PLAN
NORTH: PLAN TRUE

CLIENT
KARNES JUNOR HIGH

DATE	PROJECT NUMBER
2023/01/17	P2104600AR

DRAWING HISTORY

No.	Description	Date
1	ADDENDUM 2	2024/05/03

BUILDING NUMBER

SECURITY VESTIBULES

A-103
RFP

File Path: Z:\Projects\SAN\21\P2104600AR - Karnes ISD Elementary School\Z - Additional Services - Secure Vestibules and Flagpoles\Secure Vestibules\AR21_P2104600AR_KCISD_Vestibule(2024).rvt
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DRAWN BY: Author
Plot Stamp: 5/2/2024 4:58:10 PM

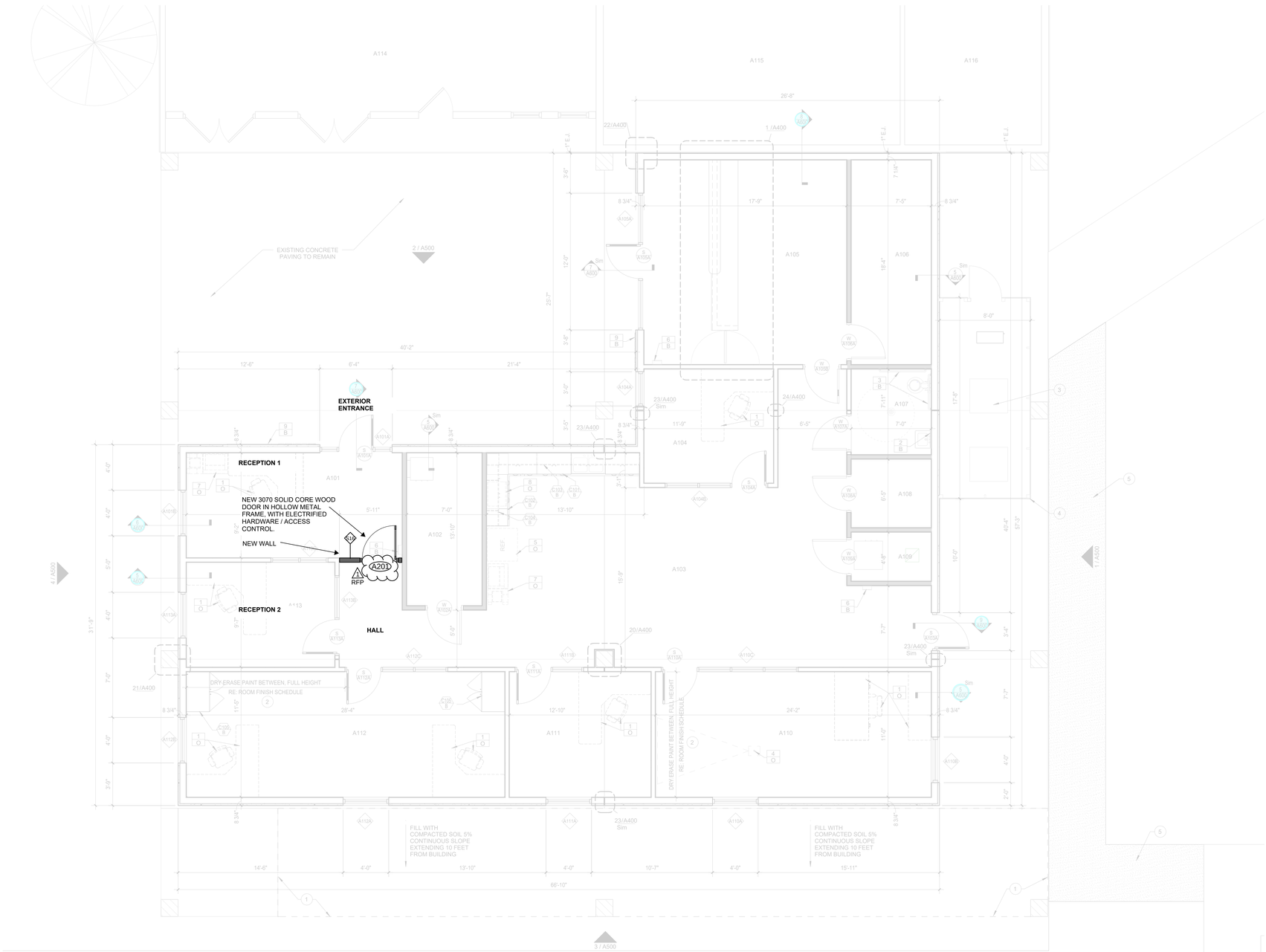
VESTIBULE UPGRADE CONCEPT PLANS

A-101B

FOR BLUEBEAM LABELING/OCR:

0"

1"



1 FLOOR & FIXTURE PLAN
1/4" = 1'-0"

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19 GENERAL ARCH PLAN NOTES

1 KARNES ISD - ADMINISTRATIVE CENTER VESTIBULE
3/8" = 1'-0"

PBK

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THEATER
CONSULTANT NAME
T.000-000-0000
FOOD SERVICE
CONSULTANT NAME
T.000-000-0000
OTHER
CONSULTANT NAME
T.000-000-0000

REGISTERED ARCHITECT BRADEN G. HALEY 30 STATE OF TEXAS

6/30/2023

KARNES CITY ISD - HIGH / PRIMARY SCHOOL

400 North Highway 123
Karnes City, Texas 78118

KEY PLAN
NORTH: PLAN TRUE

DISCIPLINE

REGISTERED ARCHITECT EDWARD WHITTINGHILL 18585 STATE OF TEXAS

CLIENT
KARNES JUNOR HIGH

DATE	PROJECT NUMBER
2023/01/17	P2104600AR

DRAWING HISTORY

No.	Description	Date
1	ADDENDUM 2	2024/05/03

BUILDING NUMBER

VESTIBULE UPGRADE CONCEPT PLANS

A-104

1 RFP

File Path: Z:\Projects\SAN\21\P2104600AR - Karnes ISD Elementary School\Z - Additional Services - Secure Vestibules and Flagpoles\Secure Vestibules\AR21_P2104600AR_KCISD_Vestibule.rvt

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Author
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3/15/2023 11:55:51 AM